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. XXXV.

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 MAVOR AND JONES, J. AND A. ARCH, CADELL AND DAVIES, S. BAGSTER, J. MAWMAN, JAMES BLACK AND SON, BLACK KINGSBURY PARBURY 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.

CYCLOPÆDIA:

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OF

ARTS and SCIENCES.

T

T, A consonant, and the nineteenth letter in the alphabet; the found of which is formed by a ftrong expulfion of the breath through the mouth, upon a fudden drawing back of the tongue from the fore part of the palate, with the lips at the fame time open.

The T, at the beginning and end of words, has always the fame found, nearly refembling that of D, for which reafon they are often put for each other; and Quinctilian even rallies thofe who made any fcruple of writing the one indifferently for the other: as *at* for *ad*, *fet* for *fed*, *haut* for *haud*, &c.

The cuftomary found of T is that which occurs in the words *take*, *temptation;* but before an *i*, when followed by a vowel, it has the found of an obfcure *s*, as *nation*, *falvation*, except when *s* precedes *t*, as *Chriftian;* and in derivatives from *y*, as *mighty*, *mightier*.

The T is one of the five confonants which the abbot de Dangeau calls *palatal:* thefe five are *D*, *T*, *G*, *K*, and *N;* the four firft of which have the fame relation to each other, as the labials *B-P* and *V-F* have; *D*, for inftance, having the fame relation to *T*, that *B* has to *P*, and *V* to *F*.

The T, the fame author obferves, is a letter of a ftrong found; fo that a feeble one cannot be heard before it. Hence, to form the fupine of *rego*, the *T* of *tum* changes the *g*, and ftrengthens it to the found of a *c*, fo that we fay *rectum;* as in the preterperfect tenfe *rexi*, which we pronounce *reckfi*.

Th has two founds: the one foft, as *thus;* the other hard, as *thing*. The found is foft in thefe words, *then*, *thence*, *there*, with their derivatives and compounds, *that*, *thefe*, &c.; and in all words between two vowels, as *father;* and between *r* and a vowel, as *burthen*. In other words it is hard, as *thick*, *thunder*. Where it is foftened at the end of a word, an *e* filent muft be added, as *breath*, *breathe*. Johnfon.

T is ufed as an abbreviature on ancient monuments, &c. for Titus, Titius, and Tullius.

T, among the *Ancients*, was ufed as a numeral letter, fignifying 160, according to the verfe,

"T quoque centenos & fexaginta tenebit."

When a dafh was at the top, thus, $\overline{T}$, it fignified 160 thoufand.

T', with a kind of acute accent over it, denoted among the Greeks 300; and if the accent was below it, thus T, it denoted 300,000. The ט of the Hebrews fignified 9; and with two points fixed horizontally over it, thus, ט̈, it fignified 9000.

Sometimes an acute accent over this, or any one of the firft nine letters, multiplies its value by a thoufand.

We fhall here obferve, that the number 15 fhould be reprefented by יה, *i. e.* 10 and 5; but, becaufe thefe letters conftitute part of the word יהוה, *Jehovah*, the letters טו, *i. e.* 9 and 6, reprefent 15, to prevent, as the Jews allege, the profanation of the peculiar name of God. For the fame reafon, טז, *i. e.* 9 and 7, are ufed inftead of יו, *i. e.* 10 and 6, to exprefs 16.

T, on the French coins, denotes thofe that were ftruck at Nantes.

When the Roman tribunes approved of the decrees of the fenate, they teftified their confent by fubfcribing a T.

T, in *Mufic*, is the initial of tenor, vocal and inftrumental; of *tacet*, for filence: as *adagio tacet*, when a performer is to reft during the whole movement. In concertos and fymphonies, *t* is the initial of *tutti*, the whole band, after a folo part. It alfo frequently ftands for *trillo*, or *tr*, a fhake.

T is alfo a mark or brand, with which by ftat. 4 Hen. VII. every perfon convicted of felony, fave murder, and admitted to to the benefit of the clergy, ſhall be marked on the brawn of the left thumb.

T, or Tau, in *Heraldry*, is a kind of croſs-potent, or truncated; found in all the armories of the commanders of the order of St. Anthony.

The azure T, or Tau, is ſeen in arms above 400 years old. Its origin, according to ſome authors, is taken from the Apocalypſe; where the ſame is a mark that the angel impreſſes on the foreheads of the elect: others take it to repreſent a crutch, a ſymbol proper enough for this order, which was ſworn to hoſpitality. But the truth, F. Meneſtrier obſerves, is, that it is the top of a Greek croſier.

The biſhops and abbots of the Greek church wear it ſtill; and if it be found on the habit of St. Anthony, it is only to ſhew that he was an abbot.

T *Bandage*, in *Surgery*, is ſo called from its reſembling that letter in ſhape. It conſiſts of two bands of linen, of greater or leſſer breadth, according to circumſtances. The tranſverſe piece of the bandage ſerves to go round the body above the hips. The perpendicular portion is ſewed at one of its ends to the middle and back point of the band, which ſurrounds the pelvis; and its other or anterior extremity is generally ſlit into two portions, or tails, about ſix or eight inches in length. The perpendicular piece of the T bandage applies itſelf between the glutæi muſcles and to the perinæum; while the two tails, which we have juſt now deſcribed, are carried between the thighs and the pudenda to the right and left, and are laſtly faſtened to the tranſverſe piece, which ſurrounds the body. The T bandage is chiefly employed for keeping on the dreſſings, after the operation for the fiſtula in ano, in diſeaſes of the perinæum, and in thoſe of the anus, groins, &c.

Beſides the common T bandage, ſurgeons make uſe of another, which they call *double*, and which is furniſhed with two perpendicular pieces, ſewed to the tranſverſe one, about four inches apart. The double T bandage is repreſented to be particularly calculated for caſes of lithotomy, and for diſeaſes in the perinæum; becauſe the two perpendicular bands may be made to croſs each other on the part affected, and leave the anus uncovered; an advantage which the ſingle T bandage certainly has not.

The T bandage admits of application alſo in other modes. When the croſs band is broad, it may be applied round the cheſt, while the perpendicular portion, being ſlit into two, may be made to paſs over the ſhoulders, ſo as to keep the bandage from ſlipping downward. There is no kind of bandage which can be more conveniently applied to the cheſt, than that which has juſt now been deſcribed. See Bandage.

TA, in *Geography*, a fortified city of China, of the ſecond rank, in the province of Se-tchuen; 650 miles S.W. of Pekin. N. lat. 31° 18′. E. long. 107° 15′.—Alſo, a river of China, which runs into the Eaſt ſea, N. lat. 36° 55′ E. long. 121° 34′.

Ta, *Lough*, a lake of the county of Wexford, Ireland, not far from Carnſore Point. It receives two or three ſmart rivulets, and having no outlet, the waters accumulate, and gradually overflow the adjacent grounds; till the peaſantry, once in three or four years, let them off, by making a cut through the high ſand-bank that parts the lake from the ſea; which cut very ſoon fills up again.

Ta, a name given in China to their pagodas. Theſe are moſt numerous in hilly parts of the country, upon the ſummits of which they are frequently erected. They are generally from 120 to 160 feet high, which height is equal to four or five of their diameters at the baſe; and they conſiſt moſtly of an unequal number, five, ſeven, or nine galleries or ſtories, diminiſhing as they riſe, with as many projecting roofs.

Ta, τα, one of the four ſyllables uſed by the ancient Greeks in ſolmiſation, or the firſt leſſons in ſinging.

TAAIF, in *Geography*, a town of Arabia, in the province of Hedſjas, ſituated upon a lofty mountain, in a country ſo agreeable, that the Arabs compare its environs to thoſe of Damaſcus and Sana. This city ſupplies Jidda and Mecca with excellent fruits, particularly raiſins; and carries on a conſiderable trade in almonds, which abound in its territories. Near Taaif is the lofty mountain of Gazvan, which, according to Arabian authors, is covered with froſt and ſnow in the midſt of ſummer.

TAAMBOOTERA, a large town of the Birman empire, on the Irawaddy.

TAAPAN, a town on the eaſt coaſt of Mindanao. N. lat. 7° 38′. E. long. 124° 5′.

TAAS, or Taæs, a city of Arabia, in the province of Yemen, ſituated at the foot of the fertile hill of Sabber, and encompaſſed with a wall, between 16 and 30 feet thick, and flanked with ſeveral towers. Within the circuit of the wall ſtands the fortreſs of Kahhre. The city has only two gates, each fortified with three towers; affording a very inſufficient defence againſt any aſſault but that of Arabs, unſkilled in the uſe of artillery. The ſaint who is the patron of Taæs is the famous Iſmael Mulk, reported by tradition to have been once king of this country. His remains are interred in a moſque bearing his name. Near this moſque is a garden, which was poſſeſſed by Iſchia, his ſon. The city has ſeveral other deſerted and ruinous moſques. The laſt lords of Taæs have choſen to diſtinguiſh themſelves, not by moſques, but by noble palaces, and have contented themſelves with a ſmall kubbet for their oratory and burial-place. Theſe palaces are now the ornaments of the city. Near the city are the ruins of two ancient cities: one called Thobad, ſituated near mount Sabber; and the other Oddena, upon the ſummit of mount Sabber, over-againſt Kahhre. This was formerly the reſidence of the kings of the country. Its only remains are the ruins of ſome moſques. Taæs has undergone ſeveral revolutions; but after various events, which we cannot recite, the Imam ſent a Dola to this city, and it is now under the ſame government as the other cities in his dominions; 48 miles E.N.E. of Mocha. N. lat. 13° 33′. E. long. 44° 10′.

TAASINGE, an iſland of Denmark, about 16 miles in circumference, ſituated between Funen and Langeland, with a town upon it of the ſame name. N. lat. 55°. E. long. 10° 37′.

TAAUT, Thoyt, or *Thot*, in *Ancient Mythology*, the name of a deity among the Phœnicians, and probably the ſame with the Egyptian *Thoyt*, *Thot*, or Hermes, the *Theutate* or Teutat of the Greeks, and the Mercury of the Latins. His coſmogony has been tranſmitted to us by the Phœnician writer Sanchoniathon, whoſe account is preſerved by Euſebius, De Præp. Ev. lib. i. cap. 10. To him the Phœnicians aſcribe the firſt invention of letters. See Mercury.

TAAWIRRY, in *Geography*, an iſland in the South Pacific ocean. There are two ſituated within the reef of the iſland of Otaheite, and on the eaſt ſide of the main iſland. Within theſe iſlands there is anchorage within the reef that ſurrounds them. The French veſſels under the command of M. Bougainville lay here. The name of the other iſland is Boourou.

TAB, the ancient *Aroſis*, a river of Perſia, in the province of Fars or Farſiſtan, formed by the junction of two ſtreams, within a few miles of the town of Zeitoon. Both theſe

these streams take their rise in the recesses of the mountains of Fars; the first at the foot of the high hill of Kamarah, and the other near that of Ardicoone, 12 fursungs (the fursung being estimated at three English miles and three quarters) N.W. of Shirauz. This branch of the river is mentioned by Arrian in the march of Alexander. It divides Fars from Chusistan, and passes through the centre of the town of Endian, being navigable for boats of 20 tons burthen. Nine miles above the town is a ford; and 16 miles below it, the Tab falls into the sea. When the river passes Zeitoon, the waters are perfectly sweet; but in its course over the hills, towards Endian, they become corrupted, and at that place are so brackish as to be hardly fit for use.

TABA, a town of Africa, on the Grain Coast.

TABA *Islands*, four small islands in the East Indian sea, lying north-west and south-east near the east coast of Borneo. N. lat. 2° 6′. E. long. 118° 12′.

TABA, or *Tabo-seil*, in *Modern History*, a name by which the Negroes, who inhabit the Gold Coast in Africa, describe their king, whose power is very arbitrary, insomuch that they regard him as a being superior in nature to themselves.

TABAB MANAM, in *Geography*, a town of Abyssinia; 100 miles S.S.E. of Gondar.

TABACUM, in *Botany*, whence comes its common English name Tabacco, or, at present, Tobacco. (See NICOTIANA.) Bauhin says, after Monardez, that this appellation is derived from an island so called; but it should seem to originate from the Indian name of the plant, *Tubac*, or *Tubacka*.

TABÆ, in *Ancient Geography*, a town of Asia, in Cilicia.—Also, a town of Asia, on the confines of Pisidia, on the coast of the sea of Pamphylia.—Also, the name of three towns in Asia Minor; one in Caria, another in Peræa, and a third in Lydia.

TABAFRA, in *Geography*, a town of Africa, on the Ivory Coast; 15 miles E. of Druin.

TABAGO, an island in the Pacific ocean, near the coast of Mexico; about three miles long, and two broad. It is mountainous, and on the north side the high land declines with a gentle descent to the sea. Near the strand the soil is a black mould, and deep, but towards the top of the mountain strong and dry. The north side of the island makes a very pleasant appearance, and seems to be a garden of fruit-trees, inclosed with others of the forest-kind. The principal products are plantains and bananas, which grow very well from the foot to the middle of the mountain; but those near the top are small, as wanting moisture. There was formerly a small town near the sea, on the north side of the island; but it was ruined by the privateers that then frequented those seas. Before it is a good road, about a mile from the shore, where ships may ride very safely in 16 or 18 fathom water; 18 miles S. of Panama. N. lat. 8° 40′. W. long. 80° 9′.

TABAGUILLA, or *Little Tabago*, a small island in the Pacific ocean, near Tabago.

TABAJANA, a town of Africa, in the country of Woolly; 12 miles W.S.W. of Medina.

TABALLAR POINT, a cape on the east coast of the island of Borneo. N. lat. 2° 12′. E. long. 117° 4′.

TABALTHA, in *Ancient Geography*, a town of Africa, on the route from Tuburbum to Tacapæ, between Cellæ Picentinæ and Septimunicia. Anton. Itin.

TABALUM, a town of Asia Minor, in the vicinity of Ionia. Herodotus.

TABANA, MANKOUP, a town in the interior of the Tauric Chersonesus. Ptol.

TABANIE′, in *Geography*, a town of Egypt, on the east branch of the Nile; 6 miles S.W. of Mansora.

TABANUS, the *Ox-fly*, in *Entomology*, a genus of the Diptera order of insects; the generic characters of which are, that the mouth has a fleshy proboscis, terminated by two lips, and that the rostrum is furnished with two awl-shaped palpi, placed on each side of, and parallel to, the proboscis. Gmelin, in his edition of the Linnæan system, enumerates 38 species.

The insects of this genus very much resemble those of the *Musca*; which see.

Species.

ROSTRATUS. With brownish eyes, and sucker of the length of the body.

BARBATUS. With black eyes, and sucker half the length of the body. Both these species are found at the Cape of Good Hope.

MAURITANUS. With blackish eyes, a black spot on the second segment of the abdomen, and sucker equal to the body. Found in Barbary and Spain.

BOVINUS. Greenish eyes; marked down the back by a series of large, whitish, triangular spots, and on each side is a similar appearance, but less distinct than that of the dorsal row. This is the largest of the British species, and, like others of its species, is seen generally in the hottest part of the day, during the middle and the decline of summer. It is very troublesome to cattle. Its larva is large and dusky yellowish, like that of a tipula, marked by transverse blackish streaks or rings; residing under ground in moist meadows, &c.; and changing into a cylindric brownish chrysalis, with a roundish or slightly pointed extremity, from which within a month proceeds the perfect insect.

AUTUMNALIS. With glassy wings, and brown abdomen, and a whitish three-fold spot. Found in Europe.

CALANS. With green eyes, a white line on the back, and red antennæ. Found in South America.

TARANDINUS. With green eyes and feet, and the segments of the abdomen yellowish at the margin. Found in the north of Europe.

EXÆSTUANS. With green eyes, the segments of the abdomen white at the margin, and whitish legs. Found in Surinam.

FERVENS. With green eyes, yellow abdomen and antennæ, and brown head and thorax. Found in South America.

MEXICANUS. With a livid body, green antennæ, and greenish wings. Found in Surinam.

RUSTICUS. Cinereous, with grey eyes, and two black points in the front. An European insect.

BROMIUS. With a purple fascia about the eyes, and cinereous body. Found in Germany, and the northern part of Europe.

OCCIDENTALIS. With eyes having double brown fasciæ, a brown body, and the abdomen marked with three yellow lines. Found in Surinam.

TROPICUS. With eyes having triple purplish fasciæ, and the sides of the abdomen ferruginous. An European insect of a brown colour, smaller than T. bovinus, and less common, troublesome to cattle, and especially to horses.

ANTARCTICUS. With eyes like the former, black abdomen, and segments with whitish margins. Found rarely in Norway.

PLUVIALIS. With eyes waved with four-fold fasciæ, and brown-speckled wings. This is an European species, very troublesome with us in the latter part of summer, fastening on on the legs, hands, &c., and peculiarly teasing on the approach of rain.

Cæcutiens. With eyes that are of a very lucid green, marbled with black spots and streaks, and wings marked by large black bands or patches. This is an European insect, not uncommon with us in autumn.

Lugubris. With black eyes and body, brown wings, and white spots. Found in Europe.

Morio. With eyes and body wholly black, and glassy wings. An inhabitant of Barbary.

Lineatus. With greenish eyes, lineated thorax, obscurely blueish abdomen, and red antennæ. Found in America.

Fasciatus. With green eyes, brown body, and wings having a brown fascia. Found in Sierra Leone.

Atratus. With blueish abdomen, and black wings. An American insect.

Pellucens. Black, with fasciated eyes; the first segment of the abdomen blueish, and whitish legs. A German species.

Ruficornis. With fasciated eyes, white wings, brown side, and red antennæ. Found in America.

Paganus. With green eyes, three yellow fasciæ, and both sides of the abdomen ferruginously spotted. Found in England.

Italicus. Cinereous, with brown eyes; obscure abdomen, with the base palely pellucid. Found in Italy.

Cayennensis. With eyes brown before, and behind green; black abdomen; the second and third segments yellow, the rest white at the margin. This and the next are found in Cayenne.

Punctatus. Cinereous, with testaceous eyes, and white wings speckled with black.

Inanis. Cinereous, like the former, with brown eyes, and pellucid abdomen, having a brown apex.

Borealis. With eyes having three purplish fasciæ, black abdomen, and the margins of the segments whitish. Found rarely in Norway.

Longicornis. With spotted eyes, wings half brown, a white spot, and longer antennæ. Found in Brasil.

Striatus. Cinereous, with brown abdomen, and three abbreviated white lines. A Chinese species.

Bidentatus. Ferruginous; the abdomen having on each side two yellow spots, and the scutellum bidentated. Found in Austria.

Bispinosus. Brown, ferruginous, abdomen black at the base, and scutellum bispinose. Found in Gottingen.

Mærens. Varied with whitish and black; black eyes; white wings; side and fascia black. Found in Cayenne.

Griseus. Black, with greyish thorax; the second segment of the abdomen having on the hind part a cinereous fascia, the fourth, fifth, and sixth being on both sides cinereous, and the wings ferruginous.

Albipes. With eyes having four fasciæ; the abdomen with a black ring, and the legs white. Found in Bulgaria.

Maritimus. Cinereous, with glassy wings; margin and broad fascia black. Found in Carniola, Austria, and France.

TABARA, in *Geography*, a town of Spain, in the province of Leon; 14 miles N.W. of Zamora.

TABARABA, a river of Mexico, in the province of Veragua, which runs into the Pacific ocean, N. lat. 8° 40'. W. long. 82° 48'.

TABARCA, a town of Africa, in the kingdom of Tunis, situated on the north coast, at the mouth of the Zaine, of which little but ruins are existing, and a small garrison; 60 miles N.W. of Tunis.

Tabarca, or *Tabaquer*, an island in the Mediterranean, near the coast of Africa, at the mouth of the river Zaine, which separates Algiers from Tunis. The Lomellines, a noble Genoese family, have been in possession of the little island that lies before Tabarca, at the mouth of the Zaine, ever since the time of the famous Andrea Doria, to whom the Tunisceans gave it, with the solemn consent of the grand seignior, in ransom for one of their princes, whom Andrea had taken captive. This place is defended by a small castle, well armed, and in good order, and protected the coral fishery which was carried on in these seas. But, in the year 1740, that monster of princes, Aly Bashaw, the reigning king of Tunis, took it by treachery from the Genoese; and, contrary to all justice and the right of nations, put some of them to the sword; and the rest, in number 300 or 400, he carried into captivity. N. lat. 36° 55'. E. long. 9° 8'.

Tabarca. See Plana.

TABARD, or Taberd, derived from the low Latin, *tabarda*, denotes a short jacket or coat, open on both sides, with a square collar and hanging sleeves. From the wearing of this garment, some of those on the foundation of Queen's college, Oxford, are called *Taberdarii*.

From an inn in Southwark, whose sign was the *Tabard*, afterwards changed to the *Talbot*, Chaucer and his companions set out on a pilgrimage to the shrine of Becket at Canterbury; on which was founded his Canterbury Tales.

TABAREK, a town of Persia, in the province of Irak; 8 miles S.E. of Casbin.

TABARIA, or Taberayan, or *Tabarieh*, anciently *Tiberias*, a town of Palestine, situated on the west bank of a lake, called in the scriptures the "Lake of Gennesareth," and the "Sea of Tiberias," and at the foot of a high and sharp mountain; surrounded with walls, except towards the water. This town was built by Herod Antipas, to the honour of Tiberius, and was long the capital of Galilee, and after the destruction of Jerusalem, for some time the residence of the high priest. This city Herod was obliged to people mostly with Galileans and strangers, because it being built on a ground which was full of sepulchres, the going over which pollutes the Jews seven whole days, he could scarcely get any of that nation to settle there, though he endowed it with considerable privileges, and gave its inhabitants the greatest encouragement, *viz.* lands to some, houses to others, to take off their qualms of conscience about treading on dead bodies. At the destruction of Jerusalem the town submitted to Vespasian, and received the Jews which escaped. In the year 1100, it was taken by the Christians under Godfrey; but in 1116, it was retaken by the Saracens, through the treachery of Raymond III. count of Thoulouse. During the time of Christianity it was the see of a bishop, suffragan of Nazareth. Near it are some warm baths. The Christians have a church here, and the Jews a seminary. In 1759, it suffered much by an earthquake; 16 miles S. of Safad.

TABAS, a town of Asiatic Turkey, in Natolia; 34 miles S. of Dignizlu.

Tabas, the ancient *Tabienne*, a town of Persia, in the province of Chorasan, situated in a range of hills, 337 miles from Herat and 150 from Yezd. It contains a population of about 20,000 persons, and carries on a trifling trade with Herat and Yezd.

TABASCO, a province of Mexico, bounded on the north by the gulf of Mexico, on the east by Yucatan, on the south by Chiapa, and on the west by Guaxaca, about 100 miles in length, but narrow. The climate is not reckoned healthy, nor is the soil remarkable for its fertility.

The inhabitants, however, have good farms well-ftocked with cattle, which fell to good advantage. They have alfo great plenty of Indian corn and cocoa-nuts, which they fend to Vera Cruz. Moft of the country is flat and moift, has many marfhes and lakes well-ftocked with fifh. It rains nine months out of the twelve, fo that the air is exceffively damp; and in February, March, and April, remarkably hot, when infinite fwarms of gnats and other infects are produced. The coaft, from the beginning of September to the end of March, is fubject to tempeftuous northerly winds, which render failing dangerous during that feafon. The Spaniards brought hither vines, lemon, orange, and fig trees, which all thrive here very well. Here are large thickets of mangroves and bamboos, and woods of cedar, Brafil wood, &c. frequented by lions, tigers, wild bears, and deer. They have a great number of rabbits, apes, and fquirrels, with the common fruits of America; and three or four harvefts of maize in a year; befides rice, barley, and all forts of garden-herbs, different fpecies of European fowls, and others to us unknown. This province was accuftomed to pay its tribute to the ancient kings of Mexico in chocolate.

Tabasco, a river of North America, which runs into the bay of Campeachy, N. lat. 18° 15′. W. long. 93° 40′. On the banks of this river are fome of the largeft cabbage and cotton trees fuppofed in the world.

Tabasco, a town of Mexico, and capital of a province, to which it gives name, called alfo by the Spaniards "Nueftra Sennora de la Vittoria," from a great victory obtained here by Cortez, on his firft arrival. It ftands on an ifland, at the mouth of the river Grijalva, which divides itfelf near the fea into two branches, of which the weftern falls into the river Tabafco, which rifes in the mountains of Chiapa; and the other continues its courfe till within four leagues of the fea, where it fubdivides, and feparates the ifland above mentioned from the continent. Near it are plains, which abound with cattle and other animals, particularly the mountain-cow, fo called from its refembling that creature, and feeding on a fort of mofs found on the trees near great rivers. The ifland of Tabafco, on which the town of that name is built, is about 12 leagues long and 2½ broad. The town is not very large, but well-built, and confiderably enriched by a conftant refort of merchants and tradefmen at Chriftmas. N. lat. 18° 20′. W. long. 93° 46′.

TABASHEER, in *Medicine*, a drug of high repute in many parts of the Eaft, the knowledge of which has been communicated to the weftern world by the works of the Indian phyficians, by all of whom it is mentioned as an important article in the Materia Medica; and it is ftill confidered to be adminiftered under this and other names in Turkey and in various parts of India. The Arabian medical writers generally agree, that the Tabafheer is a production of the Indian reed. The genuine Tabafheer, according to Dr. Patrick Ruffell (Phil. Tranf. vol. lxxx. p. 275.) is undoubtedly a production of the Arundo Bambos of Linnæus; and the bamboo in which it is found, is vulgarly called the female bamboo, and diftinguifhed by the largenefs of its cavity from the male, employed for fpears and lances. The bamboo, however, yields this drug only in a fmall quantity, varying according to the foil or fituation in which the bamboo grows. For a farther account of it, we refer to the Phil. Tranf. ubi fupra. See Arundo.

TABASO, in *Ancient Geography*, a town of India, on this fide of the Ganges, between Bynda and Pfeudofiomus. Ptol.

TABASSERAN, in *Geography*, a diftrict of the tract of land fituated along the Cafpian fea, between the rivers Terek and Kur, and one of the divifions of the province of Dagheftan, dependent on Perfia. It lies between the Durbach and Rubas, towards their fources; extending about fix German miles inland from above the territory of Derbent as far as the higheft ridge of the Lefgian mountains, which is here very rocky and woody. Reineggs calculates the ftrength of the different tribes inhabiting Tabafferan, who, befides the Tartarian, fpeak another language peculiar to themfelves, at about 10,000 families: and, according to him, the reigning family have held the fovereignty over the country for more than 600 years. See Reineggs' General Hiftorico-topographical Defcription of Caucafus, &c. The town of Tabafferan is the refidence of a prince, and the centre of the trade carried on between Perfia and Dagheftan.

TABAXIR, in *Botany*, pronounced *Tabafheer*, appears to be a Perfian name, appropriated to the Bamboo, *Arundo Bambos* of Linnæus, or rather originally to an internal fecretion of the ftem of that plant. This is at firft of a milky afpect, but fubfequently concretes into a folid form, and very hard fubftance, compared to fugar, but more like fand or pebbles, being indeed a real filiceous earth. The difcovery of its true nature was made by Mr. Macie, now Smithfon, and publifhed in the Philofophical Tranfactions for 1791, vol. viii. p. 368. See Arundo, and Tabasheer.

TABAZET, a word ufed by fome writers to exprefs highly-refined fugar.

TABBAJEE, in *Geography*, a town of Africa, in Neola. S. lat. 13° 32′. W. long. 11° 8′.

TABBAY, one of the Weftern iflands of Scotland, near the eaft coaft of Skye. N. lat. 57° 16′. W. long. 5° 51′.

TABBY, a mixture of ftone and mortar, which becomes as hard as a rock, ufed in Morocco. The walls of the city are formed of this fubftance.

Tabby, in *Commerce*, a kind of thick filk, ufually watered. It is manufactured like the common taffety, excepting that it is ftronger and thicker both in the woof and warp.

The watering is given it by means of a calender, the rolls of which are of iron, copper, or wood, which, bearing unequally on the ftuff, render the furface of it unequal, fo as to reflect the rays of light differently.

TABBYING, or Watering, the paffing a ftuff under a calender, to make the reprefentation of waves on it as on a tabby. It is ufual to tabby mohairs, ribbands, &c. Tabbying is performed without the addition of any water, or dye; and furnifhes the modern philofophers with a ftrong proof that colours are only appearances.

TABE, in *Geography*, a river of Pruffia, proceeding from the Niemen, and running into the Curifch-Haff.

TABEA, in *Ancient Geography*, a town of Afia Minor, in the Greater Phrygia. Strabo.

TABEIPILLY, in *Geography*, a town of Hindooftan, in Myfore; 25 miles W.N.W. of Bangalore.

TABELLA, or Tablet, *Tabularium*, in *Pharmacy*, a folid kind of electuary, or confection, made of dry ingredients, ufually with fugar, and formed into little flat morfules, or fquares, more ufually called *lozenges*, and fometimes *morfelli*, *troches*, &c.

Powders, fruits, falts, &c. are diffolved with fugar, and made into *tabulæ*, as thofe of the juice of liquorice for colds, &c.

We have *cordial*, *ftomachic*, *aperitive*, and *hepatic* tablets. Jellies and broths are fometimes reduced into a fort of tablets, to be carried in the pocket, and called *pocket-foup*. *Tabellæ manus Chrifti* are made of fugar of rofes pearled. *Tabellæ magnanimitatis* are a fort taken by feeble old men, when

when matched with young wives, to affift them in the affair of generation.

Tabellæ *Votivæ*, in *Antiquity*, a name given to certain tablets, which were hung up in the temples: for, according to an ancient cuftom, which prevailed all over Greece, fuch as recovered from any diftemper ufed to write in a tablet the nature and fymptoms of their refpective maladies, and the remedies which had been moft fuccefsful. Thefe tablets Hippocrates is faid to have copied and followed when he firft began to practife: and, if we believe Pliny (lib. vii. c. 37.), he learned from thefe the firft rudiments of phyfic.

A tablet of this nature was difcovered at Rome, not many years ago, among the ruins of the ancient temple of Æfculapius, with this infcription in Greek. Julianus being afflicted with vomiting of blood, and abandoned by men, the gods haftened to his relief, and having nourifhed him for the fpace of three days with honey, reftored him to his health: for which favour he came to return them thanks in the prefence of the people. Tables of a fimilar kind, under the fame denomination, were hung up in the temples by thofe who had efcaped fhipwreck, &c.

TABELLIO, Tabularius, in the Roman law, a *fcrivener;* a kind of officer often confounded with the notary, *notarius:* yet the two differed in this; that the notaries only drew up and kept the minutes of acts and inftruments on paper, and in notes, or fhort-hand; whereas the tabelliones delivered them engroffed fair, on parchment, in the full executory form. The fame alfo put the feals to contracts, and rendered them authentic.

The domeftic clerks of thefe tabelliones, who at firft wrote under them, in procefs of time came to be called *notaries*.

Pafquier obferves, that the tabelliones at Rome were public flaves, appointed for the keeping of contracts made between private perfons. According to Loyfeau, a contract written by a notary was not perfect, or obligatory, till the tabellio had written it fair: after which, the parties fubfcribed it, *i. e.* they wrote at bottom, that they approved the contents; for fignatures were not then in ufe. See Signature.

"Quoniam tabellionum ufus in regno Angliæ non habetur, propter quod magis ad figilla authentica credi eft neceffe, ut eorum copia facilius habeatur, ftatuimus, ut figillum habeant non folum archiepifcopi, et epifcopi, fed eorum officiales."

TABENNE, in *Geography*, an ifland in the river Nile, between Dendera and the ruins of the ancient Thebes; famous on account of the retreat of the monk Pacomius and feveral hundred of his brethren.

TABENUS Campus, in *Ancient Geography*, a country of Afia Minor, on the confines of Phrygia and Myfia. Strabo.

TABERG, in *Geography*, a town of Sweden, in the province of Smaland, fituated on a mountain of the fame name, which abounds in iron-ore; 8 miles S. of Jonkioping.

TABERISTAN. See Mazanderan.

TABERN, in *Rural Economy*, a term fometimes applied to a cellar, or other fimilar excavation, for the containing of liquor of the domeftic kind.

TABERNA Meritoria, among the Romans, Mars' hofpital, or a place where difabled foldiers were maintained at the charge of the government.

TABERNACLE, Tabernaculum, *q. d. a tent;* among the Jews, was a kind of moveable chapel, fo contrived as to be taken to pieces, and put together at pleafure, for the convenience of carrying it from place to place, during the migration of the Ifraelites in the wildernefs for forty years. It was erected by Mofes, in confequence of the exprefs command of God, partly to be a palace of his prefence as the king of Ifrael, and partly to be the medium of the moft folemn public worfhip, which the people were to pay to him. It was erected on the firft day of the firft month of the fecond year after the Ifraelites' exodus from Egypt. Exod. xl. 2. 17. 26. 29. 34, 35.

The tabernacle was of a rectangular figure, thirty cubits long, ten broad, and ten high; or, according to Dr. Cumberland's reduction to Englifh meafure, fifty-five feet long, eighteen broad, and eighteen high. The two fides and one end were compofed of broad boards, ftanding upright; each board being about two feet nine inches broad, faftened at the bottom by two tenons in each board, fitted into two mortifes on the foundation; at the top by links or hafps, and on the fides by five wooden bars, which run through rings or ftaples in each of the boards. Each fide confifted of twenty of thefe boards, and the end of eight. Both the boards and bars were overlaid with gold; and the rings and hafps were of the fame metal. The foundation, on which they ftood, confifted of folid blocks of filver, two under each board; each of which was about fixteen inches long, and weighing a talent, or about an hundred weight. The number of thefe blocks was about an hundred; ninety-fix of which were laid under the forty-eight boards, and the other four were the bafes of the columns that fupported the veil or curtain, which divided the infide of the tabernacle into two rooms. Hence fome have derived the ancient fafhion of fetting porphyry columns on bafes of white marble.

The tabernacle had four different coverings, or carpets, thrown over one another. The firft and loweft was made of fine linen, richly embroidered with figures of cherubims, in fhades of blue, purple, and fcarlet: and confifted of ten breadths, which were joined together with blue loops and clafps of gold. The next over this was made of a fort of mohair, the breadths of which were joined with clafps of brafs. The third carpet was made of ram's fkin dyed red; and the uppermoft of all was made of *tachafh*, *i. e.* as has been generally fuppofed, badger's fkins.

The eaft end of the tabernacle had no boards, but was fheltered with a fine embroidered curtain, hung upon five pillars of Shittim wood, overlaid with gold, and fuppofed by Philo to touch the ground.

The infide of the tabernacle was divided into two rooms, by means of a veil or curtain, hung upon four pillars; the veil was curioufly manufactured of the richeft ftuff, and adorned with cherubims and other ornaments, embroidered upon it. By this veil the tabernacle was divided, and learned writers have reafonably conjectured, in the fame proportion with the temple, afterwards built according to its model: that is, two-thirds of the whole length were allotted to the firft room, and one-third to the fecond; fo that the room beyond the veil, which was called the *holy of holies*, was exactly fquare, being ten cubits each way: and the firft room, called the *fanctuary*, was twice as long as broad.

Round the tabernacle there was a fpacious court, one hundred cubits long, and fifty broad, furrounded with pillars fet in bafes of brafs, and filleted with filver, at the diftance of five cubits from one another. The chief things in this court were the altar of burnt-offering, and the brazen laver. See Exod. ch. xxviii. and ch. xxx.

In the fanctuary, or firft room of the tabernacle, were the altar of incenfe (Exod. xxx. 1—10.), the golden candleftick (Exod. xxv. 31, &c.) valued by Cumberland at upwards of five thoufand and feventy-fix pounds fterling, and the table of fhew-bread, defcribed Exod. xxv. 23—30. Within the fecond veil, in the holy of holies, was the ark of teftimony, testimony, and its lid or cover, called the *mercy-seat*, described Exod. xxv. 10—21. See Ark *of the Covenant*.

The learned Spencer (De Leg. Hebr. diss. i.) suggests, that Moses projected the tabernacle, with its furniture and appurtenances, after the fashion of a similar structure, which he had observed in Egypt, and which was in use among other nations; or, at least, that God directed it to be made with a view of indulging the Israelites in a compliance with their customs and modes of worship, so far as there was nothing in them really sinful: and he alleges evidence of such portable temples among the heathens, in which they deposited the most valuable sacred or religious utensils. But it has been replied to this conjecture, that it is not probable. But, on the other hand, it should seem more likely, that the heathens took these things from the Jews, who derived the whole of their religion from God, than that the Jews, or rather that God should take them from the heathens: and, besides, the Jewish tabernacle was ordered to be directly the reverse of the heathen tabernacles, both in its form, which was capable of being taken to pieces, whereas theirs was carried about entire; and in its situation, which was accommodated to the people's worshipping towards the West; whereas it was the general practice of the heathens to worship with their faces towards the East. (See Ezek. viii. 16. and Virgil Æneid. xii. l. 172—174.) The value of the gold and silver only, used for the work of the tabernacle (Exod. xxxviii. 24, 25.), amounted, according to bishop Cumberland's reduction of Jewish talents and shekels to English coin, to upwards of one hundred and eighty-two thousand five hundred and sixty-eight pounds. Jennings's Jewish Ant. vol. ii. b. 2. c. 1. Anc. Univ. Hist. vol. i. part ii. p. 651, &c. folio.

We have also an account of two other tabernacles before the building of Solomon's temple, besides that above described. One of these was erected by Moses for himself; in which he gave audience, heard causes, and inquired of God; and, perhaps, also the public offices of religious worship were performed in it for some time; whence it was called the *tabernacle of the congregation* (Exod. xxxiii. 7.) The other was that which David erected in his own city, for the reception of the ark, when he received it from the house of Obededom. 2 Sam. vi. 17. 1 Chron. xvi. 1.

Tabernacles, *Feast of.* See Scenopegia.

Tabernacle is also used, of late, for a place of religious worship, appropriated to the use of those that are called Methodists.

Tabernacle, in *Architecture*, an ornamented chest, generally made of precious wood, metal, or marble, and placed upon Roman Catholic altars, as a receptacle for the ciborium and pyxis.

Tabernacle, in *Pointed Architecture*, a niche surmounted by a canopy of tracery work.

TABERNÆMONTANA, in *Botany*, was so called by Plumier, in memory of one of the fathers of modern botany, James Theodore, surnamed Tabernæmontanus, that being the latinized appellation of Berg Zabern, a town in the district of Deux-Ponts, where he was born. He died at Heidelberg in 1590, having published a ponderous and learned German *Kreuterbuch*, or Herbal, the wooden figures of which were subsequently printed by themselves, under the title of *Tabernæmontani Eicones*, in long quarto.—Linn. Gen. 118. Schreb. 165. Willd. Sp. Pl. v. 1. 1244. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 2. 71. Swartz Ind. Occ. 535. Brown Prodr. Nov. Holl. v. 1. 467. Plum. Gen. 18. t. 30. Juss. 145. Lamarck Dict. v. 7. 527. Illustr. t. 170.—Class and order, *Pentandria Monogynia.* Nat. Ord. *Contortæ*, Linn. *Apocineæ*, Juss. Brown.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, small, in five acute converging segments, permanent. *Cor.* of one petal, salver-shaped; tube cylindrical, many times longer than the calyx, tumid at the base; limb horizontal, in five deep, oblong, obtuse, obliquely twisted segments, scarcely so long as the tube. Nectary of five cloven glands, surrounding the germen. *Stam.* Filaments five, small, inserted into the middle of the tube; anthers erect, arrow-shaped, converging, generally enclosed in the tube. *Pist.* Germens two, simple; style solitary, central, thread-shaped; stigma oblong, capitate, cloven, dilated at the base. *Peric.* Follicles two, horizontally spreading, tumid, pointed, each of one cell and one valve. *Seeds* numerous, ovate-oblong, obtuse, rugged, imbricated, imbedded in pulp.

Eff. Ch. Corolla salver-shaped; its limb obliquely twisted, in five deep segments. Anthers arrow-shaped, within the tube. Follicles two, tumid, divaricated. Seeds imbedded in pulp.

"A genus of shrubs, with opposite simple *leaves*. *Stipulas* between the footstalks, connected below, loose above. *Cymes* somewhat forked. *Calyx* permanent."—*Brown*, by whose remarks we have profited in some of the above characters. The species are all of tropical origin, and contain more or less of an acrid milky juice. The *flowers* are white or yellow, mostly fragrant and ornamental. Two North American herbaceous species, with alternate *leaves*, and blueish *flowers*, one of them, *T. Amsonia* of Linnæus, having a funnel-shaped *corolla*, and no pulp in the *fruit*, are well separated by Walter, Michaux, and other late writers, under the generic name of *Amsonia*.

1. T. *citrifolia*. Citron-leaved Tabernæmontana. Linn. Sp. Pl. 308. Willd. n. 1. Ait. n. 1. Jacq. Amer. 38. t. 175. f. 13. (T. lactescens, citri foliis undulatis; Plum. Ic. 246. t. 248. f. 2. T. n. 1; Browne Jam. 182.)—Leaves elliptical, pointed. Panicles axillary, stalked, cymose, of few flowers.—Native of the West Indies. Jacquin observed it in Martinico; Browne in Jamaica. The French in the former island call it *Bois laiteux*, from the milky juice with which every part abounds. The *stem* is shrubby, erect, branched, from five to eight feet high, smooth like every other part. *Leaves* opposite, stalked, from four to six inches long, and from two to three and a half broad, of a fine shining pellucid green; paler beneath; wavy at the edges; furnished with a central rib, and many strong, curved, nearly opposite, transverse ones. *Flowers* white, with a light agreeable scent, in opposite, axillary, somewhat umbellate, stalked *panicles*, about twice or thrice the length of the *footstalks*. Jacquin describes the *follicles* as always green, acute, filled with soft orange pulp, enveloping the brown rugged *seeds*.

2. T. *laurifolia*. Laurel-leaved Tabernæmontana. Linn. Sp. Pl. 308. Willd. n. 2. Ait. n. 2. Jacq. Amer. 39. (Nerium arboreum, folio latiore obtuso, flore luteo minore; Sloane Jam. v. 2. 62. t. 186. f. 2.)—Leaves elliptical, bluntish. Panicles axillary, nearly sessile, cymose, smooth, shorter than the footstalks.—Native of banks of rivers in Jamaica. We have seen no specimen. Sloane describes this as a *tree*, whose *trunk* is as thick as one's leg, fifteen feet high, with long crooked *branches*, leafy at the end. The *leaves* appear to be rather less pointed than in the former, and of a darker green. *Flowers* yellow, very sweet-scented; the tube of their *corolla* half an inch only in length; in the first species it measures full an inch. The *flower-stalks* are smooth, not scaly. Linnæus erroneously refers Browne's plant to this species, on the authority of Solander, who marked the original specimen *T. laurifolia*.

3. T. *squamosa*. Scaly-stalked Tabernæmontana.—Leaves ovate,

ovate, bluntifh. Panicles from the forks of the branches, cymofe, with fcaly flower-ftalks.—Gathered by Commerfon, in the ifland of Mauritius. The *branches* are round, forked, rough with minute white tubercles. *Leaves* three or four inches long, and two or three broad, very fmooth, opaque, flightly wavy, with one rib, and many tranfverfe veins, on fmooth *footftalks* three quarters of an inch in length. *Panicles* in pairs from the forks of the branches, each cloven and fomewhat fubdivided, divaricated, of about ten apparently white or yellowifh *flowers;* their partial ftalks clothed with numerous, roundifh, imbricated *bracteas*, gradually larger upward, which we have not feen in any other fpecies. Tube of the *corolla* above an inch long; limb fomewhat fhorter, rough with glandular hairs, on the upper fide, about the centre. We cannot refer this to any defcribed fpecies, even in Lamarck.

4. T. *odorata*. Fragrant Tabernæmontana. "Vahl Eclog. Amer. fafc. 2. 22." Poiret in Lamarck Dict. n. 17. (Cameraria Tamaquarina; Aubl. Guian. 260. t. 102. C. lutea; Willd. Sp. Pl. v. 1. 1244.)—Leaves elliptic-lanceolate, pointed, fmooth and fhining, on fhort ftalks. Umbels from the forks of the *branches*, of about four flowers. Corolla flightly downy externally.—Found by Aublet, on the banks of rivers in Guiana, flowering in May. Vahl was induced by the remarks of Von Rohr to remove this plant hither. (See CAMERARIA, n. 3.) The *leaves* in Aublet's fpecimen are highly polifhed, about four inches long, and above one wide. *Partial flower-ftalks* above an inch long, fmooth, naked, fimple. *Flowers* yellow, with a fweet pleafant fmell; their limb longer than the tube, which meafures about three quarters of an inch.

5. T. *echinata*. Prickly-fruited Tabernæmontana. Aubl. Guian. 263. t. 103. Willd. n. 3.—Leaves on fhort ftalks, elliptic-lanceolate, pointed; fomewhat downy beneath. Umbels denfe, many-flowered, from the forks of the branches. Follicles muricated.—Native of Guiana, flowering in Auguft. The *ftems* are numerous, knotty, four or five feet high. *Leaves* five or fix inches long, and two broad, fmooth and green above; clothed with a flight whitifh down beneath. *Flowers* fmall, yellowifh; their tube dotted with red. The *follicles* are ovate, deflexed, an inch long, covered with crowded foft tubercles. *Aublet*. We have feen no fpecimen. The author mentions no pulp in the feed-veffels.

6. T. *grandiflora*. Large-flowered Tabernæmontana. Linn. Mant. 53. Willd. n. 4. Jacq. Amer. 40. t. 31. Lamarck f. 2.—Leaves ovato-lanceolate, acute. Stem forked. Segments of the calyx unequal, very lax.—Found by Jacquin in woods at Carthagena, but rarely, flowering from July to September. A *fhrub* eight feet high, with forked divaricated, leafy *branches*. *Leaves* three or four inches long, tapering at each end, fmooth and fhining, on fhort ftalks. *Flowers* large, inodorous, two or three together on a ftalk, at the fide of each uppermoft fork of the branches. *Calyx* divided into five whitifh, flat, ovate fegments, very unequal in length, and loofely fpreading, ill agreeing with the ufual character of the genus; but the *fruit*, which is in this cafe much more important, is that of a *Tabernæmontana*. Its furface is fmooth and green. *Jacquin*.

7. T. *cymofa*. Cymofe Tabernæmontana. Linn. Mant. 53. Willd. n. 5. Jacq. Amer. 39. t. 181. f. 14.—Leaves ovato-lanceolate, acute. Cymes axillary, many-flowered. Stamens in the bafe of the tube. Follicles coloured, recurved, very obtufe.—Frequent in woods and bufhy places at Carthagena, flowering in July and Auguft.—An elegant *fhrub*, from fix to fifteen feet in height. *Leaves* flightly wavy, half a foot long. *Cymes* large and handfome, convex, denfe, each of about forty dirty-white or reddifh fcentlefs *flowers*, the fize of the firft or fecond fpecies. *Follicles* large, very blunt, red, fpotted with brown; one of them generally abortive.

8. T. *obtufa*. Blunt-leaved Tabernæmontana.—Leaves obovate, obtufe. Panicles terminal, aggregate, forked, level-topped, many-flowered.—Gathered by Commerfon, in the ifle of Bourbon. The *leaves* are three or four inches long, flat, fmooth and fhining, with fine clofe tranfverfe veins; very obtufe, and often emarginate at the extremity; tapering at the bafe into a *footftalk* about an inch in length. *Panicles* three, in our fpecimen, at the end of the branch, on ftalks, nearly equal to the adjoining leaves, repeatedly forked, confifting of numerous yellow *flowers*, fmaller than in moft of the foregoing. We know nothing of the *fruit*.

9. T. *amygdalifolia*. Almond-leaved Tabernæmontana. Jacq. Amer. 39. t. 181. f. 15.—Leaves oval-lanceolate, acute, fmooth and fhining. Anthers projecting out of the tube.—Frequent in woods and thickets at Carthagena. A branching milky *fhrub*, fix feet high. *Leaves* flat, highly polifhed. *Flowers* but few on a ftalk, white, powerfully fcented. *Filaments* in the upper part of the tube, fo that their *anthers* project above the orifice, in the form of a pointed cone. *Follicles* pointed, green and fhining, refembling thofe of *T. citrifolia*, but fcarcely half, or one-third, fo large; their pulp orange. When this fhrub begins to flower, it is moftly without leaves. *Jacquin*.

10. T. *difcolor*. Two-coloured Tabernæmontana. Swartz Ind. Occ. 535. Willd. n. 7. Poiret in Lamarck n. 3.—Leaves elliptic-lanceolate, fmooth, tapering at each end. Stalks two-flowered, terminal, thread-fhaped.—Native of bufhy places in Jamaica. *Swartz*. The *ftem* is fix feet high, with fmooth, oppofite *branches*, quadrangular when young, leafy at the ends. *Leaves* two or three inches long, ftalked; dark green above; pale beneath. *Footftalks* bordered, about half an inch in length. *Flower-ftalks* very flender, fmooth, one and a half or two inches long, divided rather below the middle, and bearing two whitifh or yellowifh *flowers*, with one or two ftraggling *bracteas*. Tube of the *corolla* half an inch long; limb fhorter. The *inflorefcence* is terminal in Dr. Swartz's own fpecimen, as he defcribes it; and yet it is called axillary in the fpecific character; perhaps becaufe it is, as in other fpecies, clofely attended by leaves.

11. T. *multiflora*. Many-flowered Tabernæmontana.—Leaves ellliptic-lanceolate, fmooth, pointed. Stalks lateral and terminal, many-flowered, thread-fhaped, corymbofe.—Gathered by the late Mr. Chriftopher Smith, in the ifle of Banda. This much refembles the laft in general habit, though the leaves are fomewhat larger, with an oblong obtufe point, and more reticulated beneath. The *flowers* too are rather larger, and differ effentially in compofing ample, repeatedly fubdivided, corymbofe *panicles*, about the ends of the branches, accompanied here and there by very minute, fcattered, fcale-like *bracteas*. The *corolla* feems flefh-coloured in the dried fpecimen, with long flender fegments; its tube an inch long.

12. T. *undulata*. Wave-leaved Tabernæmontana. "Vahl Eclog. Amer. fafc. 2. 20." Poiret in Lamarck n. 5.—Leaves lanceolate-elliptical, pointed, undulated, fmooth, nearly feffile. Branches forked. Flowers fomewhat cymofe. Follicles fmooth.—Native of South America, and the ifland of Trinidad. The *leaves* are five or fix inches in length, tipped with a long point; contracted at the bafe; bright green above; pale and yellowifh beneath. *Flowers* three or four together, in fmall, folitary, axillary

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or terminal, cymofe *clufters*. *Tube* an inch long. *Follicles* an inch and a half in length, reflexed, even, rather pointed. We have no knowledge of this fpecies, or of the two following, but from the authors quoted.

13. T. *heterophylla*. Various-leaved Tabernæmontana. "Vahl Eclog. Amer. fafc. 2. 22." Poiret in Lam. n. 7. —"Leaves elliptic-lanceolate; partly fomewhat heart-fhaped, pointed, rather wavy, fmooth. Branches forked. Flowers racemofe."—Native of Cayenne. The *leaves* immediately under the forks of the *branches* are lanceolate, three or four inches long, and moderately ftalked: the reft are feffile, much fhorter, and almoft heart-fhaped. The *flower-ftalks* are folitary, in the forks as well as at the fummits of the branches, fmooth and flender, each bearing from five to feven *flowers*, whofe *corolla* is half an inch long, with fome filky hairs about the mouth. *Vahl*.

14. T. *Pandacaqui*. Pandacaqui Tabernæmontana. Poiret in Lam. n. 8. (Pandacaqui; Sonnerat Nouv. Guin. 49. t. 19.)—Leaves elliptic-lanceolate, fmooth, with a blunt point. Panicles axillary, corymbofe, many-flowered, half as long as the leaves.—Native of the Philippine iflands, where it was found by Sonnerat. He fays the natives of the ifle of Luçon apply the milk of this fhrub to their wounds. The *ftem* is four or five feet high. *Leaves* two or three inches long, fmooth, even, and quite entire, on fhort ftalks. *Flowers* white; their tube an inch long; limb fcarcely half that length. He did not fee the fruit. The younger Linnæus moft unaccountably referred this plant, in the *Supplement*, to *Chiococca racemofa*, with which it accords as little as can well be. It is now, on Juffieu's authority, removed to the prefent genus; and as he fpeaks decifively on the fubject, *Gen. Pl.* 145, we prefume he was acquainted with the *follicles*.

15. T. *perficariæfolia*. Knot-grafs-leaved Tabernæmontana. Jacq. Coll. v. 4. 139. Ic. Rar. t. 320. Willd. n. 8. Poiret in Lam. n. 9.—Leaves lanceolate, fmooth, tapering at each end. Corymbs from the forks of the branches, in pairs, divided.—Native of the ifland of Mauritius. The *ftem* is fhrubby, erect, flender, repeatedly branched. *Leaves* four or five inches long, more or lefs tapering at the end, dark green, fhining, with a white rib and veins; their margin flightly undulated. *Footftalks* hardly an inch in length. *Flowers* yellowifh-white; their tube and limb each meafuring nearly an inch. We have from Commerfon a fpecimen collected in the ifland above-mentioned, which anfwers to Jacquin's defcription and figure, except the *leaves* being lefs elongated; but it can fcarcely be more than a variety. Another from the ifle of Bourbon would appear to be the fame plant, but its *inflorefcence* is lateral, from the bofoms of the leaves, not from the forks of the branches. Still we dare not defcribe this as a feparate fpecies.

16. T. *neriifolia*. Oleander-leaved Tabernæmontana. "Vahl Eclog. Amer. fafc. 2. 21." Poiret in Lam. n. 10. —Leaves lanceolate, fmooth, veinlefs, acute at each end. Clufters axillary, folitary, of few flowers. Limb of the corolla downy about the mouth. Stamens prominent.—Native of Porto-Rico. Allied to the laft. *Leaves* two or three inches long, fcarcely wavy at the margin; paler beneath; marked with a few fine lateral diftant ribs. *Footftalks* half an inch long. *Clufters* twice the length of the footftalks, each of three or four *flowers*, with a fmall, linear, deciduous *bractea* to each of their fhort partial ftalks. *Corolla* about half an inch long, with wedge-fhaped fegments, a little downy on their inner fide towards the bafe. The *ftamens*, (we prefume the *anthers* only,) project out of the tube. *Vahl*. The fpecific character given by this author being quite infufficient, we have ventured to enlarge it from his defcription, without feeing the plant.

17. T. *mauritiana*. Brittle Tabernæmontana. Poiret in Lam. n. 11.—Leaves ovate, obtufe, membranous; fcarcely downy beneath. Clufters axillary, of few flowers. Branches with brittle joints.—Gathered by Commerfon in the ifland of Mauritius, and by Sonnerat in the Eaft Indies. We find no fpecimen in our collection anfwerable to Poiret's defcription. He fays the plant is remarkable for its woody, cylindrical, ftriated, fmooth *branches* being jointed at the infertion of the leaves, and very brittle at thofe joints; bearing very fmall, oval, whitifh tubercles. *Leaves* thin, membranous, oval, obtufe, rounded at each end, entire, a little wavy at the edges, three or four inches long, and two and a half wide; green and rather fhining above; paler beneath, and very foft to the touch, but hardly pubefcent; having one ftout yellowifh mid-rib, with fine parallel tranfverfe veins. *Footftalks* thick, from fix to eight lines in length. *Clufters* fhort and nearly fimple, towards the ends of the branches, a little drooping. *Corolla* yellowifh-white; its tube three or four lines long; limb fhort and obtufe. *Fruit* not examined. *Poiret*.

18. T. *Sananho*. Sananho Tabernæmontana. "Ruiz and Pavon. Fl. Peruv. v. 2. 22. t. 144." Poiret in Lam. n. 12.—Leaves oblong, pointed, fmooth, fomewhat wavy. Corymbs with four or five branches. Bracteas inverfely heart-fhaped. Follicles roundifh-obovate, pointed.—Native of the extenfive forefts of Peru, flowering in Auguft and September. A *fhrub* twelve or fifteen feet high, or more, with fmooth cylindrical *branches*. *Leaves* fix or eight inches long, ftalked, fhining, fomewhat veiny. *Flowers* yellowifh-white, lateral and terminal, from fifteen to twenty in each corymb. *Corolla* large, with a very long angular tube. *Follicles* the fize of an apricot, of a dirty white, containing many brown ftriated *feeds* lodged in pulp. *Poiret*.

19. T. *arcuata*. Curve-fruited Tabernæmontana. "Ruiz and Pavon Fl. Peruv. v. 2. 22. t. 143." Poiret in Lam. n. 15.—Leaves obovate-oblong, pointed, entire, on fhort ftalks. Corymbs axillary, ternate, many-flowered. Follicles recurved.—Common in the great forefts of Peru, about Pozuzo, flowering in November and December. A *tree*, thirty or forty feet high, difcharging, when wounded, a very copious milky juice, which hardens in the air into a gum-refin of a brown hue. The *branches* form an ample leafy head, and are forked, pale, flightly compreffed. *Leaves* eight or nine inches long, on fhort, rather twifted, ftalks. *Flowers* yellowifh-white, with fmall, oval, pointed *bracteas*. *Follicles* oblong, thick, three inches in length, reddifh, full of red wrinkled *feeds*, in a crimfon pulp.

20. T. *fafciculata*. Clufter-flowered Tabernæmontana. Poiret in Lam. n. 14.—Leaves oval-lanceolate, pointed, fmooth, ribbed. Clufters axillary, fomewhat umbellate, many-flowered. Segments of the corolla linear. Branches jointed.—Native of Cayenne. Seen by Poiret in Lamarck's herbarium. He defcribes the *branches* as very brittle at the infertion of the *leaves*, which are ftalked, two or three inches long, an inch or more in width, rather obtufe, though pointed; fhining above, reddifh beneath. *Flowers* plentiful about the ends of the branches, in fhort, tufted, inclined *corymbs*, whofe ramifications are fomewhat forked and jointed, with little fhort deciduous *bracteas*. Tube of the *corolla* but two or three lines long; limb in five narrow, linear, obtufe fegments. *Fruit* unknown. If it fhould prove muricated, Poiret thinks this fpecies may not differ much from *T. echinata* of Aublet. See fpecies 5.

21. T. *coronaria*. Garland Tabernæmontana. Ait. n. 3. Roxburgh MSS. (Nerium coronarium; Willd. Sp. Pl. v. 1. 1236. Jacq. Ic. Rar. t. 52. N. divaricatum; Linn. Sp. Pl. 306. Willd. ibid. Jaſminum zeylanicum, folio oblongo, flore albo pleno odoratiſſimo; Burm. Zeyl. 129. t. 59. Nandi-ervatam; Rheede Hort. Malab. v. 2. 105. 107. t. 54, 55.)—Leaves elliptical, pointed, ſmooth. Stalks forked, corymboſe, from the forks of the branches, as long as the leaves.—Native of the Eaſt Indies, in a ſandy ſoil, flowering two or three times in a year. It is ſaid to have been introduced into the Engliſh ſtoves by the late Mr. Gordon, in 1770. This plant blooms at various ſeaſons, and is ornamental as well as fragrant, though inferior in both reſpects to the *Gardenia florida*, with which ſome of its ſynonyms have been confounded. Its genus is now more correctly determined in the ſecond edition of Hort. Kew. than in the firſt; but a faulty ſpecific character ſtill remains, taken (as it ſeems) from Jacquin's plate, which exhibits a weak imperfect ſpecimen. The *ſtem* is ſhrubby, buſhy, ſmooth, three or four feet high, with copious forked ſpreading *branches*. *Leaves* two or two and a half inches long, paler beneath, on channelled *footſtalks* half an inch in length. The *corymbs*, in various wild or cultivated, ſingle or double-flowered, ſpecimens before us, conſiſt of from three to ſix cream-coloured *flowers*, and are elevated on a ſtalk, an inch and a half long, always ſolitary, from the forks of the branches. The ſingle *corolla* has a rather ſlender tube, an inch long, with broad ſegments to the limb, about the ſame length; but in a double ſtate both parts are much enlarged and thickened.

Mr. Brown has determined the *Nerium divaricatum* of Linnæus, erroneouſly marked as biennial, to be the ſame plant with the above. We ſhall now proceed to enumerate three new ſpecies from his *Prodromus*.

22. T. *orientalis*. Smooth Indian Tabernæmontana. Brown n. 1.—"Leaves lanceolate-oblong, pointed, very ſmooth, as well as the branches. Cymes repeatedly compound, ſmooth. Bracteas awl-ſhaped, not ſoon deciduous."—Gathered in the tropical part of New Holland, by Mr. Brown, who ſuſpects the *Curutu-Pala*, Hort. Malab. 83. t. 46, cited by Linnæus for his *T. alternifolia*, ſee our 25th ſpecies, may belong to the preſent plant, the *leaves* being erroneouſly repreſented as alternate.

23. T. *pubeſcens*. Downy New Holland Tabernæmontana. Br. n. 2.—"Leaves elliptic-oblong, ſomewhat pointed, downy beneath like the young branches. Branches of the cymes erect, hairy as well as the calyx. Bracteas very minute, deciduous."—Native of the tropical part of New Holland. *Mr. R. Brown.*

24. T. *ebracteata*. Naked-flowered Tabernæmontana. Br. n. 3.—"Leaves ſomewhat elliptical, downy as well as the cymes. Branches and flower-ſtalks ſpreading. Bracteas none."—Found by Mr. Brown in the ſame country as the two laſt. We have ſeen no ſpecimens of any of theſe three ſpecies.

25. T. *alternifolia*. Alternate-leaved Tabernæmontana. Linn. Sp. Pl. 308. Willd. n. 10. Poiret in Lam. n. 20. (Curutu-Pala; Rheede Hort. Malab. v. 1. 83. t. 46.)—Leaves ſcattered, ovato-lanceolate.—Native of ſandy ground on the coaſt of Malabar, flowering all the year, but eſpecially in the rainy ſeaſon. A ſmall *tree*, from ſix to twelve feet high, a foot in diameter. The *leaves* are three or four inches long, pointed, on ſhort thick *footſtalks*, more or leſs alternate, or diſperſed, according to the figure, which is our only authority for that character. *Panicles* lateral or terminal, corymboſe, drooping, of about nine white fragrant *flowers*, whoſe tube is near two inches long, the limb dilated and notched, very much twiſted. *Follicles* tawny, ovate, an inch long, with a recurved point. Linnæus depended ſolely on the Hortus Malabaricus for this ſpecies, of which he had no ſpecimen. The circumſtance of the alternate *leaves*, unexampled in any known *Tabernæmontana*, has excited a reaſonable ſuſpicion of error. See our 22d ſpecies.

26. T. *bufalina*. Buffalo-horned Tabernæmontana. Loureir. Cochinch. 117. (Capſicum ſylveſtre; Rumph. Amboin. v. 4. 133. t. 67.)—Leaves lanceolate, ſmooth. Stalks lateral, in pairs, ſingle-flowered, pendulous.—Native of moiſt ſhady vallies in Amboina, and of buſhy places in Cochinchina, where it is called *Cây ſùng tlâu*. A *ſhrub* five feet high, branched, nearly erect. *Leaves* oppoſite, from five to eight inches in length, ovato-lanceolate, ſhining, entire. *Flowers* white, on long ſimple ſtalks. *Tube* long and ſlender, inflated at the baſe. *Follicles* rather long, pointed, ſwelling, ſmooth, with an unequal ſurface. *Seeds* oblong, angular, imbedded in red pulp. The fruit in Rumphius's plate is more like the following. *Loureiro.*

27. T. *bovina*. Bull-horned Tabernæmontana. Loureir. Cochinch. 118. (*Cây ſùng bò* of the Cochinchineſe.)—Leaves lanceolate, ſmooth. Stalks axillary, ſolitary, nearly erect, about five-flowered.—Native of the plains of Cochinchina. A *ſhrub* four feet high, with drooping branches. *Leaves* oppoſite, entire. *Flowers* white. *Follicles* ſhort, recurved, tumid, pointed, even in the ſurface. *Seeds* roundiſh, angular, lodged in red pulp.

Loureiro, from whoſe work and that of Rumphius all our knowledge of the two laſt ſpecies is derived, attributes to them an emollient and relaxing quality. Their viſcid milky juice is ſaid gently to draw out thorns from the fleſh.

The herbaceous plants, ſuppoſed by Linnæus to belong to this genus, conſtitute, as we have already ſaid, and as Linnæus himſelf originally thought, a very diſtinct one, of which we ſhall now treat by the name of *Amſonia*. We can give no poſitive account of the meaning or origin of this name, except that its author, according to Miller, was Clayton. Linnæus, in his own copy of Gronovius's Flora Virginica, ed. 1. p. 26, has written *Amſonia*, as a generic name, to what Clayton took for a ſpecies of *Nerium*, and has ſubjoined alſo in manuſcript the characters of the follicles and ſeeds. This plant, in the ſecond edition of Sp. Pl. is the *Tabernæmontana Amſonia*; and ſo it remained, till Mr. Walter reſtored it to rank as a genus; but without throwing any light upon the name. A ſimilar obſcurity envelopes the nearly ſimilar name of AMASONIA, (ſee that article,) which is reported in the Supplementum of Linnæus to be dedicated to the honour of Amaſon, a traveller in America, whom M. De Theis has baptized Thomas. But we have never been able to learn any tidings of ſuch a perſon. Whether *Amſonia*, being an error in orthography for *Anſonia*, may have been deſigned to commemorate the great lord Anſon, who brought home a new eſculent pea, and deſerved botanical commemoration as much as any other eminent navigator not a profeſſed botaniſt; and whether *Amaſonia* be a ſtill further corruption of the ſame name, we muſt leave in doubt. We have only to obſerve, that if both theſe names ſhould prove to have the ſame origin, or be thought, as they certainly are, too nearly alike, the former, *Amſonia*, ought to be retained in preference to the latter, which is of much later date.

AMSONIA. Walter Carolin. 98. Michaux Boreal-Amer. v. 1. 121. Purſh 184. Ait. Hort. Kew. v. 2. 72. —Claſs

—Clafs and order, *Pentandria Monogynia*. Nat. Ord. *Contortæ*, Linn. *Apocineæ*, Juff. Brown.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, fmall, in five deep, acute, triangular, fpreading fegments, permanent. *Cor.* of one petal, funnel-fhaped; tube many times longer than the calyx, gradually fwelling upwards, hairy in the throat; limb about as long as the tube, in five deep, lanceolate, varioufly fpreading, oblique fegments. Nectary of five minute glands, furrounding the germen. *Stam.* Filaments five, fmall, inferted into the upper part of the tube; anthers erect, arrow-fhaped, converging, within the tube. *Pift.* Germens two, fimple, ovate; ftyle folitary, central, thread-fhaped, about as long as the tube; ftigma oblong, obtufe. *Peric.* Follicles two, erect, long, cylindrical, pointed, deftitute of internal pulp. *Seeds* numerous, pointed, rough, naked, abrupt and oblique at the point.

Eff. Ch. Corolla funnel-fhaped; its limb in five deep oblique fegments. Anthers arrow-fhaped, within the tube. Follicles two, cylindrical, erect. Seeds cylindrical, naked.

1. A. *latifolia*. Broad-leaved Amfonia. Michaux n. 1. Purfh n. 1. Ait. n. 1. (Tabernæmontana Amfonia; Linn. Sp. Pl. 308. Willd. Sp. Pl. v. 1. 1246. Apocynum virginianum erectum, alternis afclepiadis foliis, floribus pallidè cæruleis, radice craffâ; Pluk. Almag. 35. Phyt. t. 115. f. 3.)—Stem fmooth. Leaves ovato-lanceolate; flightly hairy beneath. Panicle taller than the lateral branches. Limb of the corolla afcending.—Native of fhady wet woods in Carolina, flowering in May. *Purfh.* Cultivated by Miller in 1759, and hardy in our climate. The *root* is flefhy, perennial. *Stem* herbaceous, erect, a foot high, round, leafy, nearly or quite fmooth, terminated by a compound fmooth panicle of greyifh-blue fcentlefs *flowers*, and bearing two or three alternate leafy *branches*, which do not rife above the panicle till the flowers are paft. *Corolla* very hairy about the mouth; its tube pale, nearly half an inch long. The *leaves* are all alternate, on fhort footftalks, entire, pointed, two or three inches in length, and one in breadth; paler beneath, and minutely hairy about the edges and veins.

2. A. *triftis*. Brownifh-flowered Amfonia.—Stem fmooth; its branches overtopping the panicle. Leaves ovate; flightly hairy beneath. Limb of the corolla reflexed.—Brought from North America, by Mr. Lyon. We received a fpecimen in flower, in June 1808, from Mr. Vere's garden, at Knightfbridge. This is rather taller than the foregoing, and diftinguifhed by its leafy lateral *branches* rifing high above the panicle. The *flowers* are fmaller, of a dingy brown hue; the fegments of their limb ftrongly reflexed, at leaft in fading. *Follicles* fmooth, cylindrical. Perhaps Mr. Walter might have this fpecies in view when he attributes tawny flowers (*flores fulvi*) to his *A. ciliata*, our 4th fpecies.

3. A. *falicifolia*. Willow-leaved Amfonia. Purfh n. 2. —"Stem fmooth. Leaves linear-lanceolate, acute at each end, very fmooth."—Gathered by Mr. Lyon in Carolina and Georgia, flowering in May. *Flowers* the fame as the firft fpecies, more abundant. *Purfh.*

4. A. *anguftifolia*. Narrow-leaved Amfonia. Michaux n. 2. Purfh n. 3. Ait. n. 2. Venten. Choix. t. 29. (A. ciliata; Walter n. 2. Tabernæmontana anguftifolia; Willd. Sp. Pl. v. 1. 1247.)—Stem downy. Leaves linear, erect, fringed.—In fandy barren ground of Carolina and Georgia, flowering in May and June. *Flowers* of the fame difpofition and colour as in *A. latifolia* and *falicifolia*. *Purfh.* This fpecies is faid to have been introduced into the Englifh gardens, in 1774, by the late Mr. James Gordon. Its copious narrow *leaves* are glaucous beneath, and fmooth, except at the edges, where they are fringed with long foft hairs, fuch as clothe the *ftem*. Ventenat fays the upper ones are quite fmooth, but this is not the cafe in our fpecimen. The teeth of the *calyx* are fometimes tipped with a tuft of hairs. Walter fays the *flowers* are tawny; others defcribe them, as we find them, like thofe of *A. latifolia*, blue, with a pale, or fomewhat tawny, tube. The *follicles* of all the fpecies, as far as we have feen, are flender, cylindrical, and fmooth, about two inches long.

Tabernæmontana, in *Gardening*, contains plants of the woody, exotic, and hardy perennial kinds, among which the fpecies chiefly cultivated for garden purpofes are, the citron-leaved tabernæmontana (T. citrifolia); the laurel-leaved tabernæmontana (T. laurifolia); the Virginian tabernæmontana (T. amfonia); and the narrow-leaved tabernæmontana (T. anguftifolia).

Thefe are all plants of the more tender and delicate kind, but more efpecially the two firft forts, which require the conftant aid of artificial heat in this climate.

Method of Culture.—All thefe plants may be increafed by feeds, which muft be procured from the countries where the plants grow naturally, and be fown early in the fpring on a hot-bed; and when the plants are come up, and fit to remove, be carefully planted out into fmall pots filled with light rich earth, and then plunged into a hot-bed of tanners' bark, being careful to fhade them in the heat of the day, until they have taken new root; after which they fhould have free air admitted to them every day when the weather is warm; but on cold nights have the glaffes of the hot-bed covered with mats every evening, foon after the fun goes off from the bed: they muft be often refrefhed with water, but not in large quantities, efpecially while they are young, as they are full of a milky juice, and are fubject to rot with much moifture: they may remain during the fummer feafon in the hot-bed, by ftirring up the tan to renew the heat when it wants it, and a little new tan being added; but when the nights begin to be cold, the plants fhould be removed, and plunged into the bark-bed in the ftove, where, during the winter feafon, they muft be kept in a moderate degree of warmth, and in cold weather have but little water given them: they fhould conftantly remain in the ftove, where, in warm weather, they may have free air admitted to them by opening the glaffes, but in cold weather be kept in a warm ftate. With this management they thrive and produce flowers; and, as their leaves are always green, make a pleafant diverfity among other tender exotic plants: they may be increafed likewife by cuttings in the fummer feafon, which fhould be cut off from the old plants, and laid to dry in the ftove five or fix days before they are planted, that the wounded parts may heal over: thefe fhould then be planted in pots filled with frefh light earth, and be plunged into the hot-bed of tanners' bark, and clofely covered with a hand-glafs, fhading them from the fun in the middle of the day in hot weather, refrefhing them now and then with a little water: when they have taken root, they may be planted out into feparate pots, and be treated in the fame manner as thofe raifed from feeds are recommended to be.

It may be noticed, that the third and fourth forts are capable of living in the open air here, provided they are planted in a warm fituation: they love a light foil, rather moift than otherwife; of courfe, when planted in dry ground, they fhould be frequently watered in dry weather. They are beft increafed by offsets from the roots, which fhould be planted out in the autumnal feafon.

Among thefe, the two firft forts afford variety in the ftove, and the latter forts in this as well as the borders in mild climates.

TABERNÆMONTANUS, James Theodore, in *Biography*, a phyfician and botanift, was born at Berg-Zabern, in Alface, and having practifed as an apothecary, and acquired fome knowledge of botany, went to France, where he took the degree of M.D. Advancing in his profeffion, he became firft phyfician to the Elector-Palatine, the bifhop of Spire, and other perfons of rank. He died at Heidelberg, whither he had removed from Worms, in the year 1590. Apprehending that Providence had furnifhed every country with remedies fuitable to its difeafes, he confided much in the efficacy of herbs; and particularly in the powder of mugwort. His German Herbal confifts of three volumes, publifhed feparately in the years 1558, 1590, and 1592, and containing figures, copied either by himfelf or others from nature. This work was well received, and has been often reprinted. He alfo publifhed in German a treatife on baths and mineral waters. Haller. Eloy. Gen. Biog.

TABERNAS, in *Geography*, a town of Spain, in the province of Grenada; 15 miles N.N.E. of Almeria.

TABERNE, a town of Curdiftan; 50 miles E.S.E. of Kerkuk.

TABES, in *Ancient Geography*, a town of Afia, in the mountains of Parétacéne, upon the frontiers of Perfia and Babylonia. Strabo and Quintus Curtius.

Tabes, in *Medicine*, a wafting or confumption of the body, accompanied with hectic fever. The diftinction which nofologifts have made between tabes and atrophia, is founded on the prefence of hectic fever in the former, and its abfence in the latter form of difeafe. Such a definition of tabes, however, would comprehend phthifis, a term which is generally reftricted to that fpecies of confumption which has its origin in difeafes of the lungs. (See Consumption.) The ground of the diftinction between tabes and atrophy, has already been fully difcuffed under the head of Atrophy: and the train of fymptoms conftituting the fever that accompanies tabes, is fufficiently detailed under the article *Hectic* Fever. Dr. Cullen has enumerated three fpecies of tabes; the firft, which he calls the *purulent*, arifing from fuppuration, either of an internal or external part, and the feat of which may be various, according to the organ originally difeafed; the fecond, the *fcrofulous*, being the confequence of fcrofula affecting different parts, but more efpecially the mefenteric glands; and the third, the *venenata*, proceeding from the operation of a poifonous fubftance received into the body. The other affections which had been claffed by Sauvages under tabes, fuch as the tabes dorfalis, nutricum, fudatoria, a fanguifluxu, fyphilitica, and a hydrope, are referred by Dr. Cullen to the genus Atrophy; which fee.

Tabes *Dorfalis*, a fpecies of confumption arifing from the exceffive evacuation of femen: its fymptoms and treatment are detailed under Atrophy.

Tabes *Mefenterica*, or mefenteric confumption, is a difeafe that more particularly affects children, and arifes from obftruction and enlargement of the mefenteric glands. Children are liable to its attacks from the age of three or four years, and become lefs fo when they have attained that of eight or ten, unlefs they are of fcrofulous habits, in which cafe the difeafe may fupervene at a much later period. Its relation to fcrofula is clearly marked, from its more frequent occurrence in families where this difeafe is hereditary: but it may, at the fame time, arife independently of that affection, from a great variety of caufes. It may be induced by any protracted difeafe of infancy producing much conftitutional difturbance, and more efpecially by fuch as are attended with diforder of the functions of the alimentary canal. It may often be traced to improper treatment, or unwholefome food; to long-continued irritation from teething; to the fuppreffion of eruptions, or the incautious ftopping of diarrhœa; and fometimes appears to be the confequence of exanthematous fevers, as the meafles, fmall-pox, or fcarlatina. The prefence of worms in the inteftines, has very frequently been accufed of laying the foundation of this difeafe: but it may be queftioned, whether they are not more generally the confequence than the caufe of derangement in the primæ viæ attendant on this diforder.

The fymptoms which attend the early ftages of this affection, and before the enlargement of the glands has become fenfible, are fimilar to thofe which accompany many of the difeafes of the alimentary canal, more efpecially thofe produced by worms, and can hardly be diftinguifhed from them. Indigeftion occurs in various degrees, denoted by the ufual figns, fuch as acid eructations, fetid breath, great irregularity in the action of the bowels, and in the appearance of the ftools; occafional fever, occurring, however, lefs in regular paroxyfms than happens in the remitting fever of infants, but giving a hectic flufh to the cheeks, which, when the fever has fubfided, are of a pallid hue. The appetite is extremely irregular; fometimes it is nearly gone, at other times it is voracious, and attended with a fenfe of craving, unlefs fpeedily fatisfied. The fymptom which particularly characterifes this difeafe, when occurring in conjunction with thofe above ftated, is fhooting pains in the abdomen, varying confiderably, both in their feat and their intenfity, at different times. Thefe pains, though felt more or lefs every day, occur only at intervals, and frequently, after a longer intermiffion than ufual, they return with more feverity than before.

The belly now begins to fwell and to grow hard, while, at the fame time, the limbs and countenance are emaciated: the ftrength and fpirits decline; the hectic fever is more and more diftinctly marked, and exerts its ufual undermining influence on the conftitution. Cough frequently attends this complaint in its latter ftages, and the fymptoms become blended with thofe of true pulmonary confumption. The difeafe of the mefenteric glands is often, indeed, found, on diffection, to have extended to other vifcera, and more efpecially to the lungs: and tubercles, and even purulent matter, are not unfrequently found in them, although the fymptoms during life did not particularly indicate any affection of thefe organs. The mefenteric glands themfelves exhibit different appearances, according to the progrefs which the difeafe has made: in the early ftages they are enlarged in their fize, and are fomewhat fofter to the touch than in a natural ftate: but upon being cut into, do not exhibit any fenfible deviation from their natural ftructure. If the patient, however, has not already funk from the exhauftion of the conftitutional affection, the difeafe proceeds to fuppuration, the pus being intermixed with the white, foft, and curdy matter which is fo peculiar to fcrofula.

Mefenteric confumption is a difeafe of frequent occurrence, and when it has proceeded a certain length, is almoft invariably fatal. Yet we find, in fome rare inftances, that the powers of the conftitution are fometimes called forth in an extraordinary manner under the moft unpromifing circumftances, and the difeafe recovered from. In the early periods of life, indeed, we fee nature abounding in refources, which a more mature age cannot fupply: and there is, to ufe the language of the late Dr. Gregory, "a greater luxuriancy of life and health in infancy than at any other period. Infants, it is acknowledged, are more delicately fenfible to injury than thofe advanced in life; but to compenfate this, their fibres and veffels are more capable of diftention, their whole fyftem is more flexible, their fluids are lefs acrid, and lefs difpofed to putrefcence; they bear all evacuations more eafily,

eafily, except that of blood; and, which is an important circumftance in their favour, they never fuffer from the terrors of a diftracted imagination. Their fpirits are lively and equal; they quickly forget their paft fufferings, and never anticipate the future. In confequence of thefe advantages, children recover from difeafes, under fuch unfavourable circumftances as are never furvived by adults. If they wafte more quickly under ficknefs, their recovery from it is quick in proportion, and generally more complete than in older people; as difeafes feldom leave thofe baneful effects on their conftitutions fo frequent in adults. In fhort, a phyfician ought fcarce ever to defpair of a child's life, while it continues to breathe."

The plan of treatment to be purfued in this difeafe, muft be founded very much on the fame principles as that of fcrofula in general, modified, however, in fome degree, by its peculiar feat, and by the functions of the parts affected. It is chiefly in the earlier ftages that we can expect much efficacy from an alterative courfe of remedies in the removal of the glandular obftructions. As there is often much ambiguity between the fymptoms of this difeafe and thofe occafioned by the prefence of the round worm in the inteftines, we fhould firft fatisfy ourfelves that this is not the fole caufe of the diforder. In both difeafes there is a tumid belly, and emaciated extremities: fo that the chief ground of diftinction is derived from the effect of ftrong purgatives, which bring away worms in the one cafe, and none in the other. It is obferved by Dr. Baillie, that ftartings and grinding of the teeth during fleep, occur very commonly in worms, but are rarely obferved as fymptoms of fcrofulous enlargement of the mefenteric glands. Some difcrimination, likewife, between the two difeafes, may fometimes be derived from examining ftrictly into the nature of the conftitution. If decided marks of fcrofula fhew themfelves in an external part of the body, they will lead a practitioner more fatisfactorily to the opinion, that the mefenteric glands are alfo affected with the fame difeafe.

The principal alterative remedy on which any dependence can be placed is mercury, particularly in the form of calomel; half a grain, or a grain of which, may be given two or three times a week, in conjunction with, or fucceeded by, fome mild purgative. On the intermediate days, fmall dofes of alkalies, with rhubarb, may be exhibited. Great attention fhould, at all times, be paid to the ftate of the bowels, which fhould be kept freely open: while the acrimony of their contents fhould be counteracted by abforbents, fuch as magnefia, when there is no diarrhœa, or by prepared chalk, or gentle aftringents, in fmall dofes, when this latter ftate prevails. For the removal of fever, the fame means are to be employed as have already been pointed out when treating of the infantile remitting fever, under the head of *Difeafes of* INFANTS. The calomel, combined with purgatives, may be continued, for feveral weeks, till a favourable change has been effected in the fize and hardnefs of the belly. The milder vegetable tonics, fuch as chamomile, or cafcarilla, may then be tried, and according as the conftitution will bear them, preparations of iron fhould be given, in order to ftrengthen the digeftive organs, and the fyftem in general. Together with thefe means, every circumftance which can contribute to general health fhould be attended to. Pure air, regular exercife, gentle frictions of the body and limbs, an eafy drefs, frequent wafhing of the whole body with foap and warm water in young children, or the cold bath in older children, and efpecially a light and nutritious diet, with fuch mild aromatics as may affift digeftion, are fome of the principal and moft effectual means of fecuring the ground that has been gained, and of preventing a return, as well as guarding againft an attack, of the difeafe. For greater details on thefe points, fee *Difeafes of* INFANTS, and SCROFULA.

TABEYRO, in *Geography*, a town of Spain, in Galicia; 5 miles S.E. of St. Jago.

TABIANA, in *Ancient Geography*, an ifland of the Perfian gulf, near and weft of the ifle of Sophthe, and overagainft the promontory of Taoce.

TABIANA, in *Geography*, a town of the duchy of Parma; 13 miles W. of Parma.

TABIDIUM, in *Ancient Geography*, a town in the interior of Africa, towards the fource of the river Bagrada.

TABILLOLA, in *Geography*, a town on the fouth coaft of the ifland of Machian. N. lat. 0° 13'. E. long. 127° 21'.

TABINSK, a town of Ruffia, in the government of Upha, on the Bielaia; 40 miles S. of Upha. N. lat. 54°. E. long. 56° 14'.

TABLADA, a town of South America, in the province of Carthagena; 80 miles S. of Mompox.

TABLANATZ, a town of Iftria; 24 miles N.E. of Pedena.

TABLAS, one of the Philippine iflands, about 25 miles long from north to fouth, but narrow and interfected by a deep bay on the eaft and weft coafts. N. lat. 12° 30'. E. long. 121° 40'.

TABLATURE, in *Anatomy*, a divifion or parting of the fkull into two tables.

TABLATURE, *Tablatura*, in *Mufic*, in general, is when to exprefs the founds or notes of a compofition, we ufe letters of the alphabet, or cyphers, or any other characters not ufed in the modern mufic.

TABLATURE, in its ftricter fenfe, is the manner of writing a piece for the lute, theorbo, guitarre, bafs viol, or the like; which is done by writing on feveral parallel lines (each of which reprefents a ftring of the inftrument) certain letters of the alphabet, referring to the frets on the neck of the inftrument: of which A marks, that the ftring is to be ftruck open, *i. e.* without putting the finger of the left hand on the head; B fhews, that one of the fingers is to be put on the firft ftop; C, on the fecond; D, on the third, &c.

The time of the notes is fignified by marks over the letters of a hooked form, that anfwer to the minim, crotchet, quaver, &c. in the French tablature; but the Italians and Spaniards, till of late years, made ufe of figures inftead of letters.

The tablature of the lute is ufually written in letters of the alphabet, and that of the harpfichord in the common notes.

TABLE, TABULA, a moveable, ufually made of wood, or ftone fupported on pillars, or the like; for the commodious reception of things placed upon it.

Mofes made a table, in the tabernacle, for laying the fhew-bread upon, defcribed by Philo Judæus as two cubits long, one broad, and one and a half high.

Among Chriftians, the *table*, or *Lord's table*, fignifies the facrament of the Lord's fupper. See COMMUNION.

TABLE, *Round*, *Knights of the Round Table*, a military order fuppofed to have been inftituted by Arthur, the firft king of the Britons, in the year 516.

They are faid to have been twenty-four in number; all felected from among the braveft of the nation.

The round table, which gave them their title, was an invention of that prince, to avoid difputes about the upper and lower end, and to take away all emulation as to places.

Lefley affures us, he faw the table at Winchefter: at leaft, he fays, if he might believe the keepers of it, who ftill fhew ſhew it with great ſolemnity. He adds, that the names of a great number of knights, written around it, ſeemed to confirm the truth of the tradition.

Larrey alſo, and ſeveral other authors, make no ſcruple to relate this fable of knighthood as matter of hiſtory: but that it is a fable, is certain; F. Papebroch having ſhewn, that there was no ſuch thing as an order of knights before the ſixth century.

Camden alſo obſerves, that the table at Wincheſter is of a ſtructure much more modern than the ſixth century. It is to be added, that Arthur himſelf is eſteemed by many no more than a fabulous prince.

An excellent hiſtorian obſerves, that Arthur was undoubtedly a great general, though his actions have given occaſion to innumerable fables; and though the inſtitution of the "Knights of the Round Table" has ſerved as a foundation for many fabulous relations, it is not to be deemed altogether chimerical. For where is the improbability that Arthur ſhould inſtitute an order of knighthood in Britain, when we learn from the letters of Caſſiodorus, that Theodoric, king of the Oſtrogoths, inſtituted one in Italy in the ſame century. Rapin's Hiſt. of Eng. vol. i. p. 39. fol.

However, others have ſuppoſed that the round table was not any military order, but rather a kind of juſt, or military exerciſe, between two perſons armed with lances. Several authors ſay that Arthur, duke of Bretagne, renewed it. See Matthew Paris, the abbot Juſtiniani, and F. Helyot.

Paulus Jovius ſays, it was under the empire of Frederic Barbaroſſa that the knights of the Round Table firſt began to be talked of; others attribute their origin to the factions of the Guelphs and Gibellins. King Edward I. built a houſe called the Round Table, the court of which was two hundred feet in diameter. Du-Cange Gloſſ. *Tabula*.

Table, in *Architecture*, a ſmooth, ſimple member, or ornament, of various forms, but moſt uſually in that of a long ſquare. See Platband.

Table, *Projecting*, is ſuch a one as ſtands out from the naked of the wall, pedeſtal, or other matter which it adorns.

Table, *Raked*. See Raking-*Table*.

Table, *Razed*, an emboſſment in a frontiſpiece, for the putting an inſcription, or other ornament, in ſculpture. This is what M. Perrault underſtands by *abacus* in Vitruvius.

Table, *Crowned*, that covered with a corniche, and in which is cut a baſſo-relievo, or a piece of black marble incruſtated, for an inſcription.

Table, *Ruſticated*, that which is picked, and whoſe ſurface ſeems rough, as in grottos, &c. See Rustics.

Table, *Water*. See Water-*Table*.

Table, *Plain*, a ſurveying inſtrument. See Plain *Table*.

Table, in *Perſpective*, denotes a plain ſurface, ſuppoſed to be tranſparent, and perpendicular to the horizon.

It is always imagined to be placed at a certain diſtance between the eye and objects, for the objects to be repreſented thereon by means of viſual rays paſſing from every point thereof, through the table to the eye.

Whence it is alſo called *perſpective plane*. See Perspective.

Table, in *Anatomy*. The cranium is ſaid to be compoſed of two tables, or laminæ; *i. e.* it is double, as if it conſiſted of two bones laid one over another. See Skull.

Table *of Pythagoras*, called alſo *multiplication-table*, is a ſquare formed of an hundred or more leſſer ſquares, or cells, containing the products of the ſeveral digits, or ſimple numbers, multiplied by each other. See this table under Multiplication.

Tables, *Laws of the Twelve*, were the firſt ſet of laws of the Romans; thus called, either becauſe the Romans then wrote with a ſtyle on thin wooden tables, covered with wax; or, rather, becauſe they were engraved on tables, or plates of copper, to be expoſed in the moſt noted part of the public forum. Wood, braſs, or ivory, might be ſucceſſively employed.

After the expulſion of the kings, as the Romans were then without any fixed or certain ſyſtem of law; at leaſt, had none ample enough to take in the various caſes that might fall between particular perſons; it was reſolved to adopt the beſt and wiſeſt laws of the Greeks.

One Hermodorus, to whom a ſtatue was erected in the forum, was firſt appointed to tranſlate them; and the decemviri afterwards compiled and reduced them into ten tables. After immenſe care and application, they were, at length, enacted and confirmed by the ſenate, and an aſſembly of the people, in the year of Rome 303.

The following year they found ſome things wanting therein, which they ſupplied from the laws of the former kings of Rome, and from certain cuſtoms, which long uſe had authorized: all theſe, being engraven on two other tables, made the *law of the twelve tables*, ſo famous in the Roman juriſprudence; the ſource and foundation of civil or Roman law. See Civil *Law*.

The laws of the twelve tables were alſo called *decemviral laws*, from the officers entruſted with the compoſing them. See Decemviri.

Theſe laws of the decemviri were dictated by the rigid and jealous ſpirit of an ariſtocracy, which had yielded with reluctance to the juſt demands of the people. But the ſubſtance of the twelve tables was adapted to the ſtate of the city; and the Romans muſt have emerged from barbariſm, ſince they were capable of ſtudying and embracing the inſtitutions of their more enlightened neighbours. Mr. Gibbon ſuggeſts, that a motive of national pride induced Livy and Dionyſius to believe, that deputies from Rome viſited Athens under the wiſe and ſplendid adminiſtration of Pericles, and that the laws of Solon were transfuſed into the twelve tables. If ſuch an embaſſy, ſays the hiſtorian of the Roman empire, had indeed been received from the barbarians of Heſperia, the Roman name would have been familiar to the Greeks before the reign of Alexander, and the fainteſt evidence would have been explored and celebrated by the curioſity of ſucceeding times. But the Athenian monuments are ſilent; nor will it ſeem credible that the patricians ſhould undertake a long and perilous navigation, to copy the pureſt model of a democracy. In the compariſon of the tables of Solon with thoſe of the decemvirs, ſome copied reſemblance may be found; ſome rules which nature and reaſon have revealed to every ſociety; ſome proofs of a common deſcent from Egypt or Phœnicia. But in all the great lines of public and private juriſprudence, the legiſlators of Rome and Athens appear to be ſtrangers or adverſe to each other.

Whatever, as the ſame hiſtorian proceeds, might be the origin or the merit of the twelve tables, they obtained among the Romans that blind and partial reverence which the lawyers of every country delight to beſtow on their municipal inſtitutions. The ſtudy is recommended by Cicero as equally pleaſant and inſtructive. "How admirable," ſays the Roman orator, with honeſt or affected prejudice, "is the wiſdom of our anceſtors! We alone are the maſters of civil prudence; and our ſuperiority is the more conſpicuous, if we deign to caſt our eyes on the rude and almoſt ridiculous juriſprudence of Dracon, of Solon, and of Lycurgus."

The

The twelve tables were committed to the memory of the young, and the meditation of the old; they were tranfcribed and illuftrated with learned diligence; they had efcaped the flames of the Gauls, they fubfifted in the age of Juftinian, and their fubfequent lofs has been imperfectly reftored by the labours of modern critics.

It is a great pity this fyftem of law fhould have perifhed through the injuries of time: we have now nothing of it, but a few fragments difperfed in divers authors. J. Gothrofed has collected them together, and we have them in Rofinus, and fome other authors. The Latin is very old and barbarous, and remarkably obfcure. See Civil *Law*.

Although thefe venerable monuments of antiquity were confidered as the rule of right and the fountain of juftice, they were overwhelmed by the weight and variety of new laws, which, at the end of five centuries, became a grievance more intolerable than the vices of the city.

The laws of the twelve tables have been juftly charged with inexcufable feverity. They are written, fays Mr. Gibbon, like the ftatutes of Draco, in characters of blood. They approve the inhuman and unequal principle of retaliation; and the forfeit of an eye for an eye, a tooth for a tooth, a limb for a limb, is rigoroufly exacted, unlefs the offender can redeem his freedom by a fine of 300 lbs. of copper. Befides the flighter chaftifements of flagellation and fervitude very liberally diftributed by the decemvirs, nine crimes of a very different complexion are adjudged worthy of death: *viz.* 1. Any act of treafon againft the ftate, or of correfpondence with the public enemy; 2. Nocturnal meetings in the city, under any pretence of pleafure, or religion, or the public good; 3. The murder of a citizen; 4. The malice of an incendiary; 5. Judicial perjury; 6. The corruption of a judge, who accepted bribes to pronounce an iniquitous fentence; 7. Libels or fatires; 8. The nocturnal mifchief of damaging or deftroying a neighbour's corn; 9. Magical incantations. The cruelty of the twelve tables againft infolvent debtors merits peculiar notice. After the judicial proof or confeffion of the debt, 30 days of grace were allowed before a Roman was delivered into the power of his fellow-citizen. In this private prifon, 12 ounces of rice were his daily food: he might be bound with a chain of 15 pounds' weight; and his mifery was thrice expofed in the market-place, to folicit the compaffion of his friends and countrymen. At the expiration of 60 days, the debt was difcharged by the lofs of liberty or life: the infolvent debtor was either put to death, or fold in foreign flavery beyond the Tyber; but if feveral creditors were alike obftinate and unrelenting, they might legally difmember his body, and fatiate their revenge by this horrid partition.

When the manners of Rome were infenfibly polifhed, the criminal code of the decemvirs was abolifhed by the humanity of accufers, witneffes, and judges; and impunity became the confequence of immoderate rigour. The Porcian and Valerian laws prohibited the magiftrates from inflicting on a free citizen any capital, or even corporal punifhment; and the obfolete ftatutes of blood were artfully, and perhaps truly, afcribed to the fpirit, not of patrician, but of civil, tyranny. Gibbon's Decl. and Fall, &c. vol. viii.

Tables *of the Law*, in *Scripture Hiftory*. See Decalogue.

Tables, *New*, *Tabulæ Novæ*, an edict occafionally publifhed in the Roman commonwealth, for the abolifhing all kinds of debts, and annulling all obligations.

It was thus called, in regard that all antecedent acts being deftroyed, there were nothing but new ones to take place.

Table, among *Jewellers*. A *table diamond*, or other precious ftone, is that whofe upper furface is quite flat, and only the fides cut in angles: in which fenfe, a diamond cut *table-wife*, is ufed in oppofition to a rofe-diamond. See Diamond.

Table, in the *Glafs-Manufacture*, denotes a circular fheet of finifhed window-glafs. Thefe tables are generally four feet in diameter, and each of them weighs 10, $10\frac{1}{2}$, or 11 pounds. Twelve of thefe is called a *fide* or a *crate* of glafs. Some tables of glafs have been four, and even five feet in diameter. Such have been made by Meffrs. Attwood and Smith, formerly Hammond and Smith, of Gatefhead, in the county of Durham; and thefe tables are the more valuable, as they yield larger fquares than ever were made, except in plate-glafs, and the quality alfo is of the beft kind. The centre of the table of glafs, where the punting iron was attached, is of courfe fomewhat thicker, and is denominated by the workmen "bull's eye:" neverthelefs, the reft of the plate is of an uniform thicknefs.

Table is alfo ufed for an index, or repertory, put at the beginning or end of a book, to direct the reader to any paffage he may have occafion for.

Thus we may fay, *table of matters; table of authors quoted; table of chapters*, &c. Tables, of themfelves, fometimes make large volumes, as that of Dravitz on the civil and canon laws.

Tables *of the Bible*, are called *Concordances*. See Concordance.

Table-*Rents*. See Bord-lands.

Tables *of Houfes*, among *Aftrologers*, are certain tables, readily drawn up, for the affiftance of practitioners in that art, for the erecting or drawing of figures or fchemes. See House.

Tables, in *Mathematics*, are fyftems of numbers, calculated to be ready at hand for expediting aftronomical, geometrical, and other operations. See Canon.

Tables, *Aftronomical*, are computations of the motions, places, and other phenomena of the planets, both primary and fecondary. See each planet.

The oldeft aftronomical tables are the Ptolemaic, found in Ptolemy's Almageft; but thefe now no longer agree with the heavens.

In 1252, Alphonfo XI. king of Caftile, undertook the correction of them, chiefly by the affiftance of Ifaac Hazen, a Jew; and fpent four hundred thoufand crowns therein. Thus arofe the *Alphonfine* tables, to which that prince himfelf prefixed a preface. But the deficiency of thefe, alfo, was foon perceived by Purbachius and Regiomontanus; upon which Regiomontanus, and after him Waltherus and Warnerus, applied themfelves to celeftial obfervations, for the farther amending of them; but death prevented any progrefs therein.

Copernicus, in his books of the celeftial revolutions, inftead of the Alphonfine tables, gives others of his own calculation, from the latter, and partly from his own obfervations.

From Copernicus's obfervations and theories, Eraf. Reinholdus afterwards compiled the *Prutenic* tables, which have been printed feveral times, and in feveral places.

Tycho de Brahe, even in his youth, became fenfible of the deficiency of the *Prutenic* tables; which was what determined him to apply himfelf, with fo much vigour, to celeftial obfervations: yet all he did, by them, was to adjuft the motions of the fun and moon; though Longomontanus, from the fame, to the theories of the feveral planets publifhed in his "Aftronomia Danica," added tables of their motions, now called the *Danifh* tables; and Kepler likewife, from

from the fame, in 1627, publifhed the *Rudolphine* tables, which are much efteemed.

Thefe were afterwards, anno 1650, turned into another form, by Maria Cunitia, whofe aftronomical tables, comprehending the effect of Kepler's phyfical hypothefis, are exceedingly eafy, and fatisfy all the phenomena, without any trouble of calculation, or any mention of logarithms; fo that the Rudolphine calculus is here greatly improved.

Mercator made a like attempt in his Aftronomical Inftitution, publifhed in 1676, and the like did J. Bap. Morini, whofe abridgement of the Rudolphine tables was prefixed to a Latin verfion of Street's "Aftronomia Carolina," publifhed in 1705.

Lanfbergius, indeed, endeavoured to difcredit the Rudolphine tables, and framed *Perpetual* tables, as he calls them, of the heavenly motions; but his attempt was never much regarded by the aftronomers; and our countryman Horrox warmly attacked him, in his defence of the Keplerian aftronomy.

Since the Rudolphine tables, many others have been publifhed; as the *Philolaic* tables of Bullialdus; the *Britannic* tables of Vincent Wing, calculated on Bullialdus's hypothefis; the *Britannic* tables of Newton; the French ones of the count de Pagan; the *Caroline* tables of Street, all calculated on Dr. Ward's hypothefis, and the *Novalmajeftic* tables of Ricciolus. Among thefe, however, the Philolaic and Caroline tables are efteemed the beft; infomuch that Mr. Whifton, by the advice of Mr. Flamfteed (a perfon of undoubted authority in fuch cafes) thought fit to fubjoin the Caroline tables to his aftronomical lectures.

The *Ludovician* tables, publifhed in 1702, by M. de la Hire, are conftructed wholly from his own obfervations, and without the affiftance of any hypothefis; which, before the invention of the micrometer, telefcope, and the pendulum clock, was held impoffible.

Another fet of tables, Dr. Halley, the aftronomer royal, long laboured to perfect.

M. le Monnier, in 1746, publifhed in his "Inftitutions Aftronomiques" tables of the motions of the fun, moon, and fatellites, of refractions, and of the places of the fixed ftars. M. de la Hire has alfo publifhed tables of the planets, and M. de la Caille tables of the fun. Mayer conftructed tables of the moon; and we have many aftronomical tables of various kinds, and computed with different views, in our modern books of aftronomy, navigation, &c. For an account of feveral, and efpecially of thofe publifhed annually under the direction of the commiffioners of longitude, fee ALMANAC, EPHEMERIDES, and LONGITUDE.

For TABLES *relating to annuities*, &c. fee ANNUITIES, EXPECTATION *of Life*, LIFE-*Annuities*, MORTALITY, and SURVIVORSHIP.

TABLES, *Sexagenary*. See SEXAGENARY.

For TABLES *of the Stars*, fee CATALOGUE and STAR.

TABLES *of Sines*, *Tangents*, and *Secants*, of every degree and minute of a quadrant, ufed in trigonometrical operations, are ufually called *Canons;* which fee. See alfo SINE.

TABLES *of Logarithms*, *Rhumbs*, ufed in geometry, navigation, &c. See LOGARITHM and RHUMB.

TABLES, *Loxodromic*, are tables in which the difference of longitude, and quantity of the way in any rhumb, are exhibited to every ten minutes of every degree of the quadrant variation of the latitude. See RHUMB.

TABLE *of Heights*, in Englifh feet, from the level of the fea.

The Cafpian fea, lower by - - - - -	306
The Thames at Hampton, Roy - - - -	$14\frac{1}{2}$
The Tiber at Rome - - - - - -	33
The Seine at Paris, mean height - - -	$36\frac{1}{2}$
The Thames, at Buckingham-ftairs, $15\frac{1}{2}$ feet below the pavement in the left-hand arcade - -	43

By barometrical comparifon with the Seine and the Mediterranean; but this height is probably too great. Roy fuppofes the low water of the fpring tides at Ifleworth to be only one foot above the mean furface of the ocean. He allows feven feet for the difference of the low water at the Nore and at Ifleworth, and taking 18 feet for the height of the fpring tide, adds one-third of this for the mean height of the fea. At Hampton, the Thames is $13\frac{1}{2}$, feet above low water-mark at Ifleworth.

The pagoda in Kew gardens, from the ground		$116\frac{1}{2}$
The weft end of the Tarpeian rock - -		151
The Palatine hill - - - - - -		166
The Claudian aqueduct, bottom of the canal -		208
The Janiculum - - - - - -		293
The crofs at St. Paul's, from the ground - -		340
St. Peter's, fummit of the crofs - - -		535
From the ground	471	
Arthur's feat, from Leith pier-head - -		803
Lake of Geneva - - - - - -		1230
Its greateft depth	393	
Mount Vefuvius, bafe of the cone - - -		2021
Skiddaw - - - - - - -		3270
Chamouny, ground floor of the inn - - -		3367
Mount Vefuvius, mouth of the crater - -		3938

For the heights of other mountains, &c.; fee MOUNTAIN.

It may be obferved, with refpect to general Roy's calculation of the mean height of the fea, that it does not appear that in rivers, or even in narrow feas, we ought to add one-third of the height of the tides only to that of low water, in order to find the level; for it is probable that even the original tides may often refemble thofe of lakes, where, for want of breadths, the effects of a fpheroidical tide cannot take place, and the elevation and depreffion are very nearly equal.

TABLE, in *Heraldry*. Coats, or efcutcheons, containing nothing but the mere colour of the field, and not charged with any bearing, figure, or moveable, are called *tables d'attente*, *tables of expectation*, or *tabulæ rafæ*.

TABLE *Bay*, in *Geography*, a bay fituated on the weft coaft of the fouthern extremity of Africa, near which are the fort and town of the Cape of Good Hope. This bay is formed by three lofty mountains. Cape Town, the capital of the colony, lies on the S.E. angle of the bay. The primary object to which Table bay is fubfervient, is the convenience of a plentiful ftream of pure limpid water, rufhing out of the mountain, and this circumftance determined the firft fettlers in their choice of the fcite for the town. If this had not been the cafe, the firft fettlers would unqueftionably have given the preference to Saldanha bay, the only defect of which is the want of frefh water near it; whereas Table bay is faulty in every point that conftitutes a proper place for the refort of fhipping, and fo boifterous for four months in the year, as totally to exclude all fhips from entering into it. The anchoring ground in this bay is tolerably good; but the fhifting of the fand leaves bare fometimes whole ridges of the fame kind of hard blue fchiftus that appears every where on the weft fhore of the bay. Thefe ridges are fo fharp, that a cable that comes acrofs them will be cut in pieces. Hence it has happened, that the bay is full of anchors, which have never been fifhed up, and thefe contribute, as well as the rocks, to cut and chafe the

the cables of ſhips. If ſome pains be not taken to remove the anchors, the number of which is annually increaſing, a clear anchorage for a ſingle large ſhip will not be found. It has been propoſed to ſink mooring-chains for large ſhips, inſtead of their lying at anchor. During the S.E. winds, which blow from September to the end of April, and which is the ſeaſon when all ſhips bound for the Cape reſort to Table bay, the only danger is that of their being driven out to ſea from the wear and tear of the cables. However, as the ſea is not high, it is hardly poſſible for a ſhip to go on ſhore, unleſs it be on the S. point of Robben iſland, which being diſtant ſeven or eight miles, may be always avoided. Within this iſland and the continent there is excellent anchorage, where ſhips ſo driven out uſually bring up. Here alſo ſhips intending to come into Table bay generally wait the abatement of a S.E. wind, if it ſhall happen to blow too ſtrong for their working up againſt it. This iſland is too ſmall and too far to afford the leaſt ſhelter to Table bay from the N.W. winds that blow in the winter months. Naval officers ſeem to be divided in opinion as to the preference of Table bay or Simon's bay, (ſee SIMON's *Bay*,) which lies on the eaſtern ſide of the peninſula, in the great bay of Falſe, and which is the uſual reſort of ſhipping for five months in the year. Both are defective, but the latter appears to be more ſecure, from the circumſtance of few, if any, ſhips having been ever known to drive on ſhore from their anchors, whilſt ſcarcely a ſeaſon paſſes without the loſs of ſome in Table bay. In the winter months, when the wind blows from N. to N.W., 40 or 50 ſhips may lie at anchor perfectly ſecure in Simon's bay, and eight or ten may be ſufficiently ſheltered in the ſtrongeſt ſouth-eaſtern. From a ſurvey of the Great Falſe bay in 1797, the exact ſituation was aſcertained of a very dangerous rock, placed directly in the paſſage of ſhips into Simon's bay. The months in which ſhips uſually reſort to this bay, are from May to September incluſive. The diſtance from Cape Town, being 24 miles, and the badneſs of the road, moſtly deep ſand and ſplaſhes of water, render the communication at all times difficult, but more eſpecially in winter; and few ſupplies are to be had at Simon's town, a name given to a collection of about a dozen houſes. We have a chart of this bay in the ſecond volume of Barrow's Africa. S. lat. 53° 50′. E. long. 18° 15′.—Alſo, a bay on the E. coaſt of Labrador. N. lat. 53° 44′. W. long. 20° 57′.

TABLE *Iſland*, a ſmall iſland near the coaſt of Spitzbergen. N. lat. 80° 57′. E. long. 20° 30′.—Alſo, one of the New Hebrides, in the South Pacific ocean. S. lat. 15° 38′. E. long. 167° 7′.—Alſo, a ſmall iſland in the Eaſt Indian ſea, near the iſland of Paraguay. N. lat. 9° 15′. E. long. 118° 2′.—Alſo, a ſmall iſland in the Eaſt Indian ſea. N. lat. 14° 8′. E. long. 93° 32′.

TABLE *Mountain*, a mountain of Ireland, in the county of Wicklow; 15 miles W. of Wicklow.—Alſo, a mountain of Africa, near the Cape of Good Hope, ſo called from its flat ſummit. In fine weather this mountain is viſible at ſea at the diſtance of 28 or 30 miles. Table mountain ſupplies Table bay and Hout bay with ſtreams of water.

TABLE *Mountains*, mountains of North Carolina. N. lat. 36°. W. long. 81° 40′.

TABLE *Point*, a cape on the S. coaſt of the iſland of Bali. S. lat. 8° 45′. E. long. 115° 11′.

TABLE *River*, a river of Louiſiana, which runs into the Miſſiſippi, N. lat. 37° 12′. W. long. 90° 11′.

TABLE-*Wheel*, in *Rope-Making*. To lay ropes, &c. from a ſix-thread line to a two-inch and half rope, a table-wheel is fixed in the wheel-houſe, at the upper end of the rope-walk, in a frame fixed in the ground, with two ſliding cheeks. The bands which work the whirls, go ſeparately over each whirl, and round the turning-wheel. Some have ſix ſets of whirls of different ſizes, with iron ſpindles, and nibbed or forelock hooks at the outer end. A tackle-board, twelve inches broad, and three inches thick, with ſix holes for the hooks to go through, is fixed above the cheeks upon cleats.

TABLEAU, Fr. This word is uſed frequently in muſic, ſays Rouſſeau, to expreſs the whole deſign of a compoſition in the ſcore: as "this ſcore is quite a picture;" "this opera is full of admirable paintings and imitations of nature."

TABLET, in *Pharmacy*. See TABELLA.

TABLIER, LE, in *Geography*, a town of France, in the department of the Vendée; 6 miles S.S.E. of La Roche ſur Yon.

TABLING *of Fines*, is the making a table for every county, where his majeſty's writs run; containing the contents of every fine paſſed each term.

It is to be done by the chirographer of fines of the common pleas; who, every day of the next term, after engroſſing any ſuch fine, fixes one of the ſaid tables in ſome open place of the ſaid court, during its ſitting; and likewiſe delivers to the ſheriff of each county a content of the ſaid tables made for that reſpective county, the term before the aſſizes, to be affixed in ſome place in the open court, while the juſtices ſit.

TABLING, in *Ship-Building*, letting one piece of timber into another by alternate ſcores or projections from the middle, ſo that it cannot be drawn aſunder either lengthwiſe or ſidewiſe; ſuch are beams, &c.

TABLING, in *Sail-Making*, a broad hem made on the ſkirts of ſails, by turning the edge of the canvas over and ſewing it down. It is to ſtrengthen the ſail for ſewing on the bolt-rope.

TABO DAGROU, or *Little Dieppe*, in *Geography*, a town of Africa, on the Grain Coaſt.

TABO *Dune*, a ſea-port of Africa, on the Ivory Coaſt; 90 miles from Cape Palmas.

TABOA, a town of Portugal, in the province of Beira, on the Mondego; 9 miles S. of Viſeu.

TABOCANA, a town of Africa, in the kingdom of Quoja. N. lat. 5° 55′.

TABOCURU, a river of Braſil, which runs into the Atlantic, near the iſland of Maranhao. S. lat. 2° 40′. W. long. 45° 30′.

TABOGA. See TABAGO.

TABOLATO, a town of Mexico, in the province of Culiacan; 30 miles W. of Culiacan.

TABON, in *Natural Hiſtory*, a name given by the people of the Philippine iſlands to a bird called in other places *daie*, and remarkable for the largeneſs of its eggs; though ſome accounts of theſe are certainly fabulous.

TABONES, in *Geography*, one of the ſmall Philippine iſlands, near Maſbate. N. lat. 12° 12′. E. long. 123° 5′.

TABOO, a town of Africa, and capital of a country, ſituated to the E. of Sahara. N. lat. 24°. E. long. 12° 10′.

TABOO, a term uſed in the Sandwich iſlands to denote a kind of religious interdiction, of very powerful and extenſive operation. With places and perſons that were tabooed, all intercourſe was prohibited. The word was alſo uſed to expreſs any thing ſacred, or eminent, or devoted. Cook's Third Voyage, vol. iii. p. 164.

TABOR, or *Hradiſlie Hory Tabor*, *i. e.* the camp of Mount Tabor, in *Geography*, a town of Bohemia, in the circle of Bechin, founded by the Huſſites, ſituated on a mountain, near the river Luznice, is naturally ſtrong, and it it is fortified in the ancient manner, with a ditch, walls, and bulwarks. It had been the camp of John Zifka in the year 1420, and was raifed to a royal borough by the emperor Sigifmund. It was taken by ftratagem by Rodolph II. in 1611, and alfo in 1621, 1648, and 1744; 10 miles N.E. of Bechin. N. lat. 49° 27′. E. long. 14° 28′.

TABOR, *Mount*, a mountain of Paleftine, frequently mentioned in the Old Teftament. (See Jofh. xiv. 22. Judg. iv. 6. 12. Pf. lxxxix. 12. Jer. xlvi. 18. Hof. v. 1.) It ftands about the middle of Lower Galilee, between Nazareth and the country of Gennefareth. According to Jofephus, it is 30 furlongs in height, and 26 in compafs. It is an infulated mountain, fituated on a plain (that of Efdraelon), and having a level area at the fummit, very fertile and pleafant. According to Maundrell, this area is of an oval figure, extending in breadth about a furlong, and two furlongs in length. Jofephus fays, that he caufed it to be furrounded by walls, within the fpace of 40 days, that he might thus, without doubt, render it more inacceffible to the Romans.

An ancient tradition informs us, that Jefus was transfigured upon mount Tabor (fee Matt. xvii. 2. Mark, ix. 2. Luke, ix. 28.), and that this is the place which is called by St. Peter the "holy mount." (2 Pet. i. 18.) Some learned authors, however, are of opinion, that the transfiguration happened upon a mountain near Cæfarea Philippi, *i. e.* upon mount Panium, which is very high, according to Jofephus. We find the city called Tabor, mentioned 1 Chron. vi. 77; but it is not well known, how it was fituated with relation to the mount.

TABOR, *Tabour*, *Tabret*, or *Tabourin*, a fmall *drum;* (which fee.) It is an accompaniment to a fmall pipe or fife; inftruments very animating in a country dance.

TABORITES, or THABORITES, in *Ecclefiaftical Hiftory*, a branch or fect of the ancient Huffites.

The Huffites, towards the beginning of the 15th century, dividing into feveral parties, and about the year 1420, into two great factions; one of them retired to a little mountain or rock, fituate in Bohemia, 15 leagues from Prague, and there put themfelves under the conduct of Zifka; building themfelves a fort or caftle, and a regular city, which they called *Tabor* or *Thabor*, either from the general word *thabor*, which in the Sclavonic language fignifies *caftle;* or from the mountain *Tabor*, mentioned in Scripture; and hence they became denominated *Thaborites*. Thofe of the other party were denominated *Calixtins*.

The Taborites not only infifted upon reducing the religion of Jefus to its primitive fimplicity, but required alfo that the fyftem of ecclefiaftical government fhould be reformed in the fame manner, the authority of the pope deftroyed, and the form of divine worfhip changed: they demanded the erection of a new church and hierarchy, in which Chrift alone fhould reign, and all things fhould be carried on by a divine direction and impulfe. In maintaining thefe demands, fome of their leaders went fo far as to flatter themfelves with the chimerical notion, that Chrift would defcend in perfon upon earth, armed with fire and fword, to extirpate herefy, and purify the church from its numerous corruptions. This enthufiaftic clafs of Huffites alone, Mofheim fays, we are to look upon as accountable for all thofe acts of violence, which are too indifcriminately laid to the charge of the Huffites in general, and to their two leaders, Zifka and Procopius, in particular. After the time of the council of Bafil, in 1433, which endeavoured, though without fuccefs, to reconcile the Taborites with the Roman pontiff, they began to review their religious tenets, and their ecclefiaftical difcipline, with a defign to render them more perfect. This review, conducted with great prudence and impartiality, gave a rational afpect to the religion of this fect, who withdrew themfelves from the war with Sigifmund, in which they were engaged, abandoned the doctrines, which, upon ferious examination, they found to be inconfiftent with the genius and fpirit of the Gofpel, and banifhed from their communion all thofe whofe difordered brains or licentious manners might expofe them to reproach. The Taborites, thus new-modelled, were the fame with thofe Bohemian brethren (or Picards, *i. e.* Beghards, as their adverfaries called them) who joined Luther and his fucceffors at the Reformation, and of whom there are at this day many of the defcendants and followers in Poland and other countries. Mofh. Eccl. Hift. vol. iii.

TABORNOST, in *Geography*, a town of Africa, in the country of Darah; 120 miles S.E. of Morocco.

TABORO, a mountain of Naples, in Principato Citra, on the confines of Lavora.

TABOROWKA, a town of Poland, in the palatinate of Kiev; 16 miles W.N.W. of Bialacerkiev.

TABOTUVO, a town of Africa, on the Ivory Coaft; 45 miles S.W. of Druin.

TABOU, a town of Africa, on the Ivory Coaft; 36 miles S.W. of Druin.

TABOURET, *Privilege of the*, in France, is a privilege fome great ladies enjoy, to fit, or have a ftool, in the queen's prefence.

TABRE, in *Geography*, a town of Hindooftan, in the Carnatic; 15 miles E. of Volconda.

TABREEZ, or TAURIS, a city of Perfia, the capital of the province of Adirbeitzan, or Azerbijan. Sir William Jones, and other learned perfons, are of opinion, that this city was the ancient Ecbatana. M. D'Anville, adjudging that honour to Hamadan, conceives Tauris to be Gaza, or Gunzaca, where Cyrus depofited the treafures of Crœfus, and which was afterwards taken by Heraclius. According to the Perfians, Zobeida, the celebrated wife of Haroun-ul-Rafhid, was its founder; but on their authority we can place little reliance. It is certain, however, that Tauris was a favourite refidence of Haroun-ul-Rafhid; and though he had not the honour of founding this city, it is probable that he improved and embellifhed it in a confiderable degree. In the days of Chardin, it was one of the largeft and moft populous cities in the Eaft, and, according to that traveller, contained half a million of inhabitants. But no town has fuffered more from the ravages of war. Situated towards the frontiers of contending empires, it has alternately been occupied by Turks, Tartars, and Perfians, and has been captured and facked eight different times; but its ruin has been chiefly owing to the number of earthquakes which have, at different times, levelled its proudeft edifices with the duft.

Tabreez does not now contain more than 30,000 inhabitants, and is one of the moft wretched cities in Perfia. It is feated on an immenfe plain at the foot of a mountain, on the banks of a fmall river, the waters of which are confumed in the cultivation. This river, called Agi, proceeds from the mountains at Buftum, and enters the plain of Tabreez three miles N. of that city. This city is furrounded with a decayed wall, and the only decent houfe in the place is a new barrack, erected by the prince for the accommodation of his troops. The ruins of the ancient city are very extenfive and very mean, being nothing but a confufed mafs of old mud walls. Tabreez is fituated in N. lat. 38° 10′. E. long. 46° 37′. Kinneir's Mem. of the Perfian Empire.

TABUDA, in *Ancient Geography*, a river of Belgic Gaul, in the country of the Morini, near Gefforiacum Navale. Ptol.

TABUE',

TABUE', in *Geography*, a town of Egypt, on the Nile; 9 miles S.W. of Menuf.

TABUIL, a town of South America, in the province of Tucuman; 20 miles E. of St. Fernando.

TABULAR Spar, in *Mineralogy*, *Spathon tables*, Haüy; a fpecies of lime-ftone, generally of a greyifh-white colour, but fometimes inclining to greenifh-yellow or reddifh-white. It occurs maffive and cryftallized in rectangular four-fided tables. The luftre of the principal fracture is fhining and pearly; the ftructure is imperfectly lamellar. Tabular fpar occurs in large diftinct prifmatic concretions, which are promifcuoufly aggregated: it is tranflucent, and phofphorefces when fcratched with a knife: its fpecific gravity is 2.86. It is fometimes friable. When put into nitrous acid it effervefces, and then falls into grains. It is infufible by the blowpipe. The analyfis, as given by Klaproth, is

Silex - - -	50
Lime - - -	45
Water - - -	5

This mineral is of rare occurrence; its locality, as given by Stütz, is at Dognafka, in the bannat of Temefvar, in Hungary, where it occurs in blue-coloured primitive lime-ftone, with garnets, actinolite, tremolite, and variegated copper. It is faid by Eftner to occur at Ozavitza. In the new fyftem of mineralogy propofed by Berzelius, this mineral is denominated a *bifiliciate of lime;* the oxygen contained by the different conftituent parts being in the proportion of 6.3 and 1; the filex containing twice the oxygen of the lime, and the water the fixth part.

TABULARIUM, among the Romans, the name of that part of the treafury where the Elephantine books were kept.

TABULARIUS. See Tabellio.

TABULARUM Apertura. See Apertura.

TABULATUM. See Tabella.

TABUM, a word ufed by medical writers, to exprefs a thin, fanious, and putrid humour, flowing from old ulcers, or from mortified parts, in cafes where the vital powers are not fufficient for the generation of a perfect or concocted matter.

TABY, in *Geography*, a town of Sweden, in Eaft Gothland; 14 miles S.E. of Nordkioping.

TACA, a town of Japan, in the ifland of Xicoco; 20 miles S.W. of Tofa.

TACALALPO, a town of Mexico, in the province of Tabafco; 23 miles S.W. of Tabafco.

TACALAYO, a town of South America, in the province of Chaco; 35 miles N. of St. Salvador de Jugui.

TACALEA, a town of South America, in the province of Carthagena, at the conflux of the Cauca and Madalena; 85 miles S.E. of Carthagena.

TACAMAHACA, in *Gardening*, a tree of the ornamental and fweet-fmelling kind, which is often planted out in fhrubberies, borders, and other parts of pleafure-grounds with much propriety and advantage in its appearance, and the grateful odour which it diffufes all around it. See Populus.

Tacamahaca, or *Tacamacha*, a kind of refinous gum, diftilling from the trunk of a very large tree, a fpecies of poplar, growing in New Spain, Canada, and other parts of America; but in the greateft abundance, as it is faid, in the ifland of Madagafcar.

The tree is not unlike our poplar-tree, only bigger and taller; its leaves long and green, its fruit red, of the fize of our walnuts, exceedingly refinous, and containing a ftone like our peaches. See Populus *Balfamifera*.

The wood of the tree makes good timber for fhips, and the gum it yields ferves there for their caulking, though its chief ufe with us is in medicine.

Two forts of this refin are fometimes to be met with. The beft, called tacamahaca in fhells, from its being collected in a kind of gourd fhells, is fomewhat unctuous and foft, of a pale yellowifh or greenifh colour, a bitterifh aromatic tafte, and a fragrant delightful fmell, approaching to that of lavender and ambergris. This fort is very rare. That commonly found in the fhops is in tranfparent grains or globes, of a whitifh, yellowifh, brownifh, or greenifh colour, and of a lefs grateful fmell than the foregoing.

The firft is faid to exude from the fruit of the tree; the other from incifions made in the trunk. The tree, as raifed among us, affords in its young buds, or the rudiments of the leaves, a refinous juice of the fame kind of fragrance.

Tacamahaca is chiefly ufed as an ingredient in warm nervine plafters; though the fragrance and tafte of the finer fort indicate its being applicable to other purpofes, as an internal balfamic corroborant. Both kinds diffolve in rectified fpirit into a gold-coloured liquor, with a fmall quantity of remaining impurity: they alfo impregnate water confiderably with their fmell and tafte, but give out very little of their fubftance to this menftruum. Lewis. The Indians are faid to ufe it for all kinds of pains. Schroder affirms, that he has feen intolerable pains in the leg removed by it.

TACAMES, or Atacames, in *Geography*, a government of South America, in the province of Quito, fituated W. of the weftern Cordilleras of the Andes, bordering northward on the department of Barbacoas, in the government of Popayan, weftward on the South fea, and fouthward on the territory of Guayaquil, and reaching along the coaft from the ifland of Tumaco and the houfe of Hufmal, which lie in N. lat. 1° 30', to the bay of Caracas, and the mountains of Balfamo, in S. lat. 0° 34'. This jurifdiction was long neglected after the conqueft of it by Sebaftian de Belalcazar, the introduction of the Chriftian religion, and its homage to the king of Spain. At length, however, it was difcovered that by making fettlements here, the intercourfe and commerce betweeen Quito and Terra Firma would be facilitated; and with this view, Paul Durango Delgadillo was, in the year 1621, appointed governor of Atacames and Rio de las Efmaraldas. He was fucceeded by Francifco Perez Menacho in 1626, and other governors, who failed in the accomplifhment of the object for which they were appointed: at length Don Pedro Vicente Maldonado, in 1741, laid open a direct communication betwixt Quito and the Rio de las Efmaraldas, and in recompence of his fuccefs he was confirmed as governor in 1746, and in the following year the country was formally conftituted a government. This government contains twenty towns, which are but fmall and poor, five of them fituated on the fea-coaft, and the others being inland places. The inhabitants of the five towns are Spaniards, Meftizos, Negroes, and Cafts, which fprung from thefe three claffes. Thofe of the other fifteen are in general Indians, among whom are few Spaniards, Mulattos, or Negroes. The fpiritual concerns of the diftrict are entrufted to eleven priefts, who refide in the great towns, and occafionally vifit the others, in which are chapels of eafe.

The temperature of Atacames is like that of Guayaquil, and accordingly it produces the fame kinds of vegetables, grains, and fruits; fome of them to greater perfection, on account of its more elevated fituation. It likewife produces in great abundance vanillas, achote, farfaparilla, and indigo. Confiderable quantities of wax are made here, and the forefts of the country afford a great variety of trees of large fize and lofty height, fit for domeſtic and naval purpoſes. (Juan and Ulloa's Voyage, vol. i.) M. d'Anville, in his map of Quito, has marked the ſuppoſed loſt mine of Emeralds, about 20 miles to the ſouth of the town of Tacames, which is ſituated in a bay of the Pacific ocean, to which it gives name; 110 miles N.W. of Quito. N. lat. 0° 52'. W. long. 62°.

TACAPHORIS, in *Ancient Geography*, a town of Africa, in the interior of Marmarica. Ptol.

TACARIGUA, *Bay* or *Lake*, in *Geography*, is ſituated in the government of Caraccas, in America, about one and a half league from the mouth of the river Tuy. Its form is circular, and its meaſure is about ſeven leagues from the ſea, on the N.E. to its deepeſt receſs on the S.E. It abounds in all kinds of ſea-fiſh, and is remarkable for the great number of alligators which are ſeen in it.

TACASARTA, in *Ancient Geography*, a town of Egypt, upon the route from Memphis to Peluſium. Anton. Itin.

TACASUKI, in *Geography*, a town of Japan, in the iſland of Niphon; 12 miles N.W. of Meaco.

TACATO, a town of Japan, in the iſland of Niphon; 48 miles S.S.W. of Jedo.

TACATUA, Tackus, in *Ancient Geography*, a town ſituated on the coaſt of Africa, between Ruſicades and Hippone; E. of the promontory of Tapſos, and W. of that of Hippi.

TACAU, in *Geography*, a town of Japan, in the iſland of Niphon; 90 miles N.W. of Jedo.

TACAXI, a ſmall iſland of Japan, on the S. coaſt of the iſland of Ximo, at the entrance into the gulf of Ximabara.

TACAZZE', a river of Africa, next to the Nile the largeſt in Upper Abyſſinia. Its principal branch riſes in Angot, in a plain champaign country, about 200 miles S.E. of Gondar, near a ſpot called Souami Midre. It has three ſpring-heads, or ſources, like the Nile: near it is the ſmall village Gourri, ſignifying cold. The other branch of the Tacazzé riſes in the frontiers of Begemder, near Dabuco, whence, running between Goulion, Laſta, and Beleſſen, it joins with the Angot branch, and becomes the boundary between Tigré and Amhara. This river was called the Siris, or the river of the dog-ſtar, whilſt the uncivilized people, the Cuſhites of the iſland of Meroë, reſided upon its banks. It was then called the Tannuſh Abay, or the leſſer of two rivers that ſwelled with the tropical rains, which was the name given to it by the peaſants from a compariſon of it with the Nile. It was the Tacazzé in Derkin, or the dwelling of the Taka, before it joined the Nile in Baja, and it was the Aſtaboras of thoſe of the ancients that took the Nile for the Siris. It is now the Atbara, giving its name to that peninſula, which it incloſes on the E. as the Nile does on the W. and which was formerly the iſland of Meroë. Tacazzé is a pleaſant river, ſhaded with fine lofty trees, and having its banks covered with tamariſks and buſhes ſingularly fragrant. Its ſtream is very limpid, its water excellent, and it abounds with a great variety of fiſh: its coverts are alſo full of all ſorts of game. During the inundation, it carries in its bed nearly one-third of all the water that falls in Abyſſinia, riſing to about three fathoms, tearing up rocks and large trees in its courſe, and forcing down their broken fragments ſcattered in its ſtream, with a noiſe like thunder echoed from a hundred hills. This river, though in many reſpects beautiful, has its diſadvantages. From the falling of the firſt rains in March till November, it is death to ſleep in the country adjoining to it, both within and without its banks. The inhabitants retire and live in villages on the top of the neighbouring mountains; and theſe are all robbers and aſſaſſins, who deſcend from their habitations in the heights to lie in wait for, and plunder the travellers who paſs that way. Its abundance of fiſh draws together a number of crocodiles: in its adjacent thickets are vaſt multitudes of lions and hyænas. The ford of this river is ſituated in N. lat. 13° 42' 45". Bruce's Travels, vol. iii.

TACCA, in *Botany*, a Malay name, uſed by Rumphius, and adopted by the claſſical Forſter, as well as by the younger Linnæus. The word being, though barbarous and unmeaning, eaſy of pronunciation, we are induced to acquieſce in theſe authorities, and to retain it, along with *Aucuba*, *Pandanus*, and a few other names ſo circumſtanced. Sir Joſeph Banks and Dr. Solander had called the ſame genus, very elegantly and judiciouſly, *Chaitæa*, from χαίτη, *a flowing mane*, or *head of hair*, in alluſion to the ſpreading tuft of long capillary filaments, apparently a ſort of bracteas, or abortive ſtalks, accompanying the flowers.—Forſt. Gen. t. 35. Linn. Suppl. 37. Schreb. 229. Willd. Sp. Pl. v. 2. 200. Mart. Mill. Dict. v. 4. Brown Prodr. Nov. Holl. v. 1. 340. Ait. Hort. Kew. v. 2. 306. Juſſ. 56. Lamarck Illuſtr. t. 232. Gærtn. t. 14.—Claſs and order, *Hexandria Monogynia*. Nat. Ord. *Narciſſi*, Juſſ. Akin to *Aroideæ* and *Ariſtolochiæ*, Brown.

Gen. Ch. *Cal.* Perianth ſuperior, of one leaf, in ſix very deep, elliptic-oblong, equal, converging, permanent ſegments. *Cor.* none. *Stam.* Filaments ſix, oppoſite to the ſegments of the calyx, into whoſe baſe they are inſerted, and half as long, equal, dilated, flat, oblong, incurved and vaulted at the ſummit; anthers ſeſſile in the hollow of each filament, of two diſtinct lobes. *Piſt.* Germen inferior, roundiſh; ſtyle ſhort, cylindrical, with three furrows; ſtigmas three, ſpreading, dilated, cloven. *Peric.* Berry ovate, angular, of one cell. *Seeds* numerous, ovate, ſtriated, "inſerted into three receptacles annexed to the coat of the berry." *Brown*.

Eſſ. Ch. Calyx in ſix deep equal ſegments. Petals none. Filaments vaulted. Stigmas ſtellated. Berry inferior, angular, with many ſeeds.

1. T. *pinnatifida*. Pinnatifid Tacca, or Otaheite Salep. Linn. Suppl. 251. Forſt. Prodr. 36. Pl. Eſcul. 59. Willd. n. 1. Ait. n. 1. Loureir. Cochinch. 300. (Tacca; Rumph. Amboin. v. 5. 324—328. t. 112—114. Chaitæa Tacca; Banks Ic. Ined. apud Bibl. Linn. Leontice Leontopetaloides; Linn. Sp. Pl. 448. "Leontopetaloides; Amman. in Comm. Petrop. v. 8. 211. t. 13.")—Leaves pinnatifid.—Native of the Eaſt Indies, Cochinchina, the tropical part of New Holland, and the Society Iſlands; brought to England by Capt. Bligh, in 1793, but has not yet flowered. *Aiton*. The *root* is tuberous and perennial. *Leaves* one or two, radical, on long ſtalks, erect, deeply three-cleft, with deeply and variouſly pinnatifid, acute, entire lobes, a foot long, ſmooth, reticulated with veins. *Footſtalk* hollow, ſmooth. *Flower-ſtalk* radical, about a yard high, hollow, erect, unbranched, terminating in a ſimple umbel of ſeveral drooping, green, ſomewhat glaucous, *flowers*, accompanied by an *involucrum* of about as many upright, partly pinnatifid, green leaves, near two inches long; with a greater number of much longer thread-ſhaped bodies, ſuſpected by Mr. Brown to be abortive flower-ſtalks. The *berries* are black, larger than a gooſeberry, but little juicy when ripe.

Forſter ſays the freſh root is intenſely bitter and acrid, though ſomewhat milder when cultivated. By being grated, and repeatedly waſhed in freſh water, it yields a very white mild powder, like ſtarch, which is dried in the ſun, and then ſerves for food, either in the manner of Salep, or baked in the form of cakes, which are even better than thoſe made of Sago. The former mode of uſing this powder is is cuſtomary in the South-ſea, the latter in the Molucca, iſlands. This root is alſo applied as a plaſter, we preſume freſh, for deep wounds made with darts or other weapons. It is well known that a ſimilar powder, or mild wholeſome flour, is obtained, by waſhing, from the roots of *Jatropha Manihot*, and various ſpecies of *Arum*, even our common *Arum maculatum*, as well as from raw potatoes.

2. T. *integrifolia*. Entire-leaved Tacca. Gawler in Curt. Mag. t. 1488. Ait. Epit. 375.—Leaves ovate, undivided.—Native of the Eaſt Indies, from whence it was ſent by Dr. Roxburgh to ſir Abraham Hume, and flowered in the ſtove at Wormleybury, in June 1812. The *leaves* are four or five inches long, probably often more, ſmooth, quite ſimple and entire, with one rib and many oblique veins; each on a ſtout, channelled, brown *footſtalk*. *Flowers* umbellate, erect or decumbent, of a dingy green, with purple ſtalks. Leaves of the *involucrum* large, ovate, pale green with many purple ribs, and accompanied by a few white thread-ſhaped ſtalks, reſembling the former. We have ſeen no ſpecimen in flower.

TACE, Ital., in *Muſic*, be ſilent.

TACET, Lat., is uſed when a vocal or inſtrumental part is to be ſilent during a whole movement: as in a maſs, *Chriſte tacet*; in a concerto or ſonata, *Largo tacet*, &c.

TACET, JOSEPH, in *Biography*, an eminent performer and maſter on the German flute, born, we believe, in France; but who came to England ſo early, and continued here ſo long, that by forgetting his own language, he ſpoke Engliſh like a native of the iſland. He was the firſt to adopt the additional keys of Quantz to the German flute, in order to correct the bad notes, and increaſed their number from three to five; though, we believe, he ſeldom uſed them all.

TAC-FREE, in *Old Charters*, an exemption from payments.

TACHAN, in *Geography*, a ſmall iſland in the Chineſe ſea, near the coaſt of Cochinchina. N. lat. 12° 35′. E. long. 109° 14′.

TACHAR, a town of Thibet; 23 miles S. of Tourfan.

TACHARD, GUY, in *Biography*, a French Jeſuit, who, after accompanying chevalier de Caumont, and the abbé de Choiſi, on an embaſſy to Siam, returned to Europe in 1688, and having made another voyage to the Indies, died at Bengal about 1694. His "Two Voyages to Siam," in 2 vols. Paris, 1686 and 1689, re-printed at Amſterdam in 1700, well received at the time of their publication, have ſunk in reputation on account of the credulity and exaggeration of the author, of which ſatisfactory evidence has been given by chevalier de Forbin, in his Memoirs. Nouv. Dict. Hiſtor.

TACHAR-SEGHIN, in *Geography*, a town of Thibet; 50 miles S. of Tourfan.

TACHAS, in *Ichthyology*, a name given by ſome authors to the manati, or ſea-cow.

TACHASARA, in *Ancient Geography*, a town of Aſia, in the interior of Media, between Zalaca and Pharambara. Ptol.

TACHAU, or TACHOW, in *Geography*, a town of Bohemia, in the circle of Pilſen, taken by Ziſka by aſſault, and ſacked in the year 1427; 34 miles W. of Pilſen. N. lat. 49° 47′. E. long. 12° 40′.

TACHBACH, a town of Germany, in the county of Henneberg; 8 miles E.S.E. of Meinungen.

TACHEMAL-ONDOUC, a town of Chineſe Tartary. N. lat. 45° 59′. E. long. 122° 31′.

TACHEMPSO, or TACHOMPSO, in *Ancient Geography*, an iſland of Ethiopia, in the vicinity of Libya, partly occupied by the Egyptians, and partly by the Ethiopians.

TACHENS, in *Geography*, a lake of the archbiſhopric of Salzburg, five miles long, and about one wide; 14 miles N.W. of Salzburg.

TACHIA, in *Botany*, called *Tachi* by the Galibis in Guiana, becauſe the hollow ſtem and branches of this ſhrub ſerve as a retreat for ants, the above word ſignifying, in the language of thoſe people, an ant's neſt. Aublet Guian. 75. t. 29. See MYRMECIA.

TACHIBOTA. See SALMASIA.

TACHIGALIA, *Tachigali* of the Galibis in Guiana. See CUNÆA.

TA-CHOUI-CAO-HOTUN, in *Geography*, a town of Corea; 425 miles E. of Peking. N. lat. 40° 11′. E. long. 124° 53′.

TACHYGRAPHY, called alſo BRACHYGRAPHY, formed from ταχυς, *ſwift*, and γραφη, *writing*; the art of quick or ſhort writing.

There have been various kinds of tachygraphy invented: among the Romans, there were certain notes uſed, each of which ſignified a word.

The rabbins have a kind of tachygraphy formed by abbreviations, which made a kind of technical words; wherein each conſonant ſtands for a whole word: as רמבם, רשי, *raſchi*; which ſtands for *rabbi Schelomoh Jarri*. See NOTARICON.

In France, &c. the only tachygraphy uſed is, the retrenching of letters, or even whole ſyllables of words, as in *ſdm* for *ſecundum*, *aut* for *autem*, *d* for *ſed*, *o* for *non*, *participaon* for *participation*, &c.

The firſt printers imitated theſe abbreviations; but at preſent they are almoſt laid aſide, except among ſcriveners, &c.

In England we have great variety of methods of tachygraphy, or ſhort-hand; more by far, and thoſe much better, eaſier, ſpeedier, and more commodious, than what are known in any other part of the world: witneſs Shelton's, Wallis's, Rich's, Maſon's, Webſter's, Weſton's, Macaulay's, Annet's, Gurney's, Lyle's, Byrom's, Rees's, and ſeveral other ſhort-hands. See STENOGRAPHY.

TACISSO, JEUNG, in *Geography*. See TASSASUDON.

TACIT ACCEPTANCE. See ACCEPTANCE.

TACIT *Community*. See COMMUNITY.

TACIT *Decree*, in *Roman Antiquity*, ſecret deliberations, to which none but old ſenators were ſummoned.

J. Capitolinus mentions a decree of this ſecret kind, which he calls *S. C. tacitum*, and ſays, that the uſe of them among the ancients was derived from the neceſſities of the public, when upon ſome imminent danger from enemies, the ſenate was either driven to ſome low and mean expedients, or to ſuch meaſures as were proper to be executed before they were publiſhed, or ſuch as they had a mind to keep ſecret even from friends; on which occaſions they commonly recurred to a tacit decree, from which they excluded their clerks and ſervants. performing that part themſelves, leſt any thing ſhould get abroad. Capitol. de Gordian. c. 12.

In the early times of the republic, there are ſeveral inſtances mentioned by hiſtorians of ſuch private meetings of the ſenate, ſummoned by the conſuls to their own houſes; to which none but the old or proper ſenators were admitted, and of which the tribunes uſually complained. Vide Dion. Halic. l. x. 40. l. xi. 55. 57. Middlet. of Rom. Sen. p. 90.

TACITUS, CAIUS CORNELIUS, in *Biography*, a well-known hiſtorian, was born about the year of the Chriſtian era 57, at Interamna, or the modern Terni. His father was a Roman knight, and procurator of Belgic Gaul. Devoted from his youth to the cultivation of literature and rhetoric,

rhetoric, his reputation at maturity was fo well eftablifhed, that he was permitted by Julius Agricola, at the expiration of his confulate, which occurred in the year 77, to form a matrimonial connection with his daughter. Thus introduced into public life, he was honoured by the patronage of Vefpafian, Titus, and Domitian. Having difcharged the office of prætor, he withdrew from the capital for four years; and on his return he found the latter emperor exercifing a tyranny which he bitterly lamented. His profpects, however, were brightened by the acceffion of Nerva to the confulfhip, in the year 97; and as his affociate Verginius Rufus died before the termination of his office, Tacitus was appointed to be his fucceffor, and commenced his literary career, if the "Dialogue concerning Orators" be not his compofition, with an eloquent oration at the funeral of Verginius, of whom Pliny fays that he "crowned the felicity of his life by poffeffing the moft eloquent of eulogifts at his death." In the early part of Trajan's reign, he concurred with his friend Pliny the Younger, in the accufation of Marcus Prifcus for the crimes with which he was chargeable during his proconfulate of Africa. The conduct of Tacitus and Pliny on this occafion was honoured by the encomium of the fenate in their fentence and condemnation of the culprit. The future circumftances of his life, and the precife time of his death, are unknown; but as he makes no allufion to the reign of Adrian, it is moft probable that he did not furvive that of Trajan.

The principal works of Tacitus were his "Annals," and his "Hiftory." The former comprehended the Roman affairs from the death of Auguftus to that of Nero; but it has been tranfmitted to us in a very mutilated ftate. The latter comprifed the period from the end of Nero to the death of Domitian; and now exifts in an imperfect ftate, as the narrative does not extend far beyond the acceffion of Vefpafian. His other works are, a "Life of Agricola," and a treatife "On the Manners of the Germans." The ftyle of his writings is fingularly concife, abrupt, and elliptical, fo that the reader is often at a lofs to comprehend his meaning. His aim feems to have been to comprize much in a fmall compafs, and he has thus furnifhed a great variety of political maxims, which, by the brevity with which they are expreffed, are peculiarly adapted to imprefs the memory. It is obferved, however, by one of his biographers, that he occafionally difcovers "an affectation of converting common remarks into aphorifms, and of philofophizing when he was only required to narrate." Neverthelefs, as the fame author remarks, "no profe writer in any language furpaffes or perhaps equals him in force of defcription, and the choice of circumftances by which he dramatizes a fcene, and brings it before the eyes of his reader; and no want of perfpicuity appears in his ftyle when employed in the relation of ftriking events." The writer whom we are now citing extols the moral merits of Tacitus as an hiftorian, and gives him his full fhare of praife for inculcating the nobleft principles of action, both public and private, and difplaying the evils arifing from uncontrolled power, united, as it generally muft be, with vice and tyranny. "He was guarded," fays the biographer, "by philofophy againft credulity, and by the love of truth againft calumny." He adds, "upon the whole, whatever defects may be juftly imputed to him, his works can never fail to keep a diftinguifhed place among the moft valuable treafures which antiquity has bequeathed to us." The following editions of the works of Tacitus are thofe which are held in the higheft eftimation: *viz.* Ryckii, Lugd. Bat. 1687, 2 vols. 12mo.; Gronovii, Traj. 1721, 2 vols. 4to.; Ernefti, Lipf. 1752 and 1772, 2 vols. 8vo.; Brotier, Paris, 1771, 4 vols. 4to. and 1776, 7 vols. 12mo. Many tranflations in different languages are extant. Brotier Præf. Gen. Biog.

Tacitus, M. Claudius, an emperor of Rome, who was advanced to this eminence from the rank of fenator, to which he belonged at the time of Aurelian's death, A.D. 275. He was then about 75 years of age, having been conful twice, bearing the character of diftinguifhed wifdom and moderation, and enjoying a patrimony valued at between two and three millions fterling. An interregnum took place in confequence of the refufal of the army and fenate to nominate an emperor, and had lafted nearly eight months. Tacitus wifhed to refer the choice to the army; but finding that he was the perfon to whom the attention of the public was directed, he withdrew to his country feat in Campania, and continued there two months. At length, the conful convoked the fenate, and Tacitus appeared in the affembly. Being afked his opinion on the fubject that had occafioned delay, he arofe to reply; but he was immediately faluted, amid general acclamations, with the titles of Auguftus and emperor. The plea of his age and infirmities was of no avail; conftrained to accept the high honour on Sept. 25, A.D. 275, he entered on his office; the Roman people and the prætorian guards approving and confirming his election. His firft object was to reftore to the fenate rights and privileges, which ferved to render the conftitution a limited monarchy. After thus gratifying the fenators, he proceeded to regulate and reform the public morals; exhibiting in his own conduct an example of fimplicity and frugality, whilft he was unufually munificent in his attention to public objects. To literature he was a diftinguifhed patron; and he paid particular refpect to his anceftor, the hiftorian Tacitus, directing ten copies of his works to be annually depofited in the public libraries. In order to fecure the attachment of the army, he vifited the camp at Thrace at the commencement of the year 276, promifed the ufual donative, and inflicted punifhment on the principal perfons who had been concerned in the murder of Aurelian. In procefs of time, diffentions broke out amongft the troops, and the malcontents being joined by the murderers of Aurelian, who had made their efcape, either by direct violence, or by the vexation which they occafioned to the aged emperor, terminated his life at Tyana, in Cappadocia, after a reign of 200 days. Crevier. Gibbon.

TACK, in *Sail-Making*, the foremoft lower corner of all fore and aft fails.

Tack, a rope ufed to confine the clues of the main and fore courfes forward occafionally in a fixed pofition, and alfo to confine the tacks of ftay-fails, boom-fails, and fore-fails of floops; and the outer lower corners of ftudding-fails. The tacks of the main and fore courfes are ropes cable-laid, and made tapering, having a large wall-knot at one end, which prevents its drawing through the clue of the fail.

Tack is alfo applied by analogy to that part of any fail to which the tack is ufually faftened. A fhip is faid to be on the ftarboard or larboard tack when fhe is clofe-hauled, with the wind upon the ftarboard and larboard fide: and in this fenfe, the diftance which fhe fails in that pofition is confidered as the length of the tack; although this is more frequently called a *board*. Falconer.

Tack, *To*, in *Sea Language*, is to change the courfe from one board to another, or to turn about the fhip from the ftarboard to the larboard tack, in a contrary wind.

Tacking is alfo ufed, in a more enlarged fenfe, to fignify that manœuvre in navigation, by which a fhip makes an oblique progreffion to the windward, in a zigzag direction. This, however, is more ufually called *beating*, or *turning* to windward.

windward. In order to explain the theory of tacking a ſhip, recourſe muſt be had to the two firſt laws of motion, recited under *Laws of* NATURE: according to which, it is eaſy to conceive how a ſhip is compelled to turn into any direction, by the force of the wind acting upon her ſails in horizontal lines. For the ſails may be ſo arranged as to receive the current of air, either directly, or more or leſs obliquely: hence the motion communicated to the ſails muſt neceſſarily conſpire with that of the wind upon their ſurfaces. To make the ſhip tack, or turn round with her head to the windward, it is therefore neceſſary, after ſhe has received the firſt impreſſion from the helm, that the head-ſails ſhould be ſo diſpoſed as to diminiſh the effort of the wind, in the firſt inſtant of her motion, and that the whole force of the wind ſhould be exerted on the after-ſails, which operating on the ſhip's ſtern, carries it round like a weather-cock. But ſince the action of the after-ſails to turn the ſhip will unavoidably ceaſe, when her head points to the windward, it then becomes neceſſary to uſe the head-ſails to prevent her from falling off, and returning to her former ſituation. Theſe are, accordingly, laid aback on the lee-ſide, to puſh the veſſel's fore-part towards the oppoſite ſide, till ſhe has fallen into the line of her courſe thereon, and fixed her ſails to conform with that ſituation.

The firſt effort to turn the ſhip in tacking, communicated by the helm, which is then put to the lee-ſide, being announced by the pilot, or commanding officer, who then calls out, *Helm's a-lee!* the head-ſails are immediately made to ſhiver in the wind, by caſting looſe their ſheets or bowlines. The pilot then calls, *Up tacks and ſheets!* which is executed by looſening all the ropes which confine the corners of the lower ſails, in order that they may be more readily ſhifted to the other ſide. When the ſhip has turned her head directly to windward, the pilot gives the order to turn about the ſails on the main and mizen-maſts, by the exclamation, *Haul main-ſail, haul!* the bowlines and traces are then inſtantly caſt off on one ſide, and as expeditiouſly drawn in on the other ſide, ſo as to wheel the yards about their maſts: the lower corner of the main-ſail is, by means of its tack, pulled down to its ſtation at the cheſs-tree; and all the after-ſails are, at the ſame time, adjuſted to ſtand upon the other board. Finally, when the ſhip has fallen off five or ſix points, the pilot cries, *Haul off all!* or, *let go*, and *haul!* the ſails on the fore-maſt are wheeled about by their braces; and as the ſhip has then a tendency to fall off, ſhe is checked by the effort of the helm, which for that purpoſe is put *hard-a-lee*. The fore-tack, or the lower corner of the fore-ſail, being fixed in its place, the bowlines are hauled; and the other ſails, which have been neglected in the hurry of tacking, are properly arranged to the wind; which exerciſe is called *trimming the ſails*. Falconer.

TACK *of a Flag*, a line ſpliced into the eye at the bottom of the tabling, for ſecuring the flag to the haliards.

TACK-*Stopper*. See STOPPER.

TACK, in *Rural Economy*, a term provincially made uſe of in ſome diſtricts, as Glouceſterſhire, to ſignify a ſort of ſhelf, within the dairy, for laying cheeſe upon while they are drying, and afterwards.

TACK, or *Tack of Land*, in *Agriculture*, is a word uſed in ſome parts of the nation, as thoſe of the north, for the term of a leaſe. It, in ſhort, denotes the means by which land is holden by the farmer, from the proprietor or real owner, in the intention of cultivation and improvement, for the advantages of the produce. It was in its origin a ſort of feudal or military tenure of land: accordingly it is found, the writer of the corrected Agricultural Report of the County of Peebles ſays, that, as military tenants, at firſt, became tenants for life, from being tenants at will; ſo the firſt notion of giving the ſecurity of independence to the cultivator of the ſoil, in Scotland, as elſewhere, was to give him ſecurity of poſſeſſion for life. The life-rent tack ſeems, it is ſaid, the firſt adopted ſpecies or kind of tack-holding, rendering the poſſeſſor independent, his ſituation reſpectable, and his rights and intereſts regarded. Superior privileges were accordingly beſtowed upon the life-rent tack; the property in this tack was, and is, conſidered to be ſo complete, as to imply the full power of its alienation, in defiance of the proprietor's ſuppoſed eſſential and inherent right of the *delectus perſonæ;* and, when granted to a woman, was not conſidered as forfeited upon her marriage, as implying aſſignment contrary to the proprietor's right of *delectus*, in conſequence of its falling under the huſband's *jus mariti;* although ſuch, it is ſaid, is the abſurd conſtruction of Scots law, in regard to the effect of a woman's marriage, upon a tack for definite time, to which ſhe ſhould fall heir by inheritance, or even, perhaps, acquire by perſonal contract. The period of nineteen years ſeems, it is ſaid, in Scotland, to have been conſidered as equivalent to the life of a perſon of age to enter upon a life-rent tack; and that, from this analogy, various privileges, originally communicated to the life-rent, would ſeem to have been extended to this ſpecies or kind of tack. As nineteen years may, however, be conſidered as a favourable exchange for a life-rent, this is, it is thought, probably the reaſon why the Scots tenant ſeems to have generally preferred this ſecurity; inſomuch that the mention of a tack, without ſpecification of the term, in common habit ſuggeſted the idea of a nineteen years' leaſe. The privileges granted to cultivators, by legiſlating proprietors, ſeem, it is ſaid, to have been granted ſlowly, with reluctance, and to no greater extent than what indiſpenſable utility obviouſly and abſolutely required. A ſhort-ſighted avarice, it is obſerved, wiſhed to graſp at the fruits of the cultivation effected by the tenant's ſtock, as ſpeedily as poſſible; even ſo prematurely, as to allow no ſufficient ſecurity of time for their being effected at all: and the genius of law ſeems, it is thought, to have been univerſally inimical, both in modern and in ancient nations, to the long duration of leaſes, which ſeemed to keep back the proprietor from reaping the benefit of the increaſed value of his property. And that, when ſubſequent views of utility ſuggeſted the propriety of tacks of ſtill longer duration, they were ventured upon with timidity, as an extenſion of a ſpecies of tenure, to which the genius of law was unfriendly; which, as yet, ſhe had not recognized to that extent, and which ſhe might be ſcrupulous in ſanctioning. Such tacks, therefore, it is ſaid, ſought ſhelter under the form of the privileged tack of nineteen years, which had acquired an analogical ſtability, and whoſe taliſmanic influence was thought able to protect them: the whole term meant durſt not, it is ſaid, be avowedly expreſſed; but the tack was granted for two nineteens, or three nineteens of years, until the number of years propoſed ſhould be completed in nineteens.

The tack, though ſtill ſomewhat loaded and encumbered by a remnant of the ſhackles and tyranny of the feudal ſtate, ſo as to conſiderably obſtruct and impede the credit and enterprize of agricultural purſuits, yet probably, in conſequence of the different enactments and deciſions ſince made, empower the holders by it, in the above part of the kingdom, perhaps to enjoy more ſecurity, it is thought, than what was ever beſtowed upon the actual cultivators of the ſoil or land, either in ancient or in modern times. See TENANT and TENURE.

TACKLE, in a *Ship*, a machine formed by the communication

munication of a rope with an affemblage of blocks, and known in mechanics by the name of *pulley*.

Tackles are ufed in a fhip to raife, remove, or fecure weighty bodies, to fupport the mafts, or to extend the fails and rigging. They are either moveable, as communicating with a runner; or fixed, as being hooked in an immoveable fituation; and they are more or lefs complicated, with blocks and fheaves, in proportion to the efforts which they are intended to produce. That part of the tackle which is fixed to one of the blocks, &c. is called the *ftanding part;* all the reft are called *running parts;* and that on which the men pull, when employing the tackle, is called the *fall.* The application of the tackle to mechanical purpofes is termed *hoifting* or *bowfing*. Falconer.

The power of a tackle will be, the friction not confidered, as the number of parts of the fall that are applied to fuftain the weight. If a tackle confifts of a double and a fingle block, and the weight to be hoifted is hung to the double block, there will be four parts of the fall; and the weight refting upon four ropes, equally ftretched, each muft bear the fame part of the weight. Thus, fuppofe the weight hung to the double block be four hundred, then one hundred applied to the fall or hauling part will fufpend it; and if as much more power be applied as will overcome the friction, it will purchafe the weight: but had the weight been hooked to the fingle block, it would have refted on three ropes only, each of which would bear a third part of the weight; therefore, a third part of the weight being applied to the hoifting part of the fall, would fufpend the weight, when hooked to the fingle block; as much more being applied as will overcome the friction, would purchafe the weight.

The blocks that are fixed are only for the convenience of turning the direction of the fall; they add nothing to the power of the purchafe, but, on the contrary, deftroy fo much as is neceffary to overcome their friction, and are, therefore, to be avoided as much as poffible.

Ropes, if tight laid, will not eafily bend round fmall fheaves, but will take up a confiderable part of the power to force them into their proper direction: hence it follows, that blocks with fmall pins, large fheaves, and flack-laid ropes, are the beft materials to obviate friction, and make tackles with more eafe.

The *anchor-ftock* tackle is compofed of a double block and a fingle block, ftrapped, with a hook and thimble. *Boom* tackles are compofed of double and fingle blocks, ftrapped, with tails, and are ufed in getting the ftudding-fail-booms in or out. *Bowline* tackle is compofed of a long tackle, and a fingle block, ftrapped, with a hook and thimble: it is ufed to bowfe up the main-bowline, when the fhip is upon a wind. *Burton* tackles are compofed of double and fingle blocks, and are ufed with pendants, to fet up the fhrowds, fupport the topfail-yards, &c. (See BURTON.) A *fifh* tackle is compofed of a long tackle, and a fingle block, ftrapped, with eyes, and is ufed with a pendant, to fifh the anchor, and get it into its place. *Garnet* tackle is compofed of a double block and a fingle block, ftrapped, with a hook and thimble: it is hooked to the fciatic-ftay in merchant-fhips, and is ufed to hoift goods, &c. in or out. (See GARNET.) *Jigger* tackles are compofed of double and fingle blocks, ftrapped, with tails, and are ufed for topping the main and fore-yards by the lifts, &c. (See JIGGER.) *Luff* tackles are compofed of double and fingle blocks, ftrapped, with a hook and thimble, and are ufed occafionally at any part of the fhip. *Outhauler* tackle is compofed of two fingle blocks, ftrapped, with tails, and is ufed to bowfe out the jib-boom. *Port* tackles are compofed of a fingle block, attached to a fpan made faft to the outfide of the port-lid, and a runner with two fingle blocks, all of which are made faft to the fide of the beam neareft the port, and are ufed to hoift and lower the port-lids. *Quarter* tackles are compofed of double and fingle blocks, ftrapped, with eyes, and lafhed to the outer quarter of the yard and the lower block, with a hook and thimble: they are ufed to hoift up water and provifions. *Reef* tackles are compofed of two double or two fingle blocks: one block is fpliced into a pendant, and the other is ftrapped, with an eye; they are ufed to draw the extremities of the reefs clofe up to the yard-arms for reefing the fail. (See REEF.) *Relieving* tackles are luff tackles, ufed at the fore end of the tillar, when the tillar-ropes are damaged. (See RELIEVING *Tackle.*) *Ridge* tackle is compofed of a double block, and a fingle block, ftrapped, with an eye, and is ufed to fufpend the awning in the middle. *Rolling* tackles are luff tackles, ufed to the topfail-yards, to fupport them under a prefs of fail, and preferve the parrals. *Rudder* tackles are compofed of a long tackle block and a fingle block, ftrapped, with hooks and thimbles: they are ufed to fave the rudder, if unfhipped by accident, or to fteer by, if the tillar is broken. *Runner* tackles are compofed of double and fingle blocks, and a pendant; the lower block is ftrapped, with a hook and thimble: they are ufed to fet up the fhrouds, and to get the maft-heads forward, for ftaying the mafts. *Stay* tackles, main and fore, are compofed of double and fingle blocks, ftrapped, with hooks and thimbles, except the block fpliced into the pendant: they are ufed for getting the provifions, &c. out of the fore and main hold, and for getting the boats in or out. The pendant formerly travelled on the ftay, by iron thimbles; but this has been difcontinued in the navy, as they much injured the ftay by the friction. *Stayfail-ftay* tackles are compofed of double and fingle blocks; the lower blocks are ftrapped, with a hook and thimble: they are ufed to fet up the jib, and other ftayfail-ftays. *Shifting back-ftay* tackles are compofed of double and fingle blocks, ftrapped, with a hook and thimble, and are ufed to fet up the fhifting back-ftays, where wanted. *Topmaft-ftay* and *preventer-ftay* tackles are compofed of long tackle blocks and fingle blocks; the lower blocks are ftrapped, with a hook and thimble: they are ufed to fet the topmaft and preventer ftays. *Fore-top-gallant-ftay* tackle is compofed of a double and fingle block, and is ufed to fet up the fore-topgallant-ftay. *Tack* tackle is compofed of a double and fingle block, ftrapped, with hooks and thimbles, and is ufed for bowfing down the tack of fore and aft main-fails. The *top* tackle is compofed of double or treble blocks: it is attached to the top-rope-pendant, and is ufed to erect the topmafts, at the heads of the lower mafts. *Trufs* tackles are compofed of two double blocks, ftrapped, with hooks and thimbles, and are ufed to fecure the lower yards to their mafts, being hooked to the trufs-pendant. *Winding* tackle is compofed of a fourfold and a treble block, or a treble and a double block, ftrapped, with eyes: it is attached to the winding-tackle-pendant, and is chiefly ufed to get in and out the guns. (See *Plate* II. *Rigging*, *fig.* 17.) *Yard* tackles are compofed of double and fingle blocks; the double blocks are fpliced into the lower ends of the pendants *f*, and the fingle blocks are ftrapped, with hooks and thimbles: they are ufed to hoift the boats in or out.

TACKLE-*Fall*, that end of the rope of a tackle which is bowfed on, or the rope which compofes the tackle.

TACKLE, *Gunner's*, that which ferves to hale the ordnance in or out.

TACKLE *Pendants*. See PENDANT.

Tackle, *Tack*, is a ſmall tackle uſed occaſionally to pull down the tack of the principal ſails of a ſhip to their reſpective ſtations. There is alſo a tackle of this kind conſtantly fixed to the tacks of the main-ſail in brigs, ſloops, and ſchooners, for the ſame purpoſe. Falconer.

TACKRAMAH, in *Geography*, a town of Africa, on the Gold Coaſt. N. lat. 4° 52′. W. long. 3° 10′.

TACKSMAN, in *Agriculture*, the tenant or perſon who holds or takes a tack of land of another. In ſubſetting, the original perſon of this kind is, it is ſaid, by the writer of the Peebles Corrected Agricultural Report, conſidered as bound to the proprietor, as well as the ſub-tenant; whilſt, in aſſignment, the original tenant is free, ſubſtituting the other in his place. In conformity to the analogy of the feudal law, therefore, it is ſaid, as well as to the greater ſecurity of the proprietor, the Scottiſh law is conſidered as more favourable to ſubſet, than to aſſignation; becauſe, in ſubſet, the firſt tenant does not relinquiſh his poſition as a *quaſi* vaſſal, and the purpoſes of the metaphorical *delectus* may be, thus, conſidered as metaphorically, or analogically fulfilled by this *fictio juris*, or *quaſi:* moreover, too, the ſecurity of the proprietor, ſo far from being weakened, is greatly ſtrengthened, in having his right of hypothec unimpaired, and the ſecurity of two inſtead of one. Upon this principle, it was conſidered, it is ſaid, by the Scottiſh law oracle, Erſkine, that a power of ſubſet was implied, in all caſes where the contrary was not directly expreſſed; until the deciſion, in 1791, came to rectify the miſconceptions of the people, when it was decided, that, in a tack of nineteen years, it was implied, in law conſtruction, without any formal ſtipulation in the leaſe to that effect, that the power of *delectus* was retained; and that the tack was neither aſſignable nor ſubſetable.

But even Erſkine allows, it is ſaid, that, upon legal principles, an expreſs ſtipulation in the tack againſt aſſignees, both *legal* and *voluntary*, would prevent the tack from being evicted by the tenant's creditors: otherwiſe a tack, unaſſignable by the tenant's voluntary deed, would, according to him, be evictable by adjudication, at the inſtance of the tenant's creditors: but even in that caſe, the creditors would be guilty of *leſe-majeſte* towards the ſacred right of the *delectus*, were they to bring the reverſion of the leaſe to a fair ſale to the beſt bidder: they are debarred, therefore, it is ſaid, from ſuch unhallowed and irreverend meaſures; they can only enter upon adminiſtration, as reſponſible factors of the tenant's concerns.

TACKUMBREET, in *Geography*, a town of Africa, or, as it may be rather denominated, the ruins of an ancient town called "Siga," or "Sigeum," once the metropolis of Mauritania, ſituated on the coaſt of the Mediterranean, at the mouth of the river Tafna; 44 miles S.W. of Oran. N. lat. 35° 30′. W. long. 0° 55′.

TACKYSERAI, a town of Hindooſtan, in Oude; 35 miles W. of Lucknow.

TACLAOUR, a town of Thibet. N. lat. 38° 5′. E. long. 80° 51′.

TACOLA Imperium, in *Ancient Geography*, a port on the weſtern coaſt of India, on this ſide of the Ganges: and now *Junkſeylon*.

TACOMA, in *Geography*, a town of Mexico; 16 miles N. of Mexico.

TACOMAR-Tree, a name by which ſome authors call the ſugar-cane.

TACON Mountain, in *Geography*, a mountain of America, in Maſſachuſetts, S. of Great Barrington.

TA-CONG-TO-CHE, a town of the iſland of Formoſa. N. lat. 22° 22′. E. long. 120° 4′.

TA-COO, a town of China, in the province of Pe-tche-li, within the mouth of the Pei-ho, or White river, and the firſt place of any note in the N.E. frontier of the country. The grand embaſſy to China arrived at this town in Auguſt 1795, and found here a conſiderable number of yachts, or large covered barges and boats of burden, fit for paſſing over the ſhallows of the *Pei-ho*, (which ſee,) and deſtined to convey the whole of the embaſſy as far as the river led towards the capital of the empire. Many of theſe veſſels were eighty feet long, and very capacious; and yet they were ſo conſtructed of light wood, as not to ſink more than eighteen inches into the water, though they were lofty above it. The cabins were high and airy above: there were births for the crew, and beneath the floors were lockers for ſecuring the neceſſaries. The yacht appropriated to the ambaſſador had an apartment, conſiſting of an anti-chamber, a ſaloon, a bed-chamber and a cloſet; and its windows were adorned with a great number of glaſs-panes; whereas the frames of the windows of the other yachts were generally filled with a kind of paper, manufactured chiefly in Corea, having in its compoſition an unctuous ſubſtance, which rendered the paper more durable when expoſed to the weather, as it was much leſs affected by the rain or any kind of moiſture, than that which is made in Europe. During the ambaſſador's ſtay before Ta-coo, he was viſited by the viceroy of the province, who, by order of the emperor, came from Pao-ting-foo, his uſual place of reſidence, at the diſtance of a hundred miles; and who took up his abode at the principal temple of Ta-coo, conſecrated to the god of the ſea, to whom invocations were frequently addreſſed under the appellation of "Toong-hai-vaung," or king of the Eaſtern ſea. Of this idol there were ſeveral figures in different brilliant edifices of porcelain, within one incloſure. Sir George Staunton, in his account of this embaſſy, has given an engraved repreſentation of this Chineſe Neptune, bearing in one hand a magnet, whilſt he is ſitting on the waves, with firmneſs, eaſe, and dignity, and thus conſcious of his own ſecurity; and in the other, a dolphin, denoting his power over the inhabitants of the ocean. His beard flowed in all directions, and his agitated locks ſeemed to be intended for a perſonification of the troubled element. At a ſmall diſtance from the "Hai-chin-miao," or temple of the ſea-god, is the hall of audience of Ta-coo, ſituated in the midſt of a ſpacious court.

TACOTALPA, a town of Mexico, in the province of Guaxaca, on the river Alvarado; 6 miles S.E. of Alvarado.—Alſo, a town of Mexico, in the province of Tabaſco; 30 miles S.W. of Villa Hermoſa.

TA-COU, a river of China, which runs into the ſea, 7 miles E.N.E. of Kiao.

TACOUR, a town of Hindooſtan, in Myſore; 10 miles S. of Bangalore.

TAC-POU-CHAI, a town of Thibet; 250 miles S.E. of Laſſa.

TAC-POU-NAI, a town of Thibet; 240 miles S.E. of Laſſa.

TAC-POUY Courou-namkin, a town of Thibet; 145 miles S.E. of Laſſa.

Tac-pouy *Laſoi*, a town of Thibet; 120 miles S.S.E. of Laſſa.

TACPOY, a town of Thibet, and capital of a diſtrict; 126 miles S.E. of Laſſa. N. lat. 27° 53′. E. long. 92° 52′.

TACQUET, Andrew, in *Biography*, a mathematician, was born at Antwerp in 1611, and having entered into the order of Jeſuits in 1629, was a teacher of the languages and mathematics for ſeveral years. He died in 1660. Tacquet was the author of ſeveral mathematical works, among which

which we may enumerate the following: *viz.* "Cylindricorum et Annularium, Libri V. Elementa brevi historica Narratione de Ortu et Progressu Matheseos," &c. printed at Venice in 1737, with Whiston's additions; "Arithmeticæ Theoria et Praxis;" "Theoremata selecta ex Archimede." After his death, several of his treatises were published under the title of "Andreæ Tacqueti Antverpiensis Opera Mathematica," containing "Astronomiæ Lib. VIII.," "Geometriæ Practicæ, Lib. III.," "Architecturæ Militaris, Lib. I.:" distinguished by their perspicuity. Montucla. Gen. Biog.

TACSAI Raki, in *Geography*, a lake of Thibet, about 36 miles in circumference. N. lat. 32°. E. long. 88° 34'.

TACSANLU, a town of Asiatic Turkey, in Natolia; 23 miles N.N.W. of Kiutajah.

TACSONIA, in *Botany*, Juss. 398, a name of Peruvian origin, given by that author to such species of Passion-flower, as have a tubular elongation of the base of their calyx. See Passiflora.

TACTICS, τακτικα, formed from ταξις, *order;* the art of disposing forces in form of battle, and of performing the military or naval motions and evolutions. The science of tactics is either *military* or *naval.*

Tactics, *Military*, comprehend great or general tactics, *la grande tactique* of the French writers, which includes every thing that relates to the order, disposition, and formation of armies, their encampment, and every other circumstance pertaining to stores, baggage, &c.; and also particular or subordinate tactics, more immediately comprising their movements and evolutions. With the former every general officer ought to be thoroughly acquainted; whilst the latter should be well understood by inferior officers and soldiers, and cannot be totally disregarded by those of the former description.

The Greeks were very skilful in this part of the military art; having public professors of it, called *tactici*, who taught and instructed their youth therein. We have an account of the progress of this art among them in Thucydides, Xenophon, and Polybius. Ælian also hath a particular book on this subject; and there is a great deal of it in Arrian, in his History of Alex. M. and in Mauritius, and Leo Imperator.

From the Greeks this art was transmitted to the Romans, among whom it arrived at its highest perfection. Vegetius has given us a compilation and abridgment of authors who have written on this subject; and his work contributed in a considerable degree to the establishment of military discipline in Europe; for which we are greatly indebted to Maurice, prince of Orange, Alexander Farnese, duke of Parma, Coligny, Henry IV. Gustavus Adolphus, &c.

Vossius, De Scient. Mathemat. mentions twenty-four ancient authors on the subject of tactics.

It does not appear what was the field-exercise of the infantry in our ancient armies. After the Revolution, our system of discipline was chiefly taken from the Dutch, who, under prince Maurice, were the best regulated troops in Europe. Previously to this, the Spaniards were reckoned to have the best disciplined infantry. The exercise was, at the commencement of the last century, and for many years afterwards, encumbered with a number of useless motions. The manner in which the soldiers were armed, with their heavy muskets, bandoliers, &c. obliged them to make wide motions, and to draw up with very extended ranks and files. For an account of the exercise and evolutions of the infantry and cavalry at this period, we refer to Grose's Military Antiquities, vol. i. Of late, great alterations have taken place in the field-exercise and manœuvres both of the cavalry and the infantry. Most of the dragoon regiments have been made light; and a new sword-exercise has been adopted for the cavalry. The whole system of the army has been rendered uniform, by regulations issued from the adjutant-general's office. Within the last 60 or 70 years, the British infantry has been gradually falling into the Prussian system; and the new regulations are almost wholly founded on the Prussian institution. For the particulars, the reader is referred to the "Rules and Regulations for the Formation, Field-exercise, and Movements of his Majesty's Forces," and the articles Manual *Exercise* and Battalion.

The subject of this article has been already discussed under the following heads; *viz.* Army, Battalion, Battle, *Order of* Battle, Camp, Campaign, Castrametation, Column, Engagement, Evolution, Exercise, Line, Phalanx, in which order the Gauls and other nations fought in the time of the Romans, and which order still prevails, under some disadvantages, throughout Europe; War, &c. &c.; so that we have here little to add.

We shall here observe, that the principal object of the Prussian tactics under Frederick the Great was that of concentrating forces, and attacking the chief points of the enemy, not at one time, but one after another; whereas the tactics which have been uniformly pursued by the French, since the commencement of their revolution, have been founded on the principle of attacking all points with divided forces at the same time; thus extending their force, whilst that of the Prussian was compressed.

Tactics, *Naval* or *Maritime*, comprehend the orders and signals which are directed to be observed by fleets preparing for action or actually engaged, together with the manœuvres and modes of attack that are then to be practised, and also a knowledge of the rates of ships, their various appendages, and the mode of constructing them. Of this branch of tactics, a copious account will be found under several articles, particularly Battle, Engagement, Exercise, and Line *of Battle*, under which last article we have referred to Clerk's (not Clarke's) Essay on Naval Tactics, of which a second edition was published in 1804, which those who are desirous of information on the various modes of attack to windward and leeward, and by cutting the line, will consult; but which does not admit of abridgment within the limits that we are under the necessity of prescribing to ourselves.

Tactics is also used for the art of inventing and making machines for throwing of darts, arrows, stones, fire-balls, &c. by means of slings, bows, and counterpoises. Vegetius, Hiero, &c. have written on these machines; and we have them described and figured by Lipsius.

TACTILE, or Tangible, in the *Schools*, something that may fall under the sense of feeling.

Though atoms be corporeal, yet are they not either tactile or visible, by reason of their smallness.

The principal tangible qualities are, heat, cold, dryness, hardness, and humidity. See Heat, &c.

TACTION. See Feeling.

Taction, in *Geometry*. See Tangent.

TACTUS, the *Touch*, in *Midwifery*, is the exploration of the state of the vagina and uterus, and of the situation of the fœtus, and whatever else is contained in it. Hippocrates, in his Treatise on the Diseases of Women, has been very full and exact in his directions upon this subject.

Tactus, *Tact*, in *Music*, before the use of bars, implied nearly the same thing as a bar: that is, the time when the hand or foot is beaten down in marking the measure. *Tatto*, Ital., the same.

TACUA, in *Ancient Geography*, a river of Italy, in Liguria, E. of Rutuba.

Tacua, in *Geography*, a town of Peru, in the dioceſe of Arequipa; 20 miles E. of Arica.

TACUBA, a town of Mexico, N.W. of the city of Mexico.

TACUMADARS, or Tigumedes, a town of Africa, in the country of Darah, the original country of the reigning ſherifs of Morocco.

TACZLI, a river of European Turkey, which runs into the Danube, near Kilia, in Beſſarabia.

TADAPOOLY, a town of Hindooſtan, in Myſore; 5 miles S.E. of Sattimungulum.

TADCASTER, a market-town in the Weſt Riding of the county of York, England, is nine miles S.W. from the city of York, and 190 miles N. of London. In the year 1811, it contained 382 houſes, and 1483 inhabitants. The name of this place implies a Roman ſtation, and accordingly we find, that the Calcaria of Antoninus was ſituated on the courſe of a Roman road, between Eboracum or York, and Mancunium or Mancheſter, at nine miles diſtance from the former; and this agrees with the ſcite of the preſent town. Dodſworth and ſome other antiquaries, however, place the Calcaria at Newton-Kyme, about a mile and a half W. of Tadcaſter. Horſley in "Britannia Romana," and Drake in "Eboracum," are deciſive in fixing the Roman ſtation at Tadcaſter. It appears that many Roman coins have been found here: ſome banks and ditches ſurround the town, and on the ſouth ſide of the river are remains of intrenchments, called the Caſtle. A conſiderable quantity of ſtone was taken from this fortreſs to build a bridge over the river Wharf at the beginning of the 18th century. This bridge is generally deſcribed as a very fine ſtructure; and its centre marks the union of the Weſt Riding of the county, with the Ainſty of York and liberty of St. Peter. Tadcaſter has a weekly market on Wedneſdays, and four annual fairs.

Tadcaſter and its vicinity have been twice diſtinguiſhed and annoyed by the deſtructive effects of civil warfare: firſt in the conflicts between the houſes of York and Lancaſter: and ſecondly, between the royaliſts and the republicans, about the middle of the 17th century. On the former occaſion, it is related, that between 30,000 and 40,000 Engliſhmen "fell in deciding the queſtion, whether a tyrant or an ideot ſhould be their maſter." After Edward IV. had been proclaimed in London, Margaret of Anjou, wife of Henry VI., raiſed an army, in the north, of about 60,000 men, all attached to the Lancaſterian intereſts. Theſe were aſſembled at York. When Edward with his army arrived at Pontefract, ſeveral ſkirmiſhes ſoon took place on the banks of the Aire, and on Palm-Sunday, 29th March, 1461, the memorable and fatal battle of Towton enſued. On this day it is ſaid, that Henry's army conſiſted of 60,000 men, and Edward's of about 48,600. Theſe commenced an engagement early in the morning, and fought with great fury during the whole day, with various degrees of ſucceſs. At length, however, Henry's ſoldiers fell back, whilſt Edward impelled his forward with increaſed impetuoſity. Many of the former were drowned, and ſeveral noblemen were ſlain, whilſt Henry and Margaret fled into Scotland. Edward and his ſoldiers retired to York, and afterwards went to London, where the new monarch was crowned. In the year 1642 another battle occurred at or near Tadcaſter. Sir Thomas Fairfax, with about 700 men, occupied this town in behalf of the Parliament, and were attacked by the royal army under the earl of Newcaſtle. After fighting a whole day, the former retreated during the night, and left the royaliſts in poſſeſſion of the place.

About five miles S.E. of Tadcaſter is Scarthingwell-Hall, the ſeat of lord Hawke, who has paid particular attention to agricultural improvements; and has fitted up a farm with every convenient and uſeful accommodation. (See Agricultural Survey of the Weſt Riding of the County of York.) Three miles ſouth of the town is Haſlewood-Hall, the ſeat of the Vavaſours, diſtinguiſhed for the fineneſs of its ſcenery, and the variety and beauty of the proſpects from its grounds. Bramham Park, the ſeat of James Lane Fox, eſq., is about four miles S.W. from Tadcaſter. —Drake's Eboracum, fol. 1736. Beauties of England, Yorkſhire, by J. Bigland, 8vo., 1815. Hargrove's Hiſtory, &c. of Knareſborough, 6th edit. 1809.

TADCUL, a town of Hindooſtan, in Myſore; 6 miles S.E. of Caveripatam.

TADEMERI, a town of Hindooſtan, in Myſore; 100 miles N.E. of Chittledroog. N. lat. 14° 35'. E. long. 78°.

TADEN, a town of the duchy of Holſtein; 14 miles E. of Meldorp.

TADEPATRY, a town of Hindooſtan, in the circar of Cuddapa; 24 miles N. of Gandicotta.

TADIPOODY, a town of Hindooſtan, in Golconda; 20 miles S.E. of Combamet.

TADIVAN, or Taduan, a town of Perſia, in the province of Farſiſtan, ſituated on a pleaſant plain, in the midſt of ſtreams, which deſcend from the neighbouring mountains, and planted with a variety of excellent fruit-trees; 60 miles S. of Schiras.

TADMOR. See Palmyra.

TADORNA, the *Anas tadorna* of Linnæus, in *Ornithology*, a name given by many authors to a ſpecies of duck, called by others *vulpanſer*, and in Engliſh the *ſhiel-drake*, or *borough-duck*; and by ſome the *bergander*. See Duck.

It is of a middle ſize between the duck and gooſe; its beak is broad, ſhort, and red; and at the origin of the upper chop there is a large red tubercle of fleſh; the head and upper part of the neck are of a fine blackiſh-green, the lower part of the neck white; the breaſt and upper part of the back ſurrounded with a broad band of bright orange-bay; the coverts of the wings and middle of the back are white; the neareſt ſcapulars black, the others white; the greateſt quill-feathers black; the exterior webs of the next are of a fine green, and thoſe of the three ſucceeding orange; the coverts of the tail white, and the tail of the ſame colour, except the two outmoſt feathers, which are tipt with black; the belly white, divided lengthways by a black line; the legs are of a pale fleſh-colour.

They inhabit the ſea-coaſts, and build in deſerted rabbit-holes; but their fleſh is not well taſted.

When a perſon attempts to take their young, they divert his attention by flying along the ground as if wounded, till the brood are ſecure, and then return and collect them together. Turner, therefore, concludes, that this bird is the chenalopex, or fox-gooſe of the ancients; and the natives of the Orkneys at this day call it the *fly-gooſe*.

Theſe birds lay 15 or 16 white roundiſh eggs. In winter they collect in large flocks. Ray and Pennant.

TADOUN, or Tadivan, in *Geography*, a town of Aſiatic Turkey, in Armenia, ſituated on the weſt coaſt of the lake of Van, having a harbour for boats; 120 miles S.S.E. of Erzerum.

TADOUSAC, a town of Lower Canada, at the mouth of the Saguenay, on the left ſide of the river St. Lawrence.

 The

The native Indians resort hither to exchange furs for cloth, and other European goods. It was first settled by the French, taken by the English in 1629, retaken by the French in 1633, and it was ceded with the rest of Canada; 100 miles N.E. of Quebec. N. lat. 48° 5′. W. long. 69° 40′.

TADPOLE. The animal called by this name is no other than the frog in its first state from the spawn; and this creature furnishes the curious in microscopic observations with a beautiful view of the circulation of the blood, especially when young.

The method of procuring them for this purpose in the greatest perfection, is this: let a small quantity of frog's spawn be kept for some days in water, and from this will be produced a vast number of young tadpoles; these, while very young, are perfectly transparent, and when placed before the double microscope, the heart may be easily seen, and its pulsation regularly observed; and the blood protruded thence may be beautifully seen circulating through the whole body; but particularly in the tail, where, though so very minute, more than fifty vessels may be seen at one view. The young brood grow more and more opaque every hour, and in a day or two the circulation of the blood can only be seen in their tail, or in the fins near the head. Baker's Microscope, p. 126.

TÆDA, in *Pharmacy*, a term used by some authors to express certain compositions made up in form of troches. These are sometimes meant as pessaries to be introduced into the vagina, and therefore made into this form; sometimes they are compositions of fragrant or other ingredients for fumigations.

Tæda, in *Botany*, a name given by some authors to the pinaster, or common wild pine, or mountain-pine.

TAEL. See Tale.

TÆNARIA, ταιναρειν, in *Antiquity*, a festival in honour of Neptune, surnamed *Tænarius*, from *Tænarus*, a promontory in Laconia, where he had a temple.

Tænaria, or *Tenarium*, now *Cape Matapan*, in *Ancient Geography*, a promontory of the Peloponnesus, S. of Laconia, between the gulf of Messenia and that of Laconia. Here were formerly a grotto, and a temple of Neptune, which rendered the place very famous, so that it was reckoned to be one of the mouths of hell, through which Hercules and Psyche descended thither. The temple was accounted an inviolable asylum. On this promontory there were also a statue of Arion, seated on a dolphin, and playing on the lyre, and a fountain of wonderful efficacy.

TÆNARIUM, a town of the Peloponnesus, upon the promontory above described.

Tænarium *Marmor*, the name of a marble used by the ancient architects and statuaries. There were two kinds of it, very different in colour, but perfectly agreeing in hardness, and in the high polish they are capable of. The first, or most frequent kind, was black, and was dug from the promontory called *Tænarus*, in the Lacedæmonian state; the other, which was more scarce, and much more beautiful, was of a green colour, with a cast of yellow; this was dug in the Tagetan quarries, and was called by some *marmor herbosum*, and *xanthon*.

TÆNIA, or Tenia, in *Architecture*, a member of the Doric architrave, resembling a square fillet, or reglet; and serving in lieu of a cymatium.

The word is Greek, ταινια, which literally denotes a *swathe*, *bandage*, *fillet*, or the like. Barbo renders it by *listel*, but Palladio uses the old name *tænia*.

Leon Baptista Alberti calls the tænia, *regulæ*, and *fasciola*; and Daviler, *bandelettes*. Philander says, there are two kinds, *viz.* that above-mentioned, which he calls the *lower*; and an *upper*, which serves for a capital to the triglyphs.

Tænia, in *Ichthyology*, the name of a fish of the anguilliform, or eel-shaped kind, common in the Mediterranean sea, and brought to market in Italy and elsewhere. This is a species of cepola in the Linnæan system. See Cepola.

Tænia *Cornuta*, the *horned tænia*, a name given by many authors to the species of cobitis, named by Artedi, the cobitis with a forked prickle placed under each eye. This fish is the *cobitis tænia* of Linnæus. See Cobitis.

Tænia, in *Zoology*, a genus of the Intestina order of worms; the characters of which are, that the body is flat and articulated, and that the head is furnished with four sucking bladders. Gmelin, in his edition of the Linnæan system, enumerates eighty-six species, besides several varieties. Their habitations are the viscera of men and of different animals. Our limits will not allow us to specify and describe them. For an account of the tænia intestinorum of the human body, or lumbricus latus, we refer to Tape-*Worm*.

TÆNIÓLONGA, in *Ancient Geography*, a town of Africa, in Mauritania Tingitana, upon the Iberian sea. Ptol.

TÆNITIS, in *Botany*, from ταινια, *a riband*, or *fillet*, because of the long narrow shape of the frond.—Swartz Fil. 24. Willd. Sp. Pl. v. 5. 135.—Class and order, *Cryptogamia Filices*. Nat. Ord. *Filices*.

Ess. Ch. Sorus linear, nearly uninterrupted, longitudinal, between the rib and outer margin of the frond. Involucrum none.

1. T. *blechnoides*. Pinnate Tape-fern. Swartz Fil. 220. Willd. n. 1. ("T. pteroides; Schkuhr Crypt. 21. t. 6." Sprengel Crypt. 411. t. 10. f. 106. Pteris blechnoides; Willd. Phytogr. 13. t. 9. f. 2.)—Frond pinnate; leaflets linear-lanceolate, tapering at each end, entire, smooth.—Native of the East Indies. The whole *frond* is from eighteen to twenty-four inches, or more in height, smooth, with a smooth, furrowed, bluntly angular *stalk*. *Leaflets* opposite, the lower ones occasionally alternate, five or six pair, equal, about five inches long, and half an inch wide in the middle. Line of *fructification* on each side of the mid-rib, about half way between it and the margin. We must rely on the authors cited as to the absence of an *involucrum*. See Sorus.

2. T. *furcata*. Forked Tape-fern. Willd. n. 2. (Pteris furcata; Linn. Sp. Pl. 1531. Swartz Fil. 95. Lingua cervina furcata; Plum. Fil. 122. t. 141. Phyllitis aspera, furcis lineatis; Petiv. Fil. n. 125. t. 6. f. 6.)—Frond simple, repeatedly forked, linear-lanceolate, acute, wavy; scaly beneath.—Gathered by Plumier in the woods of Hispaniola. No other botanist appears to have even seen a specimen. The *root* is tufted, scaly, bearing several *fronds* about a foot high, leafy to the very base, once or twice forked, and rather spreading, of a very thin membranous texture; of a fine green, and very smooth, in front; paler at the back, clothed with reddish pointed scales, and furnished with a black shining rib. The *fructification* is stationed in a *sorus*, or line, two or three inches long, on each side of the rib, but nearer the margin, in the upper part of each very acute lobe of the *frond*, the margin in that part being even, not wavy. The want of an *involucrum* is only presumed from Plumier's figure, nor do we esteem the generic character, of this species at least, to be very certain.

Dr. Swartz hints at another possible species, the *Blechnum seminudum*, Willd. Phytogr. 13. t. 8. f. 2. But if it be so, the

the genus can have little pretenfions to be efteemed natural; and as Willdenow himfelf has not fubfequently followed this hint, we prefume he thought it unauthorized by his own fpecimen, which has the afpect of a confluent *Grammitis*.

TAENSAPAVA, in *Geography*, a river of Weft Florida, which runs into the Ibberville, N. lat. 30° 19′. W. long. 10° 12′.

TAFALE, a river of Africa, which runs into the fea, between the rivers Senegal and Nunez.

TAFALISGA, a town of Africa, in the kingdom of Jaaga, at the union of the Falema with the Senegal. N. lat. 14° 42′. W. long. 10° 12′.

TAFALLA, a town of Spain, in Navarre, honoured with the name of city by Philip IV. It has an univerfity; 15 miles S. of Pamplona. N. lat. 42° 35′. W. long. 1° 43′.

TAFARA, a town of Africa, in the kingdom of Bambarra, on the Niger; 115 miles S.W. of Sego.

TAFEELALAT, a town of Africa, in Sahara; 200 miles N. of Tombuctoo. N. lat. 19° 40′. E. long. 2° 15′.

TAFELBERG, a town on the E. coaft of the ifland of Ceram. S. lat. 3 20′. E. long. 131° 10′.

TAFELICHTE, a mountain on the borders of Lufatia, 3540 feet above the level of the fea.

TAFFAREL, or TAFF-RAIL, in *Ship-Building*, the upper part of a fhip's ftern, ufually ornamented with carved work, or mouldings, the ends of which unite with the quarter-pieces.

TAFFAROWY, in *Geography*, a mountain of Algiers; 13 miles S.E. of Oram.

TAFFETY, or TAFFATY, in *Commerce*, a kind of fine, fmooth, filken ftuff; having, ufually, a remarkable luftre, or glofs.

Alamode, } the *taffetas noirs* of Lyons.
Luftring, }

Taffetas noir luftre of the French, is our *alamode*.

Non luftre is our *luftring*.

There are taffeties of all colours; fome plain, others ftriped with gold, filver, filk, &c. others cheequered, others flowered, others in the Chinefe point, others the Hungarian; with various others to which the mode, or the caprice of the workmen, gives fuch whimfical names, that it would be as difficult, as it is ufelefs, to rehearfe them: befides, that they feldom hold beyond the year in which they firft rofe. The old names of taffeties, and which ftill fubfift, are, taffeties of Lyons, of Spain, of England, of Florence, of Avignon, &c.

The chief confumption of taffeties is in the fummer-dreffes for women, in gowns, linings, window-curtains, &c.

There are three things which contribute chiefly to the perfection of taffeties, *viz.* the filk, the water, and the fire. The filk is not only to be of the fineft kind, but it muft be worked a long time, and very much before it be ufed: the watering is only to be given very lightly, and feems only intended to give that fine luftre, by a peculiar property not found in all water: laftly, the fire, which is paffed under it to dry the water, has its particular manner of application, on which the perfection of the ftuff depends very much.

Octavio May, of Lyons, is held the firft founder of the manufacture of gloffy taffeties; and tradition tells us the occafion of it. Octavio, it feems, going backwards in the world, and not able to retrieve himfelf by the manufacture of taffeties, fuch as were then made, was one day mufing on his misfortunes, and, in mufing, chanced to chew a few hairs of filk which he had in his mouth: his reverie being over, the filk he fpit out feemed to fhine, and, on that account, engaged his attention. He was foon led to reflect on the reafon; and, after a good deal of thought, concluded, that the luftre of that filk muft come, 1. From his having preffed it between his teeth. 2. From his having wetted it with his faliva, which had fomething glutinous in it. And, 3. From its having been heated by the natural warmth of his mouth. All this he executed upon the next taffeties he made, and immediately acquired immenfe riches to himfelf, and to the city of Lyons the reputation it ftill maintains, of giving the glofs to taffeties better than any other city in the world.

It will not, we conceive, be lefs ufeful than curious, to infert here the defcription of the engine contrived by Octavio to give the glofs to taffety; and to add the manner of applying it, and the compofition of the water ufed in it.

The machine is much like a filk-loom, except that, inftead of iron points, here is ufed a kind of crooked needles, to prevent the taffety from flipping: at the two extremities are two beams, on one of which is rolled the taffety to take the glofs; and on the other, the fame taffety, as faft as it has received it. The firft beam is kept firm by a weight of about two hundred pounds, and the other turned by means of a little lever paffing through mortifes at each end. The more the taffety is ftretched, the greater luftre it takes: care, however, is to be ufed that it be not weakened by over-ftretching.

Befides this inftrument for keeping the ftuff ftretched, there is another to give it the fire: this is a kind of carriage, in form of a long fquare, and of the breadth of the taffeties: it moves on trundles, and carries a charcoal fire under the taffety, at the diftance of about half a foot.

Thefe two machines prepared, and the taffety mounted, the luftre is given it by rubbing it gently with a ball, or a handful of lifts of fine cloth, as it rolls from one beam to the other; the fire, at the fame time, being carried underneath it to dry it. As foon as the piece has its luftre, it is put on new beams to be ftretched a day or two; and the oftener this laft preparation is repeated, the more it increafes the glofs.

For black taffeties, the glofs is given with double beer and orange or lemon-juice; but this laft is the leaft proper, as being apt to whiten them. The proportion of the two liquors is, a gallon of orange-juice to a pint of beer, to be boiled together to the confiftence of a rich broth. For coloured taffeties, they ufe gourd-water diftilled in an alembic.

There are alfo feveral different forts of taffeties manufactured in China; as corded taffeties, which wear well; and alfo fome with flowers, and others beautifully ftriped; and a particular taffety, of which they make drawers, and other kinds of wearing apparel. This laft is thick, and yet fo pliant, that it may be folded and preffed with the hand, without leaving any mark in it. They alfo wafh it, like other ftuffs, without its lofing much of its luftre. The Chinefe workmen give the luftre to this taffety with the fat of the river-porpoife, which they purify by wafhing and boiling; and then with a fine brufh, they give the taffety two beds in the fame direction, on the fide which they intend to render gloffy.

TAFFI, ANDREA, in *Biography*, was one of thofe early mafters to whom the revival of the arts in Italy is attributed. His fhare lay in the practice of mofaic painting, which he learned of a Greek monk, named Apollonius, who had been called to Venice to work in the great church of St. Marco; and who afterwards accompanied Taffi to Florence. Andrea was born at Florence in the year 1213, and died there at the age of 81.

TAFILET, or TAFILELT, in *Geography*, a diftrict, formerly a kingdom of Africa, in the empire of Morocco, and country of Biledulgerid, extending along the eaft fide of mount Atlas; the habitations of which are about 1500 fcattered houfes, and of thefe feveral are defended by a tower, and each of them ftands amidft an inclofure of gardens, cultivated grounds, and plantations of palm-trees, forming a variegated and pleafant country, interfected by many rivers and rivulets, defcending from the eaft of mount Atlas, and ferving to water their lands. Tafilelt, as well as Draha, produces a fuperior breed of goats, and a great abundance of dates, which are fmall, but good, conftituting the wealth of the country, and fupplying food for the people, and even for the cattle. Although the Koran prohibits the ufe of fpirituous liquors, yet by ancient cuftom, brandy is made at Tafilelt of dates, which is very ftrong, and drank fo immoderately by the fherifs, that wine produces no effect upon them. Moft of thefe fherifs are poor, and employ themfelves in their grounds and gardens, and very frequently pillage one another. The countries fituated near the banks of the rivers of Draha and Tafilelt have feveral plantations of Indian corn, rice, and indigo. The town of Tafilelt, after which the kingdom was named under the fherifs of the reigning houfe, is not an ancient city. It derives its name from the word "Fileli," which denominates the inhabitants of the country, and alfo the ftuffs and carpets which are here manufactured. The foil of the extenfive plain on which it is fituated is a whitifh clay, which when moiftened refembles foap; and though it paffes a river that rifes in the Atlas, and purfues a courfe from the S.W. to the N.E., being at Tafilelt about as wide as the Thames at Putney, its water, traverfing the faline plains, is brackifh: after a courfe of about 450 miles, it is abforbed in the defert of Angad. It has feveral caftles of tarrace on its banks, inhabited by the fherifs or princes of the reigning family of Morocco. Wheat and barley have been lately cultivated near the river and the caftles. Another river of inferior note rifes in the plains N. of Tafilelt, and flowing in a foutherly direction, is abforbed in the Great Defert or Sahara. The water of this river is alfo brackifh, and unfit for culinary purpofes. The inhabitants of this country, it is faid, poffefs fuch a fenfe of honour, that a robbery is fcarcely known among them, though they ufe no locks. Commercial tranfactions are carried on amongft them by barter or exchange, fo that they have little fpecie; but in all tranfactions of magnitude, gold-duft is the circulating medium. They live in the fimple patriarchal manner of the Arabs, differing from them only in having walled habitations, which are invariably near the river. The climate during a great part of the year is intenfely hot, and the fhume, or hot wind from Sahara, blowing tempeftuoufly in July, Auguft, and September, and carrying with it particles of earth and fand, is very pernicious to the eyes of the inhabitants. A confiderable trade is carried on from Tafilelt to Tombuctoo, Houffa, and Jinnie, S. of Sahara, and alfo to Morocco, Fez, Sufe, Algiers, Tunis, and Tripoli. Indigo abounds, but by reafon of the indolence of the cultivators, it is of inferior quality. Here are alfo mines of antimony and lead-ore. The common drefs confifts of a loofe fhirt of blue cotton, with a fhawl or belt round the waift. A caravan paffes annually from hence to Tombuctoo. Woollen haiks, of a curious texture, being light and fine, are manufactured here. The Tafilelt goats are very prolific, and afford a rich milk in great abundance: and therefore they conftitute an article of confiderable export. The Tafilelt leather is very foft and fine, and much fuperior to that of Morocco: it is as foft and pliable as filk, and impervious to water. The tanners ufe the leaves of a fhrub called tèzra, which grows in the Atlas mountains, to which fome have afcribed the peculiar quality of the leather; though others afcribe it to fome quality in the air and water. The population of the diftrict of Tafilelt is ftated by Mr. Jackfon at 650,000. The town is 140 miles E.S.E. of Morocco. N. lat. 31° 20′. W. long. 6°.

TAFNA, a river of Algiers, which runs into the Mediterranean, near Tackumbreet.

TAFO, or TAFA, a town of Africa, on the Gold Coaft.

TAG, or TAGGE, in *Rural Economy*. See TEG.

TAG, or *Tag-Sore*, a difeafe in fheep, which confifts, as ftated in a paper in the third volume of the "Tranfactions of the Highland Society of Scotland," of fcabs and fores fituated on the under fide of the tail; arifing, in warm weather, from its being fouled with purging and other difcharges. The matter hardens there, irritates the tender veffels, and produces fores, which, if not attended to, run into mortification, and prove fatal, as in the legs. See SWELLING or *Leg-Evil*.

It is fhewn by the fheep turning frequently round to bite the tail.

As this complaint arifes principally from purging, and the naftinefs caufed by it, &c. the firft thing to be done is the reftraining and cure of this evacuation: after which the tail of the animal is to be clipped, and the fore part laid bare, wafhed carefully with milk and water, blood-warm, and then with lime-water. The fheep is then to be turned out into a dry pafture, and looked at again in two or three days, and if not then well, the wafhing muft be repeated, and the parts anointed with greafe and tar mixed together in equal proportions.

TAGABONA, in *Geography*, a river of Weft Florida, which runs into the St. Mark, N. lat. 30° 22′. W. long. 84° 34′.

TAGADEMPT, TAGADEONT, or *Tigedent*, a town of Algiers, anciently called *Vaga*; 60 miles E.S.E. of Oran.

TAGÆ, in *Ancient Geography*, a town of Afia, in Parthia, near the river Oxus, and on the confines of Hyrcania.

TAGAI, in *Geography*, a town of Ruffia, in the government of Simbirfk; 48 miles W. of Simbirfk. N. lat. 54° 20′. E. long. 47°.

TAGAL, a town of the ifland of Java, on the N. coaft, the refidence of a Dutch agent for the purchafe of rice; 35 miles E. of Cheribon.

TAGALA, *Tā-Gāla*, or *Gala* language, is among the Philippines what the Malayu is in the Malay iflands, or the Hindoftani in Hindooftan Proper. It poffeffes the combined advantages of the four principal languages in the world: it is myfterious as the Hebrew; it has articles for nouns, both appellative and proper, like the Greek; it is elegant and copious as the Latin; and equal to the Italian, as the language of compliment or bufinefs. This language has been cultivated only by the Spanifh miffionaries. The Tāgāla grammar of Fra. Gafpar de San Auguftin, was printed in 1703, and again in 1787. The alphabet confifts of feventeen letters, three of which are vowels, and fourteen confonants. The Tagala characters are faid to have been derived from the Malays, and they are read with as much difficulty as the eafe with which they are written. This Tagala is written with an iron ftyle on bamboos and palm-leaves, and the Spanifh miffionaries affert, that the ancient mode of writing was from top to bottom, like the Chinefe. This language, with a confiderable number of peculiar vocables, and great fingularity of idiom, is neverthelefs to be confidered as a cognate language with Malayu, Bujis, and Javanefe. Few languages, on a curfory examination, prefent a greater appearance of originality than the Tagala.

For

For a farther account of it, we refer to Dr. Leyden's Effay on the "Languages and Literature of the Indo-Chinefe Nations," in the Afiatic Refearches, vol. x.

TAGALAZ, in *Geography*, one of the Fox iflands, in the North Pacific ocean. N. lat. 53° 30'. E. long. 185° 26'.

TAGAMA, in *Ancient Geography*, a town of Africa, in the interior of Libya, upon the bank of the Niger. Ptol.

TAGAMA, in *Geography*, a country of Africa, in Nigritia, W. of Cafhna.

TAGANROG, a fort of Ruffia, on the fea of Azoph, firft built by Peter the Great in 1696; 32 miles W.N.W. of Azof.

Taganrog is fituated upon the cliff of a very lofty promontory, commanding an extenfive profpect of the fea of Azof, and the whole European coaft to the mouths of the Don. The number of inhabitants does not at prefent exceed 5000. The mole in the haven is fo fhallow, that fhips performing quarantine lie off at the diftance of 10 miles, and all veffels drawing from 9 to 10 feet of water cannot approach nearer to the town than this diftance. This town has funk into decay; and all the beft houfes are in its fuburbs. If it had water, its fituation is very favourable for commerce; but it can be carried on here only for three months in the year. In the winter the fea is frozen. Here are three fairs in the year. The fifh caught in great abundance in the fea of Azof is dried and fent over all the fouth of Ruffia. Fruit is brought from Turkey, fuch as figs, raifins, and oranges; Greek wine from the Archipelago, with incenfe, coffee, filk, fhawls, tobacco, and precious ftones. Copper of a very inferior quality comes from Trebifond, and is forwarded to Mofcow. Among the principal exports are caviare, butter, leather, tallow, corn, fur, canvas, rigging, lines, wool, hemp, and iron. The greateft advantage this town enjoys is its being the depofitory of Siberian productions. The Calmucks form large fettlements in the vicinity of Taganrog. It is the refort of people from a great variety of countries; infomuch that the inhabitants of fifteen different countries have been obferved in this place at the fame time.

TAGAPOLA, a fmall ifland among the Philippines; 25 miles W. of the ifland of Samar.

TAGARA, an ancient city of India, known to the Greeks about 2050 years ago. Arrian, in his Periplus Maris Erythræi, fays that it was a large city, and all kinds of mercantile goods throughout the Deccan were brought hither, and hence conveyed in carts to Baroach, or Barygaza. Arrian alfo informs us that Tagara was fituated at about 10 days' journey E. of another famous mart, called Plithana, or Pluthana; that Pluthana was 20 days' journey S. of Baroach; and that the road to it was through the Bala-gaut mountains. Pluthana, now called Pultanah, is fituated on the fouthern bank of the Godavery, about 217 Britifh miles to the fouthward of Baroach. If we divide thefe 217 miles by 20, the number of days travellers fpent in paffing from between Pultanah and Baroach, according to Arrian, we fhall have nearly 11 miles *per* day, or 5 cofs, which is the ufual rate of travelling with heavy loaded carts. Arrian informs us, that Tagara was about 10 days' journey W. of Pultanah. Allowing thefe 10 days to be equal to about 100 Britifh miles, Tagara, by its bearing and diftance from Pultanah, falls at Deoghire, or Deogire (which fee), a place of great antiquity, and famous through all India, on account of the pagodas of Eloura. It is now called Dowlatabad, and about four cofs N.W. of Aurungabad. It appears in Arrian's Periplus, that on the arrival of the Greeks into the Deccan, above 2000 years ago, Tagara was the metropolis of a large diftrict called Ariaca, which comprehended the greateft part of fubah Aurungabad, and the fouthern part of Concan. About the middle of the firft century, Tagara was no longer the capital of Ariaca, rajah Salbahan having removed the feat of the empire to Pattan. However, the rajahs, headed by Salbahan, having revolted, they gave him battle, and he was flain. Tagara became again the metropolis of Ariaca; at leaft this was the cafe towards the latter end of the eleventh century. When the Muffulmans carried their arms into the Deccan, about the year 1293, Tagara or Deoghir was ftill the refidence of a powerful rajah, and remained fo till the time of Shah-Jehan, when the diftrict belonging to it became a fubah of the Mogul empire. Thus Tagara was deferted, and Kerkhi, four cofs S.E. of it, became the capital, now called Aurungabad. Thus the ancient kingdom or rajahfhip of Tagara was deftroyed, after it had exifted, with little interruption, above 2000 years. Afiatic Refearches, vol. i.

TAGASA, a town of Fez, feated on a river about three leagues from the Mediterranean; 20 miles W. of Melilla.

TAGASTA, in *Ancient Geography*, a town of Africa, in Numidia, on the route from Hippone to Cæfarea. Anton. Itin.

TAGAVAST, in *Geography*. See TAGOAST.

TAGAZEE, a town of Africa, on the road from Mourzouk to Agades; 260 miles S. of Mourzouk. N. lat. 23° 32'. E. long. 12° 55'.

TAGAZOUTE, a town of Algiers; 45 miles S.E. of Oran.

TAGEBACHI, an ifland in the Red fea. N. lat. 25° 2'.

TAGETES, in *Botany*, a name which Fuchfius tells us is applied by Apuleius to the Tanfy, but which he himfelf adopts for a plant, not very diffimilar in foliage, now vulgarly called the French, or African, Marygold. He is followed by Dillenius, Linnæus, and every fubfequent writer. De Theis derives the word from Tages, an Etrufcan deity, grandfon of Jupiter, and teacher of divination; and fuppofes the beauty of its flowers may have procured the plant this mythological appellation. Of this intention we can find no traces in the above writers.—Linn. Gen. 430. Schreb. 561. Willd. Sp. Pl. v. 3. 2126. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 5. 88. Tourn. t. 278. Juff. 182. Lamarck Illuftr. t. 684. Gærtn. t. 172.—Clafs and order, *Syngenefia Polygamia-fuperflua*. Nat. Ord. *Compofitæ oppofitifoliæ*, Linn. *Corymbiferæ*, Juff.

Gen. Ch. *Common calyx* perfectly fimple, of one leaf, tubular, oblong, with about five teeth, and as many longitudinal angles. *Cor.* compound, radiant. Florets of the elevated difk numerous, all perfect, tubular, longer than the calyx, erect, cut half way down into five linear fegments, villous at the infide: thofe of the radius five, ligulate, female, longer than thofe of the difk, their limb almoft as broad as long, very obtufe, contracted and downy towards the tube, permanent. *Stam.* in the perfect florets, Filaments five, capillary, very fhort; anthers united into a cylindrical tube. *Pift.* in the perfect florets, Germen oblong; ftyle thread-fhaped, the length of the ftamens; ftigma divided, flender, reflexed. *Peric.* none, the calyx remaining unchanged. *Seeds*, to both kinds of florets, folitary, linear, compreffed, rather fhorter than the calyx; crowned with five, more or lefs, erect, pointed, unequal fcales. *Recept.* naked, fmall, flat.

Obf. In a cultivated ftate, the two common garden fpecies have ufually, from luxuriance, more fegments in the calyx,

calyx, and more florets in the radius, than is natural; one of these luxuriant flowers is what Gærtner has delineated. Some more recently discovered species, on the other hand, have naturally but three or four radiant florets.

Eff. Ch. Receptacle naked. Seed-down of several erect pointed scales. Calyx simple, of one leaf, tubular, with five teeth. Florets of the radius five, permanent.

1. T. *patula*. French Marygold. Linn. Sp. Pl. 1249. Willd. n. 2. Ait. n. 2. Loureir Cochinch. 504. Curt. Mag. t. 150. (Flos aphricanus minor, simplici flore; Ger. Em. 750. Caryophyllus indicus minor; Camer. Epit 407.)

β. T. minor, flore fulvo maculato; Dill. Elth. 373. t. 279.—Stem spreading. Leaves pinnate; leaflets lanceolate, with hair-pointed serratures. Stalks single-flowered, somewhat swelling upwards.—Native of Mexico, from whence it was brought to the gardens of Europe, about the middle of the sixteenth century, and hence dispersed over other countries, being now, according to Loureiro, commonly cultivated in Cochinchina, China, and various parts of India. With us it is a tender annual, raised on a hot-bed in spring; and being planted out after midsummer, decorates almost every garden throughout the autumn. Its appellations of French Marygold, and African Flower, are altogether founded in error. The *stem* is about a foot or 18 inches high, branched and widely spreading. *Leaves* opposite, of five or six pair of dark green shining leaflets, with an odd one; all gradually smaller downwards. *Flowers* about two inches in diameter, yellow, with broad lateral stripes, or spots, to each radiant *floret*, of a peculiarly rich brown. They vary in size and tints, as well as scent, and are generally more or less double. The plant of Dillenius hardly deserves to be marked as a variety. The herb when bruised is very fetid, acrid, and supposed to be poisonous, though too nauseous to be very dangerous. Few flowers are more striking in appearance.

2. T. *erecta*. African Marygold. Linn. Sp. Pl. 1249. Willd. n. 3. Ait. n. 3. (Flos aphricanus major; Ger. Em. 749. Caryophyllus major indicus; Besl. Eystet. æst. ord. 14. t. 2. C. indicus; Camer. Epit. 406.)—Stem erect. Leaves pinnate; leaflets lanceolate, with hair-pointed serratures. Stalks single-flowered, swelling upwards.—Native of Mexico; introduced into the gardens of Europe about the same time as the foregoing, nor is the epithet of African more correctly applied to one than to the other. The same mode of culture suits both, and both are equally common. This species is much the tallest, and grows erect. The *leaves* are rather paler. *Flowers* twice as large, of a golden uniform yellow; sometimes orange-coloured. Columna, in his *Ecphrasis*, part 2. 47. t. 46, represents a quilled variety, as it is termed, whose radiant *florets* are funnel-shaped, and another whose *florets* are all of that sort.

3. T. *elongata*. Long-stalked American Marygold. Willd. n. 4.—Stem erect, nearly simple. Leaves pinnate; leaflets linear, serrated at the end; those of the lower leaves wedge-shaped. Stalks single-flowered, elongated, slightly swelling.—Native of South America. *Root* annual. *Stem* from three inches to a span high, either simple, or furnished with a branch or two from the bottom. *Leaflets* of the lower leaves obovato-lanceolate, serrated at the extremity; those of the upper linear, with a few slightly hair-pointed serratures at the end. *Stalk* solitary at the top of the stem or branch, and almost as long as the stem itself. *Flower* deep yellow, agreeing in form and structure with *T. patula*.

4. T. *minuta*. Small-flowered Chili Marygold. Linn. Sp. Pl. 1250. Willd. n. 5. Ait. n. 4. (T. multiflora, minuto flore albicante; Dill. Elth. 374. t. 280.)—Stem erect, densely panicled. Leaves pinnate; leaflets lanceolate, serrated. Stalks many-flowered, scaly.—Native of Chili. Cultivated in Dr. Sherard's garden, before the year 1728. A hardy annual, flowering in autumn, but seldom preserved in collections. The *stem* is ten or twelve feet high, covered with *leaves*, which are smaller than those of the first species. The *flowers* are very small and pale, forming dense, compound, tufted, erect *panicles*, at the ends of the branches; their *stalks* clothed with bristly scales. *Calyx* cylindrical. *Radius* of two, three, or four variously lobed florets. This is surely the Chili plant of which Feuillé (quoted by Dillenius) describes two varieties, differing in the number of their radiant *florets*; and which he says is extremely hot in quality. The Indians eat it to warm themselves after their return from fishing.

5. T. *caracasana*. Long-stalked South American Marygold. Willd. n. 6. (T. peduncularis; Cavan. Leccion. 201. n. 494?)—"Stem corymbose, furrowed, erect. Leaves pinnate; leaflets lanceolate, serrated at the end. Stalks elongated, single-flowered, erect. Calyx cylindrical."—Gathered by Baron Humboldt at the Caraccas.—*Root* annual. *Stem* corymbose at the top. *Leaflets* linear-lanceolate, serrated at the end, not fringed. *Flowers* like those of the next species, on long alternate stalks. *Leaflets* of the uppermost leaves entire. *Willdenow*. The plant of Cavanilles was raised in the garden at Madrid, from seeds collected at Cumaná by Bonpland, the companion of the celebrated Humboldt. The *stem* is described a foot and a half high, furrowed, much branched. *Flower-stalks* six inches long, tumid near the calyx, leafy in their lower part. *Corolla* entirely yellow, with six or eight rays shorter than in the following. We find nothing in his account which is not conformable to the plant before us, and should have been glad if we could have adopted his greatly preferable specific name.

6. T. *tenuifolia*. Fine-leaved Peruvian Marygold. Cavan. Ic. v. 2. 54. t. 169. Willd. n. 7. Ait. n. 5.—Stem panicled. Leaves pinnate; leaflets linear, serrated; their lower serratures elongated. Stalks alternate, single-flowered. Calyx club-shaped.—Native of Peru. *Cavanilles*. We have specimens from Mutis. Mr. W. Malcolm is said in Hort. Kew. to have cultivated this species in 1797, but being a late-flowering annual, greatly inferior in size and beauty to the popular species of the same genus, it has probably not been preserved. The appearance of the dried specimens is like a starved *T. patula*, with more numerous, much smaller, *flowers* than usual. The *calyx* abounds with oblong glandular dots, of which traces are likewise found in that species. The *corolla* is described of a full unspotted yellow.

7. T. *elliptica*. Oval-leaved Peruvian Marygold.—Stem erect, branched. Leaves pinnate; leaflets elliptical, with shallow serratures. Stalks corymbose, with lanceolate bracteas.—Native of Peru. We received a dried specimen from the late abbé Cavanilles, in 1804. The *stem* has a shrubby appearance, and is much branched, leafy and furrowed. *Leaflets* scarcely visibly serrated, pointed, smooth and even; the lower ones of each leaf gradually smaller, and mostly alternate. *Flowers* rather numerous, not very much smaller than in *T. patula* when not luxuriant; their partial stalks accompanied by alternate lanceolate *bracteas*. *Calyx* marked with scattered, apparently glandular, lines. This is certainly very distinct from all the species we can find described.

8. T. *micrantha*. Small-flowered Mexican Marygold. Cavan. Ic. v. 4. 31. t. 352. Willd. n. 8.—Stem much branched, spreading. Leaves pinnate; leaflets linear-awl-shaped, entire. Stalks axillary, single-flowered.—Gathered by Louis

Louis Née, near the town of Querétaro, in New Spain. It flowered in the Madrid garden, in October 1796. *Root* annual. *Stems* hardly a foot high, round, rather woody, fmooth like every other part of the plant. The flendernefs of the *leaves*, and fmallnefs of the *flowers*, give this fpecies the appearance of a PECTIS or HETEROSPERMUM (fee thofe articles); but the *calyx* is perfectly fimple, tubular, with five furrows and five teeth. *Florets* of the radius two only, whitifh and undivided: thofe of the difk generally five, yellow, fcarcely more than four-cleft. *Seeds* long, compreffed, each crowned with two briftles, and two intermediate, notched, unequal fcales.

9. T. *lucida.* Sweet Chili Marygold. Cavan. Ic. v. 3. 33. t. 264. Willd. n. 1. Ait. n. 1. Curt. Mag. t. 740. Andr. Repof. t. 359. — Leaves fimple, finely ferrated. Panicle corymbofe.—Native of New Spain. Its feeds were brought to England in 1798, by the late marchionefs of Bute, along with many other novelties from the gardens of Madrid. The *root* is perennial, and will endure our ordinary winters, with a flight degree of protection. *Stem* erect, about two feet high, round, ftriated, leafy, fmooth; branched in the upper part. *Leaves* one and a half or two inches long, oppofite, on fhort, broad, combined *footftalks*, elliptic-oblong, fmooth, veiny, full of pellucid dots; their lower ferratures tipped with briftly points, or hairs. *Panicle* level-topped, many-flowered; its ftalks angular, fmooth, with linear-lanceolate *bracteas*. *Calyx* half an inch long, befprinkled with glandular dots. *Flowers* of a golden yellow, agreeably fcented; their radiant *florets* generally three, very broad. *Seed* crowned with from two to five linear-lanceolate unequal fcales. The ferratures of the *leaves* are very incorrectly reprefented in Cavanilles's plate, where they are made to refemble a fringe of fine hairs, which only belongs to the lower ones, and is not expreffed in any of the figures hitherto publifhed.

TAGETES, in *Gardening*, furnifhes plants of the herbaceous annual kind, among which the fpecies moftly cultivated are, the French marygold (T. patula), and the African marygold (T. erecta).

The firft fort has feveral varieties, as the pale yellow-flowered, deep yellow-flowered, golden yellow-flowered, crimfon-coloured, velvety, variegated crimfon and yellow, ftriped crimfon and yellow; each of which has both fingle and double flowers: and there are the large-flowered, fmall-flowered, fweet-fcented, and the dwarf French marygolds.

In the fecond fort, alfo, there are varieties; as thofe with pale yellow or brimftone-coloured flowers, with deep yellow flowers, with orange-coloured flowers; the fweet-fcented and the dwarf, &c.; each with fingle, double, and fiftulous flowers; the middling African, with orange-coloured flowers, and the fweet-fcented African, and perhaps fome others.

Method of Culture.—All thefe plants are increafed by feeds, which fhould be fown in the beginning of April upon a hot-bed; and when the plants appear, they fhould have plenty of frefh air, and, after they have attained fome growth, be tranfplanted on to another hot-bed, which is arched over by hoops, at the diftance of fix inches; watering and fhading them well till frefh-rooted, being afterwards gradually inured to the open air; and about the beginning of May they may be taken up with balls of earth about their roots, and be planted in pots, to be fet out in the courts, yards, &c. about the houfe, fhading them till frefh rooted, and giving them water occafionally. But the firft fort divides and fpreads out widely near the ground, in a rambling manner, and requires to be trimmed up at bottom to a fingle ftem, and its branches occafionally, to preferve the head fomewhat regular, and within due bounds.

In raifing them in the open ground, in cafe of the default of hot-beds and other conveniencies, the feed fhould not be fown before the beginning of April, when the plants are to be covered and protected in the nights, and in fevere weather; and when otherwife, not until the middle or latter end of it, and then in a warm rich fituation, either in drills of half an inch in depth, or on the furface, and raked in lightly. After the plants are a few inches high, they fhould be planted out either finally into the borders and other parts, or, when too fmall, into nurfery-rows for a little time, and then fet out where they are to remain.

Two or three plants may be placed nearly together, in patches at five or ten feet diftance; and when they fhew their flowers, fo as to judge of their properties, the worft may be cleared away, and one only of the beft left to each patch, &c. The fame way may be had recourfe to in planting in pots, &c.

In the future culture of all thefe kinds of plants, occafional waterings are neceffary, frequently the firft and fecond weeks after planting out, but more feldom afterwards. Thofe in pots fhould have it three times in the week conftantly, and morning and night in very hot weather.

Stakes are requifite to the ftrong large-headed plants, one to each. They fhould alfo be properly trimmed in their fide-branches near the bottom, and the too great ramblers, to produce regularity.

However, the fecond fpecies in particular, and the varieties of it, as they always grow firmly erect, both in ftem and branches, require but very little trouble after their final planting out: they afford ornament and variety, among other plants, in the borders, clumps, and other parts of pleafure-grounds, as well as in pots for particular places about the houfe, among other potted annual plants. The feeds of each fpecies, and their varieties, fhould be annually faved from the beft plants.

All the forts grow very well and freely in any common garden foil, which is in an open expofure, exhibiting a particularly confpicuous autumnal bloom, in long fucceffion; and when properly arranged, and difpofed in affemblage with other forts of plants, afford a highly ornamental variety and effect, in the great diverfity of the various forms and colourings of the flowers, in the different forts and varieties.

In faving the feed, it fhould be collected only from the fineft and fulleft double flowers, when perfectly ripe, keeping that of the different varieties quite diftinct. The prime large heads of feed of each fort, after being well dried, may either have the feed beat and rubbed out, or kept in them, putting the whole up into bags, boxes, or drawers, until the period of putting them into the ground. Frefh feed fhould conftantly be faved every year, as that of more than one year old will feldom grow well.

TAGGAH, in *Geography*, a town of Africa, in the country of Algiers; 24 miles S.E. of Seteef.

TAGGIA, a town of the Ligurian republic; 4 miles N.E. of St. Remo.

TAGGING. See SHEARING.

TAGHAYOOG BAY, in *Geography*, a bay on the weft coaft of the ifland of Paraguay. N. lat. 25° 2'.

TAGHMON, a poft-town of the county of Wexford, Ireland, on the road from New Rofs to Wexford, which was a borough before the union, and fent two members to the houfe of commons. It is 73 miles S, by W, from Dublin, and about 9 W. from Wexford.

TAGIA, a fmall ifland in the bay of Gunong-Tellu, on the eaft coaft of Celebes. S. lat. 0° 30'. E. long. 122° 6'.

TAGIABAD, a town of Perfia, in the province of Irak; 15 miles E. of Natens

TAGIAH, a river of Algiers, which runs into the Mediterranean, 24 miles E. of Oran.

TAGIDOG, a river of North Wales, which runs into the Alen, 4 miles N. of Wrexham.

TAGIL, a river of Ruſſia, which runs into the Tura, 48 miles W. of Turinſk.

TAGILSKOI, Verchnei, a town of Ruſſia, in the province of Ekaterinburg; 52 miles N. of Ekaterinburg.

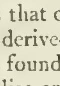
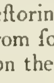
Tagilskoi, *Niznei*, a town of Ruſſia, in the province of Ekaterinburg; 60 miles N. of Ekaterinburg.

TAGIOURA, a town of Africa, in the country of Tripoli; 10 miles E. of Tripoli.

TAGLARET, a town in the department of the Po; 7 miles W. of Pinerolo.

TAGLIACOZZI, or Taliacotius, Gasparo, in *Biography*, was born at Bologna in 1546, and practiſed with celebrity as a phyſician and ſurgeon in his native city from the year 1570 to 1599, where he died. The peculiar practice, implied in his name, was that of reſtoring loſt parts by inſition; and this practice he derived from ſome Neapolitan and Sicilian ſurgeons. It was founded on the principle, that two raw ſurfaces of living bodies or parts, attached to each other in cloſe contact, will adhere and mutually tranſmit circulating fluids. On this ſubject he publiſhed two treatiſes: *viz.* "Epiſtola ad Hieronymum Mercurialem de Naribus, multo ante abſciſſis, reficiendis," Francof. 1587; and "De Curtorum Chirurgia per Inſitionem, Lib. duo, additis Cutis traducis, Inſtrumentorum omnium, atque Deligationum, iconibus et tabulis," Venet. 1597, fol. A ſimilar practice has anciently prevailed in India, and is now occaſionally adopted after the common puniſhment of amputating the noſe; for reſtoring which, a piece from the ſkin of the forehead is ingeniouſly engrafted. Modern ſurgeons have availed themſelves of the principle, by bringing over flaps of the adjacent ſkin, in order to accelerate the healing after amputation, and other operations. Haller. Eloy. Gen. Biog.

TAGLIACOZZO, in *Geography*, a town of Naples, in Abruzzo Ultra; 18 miles S.W. of Aquila. N. lat. 42° 4′. E. long. 13° 19′.

TAGLIATO, Ital., in *Muſic*, is uſed for meaſure, which the French call *barré;* that is, when the character for common time is thus marked, , or , with a perpendicular line drawn through the middle of the C; it implies quick time, in which the notes are played or ſung twice as rapidly as in the uſual common time; a ſemibreve being performed like a minim, a minim like a crotchet, a crotchet like a quaver, &c. A *breve,* double the length of a ſemibreve, uſed to fill a bar; whence the terms *alla breve.* This time is ſtill uſed in muſic *à capella*, and *alla Paleſtrina;* in which the notes being chiefly open, and in fugue, muſicians uſually call a fugue conſiſting chiefly of ſemibreves and minims a *white fugue.* The time, too, when a line is drawn through the C, is called *cut time.*

TAGLIER, in *Geography*, a ſmall iſland in the gulf of Venice. N. lat. 44° 10′. E. long. 15° 17′.

TAGLIO, a river of the Ligurian republic, which runs into the Mediterranean, 4 miles E. of St. Remo.

TAGLO Bay, a bay on the ſouth coaſt of the iſland of Mindanao. N. lat. 6° 8′. E. long. 125° 40′.

Taglo *Point*, a cape on the north-weſt coaſt of Mindanao.

TAGNON, a town of France, in the department of the Ardennes; 8 miles S.W. of Rethel.

TAGOAST, Tagaost, or *Tagavaſt*, a large town of Africa, in the kingdom of Sus; ſaid by ſome to have been the birth-place of St. Auguſtine; ſituated in a fertile country, and defended by a garriſon of 400 men; 140 miles S.W. of Morocco.

TAGODAST, a town of Morocco, near the foot of mount Atlas; 60 miles N.E. of Morocco.

TAGOLANDE, an iſland in the Eaſt Indian ſea, about 10 miles in circumference. N. lat. 2° 18′. E. long. 125° 6′.

TAGOMAGO, a ſmall iſland in the Mediterranean, near the eaſt coaſt of the iſland of Iviça.

TAGORA, in *Ancient Geography*, a town of Africa, in Numidia. Anton. Itin.

TAGOURIE, in *Geography*, a town of Chineſe Tartary, in the province of Hami; 40 miles N.N.E. of Hatamtam.

TAGOU-ZAINAH, the towns of Taggah and Zaina in Algiers, being contiguous, and ſeparated only by a ſmall brook; 50 miles S.W. of Conſtantina.

TAGTE-RUSTAN, a mountain of Perſia, very much reſorted to by the Gentoos; 4 miles from Iſpahan.

TAGTESSA, a town of Morocco; 120 miles W.N.W. of Morocco.

TAGUA, a town and alſo diſtrict of Africa; 250 miles N.E. of Bornou. N. lat. 19° 10′. E. long. 27° 20′.

TAGUAN, in *Zoology*. See Sciurus *Petauriſta*.

TAGULMEMMET, in *Geography*, a town of Algiers; 5 miles S.E. of Muſtygannim.

TAGULO, a town on the ſouth coaſt of the iſland of Mindanao. N. lat. 7° 30′. E. long. 124°.

TAGUMADERT, a town of Africa, in the country of Darah; 20 miles S. of Tattah.

TAGURIN, a town on the weſt coaſt of the iſland of Luçon. N. lat. 16° 20′. E. long. 120° 48′.

TAGUS, or Tajo, a river, which riſing in the mountains of Molina, that ſeparate the kingdom of Aragon from Old Caſtile, paſſes by Aranjuez, Toledo, Talavera de la Reyna, croſſes Caſtile and Eſtremadura, and enters Portugal at Montalvao; traverſing Eſtremadura, it paſſes by Abrantes, Santarem, &c. and runs into the Atlantic about 10 miles below Liſbon. Its current is broken by many cataracts, ſo that on this account, and alſo on account of its rocks, it is not navigable far above Liſbon.

TAGYPEEL, a ſmall iſland in the Eaſt Indian ſea, near the N.E. coaſt of Borneo. N. lat. 6° 29′. E. long. 117° 54′.

TAGZA, a town of Algiers; 12 miles S.S.E. of Conſtantina.

TAHA *el Modain*, a town of Egypt; 5 miles S.W. of Samalut.

TAHABUCKOO, a town of Thibet; 5 miles N.W. of Jhanſu-Jeung.

TAHAIS, a town of Sweden, in the province of Savolax; 50 miles N.N.W. of Nyſlot.

TAHAL, a town of Spain, in the province of Grenada; 8 miles N.N.E. of Purchena.

TAHATE, a town of Arabia, in Yemen; 12 miles W. of Zebid.

TA-HEAN, a city of China, of the ſecond rank, in Yun-nan; 1130 miles S.W. of Peking. N. lat. 25° 52′. E. long. 101° 50′.

TAHEJ, a town of Hindooſtan, in Cutch; 150 miles W. of Amedabad. N. lat. 23° 16′. E. long. 69° 58′.

TA-HE-KAN, a ſmall iſland near the coaſt of China. N. lat. 37° 57′. E. long. 120° 30′.

TAHGUM, a town of Bengal; 14 miles W. of Koonda.

TAHIAO, a town of Corea; 35 miles S.S.E. of Long Konang.

TAHIRAN, a town of Perfia, in the province of Irak; 45 miles E.S.E. of Cafbin. N. lat. 35° 50′. E. long. 51°.

TAHNUM, a town of Gorkah; 20 miles N.W. of Gorkah.

TA-HOOROWA, one of the fmaller Sandwich iflands, fituated about nine miles from the S.W. part of Mowee; deftitute of wood, with a fandy, barren foil. N. lat. 21° 40′. E. long. 199° 30′.

TAHOU, a town of Africa, on the Grain Coaft. N. lat. 4° 50′. W. long. 6° 50′.

TAHRIE′, a town of Perfia, in Farfiftan, on the coaft of the Perfian gulf; 12 miles E.S.E. of Konkum. N. lat. 27° 45′. E. long. 52° 20′.

TAHTA, a town of Egypt, on the Nile; 32 miles S. of Siut. N. lat. 26° 57′. E. long. 31° 22′.

TAHUK, or TABUK, a town of Arabia, in the province of Nedsjas; 176 miles S.S.E. of Jerufalem.

TAI, a city of China, of the fecond rank, in Chan-fi; 175 miles W.S.W. of Peking. N. lat. 39° 6′. E. long. 112° 30′.—Alfo, a city of China, of the fecond rank, in Kiang-nan; 22 miles E. of Yang-tcheou. N. lat. 32° 30′. E. long. 119° 36′.—Alfo, a large lake. See TAI-HOO.

TAI-*Arabs*, an ancient and noble tribe, the mention of which often occurs in the Roman hiftory. They ftill continue in poffeffion of the fame tract of country which they had in the time of Julian, *viz.* between Moful, Nifibin, and the Khadour.

TAJACU, or the *Sus tajacu* of Linnæus, in *Zoology*, the name of an animal common in fome parts of America, called by many authors *aper mofchiferus*, or the mufk-boar. (See SUS.) It is of the fhape of our hog, but much fmaller, and has no tail, and its head is broader, and the fnout much lefs pointed than in our hog; it has two tufks in each jaw, thofe in the upper jaw pointing down, and hardly apparent when the mouth is fhut, the others hid; the neck is fhort and thick, and the whole body of a grifly colour, or mixture of black and grey; its body is covered with hairs, much thicker and ftronger than our hog's-briftles, fomething like the briftles of the hedge-hog, and like them alfo variegated with circles of black and white; thefe are four or five inches long on the back, and gradually diminifh to the fides; on the middle of its head, between the ears, it has a fort of creft, made up of black briftles; the belly almoft naked; from the fhoulders to the breaft is a band of white; its ears are fmall and erect, and its eyes fmall; its fnout, feet, and hoofs, are juft like thofe of the European hog; but the two pofterior or exterior hoofs are longer than in any other of the cloven-footed beafts.

What is moft fingular, however, in this creature, is a certain gland which he has upon the back, and which has given occafion to fome to fay its navel was placed there. This gland is fituated on the very ridge of the back near the rump, and is fo clofely covered with long briftles, that till they are removed by blowing, and keeping them back with the hand, the gland is not to be feen: when thefe are removed, there is feen a fpot almoft naked, in the middle of which the top of the gland is feen; the lips of this gland ufually ftand a little way above the flefh, and its aperture eafily admits a large ftylus; and this gland, when lightly preffed, fpews out a liquid fubftance of a brownifh-yellow colour, and fcent fomething like that of mufk or civet. The gland itfelf is placed between the fkin and flefh, and is not wholly covered by its conftringing mufcle, but only furrounded by it at its bottom.

This animal inhabits the hotteft parts of South America, and fome of the Antilles; lives in forefts, on the mountains, is very fierce, and if wounded, will turn on the hunter. It feeds on fruits and roots, toads and ferpents, which it fkins with great dexterity. It is reckoned very good food; but unlefs the dorfal gland be cut out as foon as it is killed, the flefh will be infected by it. The Indians call this animal *pequaris*, whence its name *pecary*. Ray and Pennant.

TAJAMENTO, or TAGLIAMENTO, in *Geography*, a river which rifes in Friuli, and runs into the gulf of Venice; 10 miles S.S.E. of Concordia.

TAJANJE, a river of Brafil, which runs into the Atlantic, S. lat. 27° 35′.

TAJARA, in *Ichthyology*. See RAIA.

TAIBEH, in *Geography*, a fortified town in the defert of Syria, having near its gate a fountain of frefh water; 85 miles E.S.E. of Aleppo. N. lat. 35° 10′. E. long. 38° 45′.

TAI-CHAN, a town of Corea; 20 miles W. of Haimen.

TAIDENT, a town of Africa, in Fezzan; 130 miles S.S.W. of Mourzouk.

TAJE-ELT, a town of Algiers; 35 miles S.S.E. of Bona.

TAIEZA, a town of Croatia; 45 miles E. of Bihacs.

TAIGAREE. See TEGERLY.

TAI-HOO, or TAI, a beautiful lake of China, faid to be near fifty leagues in circumference, dividing the provinces of Kiang-nan and Tche-kiang, and furrounded by a chain of picturefque hills. It fupplies Sou-choo-foo, at a fmall diftance from it, with fifh, and ferves the inhabitants alfo as a place of public refort and recreation. Many of the pleafure-boats on this lake are rowed by a fingle female; and the rowers are faid to follow more than one profeffion.

TAIIBI, in *Zoology*, the name of an American animal, defcribed by Marcgrave and other authors, and fuppofed by fome to be only the male of the opoffum. The Portuguefe in America call it the *cachorro de mato*, and by the Dutch it is called *bofchratte*. See DIDELPHIS.

TAIJEOURA, in *Geography*, a town of Africa, in the kingdom of Adel; 15 miles N.W. of Zeilah.

TAIL, CAUDA, that part of an animal which terminates its body behind.

The tail is different, both in figure and ufe, in the various fpecies. In land-animals it ferves to rid them of flies, and is ufually covered with hair, and ftrengthened with bones: in fifhes it is cartilaginous, and ferves them as a helm to fteer their courfe withal in fwimming.

In birds it is covered with feathers, and greatly affifts in all afcents and defcents in the air; as alfo to render their flight fteady, by keeping the body upright in that fubtile and yielding medium, by its ready turning and anfwering to every vacillation of the body.

TAIL *of Fifh*. This part in the fifh-kind is the fubject of very great diftinctions, among the characters of the feveral genera. It differs in the feveral kinds of fifh in a very obvious manner, in number, fituation, and figure. In regard to the firft difference, the *acus lumbriciformis*, and one of the kinds of the *ferpens marinus*, have no tail at all; in all other fifh there is a tail, and it is never more than one on each fifh.

In regard to fituation, there is this great difference, that in fome it is placed perpendicularly, in others horizontally. In almoft all the known fifhes it is placed perpendicularly, except in the dolphin, the phocæna, the orca, the manati, and all the whale-kinds; for in all thefe it is placed horizontally, when the body is laid in its natural pofture.

Koei-tcheou; 967 miles S.S.W. of Peking. N. lat. 27° 5'. E. long. 105° 14'.

TAI-TONG, a city of China, of the firſt rank, in Chan-ſi. It is ſituated in a mountainous country, and is the only place expoſed to the incurſions of the Tartars: it is very well fortified, according to the manner of the Chineſe, and has a very ſtrong garriſon; its territory is ſurrounded by the great wall, which has forts from place to place; its juriſdiction is very large, and extended over four great cities of the ſecond order, and ſeven of the third: its mountains abound with all kinds of ſimple and medicinal herbs, which the botaniſts gather with great care. Lapis lazuli is in great plenty here; and there is a kind of jaſper, which is tranſparent, and as white as agate: porphyry, marble, and jaſper of all colours are very plentiful; and here is alſo a great trade for ſkins; 155 miles W. of Peking. N. lat. 40° 5'. E. long. 112° 44'.

TAITOU SAHA, a ſmall iſland in the ſea of Japan. N. lat. 42° 32'. E. long. 130° 42'.

TAI-TSANG, a city of China, of the ſecond rank, in Kiang-nan; 567 miles S.S.E. of Peking. N. lat. 31° 30'. E. long. 120° 24'.

TAIVERAM, a town of Hindooſtan, in the province of Dindigul; 8 miles N.W. of Outampaleam.

TAJUNA, a river of Spain, which riſes in the north part of New Caſtile, and runs into the Xarama, a little before its union with the Tagus.

TAIWAN. See FORMOSA.

TAI-Y, a city of China, of the ſecond rank, in Quang-ſi, on the ſouth ſide of the Poſoi; 1125 miles S.S.W. of Peking. N. lat. 23° 24'. E. long. 106° 18'.

TAI-YUEN, a city of China, of the firſt rank, in Chan-ſi; 230 miles W.S.W. of Peking. N. lat. 37° 54'. E. long. 111° 56'.

TAIZALUM, in *Ancient Geography*, a promontory of the iſle of Albion, between the mouth of the Celnius and that of the Diva. (Ptol.) This is ſuppoſed to be Kynaird-Head, near Fraſerburgh, in Buchan; the Celnius being the river Spay, in the ſhire of Elgin, and the Diva the river Dee at Aberdeen.

TAK, EL, in *Geography*, a town of Perſia, in the pro vince of Segeſtan; 15 miles N. of Zareng.

TAKA, a town of Nubia, capital of a diſtrict, called Takaki, on the Beleſe; 50 miles S.E. of Ilak.

TAKAGUS, a town of Japan, in the iſland of Niphon; 60 miles N.W. of Meaco.

TAKAKAKKAN, a ſmall iſland in the Eaſtern Indian ſea, near the eaſt coaſt of Borneo. N. lat. 3° 8'. E. long. 116° 51'.

TAKALUOTO, a ſmall iſland on the E. ſide of the gulf of Bothnia. N. lat. 61° 39'. E. long. 21° 10'.

TAKAMIDJA, a town of Japan, in the iſland of Niphon; 150 miles S.W. of Meaco.

TAKAUL, a town of Aſiatic Turkey, in Caramania; 40 miles N. of Cogni.

TAKE *and Leave*, in *Sea Language*. The ſailors ſay, a ſhip can *take and leave upon her when ſhe will*; when ſhe ſails ſo well, that ſhe can come up with another, or outſail her at pleaſure.

TAKE, *Thiſtle*. See THISTLE.

TAKE-*In*, *To*, in *Ship-Building*, is to come-up a ſett and make it faſt again cloſer to the plank, as it works nearer to the timbers.

TAKE-*In Sail*, *To*, is to diminiſh its ſurface by reefing, &c. particularly when the wind increaſes too much. See TAKING-IN.

TAKENO, in *Geography*, a town of Japan, in the iſland of Ximo; 40 miles E.S.E. of Ikva.

TAKERS—*Carr-Takers*. See CARR-TAKERS.

TA-KIA-TCHE, in *Geography*, a town of China, on the W. coaſt of the iſland of Formoſa. N. lat. 24° 22'. E. long. 119°.

TAKING-IN, in *Sea Language*, denotes the act of brailing-up and furling the ſails at ſea, particularly when the wind increaſes. It is generally uſed in oppoſition to *ſetting*.

TA-KIRON-HOTUN, in *Geography*, a town of the kingdom of Corea; 425 miles E. of Peking.

TAKLACOT, a town of Thibet; 60 miles N.E. of Kerion.

TAKMITZSKAIA, a town of Ruſſia, in the government of Tobolſk, on the Irtiſch; 36 miles S. of Tara.

TAKPO, a large province of Thibet, which is ſubdivided into ſeven takpos. On the N. it has the province of U, on the S. Combo, on the E. Cobang, and on the W. Tzhang.

TAKTANG, a river of Ruſſia, which runs into the Lis, N. lat. 62° 24'. E. long. 89° 44'.

TAKY, a town of Bengal; 30 miles E. of Calcutta.

TAL, a name uſed by ſome writers on the materia medica to expreſs the dung of peacocks; and by ſome of the chemical writers for any alkali ſalt.

TALA, in *Botany*, a name by which ſome authors call the plant, whoſe ſeed is the ſeſamum, or oily purging grain of the ſhops.

TALABON, in *Geography*, a town on the W. coaſt of the iſland of Gilolo. N. lat. 1° 40'. E. long. 127° 20'.

TALABONG, in *Ornithology*, a name given by the inhabitants of the Philippine iſlands to a ſpecies of heron, common among them; which is much ſmaller than our heron, and perfectly white all over.

TALABRIGA, in *Ancient Geography*, a town of Spain, in Luſitania, towards the ſouth, upon the Vatna, not far from the ſea, S.W. of Langobriga.

TALABROCA, the name of one of the moſt celebrated towns of Hyrcania. Strabo.

TALACACHA, in *Geography*, a town of South America, in the province of Tucuman; 15 miles S. of St. Miguel de Tucuman.

TALACOUAN, a town of Lower Siam, on an iſland in the Mecon; 30 miles S. of Juthia.

TALÆDITES, ταλαιδιτης, in *Antiquity*, gymnical exerciſes in honour of Jupiter Ταλαιος.

TALAFA, in *Geography*, a ſmall iſland in the South Pacific ocean, among thoſe called Hapaae, S.W. of Holaiva.

TALAGIR, a ſmall iſland among the Philippines; 25 miles W. of Samar.

TALAGOS, a town of Africa, in the country of Sierra Leone. N. lat. 10° 20'. W. long. 13° 40'.

TALAGUADA, a town of South America, in the province of Carthagena; 10 miles N.N.W. of Mompox.

TALAHSECHTE, an Indian town of Eaſt Florida, on the river St. Juan, near the bay of Apalache, in the gulf of Mexico; 52 miles N. of St. Mark. This town contains about 30 habitations, conſtructed of frame-work; and covered with the bark of the cypreſs-tree. The inhabitants form large handſome canoes of the trunks of cypreſs-trees, capable of holding 20 or 30 warriors. In theſe they deſcend the river on trading or hunting expeditions on the ſea-coaſt, iſlands, and keys as far as the point of Florida; and ſometimes they croſs the gulf and ſail to the Bahama iſlands, and even to Cuba, returning with cargoes of ſpirituous liquors, coffee, ſugar, and tobacco.

TALAI-

TALAI-HAI, a town of Chinefe Tartary. N. lat. 44° 17′. E. long. 120° 45′.

TALAI-HOTOC, a town of Thibet; 105 miles S.W. of Haratoubé.

TALALALUM, or Thalatatum, in *Ancient Geography*, a town of Africa Propria, on the route from Tacapæ to the Greater Leptis.

TALAMANCA, in *Geography*, a town of Spain, in New Caftile; 14 miles N.W. of Guadalaxara.

TALAMATA, a town of Hindooftan, in Coimbetore; 15 miles N. of Damicotta.

TALAN, a fmall ifland in the fea of Ochotfk. N. lat. 59° 30′. E. long. 149° 14′.

TALANGBOANG, a town on the W. coaft of Sumatra. S. lat. 4° 21′. E. long. 105° 44′.

TALANT, a town of France, in the department of the Côte d'Or; 2 miles N.W. of Dijon.

TALANTA, a town of European Turkey, in the ifland of Negroponte; 34 miles N.W. of Negroponte.—Alfo, a town of European Turkey, in Livadia; 18 miles N.E. of Livadia.

TALA-OSO, a town of Chinefe Tartary, in the country of Hami; 28 miles E.S.E. of Hatamtam.

TALAPOINS, a name given in Siam to thofe who dedicate themfelves to religion. See Siam.

TALAPOOSEE, in *Geography*, the great N.E. branch of the Alabama or Mobile river, in Florida. It rifes in the high lands near the Cherokees, and runs through the high country of the Oakfufkee tribes, in a wefterly direction, being full of rocks, falls, and fhoals, till it reaches the Tackabatches, where it becomes deep and quiet; from thence the courfe is W. about 30 miles to Little Talaffee, where it is united with the Coofa or Coofa Hatcha. The lower part of this river is, in moft maps, called Oakfufkee.

TALAPORUM, a town of Hindooftan, in Calicut; 20 miles N.N.W. of Tellicherry.

TALARHO-KARA-PALHASSUM, a town of Chinefe Tartary, in the country of the Eluths; 715 miles N.W. of Peking. N. lat. 47° 34′. E. long. 102° 34′.

TALARIUS Ludus, among the Romans, a game fomewhat refembling our dice-playing, and performed with a kind of gold or ivory dice, which they fhook as we do in a box, before they threw them. There was this difference, however, between their game and ours, that our dice have fix fides, becaufe they are cubical; but theirs had but four, and were conically fhaped. They made ufe of them for divination, as well as playing; and they concluded upon a good or evil augury, according to what came up. As they ufually threw four of them at a time, the beft chance was when four different fides came up. The fides were called by the name of fome animal, as the dog, vulture, bafilifk, &c.: or of fome deity, as Venus, Hercules, &c. Some authors have been of opinion, that they were marked with the forms of animals, or images of gods, and not with numbers or dots, as our dice are.

TALARN, in *Geography*, a town of Spain, in Catalonia; 22 miles N. of Balaguer.

TALASSEE, or Tallassee, a county confifting of a tract of land bounded by Eaft Florida on the S., N. by Alatamaha river, E. by Glynn and Camden counties, and W. by a line extending from the W. part of Ekanfanoka fwamp, in a N.E. direction till it ftrikes the Alatamaha river, at the mouth of the Oakmulgee.—Alfo, a town of the Upper Creeks, in the Miffifippi territory, on the S. fide of Talapoofee river; called alfo Big Talaffee.

TALASSIO, among the Romans, an acclamation ufed at marriages.

TALATUM, in *Ancient Geography*, the name of a temple of the fun, erected in Laconia, on the fummit of mount Taygetus.

TALAVAN, in *Geography*, a town of Spain, in Eftremadura; 25 miles S. of Plafencia.

TALAVERA *la Real*, a town of Spain, in Eftremadura; 13 miles S.E. of Badajos.

Talavera *la Reyna*, a town of Spain, in New Caftile, on the Tagus, fituated in a valley, and fortified; famous for its earthen-ware; 35 miles W. of Toledo.

Talavera *la Vieja*, a town of Spain, in New Caftile; 6 miles W.S.W. of Toledo.

TALAVERUELA, or *Talavera de Badajos*, a town of Spain, in Eftremadura, on the Guadiana; 9 miles E. of Badajos.

TALAUMA, in *Botany*, a word probably of South American origin, applied in the herbarium of Surian, now poffeffed by Juffieu, to the plant on which Plumier originally founded his genus Magnolia. See under that article, fp. 2, our reafons for not receiving *Talauma*, for the prefent at leaft, as a diftinct genus.

TALBERT's Island, in *Geography*, a fmall ifland in the Atlantic, on the coaft of Georgia, the N. point of which is in N. lat. about 30° 44′, where St. Mary's river difcharges itfelf into the ocean, between this ifland and Amelia ifland on the N. N. lat. 30° 36′. W. long. 81° 42′.

TALBOT, an ifland on the coaft of Eaft Florida, eight miles long and two wide.—Alfo, a county of Maryland, on the E. coaft of Chefapeak bay, bounded E. by Choptank river, which divides it from Carolina county, and S. by the fame river, which feparates it from Dorchefter. The foil of this county is rich and fertile; and it contains 14,230 inhabitants.

Talbot, in *Zoology*, a fort of dog, noted for its quick fcent, finding out the tracks, lodgings, and forms of beafts, and purfuing them with open mouth and continual cry, with fuch eagernefs, that if not taken off by the huntfman, he is often fpoiled.

TALC, in *Mineralogy*, *Idem*, Hauy. The name talc, in the prefent fyftomatic arrangemment of Werner, is placed both as the head of a genus and a family. Brongniart reftricts the name to thofe minerals which poffefs the following characters: they are foft and unctuous to the touch, and leave upon the nail, or on the furface of cloth on which they are rubbed, a white mark, which has fometimes a nacry luftre. The texture of talc is lamellar, or fibrous: the laminæ are flexible but not elaftic. Talc has always a fhining luftre, and is fometimes fplendent and nacry; it is tranflucent and often tranfparent; it yields eafily to the nail. The laminæ of which it is compofed, open a little by the action of fire or of the blowpipe; the fragment fwells, and the extremities of the laminæ are with difficulty fufible into a white enamel. Thefe characters, which are eafily recognifed, ferve to diftinguifh talc from chlorite and nacrite, which are very fufible; and from fteatite, ferpentine, or the unctuous clays, which are compact, have an earthy or fcaly fracture, and but little unctuofity. Talc has another remarkable property; it acquires pofitive electricity when rubbed with refin. Talc is fufceptible of cryftallization, and forms hexagonal laminæ. The primitive form of the cryftal is a right rhomboidal prifm, in which the angles at the bafe are 120° and 60°. Its fpecific gravity varies from 2.58 to 2.87. The prevailing colours are white, apple-green, and yellow.

Talc

Talc is divided by ſome mineralogiſts into three ſub-ſpecies, *viz.* common talc, indurated talc, and columnar talc.

Common talc; talc laminaire, Hauy. Its colours are thoſe before enumerated, but the green ſometimes paſſes into dark blue. The laminæ are very tender and flexible, but not elaſtic: by this they may be diſtinguiſhed from the laminæ of mica, which poſſeſs a conſiderable degree of elaſticity. In France this talc is called *craie de Briançon;* it is found in conſiderable maſſes in rocks of ſerpentine, accompanied with actinolite, granular lime-ſtone, and dolomite, along with indurated talc. The conſtituent parts are as follow:

	Vauquelin.	Klaproth.
Silex - - - - -	62	61.75
Magneſia - - - -	27	30.50
Alumine - - - -	1.50	
Potaſh - - - - -		2.75
Oxyd of iron - - -	3.50	2.50
Water - - - - -	6	2.25

It is found in Aberdeenſhire and Bamffſhire, in Scotland, and in various parts of the continent of Europe, where rocks of ſerpentine and porphyry occur. The talc which is brought from the mountains of the Tyrol is called in commerce *Venetian talc.*

Talc enters largely into the compoſition of the coſmetic named *rouge.* This ſubſtance is prepared by rubbing together in a warm mortar, generally of ſerpentine, certain proportions of carmine and finely powdered talc, with a ſmall portion of oil of benzoin. The Romans prepared a beautiful blue or purple colour, by combining this ſubſtance with the colouring fluid of the buccinum reticulatum and buccinum lapillus, teſtaceous animals abounding on the coaſts of the Mediterranean. The fleſh-coloured poliſh on figures made of gypſum is given by rubbing them with talc. The Perſians, according to Tavernier, whiten the walls of their houſes by means of lime-water, and then powder them with ſilver-coloured talc. Talc has ſometimes been uſed medicinally by the Chineſe and Europeans.

The chief uſe of the Ruſſian is as a ſcreen or cover for paintings in miniature and crayons; to which purpoſe thin ſlices of it are uſed. The Venetian is ſometimes alſo uſed for a fucus; in order to which, by reaſon of the difficulty of pulverizing it, &c. they content themſelves to raſp it with the ſkin of a ſea-dog, and to paſs the raſpings through a ſieve.

Pliny, in his Natural Hiſtory, lib. xxxvi. c. 22. obſerves, that the Romans not only uſed the Ruſſian ſort for window-lights, but they alſo paved the circus with a kind of it. See Glass.

Indurated talc is leſs flexible and leſs tranſlucent than the preceding: it occurs in maſſes, and has ſometimes a radiated ſtructure; its colours are various ſhades of green and greeniſh-grey. It forms beds of conſiderable ſize in mountains of gneiſs, mica-ſlate, and ſerpentine; it approaches nearly to pot-ſtone, and even to ſteatite, in many of its characters. It occurs in Perthſhire and Bamffſhire, in Scotland, and in France, Sweden, Saxony, Siberia, the Tyrol, and Switzerland. It is employed for drawing lines by carpenters, taylors, hat-makers, and glaziers. It is ſometimes made into culinary veſſels, like pot-ſtone, and is employed in powder for removing ſtains of greaſe from ſilk.

Columnar talc occurs in thin columnar priſmatic concretions, and it is opaque. The connection between talc, aſbeſtus, pot-ſtone, ſerpentine, chlorite, and even mica, may be traced by their apparent graduation into each other, particularly in ſome of the rock formations. See Asbestus, Pot-stone, &c.

The mixture of talc with different kinds and quantities of glaſs may be ſucceſsfully performed with a violent fire, but not with a ſmaller degree: thus three parts of talc, with one part of cryſtalline glaſs, make only a ſpongy and friable maſs in a common fire; but in a more violent one, they become a firm and ſolid maſs of a brown colour. Minium, or glaſs of lead, mixed in equal quantities with talc, and ſet in a violent fire, runs into a yellowiſh glaſs, reſembling the opaque pieces of amber; and two parts of minium to one of talc, produce a clear and tranſparent yellow glaſs, which is of a hardneſs capable of giving fire with ſteel. The alkaline earths, mixed with talc, produce a maſs ſcarcely vitrifiable by any fire: hence appears the reaſon why copels made of lime and talc are ſo very hard to vitrify. Minium, added to theſe mixtures, make them combine into a firm maſs, but without perfect fuſion; but borax added to them, melts them readily into a true glaſs. The gypſeous earths mixed with talc, will not unite into a maſs in any degree of fire; but if borax be added, the talc readily melts. Thus two parts of talc, two parts of that ſpar or gypſeous matter called *glacies Mariæ*, or the common plated ſpar, with one part of borax, run into a yellow maſs reſembling a topaz.

The argillaceous earths do not vitrify with talc; but they run into a maſs of great hardneſs, which will give fire with ſteel, and is very ſerviceable to make crucibles of, theſe veſſels not ſuffering the glaſs of lead to run through them. Talc, joined with the vitrifiable ſtones, forms no remarkable body, but the maſs remains friable; but from theſe maſſes, by the addition of proper matter to render them fluid, great variety of elegant compounds may be made. Thus if talc be mixed in equal quantities with powder of flints, on adding to the whole a fourth part of cryſtal-glaſs, the whole unites into an opaque but ſolid white maſs. Alkali-ſalt, added in equal quantity to talc and flint, gives a tranſparent yellow glaſs; and white ſand, talc, and a fixed alkali, in equal quantities, afford a green glaſs; with other mixtures of this kind, in different quantities, the reſemblances of many beautiful ſtones are produced; and what is very remarkable, ſome grains of metalline matter are often found on the ſurface of the maſſes.

Cæſalpinus, Aldrovand, and ſome others affirm, that talc melted with copper, or added to copper, while in fuſion, gave it a white colour: this being taken for granted, authors have hence agreed that talc contains an arſenical earth. But experiment ſhews this to have been a falſe aſſertion, in regard to talc; and probably it only owes its origin to the cant language of ſome of the alchemiſts, who have called the flowers of zinc talc, though theſe alone muſt render copper yellow, not white. Antimony and talc, firſt calcined with nitre, run in a violent fire into a ſort of flint, which will give fire with ſteel. With regulus of antimony and the black flux, it runs into a black maſs; and with biſmuth it calcines into a grey powder. So little is there in the propoſals of the chemiſts for the metallization of talc by antimony and biſmuth. Mem. de l'Acad. de Berlin, Ann. 1746.

In what part of Mr. Boyle's works the learned author, from whom the foregoing extract was taken, has found that talc may be reduced by common fire to a gypſum in an hour, we know not; but we find that Mr. Boyle ſays, that the calcination of talc is ſo very difficult, that eminent chemiſts have looked upon calxes of talc as counterfeits. Works abr. vol. i. p. 160.

Mr. Boyle mentions the extracting of gold from talc, as having

having ſometimes ſucceeded. See Works abr. vol. i. p. 160. but *vide ſupra.*

Talc, *Philoſophic,* a name given by ſome of the chemical writers to the flowers of zinc.

This ſubſtance, diſſolved in vinegar, affords what they have in their unintelligible language called *oil of talc,* and extolled as a thing of vaſt power in the fixing of mercury, and many other imaginary operations; and beſides this, they call it a ſovereign remedy for all diſeaſes.

TALCAGUANO, or Talcaguana, in *Geography,* a ſea-port of Chili, nine miles within the point of the ſame name, and about ſix from the town of Conception. This is the principal port in the bay of Conception, and is much the moſt frequented, as ſhips that anchor here have not only better ground than in any other part of the bay, but are in ſome meaſure ſheltered from the north winds. The town, or village, as Perouſe calls it, has been built ſince the city of Conception was deſtroyed by an earthquake in 1751: it ſtands on the river Biobin, and is ſaid to contain 10,000 inhabitants. Here are the epiſcopal cathedral, the ſeat of the biſhop, and all the religious houſes. The government of the adjacent diſtrict has been wholly military and eccleſiaſtical. The country round it is very healthy and fertile. Great numbers of cattle are annually killed for their hides and tallow, which are ſent to Lima. About 200,000 dollars' worth of gold is annually collected from the ſands in the rivers of this biſhopric. The Indians of the country have numerous herds of cattle, and plenty of horſes, and live more like the Tartars of Aſia than the ſavages of North America. Ships are here ſupplied with water, wood, and other neceſſaries. N. lat. 36° 42′. E. long. 73° 6′.

Talcaguano *Point,* a cape on the coaſt of Chili, 11 leagues N.E. of the iſland of Santa Maria, and 2 N. of Port St. Vincent.

TALCAN, a town of Aſia, in Tokariſtan, beſieged by Gengis Khan in the year 1221, and taken after a ſiege of ſeven months; 100 miles S.E. of Termed. N. lat. 36° 45′. E. long. 67° 9′.

TALCKENSTEIN, a mountain of Sileſia; 4 miles N.N.E. of Loewenberg.

TALCONAH, a town of Bengal; 30 miles E. of Goragot.

TALCOT, a town of Hindooſtan, in Concan; 25 miles N.E. of Goa.

TALCOTE, a town of the iſland of Ceylon; 20 miles W.S.W. of Candy.

TALCOUS Slate, in *Geology,* is conſidered by ſome geologiſts as a variety of clay-ſlate, but it has a nearer reſemblance to mica-ſlate. The colour is generally a greeniſh-grey, with a ſhining luſtre, like that of the finer kinds of mica-ſlate. It is ſofter than mica-ſlate, but is frequently divided into laminæ by thin ſeams of quartz, and has a twiſted or contorted form. The ſlate on ſome of the mountains of the higher Alps, as deſcribed by Sauſſure, ſeems to be of an intermediate kind between mica-ſlate and talcous ſlate. Talcous ſlate occurs on the weſtern ſide of the iſland of Angleſea, and in many alpine diſtricts, forming beds in clay-ſlate. See Slate.

TALDINGA, in *Geography,* a town of Bengal; 15 miles W. of Biſſunpour.

TALE, in *Law,* See Count and Declaration.

Tale, or Tael, in *Commerce,* a weight for gold and ſilver in China, and certain parts of the Eaſt Indies; and alſo a money of account. In China, each tale is 10 maces = 100 candareens = 1000 caſh. A tale of fine ſilver ſhould be worth 1000 caſh, which caſh is compoſed of ſix parts of copper, and four of lead, having a ſquare hole in the middle, ſo that they may be ſtrung on a ſtring or wire; but on account of their convenience for common uſe, their price is ſometimes ſo much raiſed, that only 750 caſh are given for the tale.

Gold is not conſidered as money, but as merchandize; and it is ſold in ingots of a determinate weight, called by the Engliſh "ſhoes" of gold; the largeſt of which weighs 10 tales, and the gold is reckoned 94 touch (*i. e.* 94 parts fine in 100), though it is only 92 or 93. Of late, from 100 to 110 tales of ſilver of 94 touch, have been given for 10 tales of gold of 92 or 93 touch; and ſometimes from 110 to 120 tales, or even more, of Spaniſh dollars, reckoned at 92 touch, have been paid for 10 tales of gold. When gold is exchanged for ſilver, its price is always valued by the ten-tale weight, and it is ſold either above or below touch, as follows: *viz.* if the gold be 96 touch, and ſold at 5 under touch, ſubtract 5 from 96, and 91 remains: then 91 tales of ſilver are paid for 10 of gold: if gold be ſold at 10 above touch, the fineneſs being ſtill 96, add 10 to 96, and 106 tales of ſilver are paid for 10 tales of gold. Silver ingots are uſed as money, and are from $\frac{1}{2}$ to 100 tales, their value being determined by their weight. In payment of ſmall ſums, they ſometimes lay the ingot on the fire, and by ſtriking it with a hammer, detach ſmaller pieces from it. The Engliſh reckon the tale of ſilver at 6*s.* 8*d.* ſterling, ſo that 1*l.* ſterling is = 3 tales. The catty of 16 tales weighs 19 oz. 6 dwts. 4 grs. Engliſh troy; ſo that 10 tales would weigh 5792 Engliſh grains. Upon the whole, the weight of a Chineſe tale may be taken at about 580 grains Engliſh troy; and therefore 48 tales = 58 ounces troy weight. One hundred Spaniſh dollars weigh about 722 tales. The heavieſt weight for merchandize (peculiar to the coaſt of Canton) is called pecul, and contains 100 catties or 1600 tales, with the ſame decimal diviſion as above. Hence a pecul = 132 lbs. 8 oz. 9 dr. avoirdupois: and a catty = 21 oz. $3\frac{1}{2}$dr. avoirdupois.

At Acheen, in the iſle of Sumatra, accounts are kept in tales, pardows, mace, copangs, and caſhes. A tale = 4 pardows = 16 mace = 64 copangs. The coins of the country are mace and caſhes. The mace is a ſmall gold coin weighing nine grains, and worth about 14*d.* ſterling. The caſhes are ſmall pieces of tin or lead, 2500 of which uſually paſs for a mace, ſubject to occaſional variation. In Siam, accounts are kept in catties, tales, ticals or tuals, miams, fanangs, and cowries. The catty is 20 tales: the tale = 4 ticals = 16 miams = 32 fanangs: the fanang is = 800 cowries. In Tonquin, accounts are kept in tales of 10 mace or 100 candareens. The tale weighs here 1 oz. 4 dwt. $14\frac{1}{2}$ grs. Engliſh, which is about 10 grs. more than the Chineſe tale. Kelly's Cambiſt.

TALED, in the *Jewiſh Antiquities,* a ſort of habit that the Jews wore, chiefly when they repeated their prayers in the ſynagogue. Numbers, xv. 38. Deuteronomy, xxii. 12.

It ſerved inſtead of that ſquare garment they wore heretofore, to which Moſes had appointed that they ſhould faſten borders of blue to the four quarters, and fringes or ribbands all along the borders. But at preſent, that they may not be expoſed to the laughter of the people for the too great ſingularity of their dreſs, they content themſelves with wearing a ſquare piece of cloth underneath, with four tufts at the four corners, and when they meet in the ſynagogue to ſay their prayers, they cover their heads with a ſquare woollen veil, which has four tufts at its four corners. It is this they call *thaled,* or *taled.* Calmet, Dict. & Leo of Modena, Ceremonies of the Jews, p. i. ch. 11.

TALEGONG, in *Geography*, a town of Hindooftan, in Dowlatabad; 15 miles S. of Oudighir.—Alfo, a town of Baglana; 12 miles S. of Chandor.

TALEKAN, a town and caftle of Perfia, in the province of Khoraffan; 160 miles N.E. of Herat.—Alfo, a town of Perfia, in the province of Irak; 30 miles N.E. of Hamadan.

TALENNI, a town of Japan, in the ifland of Niphon; 160 miles W.N.W. of Meaco.

TALENT, Talentum, a weight, and a coin, both very famous among the ancients; but very different in different countries.

The value of the talent it is very hard to affign in Englifh money, as being ufed among all the people throughout the Eaft, and its value, and the manner of computation, being different among each: a difficulty abundantly fhewn by Budæus, in his learned treatife "De Affe."

There were various kinds of talents, both with regard to weight and to fpecies; the value of thefe laft ftill increafing, as the metal of which they confifted was purer, though the talent weights contained the fame number of pounds and drachms. Accordingly, all talent weights are equally fixty minæ, and the mina one hundred drachmæ; but the drachma of one place exceeding that of another, there hence arofe a difference in the talents.

The common Attic talent then (the talent weight we mean) contained fixty Attic minæ, or fix thoufand Attic drachmæ; equal, according to Dr. Arbuthnot's reduction, to fifty-fix pounds, eleven ounces, feventeen and one-feventh grains, Englifh troy weight.

There was another Attic talent, by fome faid to confift of eighty, by others of one hundred minæ. The Egyptian talent was eighty minæ; the Antiochian alfo eighty; the Ptolemaic of Cleopatra eighty-fix and two-thirds; that of Alexandria ninety-fix; the Infular talent one hundred and twenty; and that of Antioch three hundred and fixty minæ. In the valuation of money, the Grecian talent, according to Dr. Arbuthnot, was equal to fixty minæ, or reckoning the mina at 3*l.* 4*s.* 7*d.* equal to 193*l.* 15*s.*; the Syrian talent in this valuation confifted of fifteen Attic minæ; the Ptolemaic of twenty; the Antiochian of fixty; the Euboic of fixty; the Babylonic of feventy; the greater Attic of eighty; the Tyrian of eighty; the Eginean of one hundred; the Rhodian of one hundred; and the Egyptian of eighty minæ. (See Arbuthnot's Tables of Ancient Coins, &c. p. 33, and Tab. 18, 19. 23, 24.) Stating the Attic drachm of filver at nine-pence of our money, the beft medium value, the mina of Athens will be worth 3*l.* 15*s.*; and the Athenian common talent, 225*l.*; and the reft may eafily be eftimated in proportion.

But Mr. Raper makes the Attic talent, which confifted of fixty minæ, or fix thoufand drachmæ, each drachm being equal to fixty-fix grains and a half troy weight, or 3*l.* 17*s.* 4$\frac{6}{10}$*d.* fterling, equal to 232*l.* 3*s.* See Drachm.

This ingenious writer alfo obferves, that hiftorians and others mention the Eginean and the Euboic talent. The former weighed ten thoufand Attic drachms; but, like other talents, contained only fix thoufand of its own; which being fo much heavier than the Attic, the Athenians called it παχειαν δραχμην, or the thick drachm. This talent was ufed at Corinth; and in a paffage of Aulus Gellius, lib.i. c. 8. it is valued at ten thoufand Attic drachms; and was probably ufed in moft of the cities of Peloponnefus. If the Attic drachm weighed fixty-fix and a half troy grains, the Eginean fhould weigh one hundred and ten and five-fixths, which Mr. Raper ftates at one hundred and eleven. This Eginean talent he concludes from the mean drachm of fix Macedonian coins, which he found to be one hundred and eleven grains and one-fourth, muft have been the ftandard of the Macedonian money, till Philip changed it. And it appears likewife to have been the ftandard of the Ptolemaic money in Egypt. Pliny indeed (Nat. Hift. lib. xxxiii. c. 3.) tells us, on the authority of Varro, that the Egyptian talent weighed eighty Roman pounds; but he fuppofes that this is a falfe reading, and that for Ægyptium we fhould read Euboicum: for Pliny is fpeaking of the riches of Afia, where the Euboic talent was ufed for weighing gold; and it is known, that the weight of that talent was fettled at eighty Roman pounds, by the treaty between the Romans and Antiochus. There is a paffage in Pollux (lib. ix. c. 6. § 86.) which makes the Egyptian talent contain fifteen hundred Attic drachms. But this, he apprehends, is an injudicious interpolation in the laft collection of that author.

The Euboic talent, fays this writer, certainly came from Afia; for Herodotus (lib. iii. fect. 89.) tells us, the kings of Perfia weighed their gold by that talent: in the fame place he informs us, that the Babylonian talent weighed feventy Euboic minæ. Pollux fays, it weighed feventy Attic minæ. Therefore the Euboic talent fhould be equal to the Attic. But Ælian (Var. Hift. lib. i. c. 22.) tells us, that it weighed feventy-two Attic minæ; and if fo, the Euboic talent fhould be heavier than the Attic, in the proportion of feventy-two to feventy. By two paffages, cited by Mr. Raper, from Xenophon, Exped. lib. i. it appears probable, that the Babylonian talent weighed above feventy Attic minæ, and above feventy Euboic minæ; and if Pollux took his value of the Babylonian talent from Herodotus, as the text now ftands, and Ælian his value of the fame from a more correct copy of that author, or from fome better authority, the Euboic talent muft have been equal to the Attic. Accordingly it contained fix thoufand Attic drachms. Phil. Tranf. vol. lxi. part ii. p. 483, &c.

There is another talent much more ancient, and much lefs than any of thofe already mentioned, which Dr. Arbuthnot calls the Homerical talent of gold, fuppofed, he fays, to be equal to three Attic aurei. Pollux fpeaks of fuch a talent. Euftathius upon Homer reckons it worth twenty-four drachmæ. That its value was fmall, whether fixed or uncertain, is conjectured from the paffage of Homer, where, defcribing the prizes at the funeral of Patroclus, two talents of gold are propofed as a more inconfiderable prize than a mare with foal, &c. Hence Mr. Raper, ubi fupra, p. 527, concludes, that it was the fame that the Dorian colonies carried to Sicily and Calabria: for Pollux tells us, from Ariftotle, that the ancient talent of the Greeks in Sicily contained twenty-four nummi, each of which weighing an obolus and a half, the talent muft have weighed fix Attic drachms, or three darics; but the daric weighed very little more than one guinea; and if two talents weighed about fix guineas, we may reckon the mare with foal worth twelve; which was no improbable price, fince we learn from a paffage in the Clouds of Ariftophanes, that, in his time, a running horfe coft twelve minæ, or above forty-fix pounds fterling; therefore this feems to have been the ancient Greek talent, before the art of ftamping money had introduced the greater talents from Afia and Egypt.

According to this ancient talent, fays Dr. Arbuthnot, fome reckon the treafure of king David, particularly that mentioned 1 Chron. xxii. 14. which, according to the common reckoning, would amount in gold talents to the value of 547,500,000*l.* and the filver to above 342,000,000*l.*; or reckoning according to the decuple proportion of gold to filver,

filver, the two fums would be equal. As David reigned in Judea after the fiege of Troy, it is not improbable but Homer and he might ufe the fame numeral talent of gold.

It is fuggefted by Mr. Pinkerton (Effay on Medals, vol. i. p. 65.) that all the ancient coins of Afia, Africa, Greece, Magna Græcia, and Sicily, were reducible to three talents or ftandards. 1. That of Egina, ufed in moft of the more ancient filver coinages; and as it would feem in even the later of Egypt, Carthage, Greece, &c. 2. The Attic, being the Afiatic gold ftandard; afterwards ufed by Phidon, king of Argos, in eftimating gold, and called Euboic, from Eubœa, one of the quarters of the city of Argos. It was afterwards ufed in Athens, and the greater part of the world, as the ftandard both of gold and filver. 3. The Doric, or Sicilian talent, of 24 nummi, each worth an obolus and a half: whence the talent is eftimated at fix Attic drachms, or three darics. Thefe weights continued to be the ftandard of money after it began to be diftinguifhed by impreffion; nay, to the fall of Greece, and prevalence of the Roman empire.

Among the Romans there were two kinds of talents, the *little* and the *great* talent; the little was the common talent; and whenever they fay fimply *talentum*, they are to be underftood of this: the *little* talent was fixty minæ or Roman pounds; the mina, or pound, eftimated at one hundred drachmæ, or denarii: it was alfo eftimated at twenty-four great fefterces, which amounted to fixty pounds.

The *great* talent exceeded the lefs by one-third part. Budæus computes, that the little talent of filver was worth 75*l.* fterling; and the greater 99*l.* 6*s.* 8*d.* fterling. The greater of gold was worth 1125*l.* fterling.

Talent, *as a fpecies, or money*, among the Hebrews, was fometimes ufed for a gold coin, the fame with the *fhekel* of gold, called alfo *ftater*, and weighing only four drachms. The Hebrews reckoned by thefe talents as we do by pounds, &c. Thus a million of gold, or million of talents of gold, among them, was a million of fhekels, or nummi; the nummus of gold being the fame weight with the fhekel, *viz.* four drachms.

But the Hebrew talent weight of filver, which they called *cicar*, was equivalent to that of three thoufand fhekels (Exod. xxxviii. 25. 28.) or one hundred and thirteen pounds, ten ounces, one pennyweight, ten grains and two-fevenths, Englifh troy weight, according to Arbuthnot's computation.

It fhould be obferved, however, that the talent was not every where the fame. The Hebrew talent weighed more than that of the Greeks, and is faid to have amounted to 341*l.* 10*s.* $4\frac{1}{4}$*d.* and $\frac{1}{7}$. The common Attic talent might be worth about 193*l.* 15*s.* which might probably have been ufed by the Jews in their commerce.

TALES, in *Law*, a fupply or addition of men for thofe impannelled on a jury of inqueft, and not appearing, or at their appearance challenged by either party as not indifferent.

In fuch cafe, the judge, upon motion, grants fupply to be made by the fheriff of one or more tales, fuch as are prefent in court, equal in reputation to thofe impannelled. For this purpofe, a writ of *decem tales*, *octo tales*, and the like, was ufed to be iffued to the fheriff at common law; and muft be ftill fo done at the trial at bar, if the jurors make default; but at the affizes, or nifi prius, by virtue of the ftatute 35 Hen. VIII. c. 6. and other fubfequent ftatutes, the judge is impowered, at the prayer of either party, to award a *tales de circumftantibus*, of perfons prefent in court, to be joined to the other jurors to try the caufe; who are liable, however, to the fame challenges as the principal jurors. This is ufually done till the legal number of twelve be completed. The *tales de circumftantibus* is in fome meafure rendered ufelefs by the ftatute for regulating juries, 3 Geo. II. c. 25. See Challenge and Jury.

TALGA, in *Geography*, a town of Hungary; 8 miles N. of Tokay.

TALGARTH, a fmall town in a hundred of the fame name, and county of Brecon, South Wales, is fituated on the banks of the river Llyfni, at one end of the Black Mountains, which ftretch hence into Herefordfhire: from its fituation it derived its name; Talgarth meaning literally the front of the hill. The town is a borough by prefcription, but without privilege, jurifdiction, or municipal officers. The parifh church is a fubftantial edifice, but has no architectural elegance, nor is it enriched by any remarkable monuments, ancient or modern: it has a tower, which forms a confpicuous object from moft parts of the furrounding country. The population of the parifh, which, befides the borough, contains five hamlets, was in the year 1811 returned to parliament as 1124, the number of houfes being 274. No lefs than eight annual fairs are held here.

In the Foreft hamlet of the parifh of Talgarth are fome veftiges of Dinas-caftle, which, at a remote period, was a fortrefs of importance, but has long fince been demolifhed. In Leland's time, it was "ruinus almoft to the hard ground." From his defcription, it muft have been of confiderable dimenfions. It confifted of three wards "waullid about," and had three parks and a foreft attached to it. From the fame writer we learn, that the caftle was deftroyed by the natives, that it might not be occupied by the favourers of Owen Glendwr.—Beauties of England and Wales, vol. xviii. South Wales, by T. Rees, F.S.A. Carlifle's Topographical Dictionary of Wales.

TALGAUTPORAM, a town of Hindooftan, in Myfore; 6 miles S. of Bangalore.

TALGRISTAN, a town of Perfia, in the province of Irak; 50 miles E. of Nehavend.

TALGUL, a town of Hindooftan, in Myfore; 10 miles S.S.W. of Sirpy.

TALHA-KIAMEN, a poft of Chinefe Tartary. N. lat. 46° 16'. E. long. 123° 44'.

TALHAM, a town of Auftria; 2 miles S.S.W. of Voglabruck.

TALI, a town on the W. coaft of the ifland of Formofa. N. lat. 23° 36'. E. long. 129° 41'.

Ta-li, a city of China, of the firft rank, in Yun-nan. This is the principal place where they make curious tables, and other ornaments of fine marble, which is got from a mountain called *Tienfung*, and is naturally beautified with different colours, in the form of mountains, flowers, trees, and rivers. Ta-li has under its jurifdiction four cities of the fecond order, and three of the third; 1205 miles S.W. of Peking. N. lat. 25° 45'. E. long. 100°.

TALIA, in *Ancient Geography*, a town of the Upper Mœfia, on the route from Viminatium to Nicomedia. Ant. Itin.

TALJARA, in *Geography*, a town of Bengal; 46 miles S. of Curruckdeah.

TALIFAY, a town on the N. coaft of the ifland of Luçon. N. lat. 14° 21'. E. long. 123° 24'.

TALIGALEA, in *Botany*, an unexplained name, Aublet Guian. 625. t. 252. Juff. 109, appears to be the fame genus, and even the fame fpecies, as Amasonia of Linnæus. (See that article.) The fruit of the latter having been examined in a drier ftate, may folve all the difficulty.

Aublet defcribes his only fpecies, *T. campeftris*, as an herb with a perennial *root*, fometimes creeping. *Stems* annual, two

two or three feet high, ſimple, leafy, downy. *Leaves* alternate, ſtalked, elliptical, pointed, from three to ſix inches long, downy, with tooth-like ſerratures. The variety with a creeping *root* has ſmooth leaves, and we ſhould preſume it may be a diſtinct ſpecies. The *flowers* are yellow, about an inch long, numerous, in a long compound *cluſter*, with ovate purple *bracteas*. *Berry* black, with two hard *ſeeds*.—This plant grows abundantly in the ſandy meadows of the iſland of Cayenne, as well as on the continent of South America, bearing flowers and fruit all ſummer long.

TALIGONG, in *Geography*, a town of Hindooſtan, in the Carnatic; 7 miles N. of Terriore.

TALIGOV, a town of Ruſſia, in the government of Riga; 24 miles N. of Dorpat.

TALIHOU, a ſmall iſland, with a lazaretto, on the coaſt of France. At low-water the land which joins to the continent is dry; 3 miles N. of La Hogue. N. lat. 49° 36′. W. long. 1° 9′.

TALINA, a town of Peru; 50 miles E.S.E. of Lipes.

TA-LIN-HO, a town of Chineſe Tartary. N. lat. 41° 10′. E. long. 120° 50′.

TALINUM, in *Botany*, a genus of Adanſon's, well ſeparated by him from the Linnæan PORTULACA. (See that article.) Its name no one, not even De Theis, has undertaken to explain; Adanſon having given ſo many barbarous, and even arbitrary ones, that the inquiry might well be deemed alike hopeleſs and unprofitable. We conjecture, however, that he muſt have had in his mind the verb θαλλω, *to be verdant*, or *flouriſhing*, and conſequently θαλος, or θαλία, *a green bough*; for he often wrote words with a *T* which in Greek begin with a θ; and the above idea is ſuitable enough to the ſucculent, and durably verdant, habit of the genus. We hence learn the true accentuation of the word, *Talinum*. Ehrhart called this ſame genus *Rülingia*, after Dr. John Philip Rülings, who publiſhed at Gottingen, in 1774, a catalogue of the genera of plants, diſpoſed in natural orders. Linnæus had formerly diſtinguiſhed it by the name of *Anacampſeros*.—Adanſ. Fam. v. 2. 245. Juſſ. 312. Willd. Sp. Pl. v. 2. 862. Ait. Hort. Kew. v. 3. 148. Purſh 365. Lamarck Illuſtr. t. 402. Gærtn. t. 128. (Rülingia; Ehrh. Beitr. v. 3. 132. Orygia; Forſk. Ægypt.-Arab. 103. Anacampſeros; Linn. Gen. ed. 1. 152. Sims in Curt. Mag. p. 1367.)—Claſs and order, *Polyandria Monogynia*. (Dodecandria Monogynia, *Willd.*) Nat. Ord. *Succulentæ*, Linn. *Portulaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of two or five oblong, rather unequal, permanent leaves. *Cor.* Petals five, ſpreading, ovate, obtuſe, as long or longer than the calyx. *Stam.* Filaments numerous, capillary, not half ſo long as the corolla; anthers incumbent, oblong. *Piſt.* Germen ſuperior, roundiſh; ſtyle ſimple, about as long as the corolla; ſtigmas three, oblong, reflexed. *Peric.* Capſule ovate, of one cell, and three, five, or ſix valves. *Seeds* numerous, roundiſh, affixed to a globular central receptacle.

Eſſ. Ch. Petals five. Calyx of two or five leaves. Capſule ſuperior, with from three to ſix valves, one cell, and many ſeeds.

Section 1. *Stipulas none. Seeds without wings.*

1. T. *triangulare*. Triangular-ſtalked Yellow Talinum. Willd. n. 1. Ait. n. 1. (Portulaca triangularis; Jacq. Amer. 147. Obſ. faſc. 1. 35. t. 23. P. racemoſa; Linn. Sp. Pl. 640. Helianthemum fruteſcens, portulacæ folio; Plum. Ic. 142. t. 150. f. 2.)—Leaves flat, channelled, wedge-ſhaped, emarginate, with a ſmall point. Cluſter ſimple, with a triangular ſtalk. Stem ſpreading.—Native of the ſea-ſhores of the Weſt Indies. Cultivated in Chelſea garden in 1739. Mr. Aiton ſays it bloſſoms in the ſtove, moſt part of the ſummer. The *ſtem* is ſhrubby, two feet high, round, ſmooth, branched, decumbent in the lower part. *Leaves* ſcattered, about one and a half or two inches long, ſucculent, ſmooth, ſhining, brittle, entire at the edges; occaſionally convex, being reflexed at the ſides, tapering at the baſe into a ſhort footſtalk. *Flowers* two or more, on a terminal triangular ſtalk, very elegant, of a brilliant yellow, without ſcent. *Calyx* of two leaves. *Capſule* with three valves.

2. T. *craſſicaule*. Thick-ſtemmed Red Talinum. (T. craſſifolium; Willd. n. 2. T. patens; Andr. Repoſ. t. 253. Ait. n. 2. Portulaca craſſicaulis; Jacq. Hort. Vind. v. 3. 29. t. 52. P. craſſifolia; Murray in Linn. Syſt. Veg. ed. 14. 446.)—Leaves flat, obovate, entire at the point. Corymbs compound, elongated. Stem erect.—Native probably of the Weſt Indies. Jacquin cultivated it at Vienna, and we have ſeen it flowering in many of the Engliſh ſtoves. This differs from the former in its more erect and thicker *ſtem*, as well as in the fine pink colour of its *flowers*. The *leaves* moreover are not emarginate. The corymboſe, or panicled, many-flowered *ſtalks*, at firſt terminal, are ſometimes overtopped by the aggregate leafy *branches*, and thus become lateral, or axillary. Murray, from mere inadvertence in tranſcribing, altered Jacquin's original name, for one which has here no appropriate meaning.—Willdenow ſeems to have copied him, without ſeeing the work of Jacquin; which from this, and ſome other inſtances, we ſuſpect he had not in his poſſeſſion. We do not think it neceſſary to perpetuate ſuch an error, any more than that of Andrews, who took this plant for Willdenow's *T. patens*, ſee n. 4.

3. T. *fruticoſum*. Shrubby White Talinum. Willd. n. 7. (Portulaca fruticoſa; Linn. Syſt. Veg. ed. 13. 371. P. paniculata; Linn. Sp. Pl. 640. P. americana latifolia erecta, floribus albis; Comm. Hort. v. 1. 7. t. 4.)—Leaves flat, obovate, ſomewhat emarginate. Corymbs compound, elongated. Stem erect. Calyx of five leaves.—Native of the Weſt Indies, or of South America. This ſpecies, a ſtranger to our gardens, appears to differ eſſentially from the two foregoing in having five leaves to the *calyx*, inſtead of two; to ſay nothing of the white *petals*. In habit, *leaves*, and *infloreſcence*, it comes very near the laſt. The *capſule* is ſaid to conſiſt of three valves in both.

4. T. *patens*. Panicled Red Talinum. Willd. n. 4. Haworth Succ. Pl. 123. (T. paniculatum; Gærtn. v. 2. 219. Portulaca patens; Linn. Mant. 242. Jacq. Hort. Vind. v. 2. 71. t. 151. P. paniculata; Jacq. Amer. 148.)—Leaves flat, obovate, obtuſe. Panicle repeatedly compound, forked, many-flowered.—Native of rocks on the ſea-coaſt of Martinico and Hiſpaniola. *Jacquin*. We have ſeen it in the Engliſh ſtoves, as Mr. Haworth likewiſe appears to have done, when he remarks that the *patens* of Andrews is a widely different plant. (See our 2d ſpecies.) That before us has an upright ſhrubby *ſtem*, one and a half or two feet high, branched; ſomewhat quadrangular below. *Leaves* ſcattered, or imperfectly oppoſite, obovate, lanceolate or oval, more or leſs obtuſe, very ſmooth and juicy; the lower ones three inches long, the reſt ſhorter; all tapering at the baſe into a ſhort *footſtalk*. *Panicles* ſolitary at the top of the ſtem and branches, erect, from ſix to ten inches long, with numerous, moſtly oppoſite, repeatedly ſubdivided, and partly forked, ſlender, ſmooth, ſpreading ſtalks, accompanied here and there by ſmall lanceolate *bracteas* at their baſe. *Flowers* numerous, ſmall, inodorous. *Calyx* of two orbicular, concave, red, widely ſpreading leaves. *Petals* five, obovate, red, thrice the ſize of the calyx, likewiſe widely ſpreading. *Capſule* globoſe, ſmaller than a pepper-corn, its three valves, which Jacquin deſcribes as double, or of

two

two layers, ſuſpended from the top of three intermediate fibres. See Gærtner's figure and deſcription, where the ſynonym of Commelin, which belongs to the foregoing, is very erroneouſly cited for the preſent ſpecies. This muſt have ariſen from Linnæus's having once called the former *Portulaca paniculata*, and Gærtner's having copied the above ſynonym without examination.

5. T. *reflexum*. Panicled Yellow Talinum. Cavan. Ic. v. 1. t. 1. Haworth Succ. Pl. 124. Curt. Mag. t. 1543. Ait. Epit. 375. (T. patens β; Willd. n. 4.)—Leaves ſomewhat convex, elliptic-lanceolate, acute. Panicle twice compound, many-flowered.—Native of South America.—An annual or biennial, ſcarcely ſhrubby, plant in our ſtoves. Mr. Haworth obſerves, it is more tender, and much taller, than the laſt, of which Willdenow thought it a mere variety. We are not ſure that the differences indicated in our ſpecific characters are ſufficient or permanent, not having had an opportunity of comparing the two plants. The *flowers* of *T. reflexum* being yellow, ſeems an important diſtinction in this genus. Both ſpecies are ſaid to be abundantly propagated by ſeed.

6. T. *cuneifolium*. Wedge-leaved Talinum. Willd. n. 5. (Portulaca cuneifolia; Vahl Symb. v. 1. 33. Orygia portulacifolia; Forſk. Ægypt.-Arab. 103.)—Leaves flat, wedge-ſhaped, obtuſe, with an occaſional point. Panicle many-flowered; its lower branches umbellate, three-flowered.—Native of Arabia Felix.—A *ſhrub* three feet high. *Leaves* eatable, alternate, ſpreading, ſeſſile, tapering at the baſe, about an inch long, thick and ſmooth. *Calyx* of two unequal leaves, deciduous. *Petals* of a violet red. *Stamens* green, with yellow *anthers*. *Capſule* three-angular, of three valves. *Seeds* black, compreſſed, ſmooth. *Forſkall.*—Vahl ſays this ſpecies is akin to *T. patens*, n. 4, but differs in having thicker *flower-ſtalks*, the lower ones bearing three-flowered umbels.

7. T. *decumbens*. Decumbent Glaucous Talinum. Willd. n. 6. (Portulaca decumbens; Vahl Symb. v. 1. 33. Orygia decumbens; Forſk. Ægypt.-Arab. 103.)—Leaves flat, obovate, pointed. Cluſters axillary. Stem decumbent. Calyx of five leaves.—Native of Arabia Felix, in ſtony places near Muſa, but not common. *Forſkall.* *Stem* ſhrubby, with angular branches, clothed, like the reſt of the plant, with a glaucous mealineſs. *Leaves* diſtant, ſtalked, thickiſh, ſomewhat wavy. *Cluſters* from the boſoms of the uppermoſt leaves, with an awl-ſhaped ſcale, or *bractea*, oppoſite to each partial ſtalk. *Capſule* of five valves. *Vahl.*—Forſkall deſcribes numerous lanceolate *petals*, about twenty, of a reddiſh violet; and five cells, as well as valves, to the *capſule*.

8. T. *teretifolium*. Cylindrical-leaved Talinum. Purſh n. 1.—"Leaves cylindrical, fleſhy. Corymbs ſtalked, terminal."—On ſunny rocks in Delaware and Virginia, flowering in July. Perennial. *Flowers* purple. *Purſh.*

Section 2. *Stipulas withinſide of the leaves, jagged. Seeds winged.*

9. T. *Anacampſeros*. Round-leaved Talinum. Willd. n. 3. Ait. n. 3. "Decand. Pl. Graſſes, t. 3." (Rülingia Anacampſeros; Ehrh. Beitr. v. 3. 133. Haworth Succ. Pl. 124. Portulaca Anacampſeros; Linn. Sp. Pl. 639. P. africana ſempervirens, flore rubicundo; Comm. Hort. v. 2. 177. t. 89. Telephiaſtrum folio globoſo; Dill. Elth. 375. t. 281.)—Leaves ovate, acute, ſmooth; convex and tumid beneath. Stipulas filamentous, many times ſhorter than the leaves. Petals obovate.—Native of the Cape of Good Hope. Cultivated by Sherard in 1732. A greenhouſe plant, flowering in July. A humble ſhrubby ſpecies, whoſe extremely thick and ſucculent *leaves*, about an inch long, give it the habit of an *Aloe*. They are ſeſſile, of a pale glaucous green, not ſhining; their upper ſide nearly flat, with a longitudinal furrow; the under very convex. *Stipulas* ſhort, in many capillary ſegments. *Flowers* crimſon, the ſize of our ſecond or third ſpecies, in long-ſtalked terminal ſimple *cluſters*, which are ſometimes two together. *Calyx* of two leaves. *Petals* ſomewhat pointed. The *ſeeds* are ſaid to be winged. Ehrhart calls them *arillata*, tunicated.—The ſpecific name, borrowed from Pliny, derived from *ἀνακάμπτειν*, *to return*, and *ἔρος*, *love*, was at firſt adopted by Linnæus as a generic appellation for the preſent plant, when he conſidered it as a diſtinct genus from *Portulaca*, in his earlier publications. But this name, and the fooliſh ſuperſtition to which it alludes, of the very touch of the herb reſtoring alienated love, rather belongs to the *Sedum Anacampſeros* of Linnæus, and its near relation *S. Telephium*. See SEDUM.

10. T. *arachnoides*. Cobweb Talinum. Ait. n. 4. (Anacampſeros arachnoides; Sims in Curt. Mag. t. 1368. Rülingia arachnoides; Haworth Succ. Pl. 125.)—Leaves elliptical, acute; ſlightly convex, and covered with cobweb-like down above; tumid beneath. Stipulas filamentous, ſhorter than the leaves. Petals elliptical.—Found by Mr. Maſſon at the Cape of Good Hope, and ſent to Kew about the year 1790. It is treated like the laſt, and agrees with that ſpecies in general habit, though ſmaller in ſize. The *leaves* are leſs glaucous; the lower ones covered with a kind of web. *Stipulas* longer and more robuſt. *Flowers* white, with a faint bluſh. *Seeds* obſerved by Mr. Haworth to be leſs winged.—The leaves are repreſented in the Botanical Magazine with a tinge of purpliſh-brown. Perhaps Mr. Haworth's *Rülingia rubens*, n. 3, may be only a higher-coloured variety.

11. T. *filamentoſum*. Thready Talinum. Ait. n. 5. (Anacampſeros filamentoſa; Sims in Curt. Mag. t. 1367. Rülingia filamentoſa; Haworth Succ. Pl. 125.)—Leaves ovate, bluntiſh, tumid and covered with cobweb-like down on both ſides. Stipulas filamentous, longer than the leaves. Petals lanceolate.—Found by Mr. Maſſon, at the Cape of Good Hope, and ſent to Kew a few years after the laſt, from which it differs in having ſmaller, blunter *leaves*, and much longer, more conſpicuous, *ſtipulas*, whoſe ſegments are linear and flattened, like ſhavings of horn. The *petals* are roſe-coloured, and elliptic-lanceolate, very fugacious, as in the two foregoing ſpecies. We have never ſeen Mr. Haworth's *Rülingia lanceolata*, n. 5, but it ſeems, by his definition, nearly akin to this.

The winged ſeeds can hardly entitle the ſpecies of this ſection to form a ſeparate genus, there being ſo little difference in habit. If they did, the name of *Rülingia* muſt certainly be preferred to *Anacampſeros*, the latter, notwithſtanding its right of priority, having been arbitrarily and erroneouſly applied to theſe Cape plants, with which the ancients were of courſe unacquainted. See our remark under the 9th ſpecies.

TALIO, *Lex Talionis*, or *Pœna Talionis*, a retaliation, or puniſhment, by which an evil is returned perfectly like that committed againſt us by another; which is what we uſually expreſs by the words, *eye for eye, tooth for tooth.*

The *pœna talionis* was enjoined by the law of Moſes, among the Jews; it was eſteemed a natural piece of juſtice, and yet the Romans ſet it aſide, inaſmuch as ſuch a parity or equality of puniſhment could not always be obſerved. For this reaſon the prætor allowed ſuch as had ſuffered an injury to make an eſtimate of it in money, that juſtice might be done him that way; only reſerving to himſelf the power of moderating the ſame. And this was what was conſtantly practiſed, and thus the *pœna talionis* became quite diſuſed with them.

TALISIA, in *Botany*, a barbarous name of Aublet's, which

which he appears to have fabricated out of the Caribbean appellation of the plant in queftion, *Toulichi*. We fhould be inexcufable in giving more than a temporary fanction to fuch a name, till the genus is either better known than at prefent, or fet altogether afide.—Aubl. Guian. 349. Juff. 247. Lamarck Illuftr. t. 310.—Clafs and order, *Octandria Monogynia*. Nat. Ord. *Sapindi*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in five deep, acute fegments. *Cor.* Petals five, ovate, inferted into the orbicular receptacle of the flower beneath the germen. Nectary of five fhort, hairy, upright fcales, one inferted into the bafe of each petal, covering the ftamens. *Stam.* Filaments eight, fhort, inferted into the orbicular receptacle; anthers oblong, of two cells. *Pift.* Germen fuperior, minute, roundifh, of four cells; ftyle one, very fhort; ftigma fimple, obtufe. *Peric.* unknown.

Eff. Ch. Calyx in five deep fegments. Petals five. Nectary of five hairy fcales, attached to the petals. Germen of four cells.

1. T. *guianenfis*. Toulichi of Guiana. Aubl. Guian. 349. t. 136.—Native of banks of rivers in Guiana, flowering in October.—A fhrub, whofe *trunk* is three or four feet high, and as many inches in diameter, with a greyifh bark, and whitifh wood; the branches long, compound, varioufly fpreading. *Leaves* alternate, pinnate, very large, each confifting of about thirty alternate, ftalked, elliptic-lanceolate, pointed, entire, fmooth, veiny *leaflets*, befides an odd one, from five to fix inches long, and above one broad. *Clufters* axillary and terminal, doubly compound, many-flowered, all over of a fine rofe-colour, with a fmall fcaly *bractea* under each fubdivifion. *Flowers* fmall, in little tufts, nearly feffile.—Nothing is known of the *fruit*, except that the germen has four cells, nor is any thing recorded concerning the qualities or ufes of this plant.

TALISKERAN, in *Geography*, a town of Perfia, in the province of Adirbeitzan; 100 miles N.N.E. of Ardebil.

TALISMANS, magical figures engraven or cut under certain fuperftitious obfervances of the characterifms and configurations of the heavens; to which fome aftrologers, hermetical philofophers, and other adepts, attribute marvellous virtues, particularly that of calling down celeftial influences.

The word is pure Arabic; though Menage, after Salmafius, thinks it may come from the Greek τελεσμα, *operation*, or *confecration*. Borel fays it is Perfian, and fignifies literally an engraven conftellation. Others derive it *a talamacis literis*, which are myfterious characters, or cyphers, ufed by forcerers, thus called from *talamafca*, a phantom, or illufion.

The author of a book, entitled, *Talifmans juftifiez*, fays, a talifman is the feal, figure, character, or image of a heavenly fign, conftellation, or planet, engraven on a fympathetic ftone, or on a metal correfponding to the ftar, &c. in order to receive its influences.

The talifmans of the Samothracians, fo famous of old, were pieces of iron, formed into certain images, and fet in rings, &c. They were held prefervatives againft all kinds of evils. There were other talifmans taken from vegetables, and others from minerals.

In the general, we may diftinguifh three kinds of talifmans. *Aftronomical*, which are known by the figns or conftellations of the heavens engraven on them, with other figures, and fome unintelligible characters. *Magical*, which bear very extraordinary figures, with fuperftitious words and names of angels unheard of. And *mixt*, which confift of figns, and barbarous words; but have no fuperftitious ones, or names of angels.

Some rabbins maintain, that the brazen ferpent, raifed by Mofes in the wildernefs, for the deftruction of the ferpents that annoyed the Ifraelites, was properly a talifman.

All the miraculous things wrought by Apollonius Tyanæus are attributed to the virtue and influence of talifmans: and that wizard is even faid by fome to have been the inventor of talifmans.

Some authors take feveral Runic medals, at leaft medals whofe infcriptions are in Runic characters, for talifmans; it being notorious, that the northern nations, in their heathen ftate, were much devoted to them. M. Keder, however, has fhewn, that the medals here fpoken of are quite other things than talifmans.

TALISSE, in *Geography*, a fmall ifland in the Eaft Indian fea, near the N. coaft of the ifland of Celebes. N. lat. 1° 40'. E. long. 124° 50'.

TALK, in *Mineralogy*. See TALC.

TALKAN, in *Geography*, a town of Perfia, in the province of Irak; 30 miles E. of Sultania.

TALKEAVE, a town of Perfia, in Khoraffan; 50 miles E. of Tabafkili.—Alfo, a town of Perfia, in Segeftan; 21 miles S.W. of Kin.

TALKHAN, a town of Grand Bucharia; 80 miles S.S.W. of Balk.

TALKING. See SPEAKING.

TALLAGH, in *Geography*, a poft-town of the county of Dublin, Ireland, where is the ancient and noble refidence of the archbifhops of Dublin; 5 miles S.W. by W. from Dublin.

TALLANO, a town of Corfica, and capital of a diftrict, in the department of the Liamone, fituated in a bay of the Mediterranean, called the "Gulf of Tallano;" 30 miles S.S.W. of Corte. N. lat. 41° 33'. E. long. 9° 11'.

TALLAPOUR, a town of Hindooftan, in Oude; 22 miles N.E. of Lucknow.

TALLARAPESCET, a town of Perfia, in the province of Mazanderan; 21 miles S. of Fehrabad.

TALLARD, a town of France, in the department of the Higher Alps, on the Durance; 9 miles S. of Gap.

TALLARO, in *Commerce*, a filver coin of Tufcany, Venice, and Ragufa. At Florence the tallaro is = 6 lire or 9 paoli, the lire being worth about 8*d.* The new tallari of Ragufa, called libertine, coined between 1791 and 1794, are of the weight of 1 oz. 10 carats, containing 9 parts of pure filver to 6 of alloy; and the value of the tallaro was reckoned at 80 groffetti. Since 1796 there have been coined ducats of 40 groffetti, containing 9 parts of pure filver and 11 of alloy. The ducat of 1796 is worth 13$\frac{1}{4}$*d.* fterling, which is nearly the value of the Turkifh piaftre of the lateft coinage.

By Mr. Bingley's affay, the mint price of filver in England being 5*s.* 2*d. per* ounce ftandard, the tallaro of Venice ($\frac{1}{2}$, &c. in proportion) is worfe than Englifh ftandard (W.) 1 oz. 3 dwts., its weight 18 dwts. 10$\frac{3}{4}$ grs., its content in pure filver 367.1 grs., and value in fterling 4*s.* 3$\frac{1}{4}$*d.* The tallaro and its divifions are marked with the head of a woman, legend, *Refpublica Veneta*; reverfe, a winged lion, and a book; legend, the reigning doge's name, thus *Paulo Rainario duca*.

The affay of the tallaro of Ragufa, or Ragufian of 1759, is W. 4 oz. 2 dwts., its weight 18 dwts. 7$\frac{1}{2}$ grs., its content in pure filver 256.4 grs., and its fterling value 2*s.* 11$\frac{3}{4}$*d.* That of 1774, W. 4 oz. 4 dwts., weight 18 dwts. 8$\frac{1}{2}$ grs., content in pure filver 253.3 grs., and value 2*s.* 11$\frac{1}{4}$*d.* That of 1794, W. 3 oz. 19 dwts., weight 18 dwts. 17$\frac{1}{4}$ grs., content 267.6 grs., and fterling value 3*s.* 1$\frac{1}{4}$*d.* The ducat of 1797, 1797, W. 5 oz. 11 dwts., weight 8 dwts. $17\frac{1}{4}$ grs., content 97 grs., and value 1*s.* $1\frac{1}{2}$*d.*

The tallaro of Ragufa is marked with the head of the chief magiftrate, called the rector; legend, *Rector Reip. Rhacufin;* reverfe, arms of the city; legend, *Ducat et Sem. Reip. Rac.* In the Levant, and other places, the term tallaro is applied to dollars in general. Kelly's Cambift.

TALLEVENDE, in *Geography*, a town of France, in the department of the Calvados, containing near 3000 inhabitants, chiefly employed in the manufacture of earthenware; 2 miles S.W. of Vire.

TALLIAGE, Tallagium, a certain rate, according to which barons and knights were anciently taxed by the king towards the expences of the ftate, and inferior tenants by their lords, on certain occafions.

That raifed to the king was on his demefnes, efcheats, and wardfhips, and upon the cities and burghs of the realm. When it was paid out of knights' fees, it was called *fcutage* (which fee); when by cities and burghs, *talliage;* when upon lands not of a military tenure, *hidage;* which fee.

This latter talliage of the cuftomary tenants was fometimes fixed and certain, and fometimes at the pleafure of the lord; and was alfo fometimes compounded for.

Talliages were anciently called *cuttings;* which name is ftill retained in Ireland, though in a different fignification.

Talliage, fays fir Ed. Coke, is a general name including all taxes; and is derived from the French *taille*, *tax*, founded on the tally of petty tradefmen; as the country people appointed to collect it, not being able to write, fcored down what they received on tallies. See Land-tax and Subsidy.

TALLIKA, in *Geography*, a town of Africa, in the kingdom of Bondou, inhabited by Foulahs of the Mahometan religion, in the road of the caravans; 70 miles W.S.W. of Fatteconda. N. lat. 13° 56′. W. long. 11° 40′.

TALLIPOUR, a town of Hindooftan, in Bahar; 10 miles S.E. of Hajypour.

TALLIS, Thomas, in *Biography*, the mafter of Bird, and one of the greateft muficians, not only of this country, but of all Europe, during the 16th century, in which many able contrapuntifts flourifhed.

He was born early in the reign of Henry VIII.; but though it has frequently been afferted that he was organift of the chapel royal during the reigns of that monarch, Edward VI., queen Mary, and queen Elizabeth, yet it would be difficult to prove that, in the three firft of thefe reigns, laymen were ever appointed to any fuch office. In the reign of Henry, and his daughter Mary, when the Roman Catholic religion prevailed, the organ, in convents, was ufually played by monks; and in cathedrals and collegiate churches and chapels, by the canons, and others of the priefthood. The firft lay organifts of the chapel royal upon record were Dr. Tye, Blithman, the mafter of Dr. Bull, Tallis, and Bird; all during the reign of queen Elizabeth.

Though the melody or plain-fong of the cathedral fervice was firft adjufted to Englifh words by Marbeck, yet Tallis enriched it with harmony. Indeed the melody ufed by Tallis is not exactly fimilar to that of Marbeck, it is only of the fame kind; confifting of fragments of the ancient ecclefiaftical canto fermo. But the harmony in which he has clothed it is admirable; and the modulation being fo antique, chiefly in common chords or fundamental harmony to each note of the diatonic fcale, often where the moderns have fixths, fevenths, and their inverfions, produces a folemn and very different effect from any mufic that has been compofed during the laft century. As all melody, in which the femitones are avoided, muft refemble that of Scotland; fo all harmony, in which neither the *tritonus* nor falfe fifth occurs, and where the fecond, third, and fixth of the key, are only accompanied with common chords, muft remind us of that which prevailed in the fixteenth century; and though fo ancient, appear new to our ears, from its long difufe.

There are two compofitions by Tallis for the organ, preferved in queen Elizabeth's Virginal Book, one of which is dated 1561, and the other 1564; both built upon a dull and unmeaning ground, or fragment of plain-chant (*fœlix namque*), and both alike dry, elaborate, and difficult, to hands formed by modern mufic. The little melody and rhythm in the compofitions of thefe times required all the harmony that could be crowded into them. Notes are multiplied without end, and difficulties created without effect. It is not by the inftrumental mufic, which had been but little cultivated, that we muft judge of the genius of old mafters; but by vocal, in parts: where the harmony and contrivance compenfate for want of accent, tafte, and invention. The Latin motets and hymns, or "Cantiones facræ," which he publifhed jointly with thofe of his difciple Bird, are perhaps the beft of his compofitions that have been preferved. Thefe appeared in 1575, under the following title: "Cantiones quæ ab Argumento facræ vocantur quinque et fex Partium. Autoribus Thoma Talliffio et Gulielmo Birdo, Anglis, Sereniffimæ Reginæ Majeftati à privato facello Generofis et Organiftis." At the time of this publication, a very arbitrary and monopolifing patent was granted by queen Elizabeth to thefe compofers, for twenty-one years, not only for the publication of their own productions, vocal and inftrumental, but thofe of all other muficians, whether Englifh, French, or Italian, as well as for the fole ruling and vending of mufic-paper.

Moft of thefe excellent compofitions, of which the words were originally Latin, were afterwards adjufted to Englifh words by Dr. Aldrich, and others, for the ufe of our cathedrals. The canons, inverfions, augmentations, diminutions, and other learned and fafhionable contrivances of the times, which were of very difficult accomplifhment, are carried to a wonderful degree of ingenuity in thefe productions.

Dr. Thomas Tudway, of Cambridge, made a very valuable collection of Englifh church mufic, in fcore, from the Reformation to the Reftoration, in fix volumes, thick 4to. for Lord Harley, afterwards earl of Oxford, which is now among the Harleian manufcripts, in the Britifh Mufeum, No. 7337. In the firft volume of this collection we have the whole fervice of Tallis in D minor, in four parts, confifting of the *Te Deum, Benedictus, Kyrie Eleifon, Credo, Magnificat, Nunc Dimittis,* and *Litany*, as printed in 1760, by Dr. Boyce; with feveral anthems in four and five parts; as, "Wipe away my fins;" "With all our hearts and mouths;" "O Lord, give thy holy fpirit;" "I call and cry;" and his anthem, "Difcomfit them, O Lord!" erroneoufly faid by Dr. Tudway to have been fet for the victory over the Spanifh Armada, 1588.

In Chrift-Church, Oxford, are manufcript fcores of his Prèces, Litany, and Anthems, among others by Bird, Farrant, Bull, Gibbons, and Child. Five of his motets and full anthems, in five parts, to Latin and Englifh words, are likewife here preferved among the works of other Englifh mafters, in Dr. Aldrich's collection. But the moft curious and extraordinary of all his labours was his "Song of forty Parts," which is ftill fubfifting, and now before us. This wonderful effort of harmonical abilities is not divided into choirs of four parts: foprano, altus, tenor, and bafe, in each, like the compofitions *a molti cori*, of Benevoli, and others; but confifts of eight trebles, placed under each other;

other; eight mezzi soprani, or mean parts; eight counter-tenors; eight tenors; and eight bases; with one line allotted to the organ. All these several parts, as may be imagined, are not in simple counterpoint, or filled up in mere harmony, without meaning or design, but have each a share in the short subjects of fugue and imitation, which are introduced upon every change of words. The first subject is begun in G, by the first mezzo soprano, or medius, and answered in D, the fifth above, by the first soprano; the second medius in like manner beginning in G, is answered in the octave below by the first tenor, and that by the first counter-tenor in D, the fifth above; then the first base has the subject in D, the eighth below the counter-tenor; and thus all the forty *real* parts are severally introduced in the course of thirty-nine bars, when the whole vocal phalanx is employed at once, during six bars more. After which a new subject is led off by the lowest base, and pursued by other parts, severally, for about twenty-four bars, when there is a general chorus of all the parts; and thus this stupendous, though perhaps Gothic, specimen of human labour and intellect, is carried on in alternate flight, pursuit, attack, and choral union to the end; when the *Polyphonic phenomenon* is terminated by twelve bars of universal chorus, in quadragintesimal harmony. The entire composition consists of one hundred and thirty-eight bars, in *alla breve* time.

This venerable musician died in November, 1585, and was buried in the old parish church of Greenwich, in Kent. The following epitaph, which Dr. Boyce has printed in the first volume of his Collection of Cathedral Music, Strype, in his Continuation of Stow's Survey, printed 1720, says he found engraved in Gothic letters, on a brass plate in the chancel.

"Enterred here doth ly a worthy wyght,
  Who for long tyme in musick bore the bell:
His name to shew was Thomas Tallis hyght,
  In honest vertuous lyff he did excell.
He serv'd long tyme in chappel with grete prayse
  Fower sovereygnes reignes, (a thing not often seene);
I mean king Henry and prince Edward's dayes,
  Quene Marie, and Elizabeth our quene,
He maryed was, though children he had none,
  And lyv'd in love full three and thirty yeres
With loyal spowse, whos name yclept was Jone,
  Who here entomb'd, him company now bears.
As he dyd lyve, so also dyd he dy,
  In myld and quyet sort, O happy man!
To God ful oft for mercy did he cry,
  Wherefore he lyves, let Deth do what he can."

The stone to which this plate was affixed had been renewed by Dr. Aldrich; but the old church having been pulled down, about the year 1720, in order to be rebuilt, no memorial remains of Tallis, or any other illustrious person, who had been interred there anterior to that period.

TALLOW, a sort of animal fat, melted down and clarified. There are scarcely any animals but a sort of tallow may be prepared from; but those which yield the most, and of which the most use is made, are the horse, bullock, sheep, hog, goat, deer, bear, and viper. Some of which tallows, or fats, are used in medicine, and called *axungiæ*.

Most of the rest are used in the making of soap, and the dressing of leather; but chiefly in making of candles. For this purpose, large quantities are annually imported from Russia in casks. (See CANDLE.) Tallow-chandlers also melt tallow, which is done by chopping the fat, as it is taken from oxen and sheep, and then boiling it for some time in a large copper; and when the tallow is extracted by this process, the remainder is subjected to the operation of a strong iron press; and the cake that is left, after the tallow is expressed from it, is called a "greave." With this dogs are fed, and most of the ducks that are reared in the vale of Aylesbury, and which supply the London markets. It is also sometimes given to oxen and pigs, but certainly without meliorating the flavour of the meat.

It has been observed, that candles should be made without any admixture of oil or grease; and when laid up, should be preserved from the action of the atmosphere. For this purpose, some persons keep their candles closely covered up in bran. If tallows are weak, a part soon becomes converted to an acid by exposure to the air; and this renders the whole, when melted together, unfit for candles. Tallows, also, that contain a large portion of sebacic acid, require much more barilla than good tallow, in the manufacture of soap, and yet produce a less quantity. Foreign tallows, which frequently contain a large portion of acid, rendering them inferior to the English, may be purified at an insignificant expence by chemical means; and by the proper application of chemical agents, other brown tallows may be rendered beautifully white, and fit for the best purposes. The mode, says a chemical writer of reputation, which naturally presents itself as the best for separating the sebacic acid from tallow, is that of melting it in water containing some alkali; but old tallows may in general be sufficiently purified from their rancidity by melting them upon lime-water, and giving a considerable agitation to the whole mixture; for when the water is again suffered to subside, it will be found to be offensive in smell, and to have subtracted most of the impurities of the tallow. If the tallow, however, should not be sufficiently purified, a repetition of this process would completely effect it. Parkes's Chemical Essays, vol. i. p. 67, &c.

TALLOW-*Tree*, in China, is a tree growing in great plenty in that country, which produces a substance like our tallow, and serving for the same purpose. See CROTON *Sebiferum*.

All the preparation they give it, is to melt it down and mix a little oil with it, to make it softer, and more pliant. It is true, their candles made of it yield a thicker smoke, and a dimmer light than ours; but those defects are owing, in a great measure, to the wicks, which are not of cotton, but only a little rod or switch of dry light wood, covered with the pith of a rush, wound round it; which being very porous, serves to filtrate the minute parts of the tallow, attracted by the burning stick, which by this means is kept burning.

TALLOW-*Chandlers' Greaves*, in *Agriculture*, the refuse of tallow-chandlery, which is found at the bottom of the pan, after the melting of tallow, in a sort of cake, and which is an excellent *manure;* which see.

TALLOW, in *Geography*, a post-town of the county of Waterford, Ireland, situated within half a mile of the river Bride, on which there is a village called Tallow-bridge. It was a borough which returned two members, previous to the Union. It is 104 miles S.W. by S. from Dublin, and 4 S. from Lismore.

TALLOW *Point*, a mark for anchoring in the harbour of Port Royal, in Jamaica.

TALLOWING, in *Rural Economy*, a term applied to the property or means of forming tallow internally in animals of some kinds, especially those of the sheep and neat cattle sorts. It has been stated in the corrected Agricultural Report of the County of Sussex, that it is by no means a settled point upon the South Downs of that district, how far a sheep, which gathers its fat upon the intestines, is or is not preferable to another which collects it upon the back and the neck,

neck. The Leicestershire graziers, it is said, contending as much for the latter as the former, is considered as a test of merit in Norfolk, and various other counties. But when it is considered, that it requires a certain portion of food to create a given quantity of fat, the question is, it is thought, which is the best part to collect it upon,—within or without? As long as the fat of the latter will sell at more than one-third of the other, it would seem, it is said, that there cannot be a doubt which of the two is preferable; and that, upon the principle of food eaten to produce the tallow or fat, that which tallows the least is the best breed. The tallow, with the major part of the fifth quarter, is all the butcher's profit, it is said, who would no doubt encourage that breed which tallows best, and yields most offal.

It is noticed, however, that the South Down sheep are not great tallowers, compared with some other sorts; but that what they lose in tallow, they make up in a disposition to fatten. The tallow of a wether, in common management, will, it is said, generally average from an eighth to a tenth part of its dead weight. In a fat wether of Mr. Ellman's, one-seventh part of the dead weight was, it is said, inside fat (caul and loose fat); and that in another which was since killed, one-sixth was inside fat. In others, too, that have been slaughtered, the variation has been found from a seventh to a tenth. The quantity of inside fat depends, it is said, much upon the age and time of fattening. It gathers itself much more in old sheep than in young ones.

The bad ill-formed breeds of sheep, for the most part, tallow in the largest and most favourable manner; and the same is mostly the case in neat-cattle stock, as those which have the best forms and dispositions for fattening have commonly the least property of tallowing well, or afford the least proof, as it is often called.

In regard to the superiority of fat meat, it may be just noticed that, in some great thoroughfares for travelling, the inn-keepers agree with the butchers to give them a penny the pound above the common price for mutton, provided it be very fat. It is likewise the same with beef. This is said to be the case at Petersfield, and to strongly shew that very fat mutton, or meat of any kind, will go much farther than that which is not equally so. It, however, makes against tallowing in animals of these kinds. See Live-*Stock* and Sheep.

TALLWATER, in *Geography*, a river of Ireland, in the county of Armagh, which runs with the Callen into Blackwater, near Charlemont.

TALLY, Taile, or *Taille*, a piece of wood on which retail traders use to score or mark, by notches or incisions, the several quantities of goods they deliver out on credit, to save the trouble of writing down so many little articles in books.

Each score consists of two pieces of wood, or rather of a single piece cleft length-wise, the parts of which falling in with one another, things delivered are scored on both at the same time; the seller keeping one, and the buyer the other.

Tallies are taken as evidences in courts of justice, as much as books. The ancient way of keeping all accounts was by tallies; the debtor keeping one part, and the creditor the other. Hence the *tallier* of the exchequer, now called the *teller*.

There are three kinds of tallies mentioned in our statutes, and long used in the exchequer; *viz*.

Tallies *of Loans*, one part of which is kept in the exchequer, and the other part given to particular persons, in lieu of an obligation for the monies they have lent to the government on acts of parliament. This last part is called the *stock*, and the former the *counter-stock*, or the counter-tail.

The tallies are numbered, and bear the person's name, and the sum lent: thus we say, the tallies, N° have been paid, or discharged; tallies are risen, fallen, 4, 5, &c.

Tallies, or *Tailes of Debt*, are a kind of acquittances for debts paid to the king.

E. gr. The university of Cambridge pays yearly 10*l.* for such things as are by charter granted them in fee-farm. He that pays this receives a *taile*, or tally, for his discharge, with which, or a note of it, he repairs to the clerk of the pipe, and there for the tally receives a full discharge on parchment.

Tallies *of Reward*, or allowance. These are made to sheriffs, for such matters as (to their charge) they have performed in their office, or by such money as is by course cast on them in their accounts, but which they cannot levy.

In the exchequer there is a *tally-court*, where attend the two deputy chamberlains of the exchequer, and the tally-cutter.

Tally-*Counter*. See Counter.

Tallies, *Cutter of the*. See Cutter.

Tally, *Petty*. See Petty.

Tallies, *Writer of*. See Writer.

Tally *the Sheets*, at sea, a word of command, when the sheets of a main-sail or fore-sail are to be hauled aft. See Sheets.

Tally *for Flowers and Plants*, in *Gardening*, that sort of mark or contrivance, either by pieces of lead or slips of wood, employed for distinguishing them.

The practice of marking flowers, trees, and plants, with tallies of some kind or other, is always highly useful and necessary in regulating their culture, as well as for many other purposes.

TALLYOOR, in *Geography*, a town of Hindoostan, in Mysore; 8 miles N.W. of Dindigul.

TALMAS, a town of France, in the department of the Somme; 9 miles S. of Dourlens.

TALMAY, a town of France, in the department of the Côte d'Or, at the union of the Vigenne and the Saône; 18 miles N.E. of Dijon.

TALMOND, a sea-port town of France, in the department of the Lower Charente, on the right side of the Gironde, with a harbour; 18 miles S.W. of Saintes.

TALMONT, a town of France, in the department of the Vendée; 6 miles E.S.E. of Sables d'Olonne.

TALMUD, or Thalmud, from תלמוד, *doctrine*, from למד, *he taught*, a Jewish book, which contains a collection of all that relates to the explication of their law.

The Talmud is the body of the Hebrew law; a compilation of expositions of the duties imposed on the people, either in scripture, or by tradition, or by authority of their doctors, or by custom, or even by superstition: to speak more plainly still, it is the course of cases of conscience, or of moral theology, in which the duties are explained, and the doubts cleared, not by reasoning, but generally by authority, by the custom of the nation, and by the decisions of the most approved of the ancient doctors.

The Talmud consists of two general parts, the one called the Mischna, the other the Gemara; which first part is also frequently called absolutely the "Talmud," the general name of the whole work.

The Jews divide their law into *written*, which is that contained in the books of Moses; and *unwritten*, which is that conveyed by tradition. This latter is, in effect, no other than a gloss or interpretation of the former, given by the ancient rabbins.

The

The Talmud then contains the traditions of the Jews, their polity, doctrine, and ceremonies, which they obferve as religioufly as the law of God itfelf: they would never put them in writing till they were compelled to it by the deftruction of Jerufalem, and till they faw themfelves difperfed throughout the world.

They had two famous fchools; the one at Babylon, and the other at Jerufalem: in thefe they made two feveral collections of thofe traditions; the firft at Jerufalem, the other at Babylon; but both called Talmud, both exceedingly reverenced, efpecially the Babylonian, though full of extravagancies. This was compiled by the Jews of Mefopotamia, about 500 years after Chrift, according to Buxtorf: but Father Morinus offers feveral reafons to prove that it was not finifhed till the year 700. The laft edition of this Talmud, at Amfterdam, is in twelve folios.

The Talmud of Jerufalem is the leaft efteemed. It was compiled by the Jews of that city, and particularly by Rabbi Jochanan, rector of the academy at Tiberias, about 300 years after Chrift, according to Buxtorf; but Father Morinus, in his "Exercitationes Biblicæ," lib. ii. exerc. 6. judges, from feveral barbarous terms found in it, of Vandalic or Gothic extraction, that it did not appear till the fifth century. This is publifhed in one large folio.

The Babylonian Talmud confifts of two parts: the one the text, the other the glofs or comment: the comment, called the *Gemara*, contains the decifion of the Jewifh doctors, and their expofitions of the text.—This we find ftuffed with dreams and chimeras; together with much ignorance, and many impertinent queftions and difputations: the ftyle is alfo very coarfe. On the contrary, the text called the *Mifchna*, is written in a tolerably pure ftyle, and the reafonings generally much more folid.

The Jews pretend that this was compofed by Rabbi Juda, furnamed the *Saint;* and that God revealed to him the doctrine, and the chief myfteries of it. But this is only to be underftood of the Mifchna, not of the Gemara, the compilation of which was not begun till the fixth century, after the deftruction of the fecond temple.

Rabbi Juda is faid to have compofed the Mifchna under the empire of Antoninus, in the fecond century; but they do not all agree about this antiquity, fome carrying it back much farther.

It is the Talmud of Babylon that is ufually read, and moft frequently confulted, among the Jews; fo that when they fay fimply "the Talmud," they always meant this; never quoting the other without the addition of Jerufalem.

Maimonides has made an abridgment of the Talmud, which Scaliger prefers to the Talmud itfelf; as being purged of many of the fables of which the other is full. It is a fyftem of the laws and cuftoms of the Jews, both of their civil and their canon law, and the beft of their traditions.

About the year 1236, a Jew of Rochelle, well verfed in the Hebrew, becoming Chriftian, made a journey to pope Gregory IX., and difcovered to him a number of errors in the Talmud: thefe the pope fent, in thirty-nine articles, to the archbifhops of France, with a letter, appointing them to feize the books of the Jews, and to burn all fuch as fhould contain thofe errors: in confequence of which order, about twenty cart-loads of Hebrew books were burnt. He wrote to the fame effect to the kings of England, France, Aragon, Caftile, &c.

His fucceffor, Innocent IV., giving commiffion to his legate, Eudes de Chateauroux, to examine the Talmud, and other Jewifh books, more carefully, and to tolerate fuch errors as were not contrary to the Chriftian religion; the legate wrote to the pope, that to tolerate them was to approve them; and the 15th of May, 1248, he alfo condemned them juridically to the flames; and Paul IV. ordered 12,000 volumes of the Talmud to be confumed; and Clement VIII. ordered all the talmudic books that could be found to be deftroyed; a zeal worthy of the Papal fee! See MISCHNA, GEMARA, CARAITES, and RABBINISTS.

TALO-CHAN, in *Geography*, a fmall ifland near the coaft of China. N. lat. 29° 57′. E. long. 122° 4′.

TALOIRE, a town of France, in the department of Mont Blanc; 8 miles S.S.E. of Annecy.

TALON, in *Ornithology*, the claw of a bird.

TALON, in *Architecture*, a kind of moulding, confifting of a cymatium, crowned with a fquare fillet; frequently found to terminate ornaments of joiners' work, as thofe of doors, &c.

The word is French, and literally fignifies *heel.*

The talon, more properly fo called, is a moulding concave at the bottom, and convex at top; having an effect juft oppofite to the doucine.

When the concave part is at top, it is called an *inverted* talon.

The talon is ufually called by our Englifh workmen *ogee*, or *O.G.* and by authors an *upright* or *inverted* cymatium.

TALOO, in *Geography*, a harbour on the N. coaft of *Eimeo;* which fee.

TALOVKA, a river of Ruffia, which unites with the Analik, and runs with it into the Irgis, 32 miles E. of Volfk, in the government of Saratov.

TALPA, the *Mole*, in *Zoology*, a genus of the Mammalia Feræ, the characters of which are, that the front teeth in the upper jaw are fix and unequal, thofe in the lower jaw are eight; the canine teeth are one on each fide, the upper ones being the largeft; and that the grinders are feven in the upper jaw, and fix in the lower. Gmelin enumerates four fpecies, befides feveral varieties.

Species.

EUROPÆA; Common Mole. Has a fhort tail, and pentadactylous or five-toed feet. The body is thick and cylindric; the fnout flender, but very ftrong and tendinous; the head not diftinguifhed from the body by any appearance of neck; the legs fo extremely fhort, as fcarcely to project perceptibly from the body; the fore-feet fituated obliquely outwards, exceffively ftrong and broad, and furnifhed with very large and ftout claws, fo as to give the animal the power of working under the furface with the utmoft eafe and readinefs; the hind-feet are fmall in proportion to the fore-feet, and are calculated for throwing back with eafe the mould from behind the creature, during his fubterraneous progrefs; the tail is fhort and fmall; the fkin is much thicker and tougher in proportion than in other quadrupeds, and the fur with which it is covered equally furpaffes that of other animals in finenefs and foftnefs. The mufcular ftrength of the mole is very great, and it is enabled to force itfelf into the ground with an extraordinary degree of celerity. The general length of the mole is about five inches and three quarters, exclufive of the tail, which meafures one inch. This animal is fuppofed to poffefs the power of hearing in an exquifite degree; and if at any time it emerges from a fubterraneous retreat, inftantly difappears on the approach of any danger. When firft taken, either by digging it out or otherwife, it utters a fhrill fcream, and prepares for defence by exerting the ftrength of its claws and teeth. According to the count de Buffon, fo lively and reciprocal an attachment fubfifts between the male and female, that they feem to dread or difrelifh all other fociety.

It has been doubted whether the mole has eyes adapted to vifion, viſion, or merely for the purpoſe of apprizing it of the approach of light, ſo as to warn it of the danger of expoſure. Galen is of the former opinion. Sir Thomas Brown refers this to the claſs of vulgar errors; but Derham, by diſſection, and the aid of a microſcope, confirmed the opinion of Galen. This animal is ſaid to feed not only on worms and inſects, &c. but on the roots of vegetables: however, it is more carnivorous than frugivorous. In particular circumſtances it is very fierce and voracious. Without damp mould for its reſidence, it is kept alive with difficulty in a ſtate of confinement. Like other animals of a black colour, the mole is ſometimes found perfectly white, or cream-coloured, and ſometimes ſpotted. Gmelin reckons four varieties, *viz.* the variegated or ſpotted mole of Edwards, the white, the yellow, and the cinereous. Of its ſurpriſing power in ſwimming, we have a curious inſtance recorded in the 3d volume of the Tranſactions of the Linnæan Society; which is that of a mole that was ſeen ſwimming towards a ſmall iſland in the middle of the loch of Clunie, in Scotland, at the diſtance of 180 yards from the land. Linnæus and Gmelin affirm that the mole paſſes the winter in a ſtate of torpidity; but this is contradicted by Buffon, and he alleges facts to prove the contrary. The mole is ſaid to be unknown in Ireland. In Siberia it attains a larger ſize than in Europe, and its fur is ſo ſoft and beautiful, that it would make the moſt elegant articles of dreſs, were it not for the difficulty of curing and dreſſing the ſkin. See Mole.

Asiatica. Has no tail, and tridactylous fore-feet. This is the Siberian mole of Pennant. It is ſomewhat ſmaller than the common mole, its length being four inches; and is a native of the Cape of Good Hope.

Longicaudata. With a tail of middling length, and pentadactylous feet, the hinder ones ſcaly. This is the long-tailed mole of Pennant: its length from noſe to tail is four inches and ſix-tenths; and it is a native of North America.

Rubra; Red Mole of Pennant. Has a ſhort tail, tridactylous fore-feet, and tridactylous hind-feet. This is ſaid to be a native of America.

Dr. Shaw mentions ſome other ſpecies, as the *T. purpuraſcens*, or black mole, with a gloſs of purple, pentadactylous feet, and white tail, firſt deſcribed by Seba, and by him ſaid to be a native of Virginia:—the *T. radiata*, or black mole, with white feet, and noſe radiated with papillæ; an inhabitant of North America:—the *Sorex criſtatus* of Linnæus; a variety, as Dr. Shaw ſays, of the *T. longicaudata*:—and the *T. fuſca*, or brown mole, with white feet and tail, the fore-feet very broad; a native of North America, and ſuppoſed to be the ſame with the *Sorex aquaticus* of Linnæus.

Talpa, (*a mole*,) in *Surgery*, a tumour, which makes its way under the ſkin, as a mole under the ſurface of the ground. Such is ſaid to be the derivation of the term. Talpa is often uſed in the language of ſurgery, to expreſs an encyſted tumour, which forms on the head, and contains a pap-like matter. See Atheroma.

TALPAR, in *Geography*, a town of Perſia, in the province of Irak; 70 miles N.W. of Hamadan.

TALPARIA, in *Surgery*, an encyſted tumour, filled with a pap-like matter. See Talpa.

TALPIA, in *Geography*, a town of Chineſe Tartary, in the country of Hami; 28 miles N.E. of Hatamtam.

TALSENGHE, a town of Hindooſtan, in Viſiapour; 10 miles S.W. of Viſiapour.

TALSHIDE. See Talwood.

TALSPERG, a town of France, in the department of the Upper Rhine; 12 miles E. of Porentrui.

TALTITZ, a town of Saxony, in the Vogtland; 4 miles S. of Plauen.

TALUS, in *Anatomy*, a name formerly given to the aſtragalus, or that bone of the foot which is articulated to the leg. (See Extremities.) This bone in the pecora has a cubic ſhape; and was employed by the ancients in their famous game, ludus talorum. (See Ariſtotle, Hiſt. Anim. lib. ii. c. 1.) For the various appellations of this well-known bone in moſt of the European and Oriental languages, and for its form in different animals; ſee Th. Hyde, Hiſtoria Talorum, in vol. ii. of his Syntagma Diſſertationum, Oxon. 1767, 4to.

Talus, or *Talud*, in *Architecture*, the inclination or ſlope of a work; as of the outſide of a wall, when its thickneſs is diminiſhed by degrees, as it riſes in height, to make it the firmer.

Talus, or *Talud*, in *Fortification*.—*Talus of a baſtion*, or *rampart*, is the ſlope or diminution allowed to ſuch a work; whether it be of earth, or ſtone; the better to ſupport its weight.

The *exterior* talus of a work, is its ſlope on the ſide towards the country; which is always made as little as poſſible, to prevent the enemy's eſcalade, unleſs the earth be bad, and then it is abſolutely neceſſary to allow a conſiderable talus for its parapet, and ſometimes to ſupport the earth with a ſlight wall, called a *revetement*.

The *interior* talus of a work, is its ſlope on the ſide towards the place.

This is larger than the former, and has, at the angles of the gorge, and ſometimes in the middle of the curtains, ramps or ſloping roads for mounting upon the terre-plain of the rampart.

Talus, *Superior*, of the *parapet*, is a ſlope on the top of the parapet, that allows of the ſoldiers defending the covert-way with ſmall-ſhot, which they could not do if it were level.

TALWOOD, Taliatura, in our *Old Writers*, fire-wood cut and cleft into billets of a certain length: it is otherwiſe written *talghwood* and *talſhide*. Stat. 34 & 35 Hen. VIII. c. 3. 7 Edw. VI. c. 7. 43 Eliz. c. 14.

TALYSIAN, in *Geography*, a town on the E. coaſt of the iſland of Borneo. N. lat. 1° 48′. E. long. 117° 40′.

TAM, a river of China, which runs into the Ta; 5 miles S.E. of Khi, in Pe-tche-li.

Tam, *El*, a town of Perſia, in Segeſtan, on the Heermund; 25 miles E. of Zareng.

TAMA, a town of Circaſſia, on the Black ſea; 60 miles E.N.E. of Theodoſia.

TAMACH. See Tainach.

TAMACHABAD, a town of Hindooſtan, in Benares; 18 miles W. of Benares.

TAMACLIPA, a town of Mexico, in the province of Guaſteca; 52 miles N. of Panuco.

TAMACUIL, a town of Mexico, in the province of Guaſteca; 40 miles S. of Panuco.

TAMAHOO, a ſmall iſland in the Eaſtern Indian ſea, near the weſt coaſt of Borneo. N. lat. 0° 7′. E. long. 109° 21′.

TAMALAMEQUE, a town of South America, in the province of St. Martha, on the river Magdalena; 160 miles S. of St. Martha. N. lat. 8° 40′. W. long. 73° 56′.

TAMALAPATRA, in the *Materia Medica*, a name by which ſome authors have called the *folium Indicum*, or Indian leaf, uſed in medicine.

The tree which produces this leaf is the *laurus caſſia* of Linnæus,

Linnæus, or *cassia lignea tree*. It is a large and lofty tree, the flowers and fruit of which resemble the cinnamon-tree. Its leaves, when full grown, are ten inches or more in length; and six or eight in breadth. The flowers stand in clusters, in the manner of umbels on the tops of the branches, and are of a greenish-white colour. The fruit is of the bigness of our currant.

The ancients recommended Indian leaf as stomachic, sudorific, and cephalic. At present, it is utterly disregarded, being only kept in the shops as an ingredient in mithridate and theriaca; and is, in its greatest perfection, far inferior to the mace which our college directs as a succedaneum to it. See CASSIA *Lignea*.

TAMALIPAN, in *Geography*, a chain of mountains in Spanish North America, called by Alcedo, in his description of New Leon, the Grand Sierra, and a branch of which is called the Eastern Tamalipa by Alzate. This last branch extends from the desarts of Jaumape to the eastern coast of the province of Santander, where it is marked in the Spanish chart of the gulf of Mexico by the names of various peaks; while the mountain of Orcasites, visible at sea at the distance of 160 miles inland, must nearly equal Orizava in height, and appears to belong to the same branch of the grand ridge of Tamalipa.

TAMALMA, a town of Africa, in the country of Kawar; 120 miles N. of Kanem.

TAMAMES, a town of Spain, in the province of Leon; 15 miles E. of Civdad Rodrigo.

TAMAN, an island at the mouth of the Kuban, and a principality belonging to it, and also a town on the same island, called *Phanagoria*, (which see.) This principality was anciently occupied by the Chazares; but it was wrested from them in the year 965 by the Russian combined with the Byzantine Greeks, who made themselves masters of the countries bordering on the sea of Azof in 1015, and completely overturned the Chazarian state, creating a distinct principality on the isle of Taman, to which both the Chazares and the Zichians were for a long time tributary. See TMUTARAKAN.

Towards the end of the 11th century, while Russia was torn by intestine broils, the principality of Taman was lost to that empire. At length, in 1221, the Mongoles made their first attack. The Komanes were expelled or subdued, but the Ziches fought for their liberty, and could not be made to submit till the year 1277, when they were overpowered by Margu-Timur-Khan and the famous Nogay. Nevertheless, they retained some degree of independence in their woody and mountainous regions. The Ottomans indeed, in 1484, conquered the cities and forts of Taman, Temryuk, and Atschuk: but they gained no sovereignty over the Tscherkassians or Circassians. At the peace of 1774, the sultan of the Ottomans relinquished his possessions in these parts; but, contrary to treaty, held Taman and Temryuk in a state of siege, till the Crimean khan, by the aid of the Russians, drove the Ottoman garrison out of them. By the treaty of the year 1783, Russia obtained, together with the Crimea and the Eastern Nogay, the northern part of the Kuban as far as the promontory of Caucasus.

The Zichians or Tschekians, called by the Russians Yasi, are the principal inhabitants of the isle of Taman. They formerly paid a small tribute to the Crimean khan, but in all other respects are governed by their own beys. The isle Atschuk or Atschuyef is likewise inhabited by Zichians. These two tribes, which, properly speaking, are only one collateral branch of the Tscherkassians, have belonged to the Russian empire, as inhabitants of the Kuban, since the year 1783.

TAMAN, the strait or channel that forms a communication between the Black sea and the sea of Azof.

TAMANAH, a sea-port town of Hindoostan, on the coast of Malabar, in the country of Concan; 25 miles S. of Gheriah. N. lat. 16° 30′. E. long. 73° 15′.

TAMANDUA, in *Zoology*, a creature called in English the ant-bear; and by the Brasilians *tamanduaguacu;* and the *tamanoir* of Buffon: different species of the same genus. See MYRMECOPHAGA.

TAMAR, in *Geography*, a considerable river, which originates in the county of Cornwall, England, and separates that county, except for the space of a few miles, from Devonshire. It rises in a moor in the parish of Morwinstow, about three miles from the North sea: passing near Whitstone, about ten miles from its source, it reaches Tamerton, which takes its name from this river; here it receives the waters of the Werrington, and about a mile and a half further its current is increased by the Attery, which runs under the walls of the town of Launceston: at Poulston-bridge it is a wide and rapid stream; a mile below Graiston-bridge it is joined by the Inney, which, rising in Alternon, passes through the parishes of Lewanick and Lezant. In the parish of Stoke-Climsland, the Tamar has a high, strong, stone bridge, called by Leland "Hawtebrig," or the High bridge, now commonly Horse-bridge. The last or lowest bridge on this river is in the parish of Calstock, and was begun, according to Leland, by sir Piers Edgcombe. Five miles farther the Tamar receives the Tavy from the east, and having made a creek into the parishes of Botesfleming and Landulph on the west, becomes a spacious harbour; and after passing near the ancient borough of Saltash, is joined by the Lynher creek and river. Increasing in importance as it winds along, it next forms, between Dock and Saltash, the noble basin called the "Hamoaze," or Plymouth Harbour, where a large proportion of the British navy rides in complete security. Having made two large creeks, one called St. John's, the other Milbrook, on the west, and Stonehouse creek on the east, the Tamar, after a course of about 40 miles nearly south, falls into the sea, having mount Edgcumbe for its western, and the lands of Stonehouse and St. Nicholas island for its eastern boundary, and produces the noble road for shipping named Plymouth Sound. The Tamar is one of the most considerable rivers in the west of England; its banks are richly diversified with rocks, woods, and meadows; and the scenery in various parts of its course is extremely interesting and beautiful. The views about the Cater-marther rocks, Tavistock-New-bridge, the Morwell rocks, Cotele and Pentilly, are peculiarly romantic, and can scarcely be equalled by any other river in the western part of the kingdom. (See PLYMOUTH *Harbour*.) Lysons's Magna Britannia, vol. iii. Cornwall. Beauties of England and Wales, vol. ii. Cornwall. By J. Britton and E.W. Brayley.

TAMAR, a town of Arabia, in the province of Hedsjas; 40 miles N.N.W. of Karac.

TAMAR *Bay*, a harbour in the straits of Magellan, E. of Cape Tamar.

TAMARA, in *Ancient Geography*, a river of Spain, which rose in the mountains W. of Lucus Augusto, and discharged itself into the sea to the W. of a small gulf, on the banks of which were Grandinirum and Acræ Sestianæ. Mela calls this river Tanaris. The Tamarisci inhabited its banks.

TAMARA, a town of the isle of Albion, assigned by Ptolemy

lemy to the Damnonii or Dumnonii. Mr. Horfley thinks it was Saltafh; but Mr. Camden and Mr. Baxter fuppofe it, more probably, to be Tamerton, which ftill retains its ancient name.

Tamara, in *Geography*, a town of Morocco, on the coaft of the Atlantic; 30 miles W. of Tarudant.—Alfo, a fea-port town on the N.W. coaft of the ifland of Socotora, and refidence of the king.

Tamara *Ifles*, or *Iflands of Idols*, a clufter of iflands near the coaft of Sierra Leone. N. lat. 8° 40′.

Tamara′, in *Botany*, the Hindoo name of a very celebrated plant. (See our article Cyamus, written by the late Rev. Mr. Wood.) The above name fhould feem to originate from the Hebrew תמר, *Tamar*, a Palm-tree, whence dates are called Támara by the Spaniards; and it may allude to the form of the feeds of the *Cyamus*, refembling dates; or to their fimilar ufe as an oriental article of food. *Támar* is alfo the Arabic name of the fame fruit. See Tamarindus.

TAMARACA, Tamarica, or *Itamaraca*, in *Geography*, a diftrict of Brafil, in the jurifdiction of Fernambuco. It has its name from an ifland on the coaft, near the mouth of the river Tamaraca, which conftitutes the principal part of its diftrict, though the territory thereof extends inland between 30 and 40 leagues, having Parayba on the north, Fernambuco on the fouth, the ocean on the eaft, and unfubdued Indians on the weft. It was reckoned one of the moft ancient and flourifhing captainfhips in Brafil; but Parayba and Fernambuco have fince exceeded it. The ifland is parted from the main land by a very narrow channel. It is fertile and pleafant enough; producing large quantities of Brafil wood, cotton, cocoa-nuts, fugar, melons, citrons, &c. befides a good deal of timber for fuel and other purpofes. It is about nine miles in length, and three in breadth, and about 22 in circuit. It has a commodious haven on the fouth fide, with fome good fprings and rivulets of frefh water. The entrance into the port is by a channel of between 15 and 16 feet water, commanded by a caftle, built on an eminence, and formerly taken by the Dutch: who alfo built Fort Orange at the mouth of the channel, which was inacceffible, by reafon of the marfhes furrounding it; fo that the veffels that failed down from the ifland were expofed to it, and they had in fome meafure ftopped all the avenues from the Portuguefe. This ifland, and the territory on the continent belonging to it, pay 3000 ducats to the governor of the captainfhip, and in it are reckoned to be about 22 fugar-mills. The French had formerly a canton or fettlement on this coaft, ftill called from them "Porto dos Francefe;" but the Portuguefe obliged them to evacuate it. The capital, called "Noftra Segnora de Conceizao," or "Da Tamaraca," ftands at the entrance into the river of the latter name; and near it is a fmall caftle with a redoubt, commanding the avenues; and about four miles N. of the mouth of the river is the famous point denominated "Punta Pedro."

Tamaraca, a river of Brafil, which runs into the Atlantic, S. lat. 7° 52′.

TAMARIL, a town of Spain, in Catalonia, fituated about a mile from the fea-coaft; 2 miles N.E. of Tarragona.

TAMARINDUS, in *Botany*, the Tamarind-tree, is fo called from *Tamar*, which is Hebrew for a Palm-tree, (and likewife the Arabic appellation of its fruit, the Date,) combined with the Latin word *Indus*, Indian. The form of the pod, and its ufe as an article of food, may well have given rife to the name. (See Tamara′.)—Linn. Gen. 23. Schreb. 450. Willd. Sp. Pl. v. 3. 577. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 4. 134. Juff. 347. Lamarck Illuftr. t. 25. Gærtn. t. 146.—Clafs and order, *Triandria Monogynia*, Linn. *Monadelphia Triandria*, Schreb. Willd. Nat. Ord. *Lomentaceæ*, Linn. *Leguminofæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of one leaf: tube turbinate, compreffed, tapering at the bafe, oblique at the mouth, permanent; limb in four deep, ovate, acute, flattifh, reflexed, coloured, deciduous fegments; the upper and lower ones rather the broadeft. *Cor.* Petals three, ovate, acute, concave, crenate, wavy, reflexed, the length of the calyx, inferted into the mouth of the tube; the two lateral ones rather the largeft. *Stam.* Filaments three, inferted into the mouth of the calyx in the vacancy oppofite to the uppermoft petal, awl-fhaped, as long as the corolla, connected in their lower half, curved upwards; anthers ovate, large, incumbent. There are befides feven rudiments of ftamens; five of them fetaceous threads, capitate, very fhort, alternate with the above, connected in their lower part, two lower than the reft; and two minute briftles, proceeding from the calyx beneath the filaments, and lying upon them. *Pift.* Germen oblong, compreffed, incurved, feated on a ftalk, which fprings from the bottom of the calyx, and is attached longitudinally to the back of its tube within, the projecting part downy along its upper edge; ftyle awl-fhaped, afcending, downy at its lower edge, rather longer than the ftamens; ftigma tumid, obtufe. *Peric.* Legume oblong, compreffed, obtufe, with a point, fwelling at the feeds, of one cell, not burfting; its coat double; the outer dry and brittle; inner membranous; a quantity of foft pulp being lodged between the two. *Seeds* few, orbicular, fomewhat angular, flattened, hard, polifhed, with a central circumfcribed difk at each fide.

Eff. Ch. Calyx in four deep fegments. Petals three. Barren filaments feven. Style one. Legume pulpy within.

1. T. *indica.* Tamarind-tree. Linn. Sp. Pl. 48. Willd. n. 1. Ait. n. 1. Jacq. Amer. 10. t. 10. and t. 179. f. 98. Woodv. Med. Bot. t. 166. (Tamarindus; Rumph. Amboin. v. 2. 90. t. 23. Ger. Em. 1607. Balam-pulli; Rheede Hort. Malab. v. 1. 39. t. 23.)—This tree, a native of Egypt, Arabia, and the Eaft Indies, is generally preferved, rather than cultivated, in both Indies for the fake, both of its fhade, and its acid, cooling, and highly grateful, as well as falutary, fruit; the pulp of which, mixed with boiled fugar, is frequently imported into Europe, and highly efteemed. The *trunk* is lofty, and of confiderable thicknefs, crowned with wide-extended *branches*, bearing umbrageous tufts of alternate, abruptly pinnate, fmooth, bright-green *leaves*, each compofed of many pair of elliptic-oblong, feffile, entire *leaflets*, rather glaucous beneath. *Flowers* in fimple clufters, terminating the fhort lateral branches. *Petals* yellow, elegantly veined with red. *Fruit* pendulous, like large beans. Gærtner obferves that the Weft Indian Tamarind pod is fhorter than what Rheede and Rumphius reprefent, and has fewer feeds. Hence he diftinguifhes two fpecies, which appear from hiftory as well as obfervation to be mere varieties, the plant being more at home in the eaftern than in the weftern fide of the globe, though almoft perfectly naturalized in the latter. It is often feen in our ftoves, but feldom in bloffom.—As Dr. Woodville has given an original coloured plate of this interefting plant, drawn by Mr. Sowerby from a fpecimen that flowered in Kew garden, and the only one of authority extant; we conceive his work, in this inftance, if not in every other, might have been cited with advantage, by our friend Mr. Aiton, in the *Hortus Kewenfis*.

Tamarindus, in *Gardening*, contains a plant of the exotic tree kind, of which the fpecies is the tamarind-tree (T. indica);

dica); which grows to a very large ſize in the countries where it is a native: the ſtem being very large, and covered with a brown bark, dividing into many branches at the top, which ſpread wide every way; the flowers come out from the ſide of the branches, five, ſix, or more together, in looſe bunches; the pods being thick and compreſſed; thoſe from the Weſt Indies from two to five inches in length, containing two, three, or four ſeeds; but thoſe from the Eaſt Indies are almoſt twice as long, and contain five, ſix, and even ſeven ſeeds. The tree is a native of both the Indies, and of ſome other places.

Method of Culture.—This is a plant which is increaſed from ſeeds, which ſhould be ſown in the ſpring on a hot-bed, and when the plants are come up, each planted in a ſeparate ſmall pot, filled with light rich earth, plunging them into a hot-bed of tanners' bark to bring them forward, watering and ſhading them until they have taken root; and as the earth in the pots becomes dry, they muſt be watered from time to time, and have air given in proportion to the warmth of the ſeaſon, and the bed in which they are placed. When the pots in which they are planted are filled with their roots, the plants ſhould be ſhifted into pots of a larger ſize, which muſt be filled up with rich light earth, and again plunged into the hot-bed, giving them air as before, according to the warmth of the ſeaſon; but in very hot weather, the glaſſes ſhould be ſhaded with mats in the heat of the day, otherwiſe the ſun will be too violent for them through the glaſſes; nor will the plants thrive if they are expoſed to the open air, even in the warmeſt ſeaſon; ſo that they muſt be conſtantly kept in the bark-ſtove both ſummer and winter, treating them in the ſame manner as the coffee-tree. Theſe plants have a good effect in the ſtove collections.

It is the ſeed-pods of this tree which form and conſtitute the preſerve called tamarinds, which is ſold in the ſhops; and is of ſuch a pulpy acid quality, as to be of great uſe in abating and quenching thirſt, and in cooling and allaying exceſſive heat. It is brought hither from both the Eaſt and Weſt Indies; but though the pods of the trees of the former ſituation are much finer and larger, the preſerve from the latter is generally conſidered better, and of courſe moſtly preferred.

There is nothing peculiar in the making of this ſort of preſerve, exactly the ſame methods being followed as are common in the preſerving of other ſubſtances of ſimilar kinds.

Tamarindus, in the *Materia Medica.* The Eaſt India tamarinds are longer than thoſe of the Weſt; the former containing ſix or ſeven ſeeds each, the latter rarely above three or four; nevertheleſs they ſeem to be the produce of the ſame plant: the Oriental ſort is drier and darker-coloured than the Occidental, and has more pulp; the former is ſometimes preſerved without addition, but the latter has always an admixture of ſugar.

In the Weſt Indies, the pods are gathered in June, July, and Auguſt, when fully ripe; and the fruit, freed from the ſhelly fragments, is placed in layers in a caſk, and boiling ſyrup poured over it till the caſk is filled. When cool, the caſk is headed for ſale. When tamarinds are good, they are not in any degree muſty: the ſeeds are hard, flat, and clean; the ſtrings rough and entire, and a clean knife thruſt into them does not receive any coating of copper. They ſhould be preſerved in cloſely covered jars.

We owe the knowledge of the uſe of tamarinds, in medicine, to the Arabians. The ancient Greeks knew nothing of them; and Serapion, Meſue, and Avicenna, are the firſt authors who preſcribe them.

The fruit of the tamarind, which is what we uſe, is only the piſtil of the flower ſwelled into a pod; this is greeniſh at firſt, but grows browniſh or reddiſh as it ripens; its common ſize is four inches in length, and one in breadth; and it is undulated on the back, and deeply notched in three or four places at the front, which is terminated by a large rib, that runs from the pedicle on which it grows, to the end of the pod, and there frequently terminates in a ſort of hook.

This fruit is, properly ſpeaking, compoſed of two pods, the one incloſed within the other: the outer pod is fleſhy, and of the twelfth of an inch in thickneſs when freſh, and the inner one is as thin as a fine piece of parchment: between theſe two there is an intermediate ſpace of about a quarter of an inch all the way; and this ſpace is filled up with a very ſoft and pulpy ſubſtance, of a tart but very agreeable taſte, which is what we uſe in medicine. This is blackiſh, and of a viſcous texture, and is traverſed by three large veſſels, or rather bundles of veſſels, one of which runs all along the back of the pod, and the two others are placed on the oppoſite ſide, and often there are ſeveral ramifications of veſſels, which run off different ways from theſe. Theſe veſſels carry the vinous juice, which afterwards hardens into the viſcous matter of the pulp; but this is not all their office, for they alſo convey nouriſhment to the ſeeds in the inner pod.

We uſe the tamarinds only in medicine; but the Africans, and the people of many of the Oriental nations, where they are common, make them into a ſort of confection with ſugar, which they eat as a delicacy, and which cools them in the violent heats of their climates; and at the ſame time keeps their bowels in a proper ſtate of laxity. The ſour taſte of this fruit proves, that acid particles abound greatly in it; and a chemical analyſis of it gives further proof of this.

According to the analyſis of Vauquelin, the pulp contains, independently of the ſugar with which it is mixed, ſupertartrate of potaſs, gum, jelly, citric acid, tartaric acid, malic acid, and a feculent matter. The acid taſte chiefly depends on the citric acid, as its quantity exceeds that of the others ℥xvj of the prepared pulp, containing ℥iſs of citric acid, but only ʒij of tartaric acid, ℥ſs of ſupertartrate of potaſs, and ʒſs of malic acid. Annales de Chimie, vol. v. p. 92.

The eſſential ſalt of tamarinds, as Beaumé obſerves, may be obtained more expeditiouſly, by clarifying the decoction of the tamarinds with whites of eggs, than by filtering and evaporating it to a proper conſiſtence, and ſetting it to cool: the ſalt ſhoots into cryſtals of a brown colour, and very acid taſte, but in diſſolving and cryſtallizing them again, or barely waſhing them with water, they loſe almoſt all their acidity; the acid principle of the tamarind ſeeming not to be truly cryſtallizable.

The pulp of tamarinds is an agreeable laxative acid, of common uſe in inflammatory and putrid diſorders, for abating thirſt and heat, correcting putrefaction, and looſening the belly. The doſe, as a laxative, is two or three drachms; an ounce or two prove moderately cathartic. It is an uſeful addition with this intention to the purgative ſweets, caſſia and manna, in increaſing their action, and rendering them leſs liable to produce flatulencies: the reſinous cathartics are ſaid to be ſomewhat weakened by it. Lewis.

This pulp is an ingredient in confectio caſſiæ, confectio ſennæ, and in the infuſum tamarindi cum ſenna.

TAMARISCUS, in *Botany.* See Tamarix.

TAMARISK Plant, in *Agriculture*, is a plant of the large ſhrubby kind, which has lately, it is ſaid, been employed in ſome ſouthern ſituations which are much expoſed to the ſea air, and other effects of it, with great utility. It is capable of being readily raiſed and propagated by means of cuttings of the laſt year's growth, as they take root without

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out any difficulty, and are, of courſe, admirably adapted as plants for forming hedges. It is the French ſort that is made up of in this way. See QUICKSET-*Hedge*.

TAMARITE, in *Geography*, a town of Spain, in Aragon; 16 miles E.S.E. of Balbaſtro.

TAMARIX, in *Botany*, *Tamariſcus* of Tournefort, and of ſome, but not all, of the older botaniſts, is ſuppoſed to derive its name from the Tamariſci, a people who inhabited a country on the other ſide of the Pyrenées, where the moſt common ſpecies of this genus abounds. Such at leaſt is the opinion of De Theis. Martyn ſays, ſome deduce this word from the Hebrew *Tamaris*, to wipe or cleanſe; but we feel no great ſatisfaction in either of theſe etymologies.—Linn. Gen. 148. Schreb. 200. Willd. Sp. Pl. v. 1. 1498. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 338. Prodr. Fl. Græc. Sibth. v. 1. 208. Ait. Hort. Kew. v. 2. 171. Juſſ. 313. Lamarck Illuſtr. t. 213. Gærtn. t. 61.—Claſs and order, *Pentandria Trigynia*. Nat. Ord. *Succulentæ*, Linn. *Portulaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, in five deep, obtuſe, erect, permanent ſegments, half the length of the corolla. *Cor.* Petals five, ovate, obtuſe, concave, ſpreading. *Stam.* Filaments five at leaſt, capillary; anthers roundiſh. *Piſt.* Germen pointed; ſtyle none; ſtigmas three, oblong, feathery, revolute. *Peric.* Capſule oblong, pointed, triangular, longer than the calyx, of one cell and three valves. *Seeds* numerous, minute, each with a ſtalked feathery crown.

Obſ. *T. germanica* has ten ſtamens, five of which, alternate with the others, are external and ſhorter; all are connected at the baſe. *Linn.*

Eſſ. Ch. Calyx inferior, in five deep ſegments. Petals five. Capſule of one cell and three valves. Seeds with a feathery crown.

1. T. *gallica*. French Tamariſk. Linn. Sp. Pl. 386. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 1318. Sm. Fl. Græc. Sibth. t. 291. unpubliſhed. Mill. Ic. t. 262. f. 1. (Tamariſcus narbonenſis; Ger. Em. 1378. Lob. Ic. v. 2. 218. Myrica; Camer. Epit. 74. f. 1.)—Stamens five. Cluſters lateral. Branches ſmooth. Leaves lanceolate, imbricated, ſpurred at the baſe.—Native of rocks and banks, or of ſwampy ground, eſpecially towards the ſea, in the ſouth of Europe, and north of Africa, very abundantly. It is plentiful about the coaſts of Cornwall, Hampſhire, and Suſſex, undoubtedly wild. This ſhrub appears to have been common in the Engliſh gardens, as it ſtill is, in Gerarde's time; and yet Camden, in his life of queen Elizabeth, attributes to archbiſhop Grindall, who died in 1583, its being firſt brought into England, and made known as "exceeding good to eaſe the hard diſtemper of the ſpleen." (See our 7th ſpecies.) Mr. Hudſon has not admitted any of this genus into his *Flora*. Dr. Sibthorp found this plant common in rather moiſt ſituations in Greece, nor can there be any doubt that it is the μυρίκη of Dioſcorides. The Turks call it *Il Ghin*. On the eaſtern coaſt of Italy we have obſerved it to be the favourite food of ſheep, probably on account of a ſaltiſh flavour, perceptible to our taſte. This is an elegant, drooping, ſlender-branched *ſhrub*, with ſmooth and ſhining twigs, of a mahogany red. *Leaves* minute, rather fleſhy, lanceolate, acute, ſmooth, deciduous, with a poſterior ſpur, as in ſome ſpecies of *Sedum*; imbricated on the youngeſt ſhoots; ſcattered on the older twigs. The *flowers* appear in July, in copious, long, cylindrical *cluſters*, rather than *ſpikes*, at the ſides of the laſt year's ſhoots. *Bracteas* awl-ſhaped, ſolitary, at the baſe of each ſmooth and naked partial ſtalk. *Calyx* bell-ſhaped, acute, ſmooth. *Corolla* and *ſtamens* white or roſe-coloured.

Willdenow's variety β we ſhall next deſcribe as a diſtinct ſpecies; his γ, the *T. africana* of Poiret, gathered by this traveller in Barbary, is ſaid to have peculiarly ſhort, thick and denſe *ſpikes*, but we are not furniſhed with any further information on the ſubject.

2. T. *tomentoſa*. Downy-branched Tamariſk. (T. gallica β; Willd. n. 2. T. pentandræ varietas; Pall. Roſs. v. 1. p. 2. 72. t. 79. BCD.)—Stamens five. Cluſters lateral. Leaves imbricated, awl-ſhaped, elongated, hoary and downy as well as the branches.—Found by Pallas in ſalt ſandy deſerts about the Caſpian ſea. He ſpeaks of this plant as a ſingular very elegant variety of the preceding, about ſix feet high, with all its *branches* downy and hoary; the younger ones thicker than in the common *T. gallica*, (which he chooſes to call *pentandra*,) and the *leaves* longer, hoary, denſely imbricated; all the parts being thicker and more crowded. In the *cluſters* and *flowers* he obſerved no difference. Willdenow's ſuggeſtion, of this being probably a diſtinct ſpecies, is apparently well-founded.

3. T. *articulata*. Jointed-branched Tamariſk. Vahl Symb. v. 2. 48. t. 32. Willd. n. 2. (T. orientalis; Forſk. Ægypt.-Arab. 206. Thuja aphylla; Linn. Sp. Pl. 1422, excluding the ſynonym of Shaw.)—Stamens five. Spikes lateral. Branches jointed. Leaves ſheathing, abrupt, with a ſhort ſpreading point.—Gathered by Forſkall in Arabia. The original ſpecimen, erroneouſly conſidered by Linnæus, for want of fructification, as a *Thuja*, appears to have been brought from Egypt, or the Levant, by Haſſelquiſt. The plant of Shaw is *Thuja articulata*, which will hereafter be deſcribed under its proper genus. We find no certain evidence of the *Tamarix* before us being a native, as Vahl ſays, of the Eaſt Indies, and we imagine he confounded with it our next ſpecies. The true plant of Haſſelquiſt and Vahl has copious ſlender *branches*, appearing when young as if jointed, each joint being crowned with a minute dotted ſcale-like *leaf*, whoſe annular baſe encircles the branch, and whoſe ſhort, erect, keeled, acute point projects on one ſide. Theſe *leaves* are permanent, enlarged, and membranous on the older branches. The *flowers* are deſcribed by Vahl as forming lateral *ſpikes* about the ends of the branches, each flower being ſeſſile, accompanied by a *bractea* reſembling the leaves, but with a widely-ſpreading point. Segments of the *calyx* roundiſh and obtuſe. *Petals* the ſize of *T. gallica*, linear, or rather elliptical. *Stamens* five. *Capſule* with four angles, pyramidal.

4. T. *epacroides*. Eaſt Indian Tamariſk.—Stamens five. Cluſters lateral and terminal. Leaves ovate, acute imbricated, claſping the ſtem; gibbous at the baſe. Bracteas awl-ſhaped, longer than the flowers.—Found by Kœnig growing plentifully on the banks of a river in the Eaſt Indies, which he calls *flumen Colloram maximum*. We have the ſame from Rottler and Roxburgh. This is unqueſtionably diſtinct from the preceding, and hitherto undeſcribed. The young *branches* have no jointed appearance, nor do the *leaves* ſurround them with an annular permanent baſe. The latter are ſucculent, of a broad triangular ſhape, tapering into an inflexed point; the floral ones, or *bracteas*, much narrower, coloured, ſtrongly keeled. *Flowers* very ſmall, on ſhort partial ſtalks. Segments of the *calyx* broad and obtuſe, fringed. *Petals* elliptical. *Capſule* ſcarcely above a line in length, priſmatic, accompanied by the permanent *filaments*, which are generally rather longer. Whether the *T. chinenſis* of Loureiro be this plant, his deſcription is not ſufficient to determine. He ſays the *petals* are linear.

5. T. *mucronata*. Pointed Tamariſk.—Stamens eight or ten. Spikes lateral and terminal. Leaves ſheathing, abrupt, pointed. Bracteas taper-pointed, lanceolate.—The ſpecimens of this very diſtinct ſpecies, in the Linnæan herbarium, have

have no mark by which we can afcertain its native country, though we fufpect them to have been fent from the Eaft Indies. The jointed appearance of the young *branches*, and the fheathing abrupt form of the *leaves*, approach thofe of *T. articulata*; but the *leaves* have much more elongated and tapering points, and every part is twice the fize of that fpecies. The *foliage* moreover is much lefs evidently dotted. *Flowers* large, feffile, with lanceolate, membranous-edged *bracteas*, whofe points are longer than the calyx, and very flender. Segments of the *calyx* elliptical, obtufe, flat. *Petals* obovate. *Stamens* eight or ten, we cannot be certain which is their general number. *Capfules* prifmatic, glaucous, three-quarters of an inch long. *Seed-down* long and feathery.

6. T. *fongarica*. Songarian Tamarifk. "Pallas Nov. Act. Petrop. v. 10. 374. t. 10. f. 4." Willd. n. 3.—"Stamens eight or ten. Flowers axillary, fomewhat fpiked. Leaves flefhy, obtufe, triangular."—Gathered by Pallas, in a falt foil, on the banks of the Songari. We know nothing of this fpecies but from Willdenow. The "triangular blunt *leaves*" indicate an effential difference from the laft.

7. T. *germanica*. German Tamarifk. Linn. Sp. Pl. 387. Willd. n. 4. Ait. n. 2. Fl. Dan. t. 234. Mill. Ic. t. 262. f. 2. Pall. Rofs. v. 1. p. 2. 73. t. 80. (Tamarifcus germanica; Ger. Em. 1378. Lob. Ic. 218. Myrica; Camer. Epit. 74. f. 2.)—Stamens ten, monadelphous. Clufters terminal. Leaves linear-lanceolate, feffile, obtufe.—Native of fwamps in Germany, Siberia, Switzerland, and the mountains of Dauria and Caucafus. Common in our gardens, where it flowers in the open air from June to September. Mr. Aiton fays, on Hakluyt's authority, that this was the fpecies introduced by archbifhop Grindall; fee *T. gallica*. Gerarde fpeaks of both as profpering well in the Englifh gardens. The prefent is a more upright and glaucous *fhrub* than the *gallica*, as well as larger in all its parts. *Leaves* feffile, imbricated, channelled, dotted, entirely pointlefs, not dilated at the bafe. *Bracteas* ovate, pointed, with membranous edges. Segments of the *calyx* ovato-lanceolate, likewife membranous at the fides. *Petals* obovate, flefh-coloured, not much longer than the calyx. *Capfule* glaucous, the fize and fhape of our *T. mucronata*. *Seed-down* long and finely feathery.

Pallas figures what he conceives to be an annual herbaceous variety of this fpecies, of which, not having feen it, we do not feel ourfelves competent to give an opinion.

Tamarix, in *Gardening*, furnifhes plants of the hardy, deciduous, tree and fhrub kinds, of which the fpecies that are cultivated are, the French tamarifk (T. gallica); and the German tamarifk (T. germanica).

Though the firft in its native fituation grows to a tree of middling fize, in this climate it feldom rifes more than fourteen or fixteen feet high, fending out many flender branches, moft of which fpread out flat, and hang downward at their ends, being rather of a fhrubby nature. It is prevalent in the fouth of France, and in other fouthern countries.

But the fecond fpecies is rather a fhrub than a tree, having feveral woody ftalks arifing from the fame root, which grow quite erect, fending out many fide branches, which are alfo erect. It is found in many parts of Germany, &c.

Method of Culture.—All thefe plants may be increafed either by laying down their tender fhoots in autumn, or by planting cuttings in an eaft border, which will take root in a fhort time, if they are fupplied with water in the fpring, before they begin to fhoot in dry weather; but they fhould not be removed until the following autumn, at which time they may be either placed in a nurfery, to be trained up two or three years, or where they are defigned to remain, mulching their roots, and watering them according as the feafon requires, until they have taken root; after which, the only culture they will require is to prune off the ftraggling fhoots, and keep the ground clear about them.

The layer method is not only tedious, but unneceffary, as the cuttings grow readily, and the layers often will not ftrike at all. The cuttings fhould be of the laft fummer's fhoots, and a moift border is moft proper for them. In two years they will be good plants for the fhrubbery, and may be planted out in almoft any foil, though they like a light, moift earth beft, efpecially the latter fort, which grows naturally in low watery fituations.

Both thefe plants are of a rather hardy nature, and beautiful in their foliage and fine fpikes of flowers. They will fucceed in almoft any fort of foil and fituation.

They are very ornamental in the fhrubbery borders, clumps, and other parts of grounds.

The former fort has likewife been lately recommended as a beneficial plant for forming quick or living hedges with, in fuch fituations as are expofed much to the fea-air and blafts, as it has been found to ftand fuch expofures remarkably well, where not affected by the winter frofts, of which it is rather impatient. See Quick *Hedges*, and Tamarisk-*Plant*.

TAMARUS, in *Ancient Geography*, a river of the ifle of Albion, which ftill retains its ancient name, being called Tamar, from Tamara, a gentle river; and its mouth is Plymouth haven.

TAMASA, or Tamasi, in *Hindoo Mythology*, is a name given to the goddefs Parvati, in her *black* character; the word meaning blacknefs or darknefs. The name of Tamas, or Tamafa, was given to a dark, gloomy, aftronomical character, called *Rahu*, (fee that article,) and Ketu, the names feverally of the dragon's head and tail, or the afcending and defcending nodes of aftrologers. One of the fons of Pavaka, the Hindoo fire-king, is likewife named Tamafa. (See Pavaka.) Alfo one of thofe mythological, or hiftorical perfonages, called Menus, of whom fee under Menu. In the Sanfcrit tongue, the root *tam* is prolific of derivations indicating properties of a dark, or gloomy, or malignant tendency.

Tamasa, in *Geography*, a river of Afia, in Mingrelia, which difcharges itfelf into the Black fea.

TAMASIDAVA, in *Ancient Geography*, a town fituated in the interior of Lower Mœfia, at fome diftance from the river Hierafus.

TAMASQUI, in *Geography*, a town of Mexico, in the province of Guafteca; 36 miles W.S.W. of St. Yago de los Valles.

TAMASSUS, in *Ancient Geography*, a town fituated in the interior of the ifle of Cyprus, W. of Ledra, on one of the ftreams which formed the Pedæus.

TAMATAMQUE, or *Villa de las Palmas*, in *Geography*, a town of South America, in the kingdom of Granada, on the river St. Martha; 25 miles S. of Teneriffe.

TAMATIA, in *Ornithology*, the name of a very ftrange bird of the Brafils. It is a fpecies of *Bucco* in the Linnæan fyftem by Gmelin, and the fpotted-bellied barbut of Latham.

Its head is very large; its eyes large and black; its beak is two fingers breadth long, and one broad, fhaped fomewhat like a duck's, but pointed at the end; its upper chap is black, its under one yellow; its legs are long, and the thighs in great part naked; its toes are long; its tail is very fhort; its head is black, and its back and wings of a plain dufky brown; its belly is of the fame brown, variegated with white.

TAMATMA, in *Geography*, a town of Africa, in the kingdom of Bornou.

TAMBA, a town of Africa, in the kingdom of Benguela; 165 miles E. of Benguela.—Alfo, a town of Hindooftan, in Vifiapour; 20 miles S.W. of Sattarah.

TAMBA-AWRA, or TAMBAOURA, a town of Africa, in the kingdom of Bambouk, having in its vicinity a gold-mine; 108 miles S.E. of Gallam. N. lat. 13° 20′. W. long. 9° 25′.

TAMBAC, or TAMBAQUA, a mixture of gold and copper, which the people of Siam hold more beautiful, and fet a greater value on, than gold itfelf.

Some travellers fpeak of it as a metal found in its peculiar mines; but upon what authority we do not know.

The abbé de Choify, in his Journal of Siam, doubts whether this may not be the *electrum*, or amber of Solomon.

The ambaffadors of Siam brought feveral works in tambac to Paris in the reign of Lewis XIV., but they were not found fo beautiful as was expected. See TOMBAC and GOLD-*coloured Metal*.

TAMBACH, in *Geography*, a town of Germany, in the principality of Gotha; 6 miles N.E. of Smalkalden.

TAMBACUNDA, a town of Africa, in the country of Woolly; 30 miles E.N.E. of Medina.—Alfo, a town of Africa, in the country of Neola; 52 miles W. of Baniferile.

TAMBERCHERRY, a town of Hindooftan; 18 miles N.E. of Calicut.

TAMBILLO, a town of Peru; 56 miles N. of Oruro.

TAMBO, a town of South America, in the province of Popayan; 12 miles W. of Popayan.—Alfo, a town of Paraguay; 250 miles E. of Affumption.

TAMBO *de Oeros*, a town of Peru, in the diocefe of Cufco; 136 miles W.N.W. of Cufco.

TAMBONA, a town of Hindooftan, in the country of Travancore; 40 miles N.E. of Travancore.

TAMBOOKIES, a people of the colony of the Cape of Good Hope, fituated N.E. of the Kouffis, or the Kooffis, N. to the Orange river and tropic of Capricorn, are fuppofed by Mr. Barrow to be of Arabian extract, as they widely differ from the Hottentots and the Negroes, and are acquainted with the fmelting of iron, and fome other rude arts. He conceives that a belt of this race fpreads acrofs to the Atlantic. The Demaras on the Copper mountains are Kouffis; and their country is fo barren and fandy, that they cannot keep cattle. The Orange river, called the Groot or Great river, feems to rife about S. lat. 30°. E. long. 28°, and paffes W. by N. till it falls into the fea between the Great and Little Nemakos. It has high cataracts and inundations like the Nile. On the fhores are carnelians, calcedonies, agates, and variolites. See ORANGE-*River*.

TAMBOPALLA, a town of Peru, in the diocefe of Arequipa, at the mouth of the Nombre de Dios; 48 miles S. of Arequipa. S. lat. 17° 10′.

TAMBOS, in *Peruvian Antiquity*, buildings placed at certain diftances, for the lodging of the princes of that country, in their travels through their dominions. See M. de la Condamine, in Mem. de l'Acad. de Berlin, tom. ii. p. 435; who tells us (p. 438.) that he faw feveral remains of thefe tambos, in his journey from Quito to Lima.

TAMBOV, in *Geography*, a city of Ruffia, on the Tzna, capital of a government, and fee of a bifhop; 228 miles S.E. of Mofcow. N. lat. 52° 48′. E. long. 41° 4′.

TAMBOUR, in *Architecture*, a term applied to the Corinthian and Compofite capitals, as bearing fome refemblance to a drum, which the French call *tambour*.

Some choofe to call it the *vafe*, and others *campana*, or the bell.

TAMBOUR is alfo ufed for a little box of timber work, covered with a ceiling, withinfide the porch of certain churches; both to prevent the view of perfons paffing by, and to keep off the wind, &c. by means of folding-doors, &c.

TAMBOUR alfo denotes a round courfe of ftone, feveral of which form the fhaft of a column, not fo high as a diameter.

TAMBOUR, in the *Arts*, is a fpecies of embroidery.

The tambour is an inftrument of a fpherical form, upon which is ftretched, by means of a ftring and buckle, or other fuitable appendage, a piece of linen or thin filken ftuff; which is wrought, with a needle of a particular form, and by means of filken or gold and filver threads, into leaves, flowers, or other figures.

TAMBOUR, Fr., *a drum;* which fee.

TAMBOUR *de Bafque*, a fmall drum ufed by the Bifcayans as an accompaniment to the flageolet, or octave flute: a tabor and pipe.

TAMBOURIN, a French dance, much in favour formerly on the French ftage in all the opera dances of Lulli and Rameau. The air is gay and in common time.

TAMBOURISSA, or TAMBOURFCISSA, in *Botany*, Sonnerat's name for what is now called MITHRIDATEA; fee that article. The French appellation of this tree, Bois Tambour, or Drum-tree, might be fuppofed to allude to the lightnefs and hollownefs of the wood, or to its ufe, were not this word evidently derived from the Madagafcar name of the fame tree, *Ambora*.

TAMBOVSKOE, in *Geography*, a government of Ruffia, bounded on the north by the government of Vladimir, on the eaft by the governments of Nizegorod, Penza, and Saratov; on the fouth by the government of Saratov; and on the weft by the governments of Riazan and Voronez; about 200 miles in length, and from 80 to 100 in breadth. N. lat. 51° 36′ to 55° 20′. E. long. 38° 30′ to 48°.

TAMBRAX, in *Ancient Geography*, a town of Afia, in Hyrcania, which, according to Polybius, was large, and had a royal palace.

TAMBRAY, in *Geography*, a town of Hindooftan, in Travancore; 60 miles N.N.W. of Anjenga.

TAMBRO, a river of Spain, which runs into the Atlantic, near Muros, in Galicia.

TAMBUCO, or TABUCO, a town on the eaft coaft of the ifland of Celebes, fituated in a bay to which it gives name. S. lat. 2° 50′.

TAME, a river of England, which rifes near Winflow, in the county of Buckingham, and runs into the Thames at Dorchefter, in Oxfordfhire.—Alfo, a river of England, which rifes near Dudley, in the county of Stafford, and runs into the Trent, about 7 miles above Burton.

TAME. See THAME.

TAMEGA, a river of Portugal, which runs into the Duero, 10 miles S. of Amarante.

TAMEGAN, a town of the ifland of Ceylon; 48 miles S. of Candi.

TAMERLANE, in *Biography*. See TIMOUR.

TAMETAVE, in *Geography*, a town on the E. coaft of Madagafcar. S. lat. 18° 5′. E. long. 49° 41′.

TAMIA, in *Ancient Geography*, a town of the ifle of Albion, in the vicinity of Banatia and Alata Caftra. Ptolemy affigns it to the Vacomagi.

TAMIAGUA, in *Geography*, a river of Mexico, which joins the Tufpa at its mouth.—Alfo, a town of Mexico, in the province of Guafteca.

TAMIEH, a town of Egypt, on a canal which forms a communication between the Nile and the Birket el Kerum; 12 miles N.E. of Fayoum.

TAMINIZ, a river of Carniola, about four miles in extent; 4 miles S.E. of Veit. It has no vifible communication with any other river.

TAMINO, a river of Switzerland, which runs into the Rhine, 2 miles S. of Sargans.

TAMISRA, denoting darknefs, a name of one of the hells of the Hindoos, of which they had upwards of a fcore. Another of the Hindoo hells is named Andha Tamifra, meaning *utter darknefs;* and as thefe purgatories are differently placed, this is fuppofed to be the one fituated in the bowels of the earth, and its degree of punifhment an aggravation of the eafier penalties inflicted in Tamifra. In the Inftitutes of Menu it is ordained, that "a twice-born man, who barely affaults a Brahman with an intention to hurt him, fhall be whirled about for a century in the hell called Tamifra." (Ch. iv. v. 165.) By "a twice-born man" is meant an individual of one of the three firft tribes or fects, they being fufceptible of regeneration by the inveftiture of the *zennaar;* which fee. See alfo O'M, and SECTS *of Hindoos.*

TAMLOOK, in *Geography*, a town of Bengal; 35 miles S.W. of Calcutta.

TAMMAPUL, a town of Mexico, in the province of Guafteca; 105 miles N.W. of Panuco.

TAMMELA, a town of Sweden, in the province of Tavaftland; 22 miles S.W. of Tavafthus.

TAMMERFORS, a town of Sweden, in the province of Tavaftland; 36 miles N.N.W. of Tavafthus.

TAMMESBRUCK, a town of Saxony, in Thuringia, near the Unftrutt; 1 mile from Langen Salza.

TAMMOWISCHKEN, a town of Pruffian Lithuania; 3 miles E. of Infterburg.

TAMNUM, in *Ancient Geography*, a town of Gallia Aquitanica, upon the route from Burdigala to Auguftodunum; now *Talmon.*

TAMNUS, in *Botany*, Tourn. t. 28. Juff. 43, a more correct name, perhaps, than that of TAMUS, ufed by Linnæus, which will be found in its proper place. The word has been corrupted occafionally into *Tamarus* and *Tannus.*

TAMOATA, in *Ichthyology*, the name of an American frefh-water fifh, called by the Portuguefe *foldido.*

It is a fmall oblong fifh, with a flat head, fomewhat like that of a frog. Its mouth is fmall, and from each angle of it there hangs a long fingle filament, by way of a beard. It has no teeth, and its eyes are extremely fmall. It has eight fins; two at the gills, of one finger in length, and hard and firm like horns; two on the belly, of a fofter fubftance; and one on the middle of the back, another near the tail, and another fmall one oppofite to it on the belly; its tail is the eighth; its whole head is covered above with a hard coat like a fhell; and its body with a fort of coat of mail made up of oblong, hard, fquamofe bodies, dented at their edges; its colour is a fort of rufty iron-colour. It is accounted a very well-tafted fifh. It lives only in frefh-water rivers; and, it is faid, when the water where it is dries up, it will crawl out upon the land, and go in fearch of more. Marcgrave.

TAMOLA, in *Geography*, a town of Sweden, in the province of Tavaftland; 20 miles S.W. of Tavafthus.

TAMONEA, in *Botany*, a name of Aublet's, faid by De Theis to be in ufe among the inhabitants of Guiana, but this does not appear from any thing mentioned in the original author. Aubl. Guian. 659. t. 268. Juff. 109. Lamarck Illuftr. t. 542. *Verbena lappulacea* of Linnæus is referred by Juffieu to this genus. (See VERBENA.) We are not certain whether *Tamonea* ought to be admitted as a genus, and therefore need not ftay to object to the name.

TAMONTACA, in *Geography*, a town on the weft coaft of the ifland of Mindanao. N. lat. 7° 2'. E. long. 124° 36'.

TAMOOK, a fmall ifland in the Sooloo Archipelago. N. lat. 6° 21'. E. long. 121° 58'.

TAMOS, in *Ancient Geography*, a promontory which formed mount Taurus, in the Eaftern ocean.

TAMPASSOOK, in *Geography*, a town on the north-weft coaft of the ifland of Borneo. N. lat. 6° 21'. E. long. 116° 13'.

TAMPICO, a fea-port of Mexico, in the province of Guafteca, fituated in the bay of the gulf of Mexico; 30 miles S.E. of Panuco. N. lat. 22° 40'. W. long. 98° 36'.

TAMPICO, a name given to a river of Spanifh North America, called the *Panuco;* which fee.

TAMPING *a Hole*, in *Mining*, is ufed for filling the upper part of a hole, bored in the rock for blafting with gunpowder, upon the charge of powder, with clay or ftony matter rammed down very clofe and tight: and the clay and ftone are called the tamping. This operation is called, in the North of England, ftemming a hole.

TAMPION, TOMPION, *Tamkin*, or *Tomkin*, a kind of plug or ftopple, ferving to clofe a veffel.

The word is formed from the French *tampon*, a bung, ftopper, &c. Some derive it from the Englifh *tap.*

In *Gunnery*, the tampions are wooden cylinders put into the mouth of guns, howitzers, and mortars, in travelling, to prevent the duft or wet from getting in. They are faftened round the muzzle of the guns, &c. by leathern collars. At fea they are carefully encircled with tallow or putty, to prevent the penetration of the water into the bore, by which the powder contained in the chamber might be damaged or rendered incapable of fervice. They are alfo fometimes ufed to put into the chambers of mortars, over the powder, when the chambers are not full. Tampions are alfo iron bottoms, to which the grape-fhot defigned for fea-fervice are fixed.

TAMPISCO, in *Geography*, a river of Mexico, which runs into the Pacific ocean, N. lat. 10° 38'.

TAMPOE, in *Natural Hiftory*, the name of an Eaft Indian fruit, approaching to the figure of the mangouftan, but not near fo agreeable to the tafte. This fruit is very much of the fize, fhape, and colour of fome of our common fummer-apples; but its fkin is very thick and tough, and it has no crown. The Indians eat it in places where better fruits are fcarce, and in fome places call it the mangouftan.

TAM-SAN-HOTUN, in *Geography*, a town of Chinefe Tartary. N. lat. 40° 20'. E. long. 123° 48'.

TAMSHUC MOUNTAINS, mountains of Thibet; 30 miles N. of Dharmfaleh.

TAMSWEG, a town of the archbifhopric of Salzburg; 12 miles W. of Muehrau.

TAMUADA, in *Ancient Geography*, a river of Africa, in Mauritania Tingitana.

TAMUGADA, a town of Africa, in Mauritania, on the route from Lambefe to Cirta Coloniæ.

TAMUS, in *Botany*, an old name, fometimes written TAMNUS, fee that article, and fuppofed to be taken from the *Uva Taminia* of Pliny, which appears to have belonged to the plant now called Black Bryony. To this therefore the above name is at prefent appropriated.—Linn. Gen. 524. Schreb.

Schreb. 691. Willd. Sp. Pl. v. 4. 772. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 1078. Prodr. Fl. Græc. Sibth. v. 2. 258. Ait. Hort. Kew. v. 5. 386. (Tamnus; Tourn. t. 28. Juss. 43. Lamarck Illustr. t. 817.)—Class and order, *Dioecia Hexandria*. Nat. Ord. *Sarmentaceæ*, Linn. *Asparagi*, Juss.

Gen. Ch. Male, *Cal.* Perianth in six deep, ovato-lanceolate segments, most expanded in their upper part. *Cor.* none; except the calyx be so considered, which we have recommended in a parallel case, see SMILAX. *Stam.* Filaments six, simple, shorter than the calyx (or corolla); anthers erect.

Female, *Cal.* (or *Cor.*) of one piece, bell-shaped, in six deep, lanceolate, spreading segments, superior, deciduous. Nectary an oblong depression in the base of each segment, at the inside. *Pist.* Germen inferior, large, ovate-oblong, smooth; style cylindrical, three-cleft, the length of the calyx (or corolla); stigmas three, reflexed, emarginate, acute. *Peric.* Berry ovate, of three cells. *Seeds* two in each cell, globose.

Ess. Ch. Male, Calyx (or rather Corolla) in six deep segments. Female, Calyx (or rather Corolla) in six deep segments. Style three-cleft. Berry inferior, of three cells. Seeds two in each cell.

1. T. *communis*. Common Black Bryony. Linn. Sp. Pl. 1458. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 91. Mill. Illustr. t. 89. (Bryonia nigra; Ger. Em. 871. Vitis nigra; Matth. Valgr. v. 2. 622. Camer. Epit. 988.)—Leaves heart-shaped, undivided.—Native of hedges, woods, and bushy places, in the more temperate parts of Europe, as well as in the Levant. It is common in England, not in Scotland, flowering in June, and laden with bunches of scarlet berries in autumn, till rotten with wet and frost. Dr. Sibthorp found this plant frequent in Greece, as well as in the isles of Crete and Cyprus. The young sprouts boiled are eaten in the latter, like asparagus, to which they are naturally allied. The fleshy perennial *root* is blackish externally, whence the ancient, as well as English, name. *Stems* annual, herbaceous, branched, twining round every thing in their way, and thus climbing, without tendrils, to a considerable height, till they become elegantly pendent in festoons. *Leaves* alternate, stalked, entire, acute, many-ribbed, smooth. *Stipulas* small, awl-shaped, spreading, in pairs at the base of each footstalk. *Flowers* in long, greenish, axillary clusters. *Berries* oval, the size of a large currant, bright red, insipid. The *root* is acrid. Its pulp scraped has formerly been used as a stimulating plaister.

2. T. *elephantipes*. Tuberous Cape Black Bryony. L'Herit. Sert. Angl. 29. Ait. n. 2. Willd. n. 2. Curt. Mag. t. 1347.—Leaves kidney-shaped, undivided. Root elevated, corky and tessellated.—Found at the Cape of Good Hope, near the town, by Mr. Masson, who sent it to Kew in 1774. A male plant flowered there, in the stove, in 1783, from whence l'Heritier caused a drawing to be made, but this plate never appeared. A female, originally imported by Mr. George Hibbert, flowered in Mr. Knight's greenhouse, and being published in the Botanical Magazine, has determined the genus, by its inferior germen, a point previously only guessed at. The singular appearance of the great fleshy *root*, rising out of the ground, a foot in diameter, and covered with angular, tessellated, brown knobs, more resembles the clumsy shell of some huge tortoise, than an elephant's foot. This uncouth mass sends forth in the spring a slender, twining, annual *stem*, about eight feet long, not unlike the last; but the *leaves* are very different, kidney-shaped, with strong ribs; their ends either emarginate, or abrupt with a small point. *Footstalks* tumid, or jointed, at each end. *Flowers* yellowish-green. *Germen* oblong, furrowed. *Fruit* not yet observed.

3. T. *cretica*. Cretan Black Bryony. Linn. Sp. Pl. 1458. Willd. n. 3. Ait. n. 3. Sm. Fl. Græc. Sibth. t. 958, unpublished. (Tamnus cretica, trifido folio; Tourn. Cor. 3.)—Leaves three-lobed.—Not rare in the woods and hedges of Crete and Cyprus, as well as Greece. *Sibthorp*. Miller appears to have cultivated it in 1739, but we have never met with a plant in gardens, nor is this species likely to be a popular favourite. It differs from the first chiefly in having a deep lateral sinus, on each side of the *leaves*, and twin clusters of *flowers*, one much longer than its companion. We know nothing of the *fruit*.—The young shoots are eaten boiled.

TAMUS, in *Gardening*, furnishes plants of the hardy, herbaceous, climbing, perennial kind, among which the species most generally grown are the common black bryony (T. communis); and the Cretan black bryony (T. cretica). The first sort has a very large tuberous root, which is blackish externally; the stems are smooth, twining about every thing in their way, and thus ascending, without the aid of tendrils, to the height of ten or twelve feet in hedges or among bushes, which their festoons of tawny leaves and red berries decorate in the autumnal season.

But the second species has a rounder root than the former; yet the stalks twine in the same manner.

Method of Culture.—All these plants are readily increased by sowing the seeds soon after they are ripe, under the shelter of bushes, where, in the spring, the plants will come up, and require no further care; or in beds to be afterwards planted out. The roots will abide many years, and sometimes send up suckers, from which plants may be raised by setting them out in the autumn or spring where they are to remain.

The thick fleshy root of the first sort is sometimes cultivated for use in the shops.

Both the plants are useful in thickets, and in the wilderness parts of pleasure-grounds.

TAMUSIDA, in *Ancient Geography*, a town of Africa, in Mauritania Tingitana, between Banasa and Silda.

TAMUSIGA, a town of Africa, in Mauritania Tingitana, on the sea-coast, between the port of Hercules and the promontory Usadium.

TAMUZ, in *Chronology*, the fourth month of the Jewish ecclesiastical year, answering to part of our June and July. The 17th day of this month is observed by the Jews as a fast, in memory of the destruction of Jerusalem by Nebuchadnezzar, in the 11th year of Zedekiah, before Christ 588.

TAMWORTH, in *Geography*, is a borough and market-town, situated partly in the hundred of Offlow, county of Stafford, and partly in the hundred of Hemlingford, county of Warwick, England: at the distance of 22 miles S.E. from Stafford, 27 miles N. by W. from Warwick, and 116 miles N.W. from London. It is seated near the confluence of the rivers Tame and Anker, the former of which runs through the town, and divides it into two nearly equal parts. Tamworth appears to have been of considerable note at an early period; and was the occasional residence of the Mercian kings. Offa dates a charter to the monks of Worcester from his palace here in the year 781; and several of his successors in the next century also date their grants from the same place. At that period, a ditch, forty-five feet in breadth, protected the town and royal demesne on the north, west, and east; the river serving as a defence on the south side. Of this ditch, some vestiges can still be traced, and at two angles which it forms, are two mounts, probably raised as foundations for towers. On the invasion of this kingdom by the Danes, Tamworth was almoſt, or totally, deſtroyed. Ethelfleda, the daughter of the illuſtrious Alfred, is ſaid to have rebuilt it in 913, after ſhe had, by her prudence and valour, freed her brother's dominions from the invaders. She alſo erected a tower on an artificial mount, which forms the ſcite of the preſent caſtle; and here ſhe generally reſided till her death, in 918. The caſtle was beſtowed by William the Conqueror on Robert Marmion, whoſe deſcendants held it till 20 Edward I., when it paſſed by marriage to the Freville family; that of Ferrers ſucceeded in the reign of Henry VI.; and they were followed by the Comptons. This venerable fabric is ſtill in a good ſtate of preſervation, as to its exterior; but the inſide has ſuffered much from age and neglect. The rooms are numerous, but ill-ſuited to the liberal domeſtic manners of the preſent era; and the whole is chiefly attractive as a monument of antiquity. The town of Tamworth is large and well-built. It was incorporated by queen Elizabeth on a ſcale peculiarly liberal: the corporation conſiſts of two bailiffs, a recorder, high ſteward, under ſteward, a town-clerk, and twenty-four principal burgeſſes: one of the bailiffs is choſen from each county. Tamworth has ſent two repreſentatives to parliament ever ſince the year 1563. The right of election is in the inhabitants paying ſcot and lot: and the members are returned jointly by the ſheriffs of Warwickſhire and Staffordſhire. The church is a ſpacious edifice. The moſt ancient portion exhibits two round-headed arches, embelliſhed with zig-zag mouldings: whence it ſeems probable that the original edifice was conſtructed ſoon after the Conqueſt. The church was rendered collegiate by the Marmion family at an early period for a dean and ſix prebendaries; with ſeveral lay prebendaries, which are ſtill attached to the church. The college was granted by queen Elizabeth in 1581 to Edward Downing and Peter Aſhton. An hoſpital was eſtabliſhed in this town by Philip Marmion in the 15th year of Edward I. On its ſcite another was founded and endowed by Mr. Guy, to whom the borough of Southwark is indebted for the noble hoſpital which bears his name. A grammar-ſchool, founded by queen Elizabeth, is ſtill well ſupported. Here are ſome manufactures, the chief of which is that of ſuperfine woollen cloths: but this trade, though ſtill reſpectable, has much decreaſed. The printing of calicoes, the tanneries, the manufacture of flax, and the ſpinning of yarn, are branches of buſineſs which have conſiderably advanced. A weekly market, under queen Elizabeth's charter, is held on Saturdays: and three fairs annually. In the population return of the year 1811, the Staffordſhire diviſion of Tamworth was ſtated to contain 279 houſes, and 1327 inhabitants; the Warwickſhire diviſion 325 houſes, and 1666 inhabitants: making a total of 2993 perſons, occupying 604 houſes.

About four miles ſouth-eaſt of Tamworth is Pooley-Hall, the ſeat of the honourable colonel Finch. The lands attached to this reſidence formed part of the poſſeſſions of the Marmions; and after ſeveral intermediate tranſmiſſions, came to the family of Cokaine, in the latter part of the 14th century. It is aſcertained that ſir John Cokaine reſided at Pooley in the reign of Henry IV., and his deſcendants, for many generations, made it their principal ſeat. The preſent manſion was erected by ſir Thomas Cokaine, temp. Henry VIII., and is a fine but irregular building, varying in character between the embattled ſtyle of the previous troubled and ſuſpicious ages, and the open amplitude of conſtruction then firſt growing into practice.—Beauties of England and Wales, vol. xiii. Staffordſhire, and vol. xv. Warwickſhire, by J. N. Brewer.

TAMWORTH, a town of America, in New Hampſhire; 56 miles N. of Portſmouth; containing 1134 inhabitants.

TAMYRACA, in *Ancient Geography*, a town of European Sarmatia, near the Cærcinite gulf.

TAN, the bark of the oak, chopped, and ground by a tanning-mill into a coarſe powder; to be uſed in the tanning or dreſſing of ſkins. See TANNIN.

New tan is the moſt eſteemed; when old and ſtale, it loſes a great deal of its effect, which conſiſts in condenſing or cloſing the pores of the ſkins; ſo that the longer the ſkins are kept in tan, the greater ſtrength and firmneſs they acquire.

This bark, which is more abundant in the gummy reſinous part than any of our common indigenous aſtringents, and which, on account of its aſtringent, gummy, reſinous property, ſerves both to preſerve leather from rotting, and to render it impervious to water, is preferred to all other ſubſtances for the purpoſe of tanning. It is uſed either in the way of infuſion, which is called ooze; or the dry powder is ſtrewed between layers of hides and ſkins, when theſe are laid away in the tan-pits. The ooze is made by macerating the bark in common water, in a particular ſet of holes or pits, which, by way of diſtinction from the other holes in the tan-yard, are called letches. See TANNING.

Every part of the oak-tree, of what age or growth ſoever, is fit for the tanner's uſe, and all oaken coppice-wood, of any ſize or age, being cut and procured in barking-time, will tan all ſorts of leather; at leaſt, as well as the bark alone. When this material is got at the proper ſeaſon, it muſt be very well dried in the ſun, more than the bark alone; thence it is to be cut up, and preſerved in a covered place for uſe.

When it is to be uſed, the greater wood muſt be firſt cleft ſmall, to fit it for the beating and cutting-engine; and the ſmaller muſt be put into the engine as it is: which done, it muſt be again dried upon a kiln, and after that, ground in the ſame manner that the tanners grind their bark. Such wood as is to be uſed preſently after it is gotten, will require the better and the more drying upon the kiln; and if this is omitted, it will blacken and ſpoil all the leather it is uſed about. Where oak is ſcarce, black-thorn, or ſloe-tree, will tolerably well ſupply its place; and where that is not to be had in ſufficient plenty, the white-thorn will do. Phil. Tran. N° 108.

Birch alſo, being ordered in the ſame manner with oak, is fit for ſome uſes in tanning, particularly it does very well for tanning of ſhoe-ſole leather. All theſe ingredients will tan much better than bark alone; and that with much leſs charge; ſo that this diſcovery may very well ſave the felling of trees when the bark is wanted, at a ſeaſon when the ſap is up, which, when it is done, cauſes the outſide of the trees to rot and grow worm-eaten; whereas, if the trees had been felled in winter, when the ſap is down, they would have been almoſt all heart, as the people expreſs it, and not ſubject to worms. This manner of uſing the wood with the bark, in tanning, will alſo increaſe the value of underwoods very conſiderably. Phil. Tranſ. N° 105.

The engine neceſſary for cutting the wood conſiſts of a long ſquare wooden block, and ſome pieces of iron to be faſtened on and uſed about it, *viz.* a hammer, an anvil, an iron holding the wood to be bruiſed and cut, and a knife to cut it. The whole is a very ſimple and cheap machine, and is deſcribed at large, and figured in the above-mentioned number of the Philoſophical Tranſactions.

By M. de Buffon's experiments upon different ſkins, it was found that a decoction of young oak-wood ſucceeded perfectly well in tanning ſheep and calves' ſkins, but did not

not do equally well for ox, and the other harder ſkins. This, however, he imagines, might be only for want of knowing the beſt method of uſing the wood. And certainly theſe trials deſerve to be farther proſecuted; ſince the ſmall branches of the oak, which are of little value, might be thus made to ſupply the place of a much dearer commodity, the bark; and as in many trees the bark of the young branches is found to be of greatly more virtue than that of the larger branches, or the trunk, the uſe of theſe ſmall boughs, bark and all, might very probably be found to anſwer to all the effects of the bark of the larger kind alone. Memoirs Acad. Scienc. Par. 1736.

The Society of Arts, &c. granted a premium of 100*l.* in the year 1765, for the diſcovery of a method of tanning with oaken ſaw-duſt; but the acquiſition has not hitherto had its deſired effect; though it is ſaid that the uſe of oaken ſaw-duſt has been advantageouſly adopted in Germany. Doſſie's Mem. of Agr. vol. i. p. 227.

We are told, in Phil. Tranſ. N° 36, that the operation of tanning is performed, on leather, better in the Weſt Indies than in England. They uſe three ſorts of bark, the mangrove-bark, the olive-bark, and another; and the whole buſineſs is ſo ſoon done, that a hide delivered to them, is in ſix weeks ready to be worked into ſhoes, though they beſtow leſs labour than we do.

Mr. Albert Geſner, firſt phyſician to the duke of Wirtemberg, having made ſome experiments on the duſt of heath, dried in an oven, and afterwards pulverized, as a ſubſtitute to that of oak-bark in tanning, found that the leather prepared by this method was very good; but he obſerves, that the operation is much more tedious. (Hiſt. R. A. S. Paris, for 1756.) Others have propoſed a trial of the ſmall branches of heath, and the leaves of oak.

TAN, in *Gardening*, a ſubſtance of the oak-bark, or other ſimilar kinds, after it has been ground and ſoaked in the ooze of the tanners' vats, and properly dried, is uſed for the purpoſe of making hot-beds, for forcing many ſorts of exotic plants that require a durable ſteady heat.

It has not been of very long uſe in England, and was brought to us from Holland in the reign of king William, and then uſed for the raiſing of orange-trees; but after this period it became diſuſed; and it is of a much later date, *viz.* about the year 1719, that it has been brought into uſe again for the raiſing of the pine-apple, ſince which time it is become generally uſed, wherever it is to be had, for all the purpoſes of the hot-bed, in raiſing tender exotic plants.

Refuſe tan, made up into cakes, ſerves as fuel, in circumſtances where a gentle and continued fire is advantageous. See BARK-*Bed*, HOT-*Bed*, HOT-*Houſe*, and STOVE.

TAN, *Flower of*, is a name given by the people employed in the tanning-trade, to a yellow ſubſtance, often found upon old tan, or oak-bark broken to pieces, which has been uſed as tan, and is of no farther ſervice.

The name, however, is very improper; and though every body converſant in tan-yards muſt have ſeen the thing, yet it has always paſſed as an efflorеſcence of the bark, till the curious Mr. Marchand inquired more accurately into its nature, and found it to be a plant of itſelf, wholly different from the matter of the tan; and to which the bark, which had been often wetted and dried again, ſerved as a proper matrix. He found it to be more nearly allied to the ſpunge, than to any other genus of plants, and therefore named it *ſpongia fugax mollis flava & amœna in pulvere coriario naſcens*, ſoft, beautiful, yellow-fading ſpunge, growing on tanners' bark.

It makes its appearance moſt frequently in the ſummer-months, and is then ſeen in ſmall tufts of a beautiful yellow colour, on different parts of the old heaps of bark. It appears at firſt in form of a thin yellow ſcum, and is of a ſort of jelly-like ſtructure; but it every day grows larger and thicker, till it ſtands above half an inch out from the ſurface of the bark. As it grows, its ſurface becomes more and more cavernous and ſpungy, the pores or holes being of different diameters, and the interſticial matter forming a ſort of net-work more or leſs regular, and often interrupted by irregular prominences in ſeveral parts; and, in fine, when the growth is complete, the whole more reſembles a ſpunge than any vegetable ſubſtance, and is of a deep yellow colour, and conſiderably thick and tough conſiſtence; there are no roots to be diſcovered iſſuing from it; its ſmell is like that of rotten wood, and its taſte is ſomewhat ſtyptic. It always appears in the warm months, and always upon ſuch old tan as has begun to ferment, and is in the ſtate in which our gardeners uſe it for hot-beds. If it happens to ſtand expoſed to the ſouth ſun, it is but of ſhort duration; but if it be in a ſheltered place, it will laſt a conſiderable time, and often ſpread itſelf to a great extent, and make a very beautiful figure for many weeks. Mem. Acad. Par. 1727.

TAN-*Bed*, in *Gardening*. See BARK-*Bed*.

TAN-*Pit*. See BARK-*Pit*.

TAN-*Spud*, in *Rural Economy*, the name uſually given to a particular ſort of tool uſed for peeling of the bark from oak, and ſome other trees, in certain diſtricts; but in others they employ ſeveral different implements for effecting this purpoſe.

TAN-*Stove*. See HOT-*Houſe* and STOVE.

TANA, in *Geography*, the moſt conſiderable river in Finmark.

TANACETUM, in *Botany*, Tanſy, a barbarous Latin word, of which, like *Oſmunda*, it is ſcarcely poſſible, as Linnæus remarks, *Phil. Bot.* 160, to determine the meaning, or from what language it is derived. Of OSMUNDA we have attempted an explanation. (See that article.) De Theis cites Linnæus and Dodonæus as deducing *Tanacetum* from *Athanaſia*; but we find no ſuch etymology given by them, though ſeveral writers ſpeak of theſe words as ſynonimous, and ſome lexicographers give that explanation. Αθανασια, as expreſſing an unfading, or everlaſting, flower, is little applicable to our Tanſy.—Linn. Gen. 417. Schreb. 549. Willd. Sp. Pl. v. 3. 1809. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 862. Prodr. Fl. Græc. Sibth. v. 2. 167. Ait. Hort. Kew. v. 5. 1. Purſh 522. Juſſ. 184. Tourn. t. 261. Lamarck Illuſtr. t. 696. Gærtn. t. 165.—Claſs and order, *Syngeneſia Polygamia-ſuperflua*. Nat. Ord. *Compoſitæ diſcoideæ*, Linn. *Corymbiferæ*, Juſſ.

Gen. Ch. *Common Calyx* hemiſpherical, imbricated, with acute compact ſcales. *Cor.* compound, tubular, convex. Florets of the diſk numerous, funnel-ſhaped, with five reflexed ſegments in the limb, all perfect: thoſe of the radius few, ſmall, three-cleft, moſt deeply divided at their inner ſide. *Stam.* in the perfect florets, Filaments five, capillary, very ſhort; anthers united into a cylindrical tube. *Piſt.* in the perfect florets, Germen oblong, ſmall; ſtyle thread-ſhaped, the length of the ſtamens; ſtigma in two revolute ſegments: in the female ones, Germen oblong; ſtyle ſimple; ſtigmas two, reflexed. *Peric.* none, except the unchanged calyx. *Seeds* ſolitary, oblong, crowned with more or leſs of a ſlight margin. *Recept.* convex, naked.

Obſ. Sometimes the radius is wanting, all the florets being, in that caſe, perfect. The ſeeds of ſome ſpecies are ſaid to want the crown.

Eſſ.

Eff. Ch. Receptacle naked. Seeds crowned with a border. Calyx imbricated, hemifpherical. Florets of the radius three-cleft, obfolete, fometimes wanting.

1. T. *veftitum*. Leafy Cape Tanfy. Thunb. Prodr. 147. Willd. n. 1. — "Leaves flender, triangular, imbricated. Panicle terminal."—Native of the Cape of Good Hope. *Thunberg*.

2. T. *longifolium*. Long-leaved Cape Tanfy. Thunb. Prodr. 147. Willd. n. 2.—"Leaves linear-thread-fhaped. Clufter terminal, level-topped." — Found in the fame country.

3. T. *linifolium*. Flax-leaved Cape Tanfy. Thunb. Prodr. 147. Willd. n. 3. Ait. n. 1. (Athanafia linifolia; Linn. Suppl. 361.)—Leaves linear-lanceolate, channelled, taper-pointed. Clufter terminal, fimple, corymbofe. —Native of the Cape of Good Hope. Sent to Kew by Mr. Maffon in 1774. A green-houfe fhrub, flowering in Auguft. The *ftem* is fimple, round, and fmooth, clothed with alternate, fimple, linear or awl-fhaped *leaves*. *Flowers* ovate, fmooth, yellow. The length of the *leaves* is variable.

4. T. *axillare*. Axillary Cape Tanfy. Thunb. Prodr. 147. Willd. n. 4. — "Leaves linear-thread-fhaped, combined at the bafe. Flowers axillary, feffile."—Gathered by Thunberg at the Cape.

5. T. *uliginofum*. Marfh Levant Tanfy. Prodr. Fl. Græc. n. 2029. Fl. Græc. t. 855, unpublifhed. (Santolina vermiculata cretica; Tourn. Inft. 461?)—Leaves linear; the lower ones with one lateral tooth. Stalks folitary, terminal, fingle-flowered.—Gathered by Dr. Sibthorp in boggy parts of the ifle of Cyprus, intermixed with *Juncus bufonius*. The *root* is annual, fimple, tapering, with many whitifh fibres. *Stems* feveral, afcending, branched from the bottom, three or four inches high, round, fmooth, leafy. *Leaves* alternate, feffile, an inch long, acute, channelled, fmooth, moftly entire; a few of the lower ones only dilated flightly at the end, and furnifhed with a lateral tooth. *Flowers* terminal, folitary, yellow, hemifpherical, each on a fimple, naked, fmooth, erect *ftalk*, two or three inches in length, purplifh at the top. *Seed*, according to Mr. Bauer's drawing, crowned with an oblong tubular fcale, fplit on one fide.

6. T. *fuffruticofum*. Shrubby Cape Tanfy. Linn. Sp. Pl. 1183. Willd. n. 5. Ait. n. 2. Thunb. Prodr. 146. (T. africanum fruticans multiflorum, foliis tanaceti vulgaris decuplò minoribus; Comm. Hort. v. 2. 199. t. 100.)—Leaves in many pinnate, fubdivided, acute, fomewhat downy fegments. Stem fhrubby. Flowers corymbofe, level-topped.—Native of the Cape of Good Hope, from whence the Dutch obtained feeds above a century ago, and it probably foon found its way into our more curious green-houfes. The plant has little to attract general admiration, though the *leaves* are delicately divided, and the leafy branches are terminated by abundance of little golden corymbofe *flowers*, whofe *calyx* is membranous and fhining.

7. T. *fibiricum*. Long-leaved Siberian Tanfy. Linn. Sp. Pl. 1183. Willd. n. 6. (T. n. 116; Gmel. Sib. v. 2. 134. t. 65. f. 2.)—Leaves pinnate; leaflets linear-thread-fhaped, entire; undivided or three-cleft. Flowers corymbofe, level-topped. Calyx-fcales nearly orbicular, fmooth. —Gathered by Steller, in dry mountainous parts of Siberia, beyond the lake Baical, flowering in June and July. The *root* is brown, rather thick, with many fibres running deep into the ground, and apparently perennial. *Stems* about eighteen inches high, erect, round, ftriated, fmooth, fomewhat leafy; branched and corymbofe at the top. *Leaves* acute, not unlike thofe of Southernwood, but fmooth; the lower ones on long ftalks; the uppermoft feffile, at the bafe of each branch. *Flowers* bright yellow, partly drooping, encompaffed by the white membranous edges of the green orbicular fcales of the *calyx*.

8. T. *argenteum*. Silvery Armenian Tanfy. Willd. n. 7. "Ejufd. Achill. 51. t. 2. f. 4." (Achillea argentea; Lamarck Dict. v. 1. 29. Ptarmica orientalis, foliis argenteis conjugatis; Tourn. Cor. 38.)—"Leaves pinnate, clothed with filky down; leaflets lanceolate, flightly toothed at the extremity. Corymb terminal."—Gathered by Tournefort in Armenia. This is faid to bear fome refemblance to the *Achillea Clavennæ*. The *ftem* is about a foot high, fimple, channelled, covered, like the reft of the herb, with filky down. *Leaves* alternate, ftalked, with linear or lanceolate leaflets, moft of which, efpecially in the radical leaves, have two or three teeth towards the end. *Flowers* probably white. *Receptacle* conftantly naked. *Calyx* membranous at the edge of the inner fcales. *Lamarck, Willdenow*.

9. T. *angulatum*. Dropwort-leaved Tanfy. Willd. n. 8. "Ejufd. Achill. 52. t. 2. f. 3." (Achillea filipendulina; Lamarck Dict. v. 1. 27. Ptarmica orientalis, tanaceti folio et facie, flore minimo; Tourn. Cor. 38.) — Leaves pinnatifid; fegments lanceolate, ferrated. Corymb denfe. Calyx angular." — Gathered in the Levant by Tournefort. *Stem* a foot, or rather more, in height, channelled, almoft fmooth, but fparingly leafy in the upper part. *Lower leaves* two or three inches long, deeply pinnatifid, green, and fmooth; upper about half as long. *Flowers* yellow, in a fmall denfe *corymbus*. *Florets* of the radius fcarcely more than two or three, very fhort. *Receptacle* elevated, furnifhed with a very few fcales at the margin. *Willd. Lamarck*.

10. T. *microphyllum*. Small-leaved Siberian Tanfy. (Achillea n. 164; Gmel. Sib. v. 2. 198. t. 83. f. 2. Ptarmica millefolii folio tomentofo, flore luteo; Gerb. MSS. in Herb. Linn.)—Leaves pinnate; leaflets bipinnatifid, hairy, obtufe. Flower-ftalks corymbofe, hairy. Calyx fmooth.— Gathered by Gerber, in deferts, on both fides of the river Don, near upper Kundrufchewa. He remarked that the *receptacle* is devoid of fcales, which induces us to introduce this plant here, though referred to *Achillea* by Gmelin. Linnæus has paffed it over. The *root* is woody and apparently perennial. *Stem* a fpan high, more or lefs branched, leafy, angular, and downy. *Leav s* ftalked, hairy, finely fubdivided and notched. *Flowers* yellow, rather hemifpherical than cylindrical. *Calyx-fcales* oblong, ending in a fuddenly dilated white membrane; the bafe of the outward ones only occafionally hairy, or fringed. *Florets* of the radius very fhort, three-toothed.

11. T. *incanum*. Hoary Oriental Tanfy. Linn. Sp. Pl. 1183. Willd. n. 9. (Abfinthium orientale incanum tenuifolium, floribus luteis in capitulum congeftis et furfùm fpectantibus; Tourn. Cor. 34.)—Leaves pinnate, hoary; leaflets crowded, in deep finger-like fegments. Corymbs denfe, compound, fomewhat panicled.—Native of the Levant. The *ftem* is faid by Linnæus to be fimple, leafy, and very fhort. We have feen neither fpecimen nor figure.

12. T. *cotuloides*. May-weed Cape Tanfy. Linn. Mant. 282. Willd. n. 10. — Leaves deeply pinnatifid, pointed, hairy, dotted. Stem much branched. Flowers fomewhat panicled. Calyx-fcales elliptical, nearly equal.—Native of the Cape of Good Hope. *Root* fomewhat woody, with many fibres; Linnæus judged it to be annual. *Stem* about a fpan high, copioufly branched, round; branches afcending, leafy, hairy. *Leaves* numerous, fcattered, ftalked, hardly an inch long, in feven or nine deep, acute, entire fegments, clothed, on the lower fide at leaft, with very long

ftraight

ftraight loofe hairs. *Flower-ftalks* panicled, hairy, leafy, fomewhat corymbofe. *Flowers* fmall, hemifpherical, rather convex, yellow, with few or no radiant florets. *Calyx-fcales* acute, rather lax, roughifh, with thin pale edges.

13. T. *orientale.* Silky-leaved Oriental Tanfy. Willd. n. 11. (Abfinthium orientale incanum, capillaceo folio, floribus in capitulum congeftis; Tourn. Cor. 34.)—"Leaves filky and hoary; the radical ones pinnate; leaflets in three deep, linear-thread-fhaped, acute fegments; ftem-leaves in three deep, lanceolate fegments. Panicle denfely corymbofe."—Native of Armenia. *Root* perennial. *Leaves* of the root and barren ftems about three-quarters of an inch long, on ftill longer *footftalks;* thofe of the flowering ftem broader, their fegments flat, occafionally divided. *Panicle* corymbofe, terminal. *Flowers* feffile, in round heads, upon crowded ftalks. *Calyx* downy. *Receptacle* naked. *Willd.*

14. T. *annuum.* Annual Tanfy. Linn. Sp. Pl. 1184. Willd. n. 12. Ait. n. 3. (Santolina corymbis fimplicibus faftigiatis, foliis linearibus confertis; Mill. Ic. t. 227. f. 1. Elichryfon; Cluf. Hift. v. 1. 326. Elyochryfon, five Coma aurea; Ger. Em. 645.)—Radical leaves doubly pinnate; thofe of the ftem deeply pinnatifid, downy; their fegments fharp-pointed. Corymbs level-topped. Calyx-fcales oblong, hairy.—Native of Spain and Italy. Very foon introduced into our gardens, where it proves a hardy annual, flowering in July and Auguft. The *ftem* is two or three feet high, round, furrowed, much branched, clothed with innumerable fmall crowded pinnatifid *leaves*, of a rather hoary green. *Flowers* yellow, in terminal flat corymbs; the fcales of their *calyx* unequal, imbricated, keeled, hairy, tipped with a rounded membrane.

15. T. *obtufum.* Blunt-leaved Cape Tanfy. Thunb. Prodr. 147. Willd. n. 13.—"Leaves doubly pinnate, fmooth; leaflets linear, obtufe. Heads of flowers folitary, fmooth."—Found by Thunberg at the Cape of Good Hope.

16. T. *grandiflorum.* Large-flowered Cape Tanfy. Thunb. Prodr. 147. Willd. n. 14.—"Leaves doubly pinnate, villous; leaflets linear, acute. Heads of flowers folitary, downy."—From the fame country.—We have not feen either of the two laft fpecies. Willdenow underftands Thunberg's expreffion, *capitulis folitariis*, as meaning *floribus folitariis;* but the fuppofition of fo great an inaccuracy is fcarcely warrantable. We therefore preferve the original fenfe; whether it be accurate or not muft remain with the author.

17. T. *multiflorum.* Many-flowered Cape Tanfy. Thunb. Prodr. 147. Willd. n. 16.—"Leaves doubly pinnate, villous; leaflets acute. Panicles compound, level-topped."—Found by Thunberg at the Cape.

18. T. *myriophyllum.* Millfoil Tanfy. Willd. n. 17. "Ejufd. Achill. 50." (Achillea bipinnata; Linn. Sp. Pl. 1265. Ptarmica orientalis incana, foliis pennatis, femiflofculis florum vix confpicuis; Tourn. Cor. 38.)—Leaves doubly pinnate, downy; leaflets ovate; thofe of the ftem toothed; of the radical leaves entire.—Native of the Levant. Only to be feen perhaps in Tournefort's herbarium, or in collections extracted from thence.

19. T. *vulgare.* Common Tanfy. Linn. Sp. Pl. 1184. Willd. n. 18. Ait. n. 4. Fl. Brit. n. 1. Engl. Bot. t. 1229. Woodv. Med. Bot. t. 115. Fl. Dan. t. 871. (Tanacetum; Ger. Em. 650. Matth. Valgr. v. 2. 259. Camer. Epit. 650.)—β. T. crifpum anglicum; Ger. Em. 650.—Leaves doubly pinnatifid, fharply ferrated, naked.—Native of banks, hedges, and borders of fields, in moft parts of the middle of Europe; very frequent in England, flowering in July and Auguft. *Root* perennial, creeping. *Herb* two feet high, leafy, dark green, with a ftrong balfamic fcent, and bitter tafte. It was formerly more ufed than at prefent to give a flavour, as well as a green colour, to a rich kind of pudding. The *leaves* are copious, feffile, a fpan long, fometimes a little hairy underneath; clafping the ftem with their dilated bafe. *Flowers* compofing a large, flattifh, terminal, golden *corymbus*. The *radius* is fcarcely remarkable but in hot feafons, though its rudiments may generally be detected. The curled-leaved variety is efteemed moft aromatic and wholefome.

Willdenow's fifteenth fpecies, *T. monanthos*, Linn. Mant. 111, having a fcaly receptacle, is referred to SANTOLINA, (fee that article,) in the Prodr. Fl. Græca, by the fpecific name of *S. rigida*. This is a depreffed annual plant, with doubly-pinnatifid pointlefs *leaves;* fingle-flowered afcending hairy *ftalks;* and a hairy *calyx*, whofe fcales are nearly equal. The *flowers* are yellow. This is a native of Cyprus, and very nearly akin to *S. anthemoides*, Linn. Sp. Pl. 1180; whofe *calyx* is imbricated on all fides, and its *leaves* have briftle-pointed fegments.

TANACETUM, in *Gardening*, furnifhes plants of the herbaceous and fhrubby perennial kinds, among which the fpecies moft commonly cultivated are, the common tanfy (T. vulgare); the annual tanfy (T. annuum); the coftmary tanfy (T. balfamita); the Siberian tanfy (T. fibiricum); the fhrubby tanfy (T. fuffruticofum); and the fan-leaved tanfy (T. flabelliforme).

In the firft fort there are varieties with curled leaves, called double tanfy; with variegated leaves; and with larger leaves, which have little fcent.

Method of Culture.—All the different herbaceous fpecies are increafed by parting the roots, and by feed.

In the firft mode the bufinefs is effected by flipping or dividing the roots in autumn or winter, when the ftalks are decayed; or early in fpring, before new ftalks fhoot forth; planting the flips at once where they are to remain; thofe for the kitchen-garden, as the common tanfy, &c. in any bed or border a foot and a half afunder; and thofe intended for variety in the pleafure-ground, fingly here and there, at fuitable diftances, to effect a proper diverfity.

The feed faved in autumn fhould be fown in the fpring following, in beds of light earth, broad-caft and raked in, when the plants will foon come up, and in July be fit to prick out in beds, in rows a foot afunder; fome to remain, and others to be planted out in autumn where they are to grow.

All the fhrubby forts are eafily increafed by cuttings of the branches, which fhould be planted any time in fpring and fummer, choofing the young and moft robuft fhoots, which fhould be cut off in proper lengths, and if early in fpring, &c. be planted in pots of good earth, feveral in each, plunging them in a hot-bed, where they will be rooted, and fit for potting off feparately in fix weeks; or if in fummer, the young fhoots may be planted in the full ground, in a fhady border, or where they may be fhaded with mats from the fun; or in pots, and placed in the fhade, or under a garden-frame, &c.: in all of which methods, giving plenty of water, they will readily take root; but thofe in the hot-bed will be forwardeft: they, however, will all be well rooted the fame feafon, and fhould then be tranfplanted into feparate pots, and managed as other fhrubby greenhoufe plants. See GREEN-HOUSE *Plants*.

Moft of the former forts require to be afterwards kept free from weeds, cutting down the decayed ftalks annually in autumn; and as the roots increafe faft into large bunches,

fpreading

ſpreading widely round, they ſhould be cut in, or be ſlipped occaſionally, otherwiſe they are apt to overrun the ground; and to have the ground dug between the plants annually.

All the latter ſorts are ſomewhat tender, but only require ſhelter from froſt, being kept in pots, and depoſited among the greenhouſe plants, and treated as other ſhrubby exotics of that collection. They effect a very agreeable variety at all times of the year, but particularly in ſummer and autumn, when in flower.

The common tanſy has been long cultivated in the garden as a culinary and medicinal herb; the leaves being uſed occaſionally while young and tender, in ſallads during the ſpring ſeaſon, as well as for making cakes, puddings, and many other ſimilar articles. The powder of the dried leaves, the ſeeds, and the flowers, have alſo been ſometimes employed as a remedy againſt worms.

The curled and variegated ſorts or varieties are principally made uſe of for ornamental purpoſes.

The earl of Dundonald has propoſed the cultivation of the tanacetum, or tanſy, for the production of potaſs, aſſerting that it will yield more of this alkali than can be procured from an equal weight of any other vegetable.

Tanacetum, in the *Materia Medica*. See Tansy.

TANADASSA, in *Ancient Geography*, a town of Africa Propria, on the route from the Grand Leptis to Tacapæ.

TANÆCIUM, in *Botany*, ſo named by Dr. Swartz, on account of its very long climbing ſtem and branches, from ταναηκης, *ſtretched out*, or rather *having an elongated point*.—Swartz Prodr. 91. Ind. Occ. 1049. t. 20. Schreb. Gen. 412. 834. Willd. Sp. Pl. v. 3. 312. Mart. Mill. Dict. v. 4.—Claſs and order, *Didynamia Angioſpermia*. Nat. Ord. *Luridæ*, or perhaps *Putamineæ*, Linn. Swartz. Akin to *Solanaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, undivided, abrupt, nearly or quite entire. *Cor.* of one petal, long; tube cylindrical, dilated upwards, limb ſpreading, in five, ſomewhat unequal, or two-lipped, deep ſegments. *Stam.* Filaments four, ſhorter than the tube of the corolla, two of them rather ſhorter than the reſt, with an intermediate rudiment of a fifth; anthers two-lobed. *Piſt.* Germen ſuperior, roundiſh, ſeated on an annular receptacle; ſtyle ſimple, about the length of the ſtamens; ſtigma of two thick ſpreading lobes. *Peric.* Berry very large, globoſe or oblong, on a ſhort ſtalk, of two cells, with a hard coat. *Seeds* ſmall, numerous, oblong, angular, inſerted into a central globoſe receptacle.

Eſſ. Ch. Calyx cylindrical, undivided, abrupt. Corolla tubular, rather unequal, five-cleft. Rudiment of a fifth ſtamen. Berry coated, of two cells, with many ſeeds.

Obſ. This genus ſurely belongs to the *Luridæ* of Linnæus, and is conſiderably akin to another genus of Swartz's, the Solandra, ſee that article, though he does not appear to advert to this affinity.

1. T. *paraſiticum*. Simple-leaved Tanæcium. Willd. n. 1. Swartz Ind. Occ. 1053. Jacq. Hort. Schoenbr. v. 1. 61. t. 115.—Leaves ſimple, ovate, coriaceous. Stem ſhrubby, climbing paraſitically.—Native of woods in the weſtern part of Jamaica. *Stem* when young cloſely attached by fibrous radicles to the trunks of trees, round, with a grey rugged bark; when full-grown, it often decays below, ſupporting itſelf altogether paraſitically, and ſending out round, ſpreading, ſmooth, leafy branches. *Leaves* oppoſite, on ſhort thick ſtalks, five or ſix inches long, entire, acute, ſcarcely pointed, ſmooth, of a fine ſhining green, with one rib, and many oblique veins. *Flower-ſtalks* axillary, ſhort, each bearing about four elegant drooping *flowers*, about an inch and a half long. *Calyx* ſwelling, purpliſh-red, contracted at the mouth, quite entire. *Corolla* with a pale yellowiſh tube, and crimſon, ſpreading or reflexed, border, whoſe ſegments are rounded, and nearly uniform, the lowermoſt only a little the largeſt, and folding over the mouth like a lid, before the flower expands. *Berry* globoſe, as big as a ſmall apple, with a brown brittle coat. Swartz once found a fruit with three cells.

2. T. *Jaroba*. Three-leaved Tanæcium. Willd. n. 2. Swartz Ind. Occ. 1050. t. 20. f. 1. (Jaroba; Marcgr. Braſil. 25. Pis. Braſil. 173. Cucurbitifera fruticoſa trifolia ſcandens; Sloane Jam. v. 2. 175.)—Lower leaves ternate; upper in pairs, with an intermediate terminal tendril. Stem climbing.—Native of woods, on the banks of rivers, in the weſtern part of Jamaica. Swartz found it in flower in February, climbing to the top of a tree of the *Bignonia leucoxylon*. The ſhrubby *ſtem* mounts to a great height, where it has an opportunity of ſupport, ſending out long, pendulous, round, ſlightly ſtriated, herbaceous branches. *Leaves* oppoſite, ſtalked; the lower ones with three ovate, pointed, entire, ribbed, ſmooth, ſcarcely coriaceous, leaflets, each half a foot long; upper of two rather ſmaller ones, with a ſlender rigid tendril in the place of a third leaflet, by which the branches are ſupported on thoſe of neighbouring trees. *Cluſters* axillary, of few flowers, with thick, round, oppoſite ſtalks. *Flowers* white, ſhort-lived. *Calyx* gibbous at the baſe; ſometimes very minutely five-toothed at the margin. *Corolla* funnel-ſhaped; its tube ſix or ſeven inches long, ſwelling at the top, downy both within and without; ſegments of the limb ovate, wavy or plaited, about three-quarters of an inch in length, all nearly equal, though the two uppermoſt are, as in the former ſpecies, leſs deeply ſeparated. *Berry* very large, a foot long, oval, pendulous, ſmooth, brittle when ripe. *Seeds* large, broad, compreſſed, lying cloſely over each other. The Portugueſe call this plant *Caſca amargoſa*, on account of its bitterneſs.

3. T.? *pinnatum*. Pinnate Tanæcium. Willd. n. 3. (Creſcentia pinnata; Jacq. Coll. v. 3. 203. t. 18.)—Leaves pinnate. Stem arboreous, erect.—Native of Mozambique, where it is called *Kigelikeia*, and from whence it was carried to the iſles of Mauritius or Bourbon, and thus got into the imperial gardens at Schoenbrun, being accompanied by a diſſected drawing of the *flower*, which is all that Jacquin has exhibited of the plant. The young tree, about ſeven feet high, and four inches in the diameter of its trunk, bore in the ſtove ſeveral branches, with alternate pinnate *leaves*, each of four pair of oblong leaflets with an odd one, all coriaceous, obtuſe with a point, undulated, ſparingly and ſharply ſerrated; ſmooth above; roughiſh to the touch beneath; the largeſt near ſix inches long; the odd one on a conſiderable partial ſtalk. The *flowers* are ſaid to grow on the trunk and older branches, but of their mode of inſertion or infloreſcence we have no account. The *calyx* is ovate, tubular, ſmooth, paleiſh-green, about an inch long, with five acute, rather deep, red ſegments. Tube of the *corolla* cylindrical, pale, the length of the calyx; limb very large, bell-ſhaped, three inches long, with five acute, unequal, reflexed, marginal lobes; its outſide ſtrongly and copiouſly ribbed, pale, with a tinge of red; the whole inſide of a fine crimſon. The fifth *ſtamen* is apparently perfect, with an anther, though but half the length of the others; all the filaments hairy. *Germen* accompanied at the baſe by five glands. *Stigma* of two lanceolate plates. *Berry* as large as a man's head, coated, full of pulp, in which the ſeeds are lodged.—Jacquin was doubtful of the genus of this magnificent

ficent and curious plant, which is faid to form, in its native country, a very large tree. There feems as much reafon to refer it to *Crefcentia* as to *Tanæcium*, the *calyx* not anfwering well to either, and the internal ftructure of the *fruit* being unknown.

TANAEIM, or Tenaiem, in *Geography*, a town of Arabia, in the province of Yemen, famous among the Arabian Jews, who had anciently their chief feat, and many confiderable fynagogues in it; at prefent it is almoft defolate; 30 miles S.E. of Sana.

TANAGA, one of the Fox iflands, in the North Pacific ocean, about 40 miles in circumference. N. lat. 53° 20'. E. long. 182° 14'.

TANAGER, *Il fiume Negro*, in *Ancient Geography*, a river of Italy, in Lucania, according to Virgil. It has its fource in a mountain called Albufnus, now monte Poftiglione, and difcharges itfelf into the Silanus.

TANAGRA, a confiderable town of Bœotia, towards the weft, feated on an eminence, at fome diftance from the mouth of the Afopus. In a temple of Bacchus at this town was a fine ftatue of this god, and above, a triton of admirable workmanfhip. Befides the temple of Bacchus, here were temples of Themis, Venus, Apollo, and Mercury. In the moft confpicuous place of this city was the tomb of Corinna, fo famous for her beauty and poetical talents, fo that at Thebes fhe gained a prize in preference of Pindar. Here was alfo the tomb of Orion. Paufanias.

Tanagra, *Tanager*, in *Ornithology*, a genus of the order Pafferes; the characters of which are, that the bill is conic, acuminated, emarginated, fubtrigonous at the bafe, and inclining at the apex. Gmelin enumerates forty-fix

Species.

Jacapa. Black; the forehead, neck, and breaft, crimfon-coloured. This is the jacapu of Marcgrave, the red-breafted blackbird of Edwards, and the red-breafted tanager of Latham. It is found in America.

Brasilia. Crimfon, with black tail and wings. This is the cardinal of Buffon, and the Brafilian tanager of Latham. Found in South America. Of this bird there are two varieties, one of which is the rumplefs blue, red, and black Indian fparrow of Willughby.

Rubra. Red, with black wings and tail, and tail-feathers white at the apex. This is the Canada tanager of Pennant, and the red tanager of Latham. Found in Canada. Of this the fcarlet fparrow of Edwards, or merula brafilienfis of Ray and Willughby, is a variety.

Jacarina. Violet-black, with wings whitifh beneath, and tail of two divaricated branches. This is a bird of Brafil and Guiana, the jacarini of Marcgrave.

Violacea. Violet, and the under part very yellow: the teitei of Marcgrave, the golden titmoufe of Edwards, and golden tanager of Latham. A variety of this, found in Brafil, Surinam, and Cayenne, is fhining black, with the abdomen, breaft, and front pale yellow, and the outer tail-feather having on its inner fide a white fpot.

Olivacea. Olive; the throat and breaft yellow, the abdomen white, the quills and tail-feathers brown, with a white margin. This is the olivet of Buffon, and found in Cayenne.

Gyrola. Green, red-headed, yellow collar, and ceruleous breaft: the rouvardin of Buffon, the red-headed greenfinch of Edwards, and red-headed tanager of Latham. Found in various parts of South America.

Cayana. Yellow, green back, red cap, and black cheeks. A bird of Cayenne, of which there is a variety, underneath golden-coloured, back green and yellow, head ceruleous, wings and tail green.

Atrata. Shining black: the black tanager of Latham. Found in India.

Mexicana. Black, underneath yellowifh, breaft and rump blueifh: the black and blue titmoufe of Edwards, and black and blue tanager of Latham. The tangara barbadenfis cerulea of Briffon is a variety. Found in Cayenne, Guiana, and New Spain.

Tatao. Violet, black back, yellow rump, green head, and violet breaft and wings: the titmoufe of paradife of Edwards, the paradife tanager of Latham, and the tangara of Briffon, Ray, Willughby, and Buffon. Found in Guiana.

Albirostris. Black, with a fpot on the wings, and tail yellow, and a white beak: the white-billed tanager of Latham. Of this there is a variety. It is an American bird.

Gularis. Black, beneath white, red head, and purple throat: the rouge-cap of Buffon, and red-headed tanager of Latham. Found in Cayenne and Guiana.

Cayennensis. Black, both fides of the breaft and under part of the wings yellow. Found in Brafil, Guiana, and New Spain.

Brasiliensis. Black, under part white, throat and rump blueifh, face and breaft black: the guira-genoia of Marcgrave, the turquin of Buffon, and turquoife tanager of Latham. A Brafil fpecies.

Dominica. Black-fpotted, above brown, and below whitifh: called from the place of its refidence, by Latham, the St. Domingo tanager.

Militaris. Brown; breaft, neck, throat, and fhoulders fanguineous: the military tanager of Latham, and greater bulfinch of Edwards. Found in South America.

Grisea. Grey-olive, under grey, with wings and tail black, grey at their margin. Found in Guiana and Louifiana.

Episcopus. Cinereous, with wings and tail externally blueifh: the bifhop tanager of Latham. Found in Cayenne.

Sayaca. Hoary, with blueifh wings: the fayacu of Marcgrave. Found rarely in Cayenne.

Punctata. Green, pointed with black; under yellowifh-whitifh: the fyacoa of Buffon, fpotted green titmoufe of Edwards, and fpotted tanager of Latham. Found in Cayenne.

Virens. Green, under yellowifh, cheeks and throat black: the green tanager of Latham. Found in New Spain, Peru, and Brafil.

Mississipensis. Wholly red: the Miffiffippi tanager of Latham. Of this fpecies there are two varieties; one found on the river Miffiffippi, and the other in New Spain.

Cristata. Blackifh, golden creft, throat and rump yellow: the houppette of Buffon, and crefted tanager of Latham. Found in Guiana.

Æstiva. Red, bill yellowifh: the fummer red-bird of Catefby and Edwards, and fummer tanager of Pennant and Latham. Found in Carolina and Virginia.

Magna. Olive-brown; under reddifh; legs, front, and temples blueifh; vent-feathers and throat red, and the middle of the throat white: the grand tanager of Latham. Found in Guiana and Cayenne.

Cærulea. Blueifh, black bill, and light-red legs: the blue tanager of Latham. A Cayenne bird.

Variabilis. Green, partly blueifh and partly brown, black band about the eye, quills and tail-feathers black, with green margins: variable tanager of Latham.

 Tricolor.

Tricolor. Green; head, chin, throat, and breaſt pale ſea-colour; black neck-band, head and ſides of the neck golden-green, a large ſpot on the throat, and back black, the breaſt-band blueiſh, the abdomen and vent-feathers yellowiſh-green: the green-headed tanager of Latham. Of this there is a variety.

Guianensis. Green, head cinereous-grey, front and head-band on both ſides from the front to the nape red: the grey-headed tanager of Latham. Found rarely in the foreſts of Guiana.

Nigricollis. Olive, beneath yellow, black throat, golden breaſt, feathers of the wings and tail-feathers brown, with olivaceous margins: the black-throated tanager. Found in Guiana.

Ruficollis. Black and blue, with a large red ſtreak on the throat, and black wings and tail: the rufous-throated tanager of Latham. Found in Jamaica.

Leucocephala. Black and brown, white front, reddiſh throat, purple breaſt and wings, and yellowiſh abdomen and vent-feathers: the quatoztli of Seba. Found in the mountains of Braſil.

Flava. Yellow throat, breaſt and ſpots of the abdomen black, quills and tail-feathers black, ſea-coloured at the margin. This is the guiraperea of Ray and Willughby, and the yellow tanager of Latham. Found in Braſil, of the ſize of a lark.

Amboinensis. Varied with black and blue, black vertex, blueiſh-green rump; cheeks, chin, throat, and breaſt blueiſh; abdomen and vent-feathers white. Found in Amboina, and called calatti.

Canora. Blueiſh, varied with yellow; black tail, white at the apex; and wings partly blueiſh and partly yellow: the xiuhtototl of Fernandes. Found in New Spain.

Sinensis. Olivaceous, beneath yellow, with the quills and tail-feathers black, yellow at their margin: the Chineſe tanager of Latham.

Bonariensis. Black and violet, with a ſlight greeniſh tint in the wings and tail: the violet tanager of Latham.

Atra. Cinereous, with the face, chin, and throat black, (thoſe of the female yellow:) the camail or cravatte of Buffon, and black-faced tanager of Latham. Found in Guiana.

Pileata. Blueiſh-cinereous, beneath ſilvery, with the vertex, temples, and ſides of the neck black, and the ocular ſpot white; the hooded tanager of Latham. Of this the tijepiranga of Ray and Willughby is a variety. Found in Guiana and Braſil.

Melanictera. Above ferruginous, beneath very yellow, head and nape black, wings ſtreaked with white, and tail brown: the black-crowned tanager of Latham. Found on the Caucaſus and in Georgia.

Sibirica. Black, the tips of the down between the ſhoulders and the rump ciliated with white. A Siberian ſpecies.

Atricapilla. Reddiſh and rufous; head, tail, and wings ſhining black, with a roundiſh tail: the mordoré of Buffon, and black-headed tanager of Latham. Found in Guiana.

Striata. Beneath yellow, with a head ſtriated with black and blue, back above blackiſh and beneath golden, quills and tail-feathers black, with a blue margin: the onglet of Buffon, and furrow-clawed tanager of Latham. Found in South America.

Nigerrima. Black, with a white ſpot within the wings: the Guiana tanager of Latham.

Capensis. Above ferruginous-brown, beneath ferruginous, varied with white; the middle of the tail black, its ſides ferruginous-rufeſcent, the bill yellowiſh, the legs black. Found at the Cape of Good Hope.

TANAH, in *Geography*. See San.

TANAIS, the *Don*, in *Ancient Geography*, a large river which had its riſe towards the eaſt, in the territory of the Thyrſagetes, traverſed the country of the Sarmatians, turned its courſe to the ſouth, and diſcharged itſelf in the lake of Mæotis. Its courſe was ſo rapid, that it never froze. Its borders were inhabited by the Sarmatians. The two mouths of the Tanais were diſtant 70 ſtadia from one another, according to Strabo.—Alſo, a town of European Sarmatia, ſituated between the mouths of the river of the ſame name.—Alſo, a river of Africa, which ran into the Mediterranean, towards the ſouth-weſt, at five miles from Thena.

Tanais, in *Mythology*, a divinity peculiar to the Armenians, to whom were conſecrated the ſlaves of both ſexes; and it is alſo ſaid, that the people of better rank offered to him their daughters, who, as ſoon as they were conſecrated to this god, were authoriſed by the law to proſtitute themſelves to the firſt comer, until the time of their marriage. Nor did this conduct by any means prevent the addreſſes of ſuitors.

TANAK Point, in *Geography*, a cape on the north coaſt of Java. S. lat. 6° 24′. E. long. 108° 36′.

TANAKAKA, a ſmall iſland near the ſouth-weſt coaſt of Celebes, belonging to the Dutch. S. lat. 5° 30′. E. long. 119° 42′.

TANALITZKAIA, a fortreſs of Ruſſia, in the government of Upha, at the conflux of the Urdaſim and Ural; 120 miles E. of Orenburg.

TANAMBE, a town on the eaſt coaſt of Madagaſcar. S. lat. 16° 20′. E. long. 50° 20′.

TANAON, a town on the eaſt coaſt of the iſland of Leyta. N. lat. 11° 10′. E. long. 125° 1′.

TANAOSIMA, one of the Japaneſe iſlands, about 100 miles in circumference. N. lat 30° 20′. E. long. 132° 30′.

TANARGUE, a mountain of France, which gives name to a diſtrict in the department of the Ardêche; 20 miles S.W. of Privas.

TANARO, one of the ſix departments of Piedmont, after its union with the French republic, Auguſt 26, 1802, formerly Acqui and Aſti, in N. lat. 44° 45′, weſt of Marengo, containing 197 ſquare leagues, and 311,458 inhabitants. It was divided into three circles, *viz.* Aſti, including 131,910; Acqui, 82,914; and Alba, 96,634 inhabitants. The ſoil is broken by torrents, which form many lakes and marſhes. The ſouth-weſt diſtrict conſiſts of barren ſpots and fruitful vallies; the northern part is fertile, and the hills yield abundance of wine of an inferior quality. The principal products of the department are grain, fruits, and paſtures, with quarries of ſtone, mineral ſprings, &c.

Tanaro, a river of France, which riſes in the mountains near Tenda, paſſes by Coni, Cheraſco, Alba, Aſti, Alexandria, &c. and joins the Po, 3 miles E. of Valenza.

TANARUS, the *Tanaro*, in *Ancient Geography*, a river of Italy, in Liguria, which having been formed by the confluence of many rivers, diſcharged itſelf into the Padus, north-weſt of Dertona.

TANASSERIM, in *Geography*. See Siam.

TANAVELLE, a town of France, in the department of the Cantal; 4 miles W.S.W. of St. Flour.

TANAW, a town of Napaul; 45 miles S.W. of Catmandu.

TANBAY, a town on the E. coaſt of the iſland of Negros. N. lat. 10° 3′. E. long. 123° 1′.

TANCACA, a town of Mexico, in the province of Guaſteca; 50 miles W.S.W. of St. Yago de los Valles.

TANCALE, a town of Mexico, in the province of Guaſteca; 50 miles N.W. of St. Yago de los Valles.

TANCANCHY, a town of Hindooſtan, in Madura; 8 miles S. of Vadagary.

TANCARVILLE, a town of France, in the department of the Lower Seine; 10 miles S.E. of Montevilliers.

TANCHOY, a town of Mexico, in the province of Guaſteca; 35 miles N. of Panuco.

TANCICUY, a town of Mexico, in the province of Guaſteca; 15 miles S.W. of Panuco.

TANCOA, a town of Abyſſinia; 40 miles N.N.E. of Miné.

TANCOBANCA, a river of Perſia, which runs into the ſea, 69 miles W.N.W. of Port Jaques.

TANCOS, a town of Portugal, in Eſtremadura, at the conflux of the Zezare and the Tagus; 21 miles N.E. of Santarem.

TANCUYLABO, a town of Mexico, in the province of Guaſteca; 30 miles S.S.E. of St. Yago de los Valles.

TANCYTOWN, a poſt-town of Maryland; 27 miles N.E. of Frederickſtown.

TANDA, a town on the eaſt coaſt of the iſland of Mindanao. N. lat. 8° 48′. E. long. 126° 12′.

Tanda, or *Tanrah*, a town of Hindooſtan, called ſometimes *Chawaſpour Tanda*, from the original name of the diſtrict in which it was ſituated. It was a ſhort time, in the reign of Shere Shaw, about the year 1540, the capital of Bengal, and became the eſtabliſhed capital under Acbar, about 1580. It is ſituated very near to the ſcite of Gour, on the road leading from it to Rajemal. There is little remaining of this place, ſave the rampart; nor do we know for certain when it was deſerted. In 1659 it was the capital of Bengal, when that ſubah was reduced under Aurungzebe.

TANDAH, a town of Bengal; 12 miles S.E. of Calcutta.

TANDAM, a town of Bootan; 57 miles N. of Dinagepour.

TANDAMORGONG, a town of Hindooſtan, in Goondwanah; 25 miles E. of Nagpour.

TANDEGO, a town of Africa, on the St. Domingo river; 25 miles E. of Farim.

TANDERAGEE, a poſt-town of the county of Armagh, Ireland, which has a good linen market. It is near the Newry canal, and 61 miles N. by W. from Dublin.

TANDLA, a town of Hindooſtan, in Malwa; 72 miles W. of Ougein. N. lat. 23° 5′. E. long. 74° 30′.

TANDOO Baas, a ſmall iſland in the Sooloo Archipelago. N. lat. 5° 8′. E. long. 120° 15′.

Tandoo *Battoo*, a ſmall iſland in the Sooloo Archipelago. N. lat. 5° 9′. E. long. 120° 12′.

TANDORF, a town of Bohemia, in the circle of Konigingratz; 20 miles E. of Konigingratz.

TANE, a river of Finmark, which runs into the Frozen ſea, N. lat. 70° 48′.

Tane. See Taroataihetoomo.

TANG, in *Geography*, a town of Sweden, in Weſt Gothland; 30 miles E.N.E. of Uddevalla.

TANGA, in *Commerce*, a money of account at Goa, in the Eaſt Indies; ſome of which are good, and others bad. A pardo is worth 4 good tangas or 5 bad; 16 good vintins, or 20 bad, are equal to 300 good baſaruccos, or 360 bad. The coins are the St. Thomas, a gold piece of money of nearly the weight of a ducat, which paſſes for 11 good tangas, more or leſs. The ſilver coins are the pardo xeraphin of 5 good tangas, and the common pardo of 4 good tangas. The copper and tin coins are the good and bad baſaruccos. Venetian ſequins are worth 16 good tangas; pagodas, 10 good tangas; and Spaniſh dollars, 550 good baſaruccos, all more or leſs. A good tanga is worth about $7\frac{1}{2}d$ ſterling; a pardo, 2*s*. 6*d*.; and a xeraphin, 3*s*. $3\frac{1}{2}d$. ſterling nearly. Kelly's Cambiſt.

TANGALA, in *Geography*, a ſmall iſland in the Eaſt Indian ſea, near the S. coaſt of Java. S. lat. 8° 20′. E. long. 111° 45′.

TANGALE, a town of the iſland of Ceylon; 92 miles S. of Candy.

TANGARAC, in *Botany*, a poiſonous Braſilian plant; but the root, ſays Piſo, is an antidote to the leaves, flowers, and fruit. Boyle's Works, Abr. vol. i. p. 14.

TANGAWA, in *Geography*, a town of Japan, in the iſland of Ximo; 30 miles S.E. of Kokura.

TANGE, a town of Sweden, in Weſt Gothland; 21 miles N. of Gotheburg.

TANGEN, a town of Norway, in the province of Aggerhuus; 2 miles E. of Stromſoe.

TANGENE, a town of Sweden, in Weſt Gothland; 26 miles E. of Uddevalla.

TANGENT, in *Geometry*, a right line which touches a circle, that is, meets it in ſuch manner, as that, though infinitely produced, it would never cut the ſame; that is, never come within the circumference.

Thus the line A D (*Plate* XV. *Geometry*, *fig*. 3.) is a tangent to the circle in D.

It is demonſtrated in geometry; 1. That if a tangent, A D, and a ſecant, A B, be both drawn from the ſame point, A; the ſquare of the tangent will be equal to the rectangle, under the whole ſecant A B, and that portion of it, A C, which falls without the circle.

2. That if two tangents, A D, A E, be drawn to the ſame circle from the ſame point A, they will be equal to each other.

As a right line is the tangent of a circle, when it touches the circle ſo cloſely, that no right line can be drawn through the point of contact between it and the arc, or within the angle of contact that is formed by them; ſo in general, when any right line touches any arc of a curve, in ſuch a manner that no right line can be drawn through the point of contact, betwixt the right line and the arc, or within the angle of contact that is formed by them, then is that line the tangent of the curve at the ſaid point.

The tangent of an arc is the right line that admits the poſition of all the ſecants that can paſs through the point of contact, though, ſtrictly ſpeaking, it is no ſecant. Macl. Flux. art. 181. 505.

Tangent, in *Trigonometry*.—*A tangent of an arc* is a right line, raiſed perpendicularly on the extreme of the diameter, and continued to a point, where it is cut by a ſecant, that is, by a line drawn from the centre through the extremity of the arc of which it is a tangent.

A tangent of an arc A (*Plate* II. *Trigonom. fig*. 13.) is a part of a tangent of a circle (that is, of a right line, which touches a circle without cutting it), intercepted between two right lines drawn from the centre C, through the extremes of the arc E and A.

Hence the tangent F E is perpendicular to the radius E C.

And hence the tangent F E is the tangent of the angle A C E, as alſo of that of A C I; ſo that two adjacent angles have only the ſame common tangent.

TANGENT, *Co*, or *Tangent of the Complement*, is the tangent of an arc, which is the complement of another arc to a quadrant.

Thus a tangent of the arc A H, is the co-tangent of the arc A E, or the tangent of the complement of the arc A E.

To find the length of the tangent of any arc, the ſine of the arc being given: ſuppoſe the arc A E, the given ſine A D, and the tangent required E F. Since both the ſine and tangent are perpendicular to the radius E C, they are parallel to each other. Wherefore as the coſine D C is to the ſine A D, ſo is the whole ſine to the tangent E F. See SINE.

Hence, a canon of ſines being had, a canon of tangents is eaſily conſtructed from it.

TANGENTS, *Artificial*, are the logarithms of the tangents of arcs.

TANGENTS, *Line of*, is a line uſually placed on the ſector, and Gunter's ſcale; the deſcription and uſes of which, ſee under SECTOR.

TANGENT *of a Conic Section*, as of a parabola, is a right line, which only touches or meets the curve in one point, and does not cut or enter within the curve. See CONIC *Sections*.

TANGENTS, *Method of*, is a method of drawing tangents to any algebraical curve, or of determining the magnitude of the tangent and ſub-tangent, the equation to the curve being given.

The method of tangents is nearly related to that of *maxima et minima*; and the ſame authors, who in the early ſtate of algebra attempted one of thoſe caſes, never failed of touching alſo on the other. Hence we have the methods of Deſcartes, Fermat, Roberval, Hudde, &c. We have already explained under the article MAXIMA *et Minima*, the ſeveral methods of theſe authors relating to the latter ſubject; and as their methods of tangents differ in no reſpect from this, we ſhall not repeat them again in this place, but merely explain the principle which led to ſo intimate a connection between the two problems.

Deſcartes' Method of Tangents.—It has been ſhewn under the article above referred to, that Deſcartes' method of maxima and minima, depended upon his making two roots of his equation equal to each other, and the ſame principle led him alſo to his problem of tangents.

Let us conceive, for example, a curve A B b, (*Plate* XIV. *Analyſis*, *fig.* 16.) deſcribed on an axis A C; and from any point in this axis, C, as a centre, let there be deſcribed a circle, which ſhall cut the curve at leaſt in two points, as B, b; from theſe draw two ordinates, which will neceſſarily be common both to the circle and curve: let us now imagine the radius of this circle to decreaſe, while its centre remains fixed; and it is obvious that thus the two points of interſection will approach each other, and finally coincide, in which caſe the circle will touch the curve at the point E, and the tangent at that point will be common to both, and perpendicular to the radius of the circle at that point. Thus the problem of determining the tangent to a curve, is reduced to finding the poſition of a perpendicular to the curve, drawn from any point in its axis. In order to effect this, Deſcartes ſought, in a general manner, the points of interſection in the curve made by a circle deſcribed with a given radius from a given point in the axis. He thus arrived at an equation, which, in the caſe of two interſections, ought to contain two unequal roots, expreſſing the diſtance of the two ordinates from the vertex of the curve. But when the two points of interſection are united in one, as in the caſe of the circle touching the curve, then the two roots of the equation are neceſſarily equal to each other. His object, therefore, was, in the equation firſt obtained, and of which the co-efficients were indeterminate, to give them ſuch values, that the two roots ſhould be equal; for which purpoſe, he compared the propoſed equation with an equation of the ſame degree, having two equal roots; and hence, by equating the co-efficients, obtained the value of thoſe in his firſt equation.

In order to illuſtrate this, let A B b (*fig.* 16.) be a parabola, and B b a circle. Make C A $= a$, A D $= x$, the radius C B $= r$, then C D $= a - x$; and ſince the ordinate B D belongs to the circle, we have

$$y^2 = r^2 - \mathrm{CD}^2 = r^2 - (a - x)^2 = r^2 - a^2 + 2ax - x^2.$$

But the ſame ordinate belonging alſo to the parabola, we have from the known property of that curve, $y^2 = px$, p being the parameter; therefore

$$r^2 - a^2 + 2ax - x^2 = px, \text{ or}$$
$$x^2 + (p - 2a)x + (a^2 - r^2) = 0,$$

which, being an equation of the ſecond degree, muſt neceſſarily have two roots, or values, of x, anſwering to the two abſciſſes A D, A d: for we ſhould arrive at the ſame concluſion, if our equation had been deduced with reference to the point b; and it is obvious that theſe roots depend entirely upon the relation of the co-efficients $(p - 2a)$ and $(a^2 - r^2)$, or upon the ratio of the quantities a, p, and r, to each other; and, conſequently, ſuch values may be given to theſe quantities, that the two values of x may be equal.

In order to find this ratio, Deſcartes formed an equation of the ſecond degree, having two equal roots, as $x^2 - 2ex + e^2 = 0$, *viz.* $(x - e)(x - e) = 0$; and comparing this with that found above, he obtained the equation $x - a =$ C D $= \frac{1}{2}p$, which ſhews that in the parabola, the ſubnormal is equal to half the parameter; whence it alſo follows, that the ſub-tangent is equal to double the abſciſs, which is the known property of the curve.

Deſcartes had alſo another method for tangents, a little different from the above in practice, although it was the ſame in principle; thus he conceived a right line to revolve about a fixed point in the axis of the curve produced, which at firſt ſhould cut the curve in a certain number of points, but by its revolution, theſe points of interſection approaching each other would finally coincide, and thus the revolving line become a tangent to the curve. For this purpoſe he alſo firſt obtained the general equation, which he afterwards equated with another having two equal roots, and thus determined the ſeveral relations of his indeterminate co-efficients, exactly as in the caſe above given.

Fermat's Method of Tangents.—It will be found by comparing the above method of tangents of Deſcartes, with that of his maxima and minima, that the two ultimately depend upon the ſame principle, *viz.* of making two roots of an equation equal to each other; and the coincidence of Fermat's methods for theſe two problems is ſtill more obvious; in fact, he ſcarcely treats of them as diſtinct caſes, but refers immediately for the ſolution of the caſe of tangents to that of his maxima and minima. In order, ſays this author, that a line may be a tangent to a curve, as for example to the parabola A B b, at the point b, (*fig.* 17.) it is evident that every ordinate, except B C, will meet that tangent beyond the curve, as in C. Thus the ratio of B C^2 : ce^2, which is the ſame as C D^2 : c D^2, will be leſs than that of C B^2 : cb^2, or than that of C A to c A; but if we ſuppoſe theſe ratios to be the ſame, and conſequently the diſtance c C to vaniſh, the points B, b, will coincide, and we ſhall have an equation, which, treated in the ſame manner as in his method *de maximis et minimis*, will give the ratio of C D : C A.

As

As to the methods propoſed by Hudde, Roberval, Huygens, &c. they differ from thoſe given above, only in the ſame manner as in their methods of maxima and minima; it would therefore be uſeleſs to deſcribe them in this place.

Barrow's Method of Tangents.—It is obvious from what is ſaid above, and what has been ſtated under the article MAXIMA *et Minima*, that both the method of tangents, and that for the greateſt and leaſt ordinates, were very nearly related to the preſent fluxional way of treating the ſame ſubjects; but with regard to tangents, a ſtill nearer approach was made by Dr. Barrow.

This accurate geometer conſidered the little triangle formed by the difference of the two ordinates, their diſtance from each other, and the indefinitely ſmall part of the curve, as ſimilar to that which is formed by the ordinate, the tangent, and ſub-tangent. He then ſought by the equation of the curve, the ratio of the two ſides ba, Ba, (*fig.* 18.) of the triangle Bba, when the difference of the ordinates is infinitely little; and then ſaid, as $ba : Ba ::$ ordinate BP : the ſub-tangent TP.

In the caſe of the parabola, for example, whoſe equation is $y^2 = px$; ſuppoſing Pp the increaſe of the abſciſs $= e$, and ba the correſponding increaſe of the ordinate $y = a$; then the equation for the ordinate pb becomes

$$(y + a)^2 = p\,(x + e), \text{ or}$$
$$y^2 + 2ay + a^2 = px + pe.$$

Subtracting from both ſides $y^2 = px$, there remains
$$2ay + a^2 = pe.$$

Alſo a being itſelf infinitely ſmall, its ſquare a^2 may be entirely neglected, and there reſults $2ay = pe$; therefore $a : e :: p : 2y$; but $a = ba$, and $e = Ba$, alſo $y = \sqrt{px}$; therefore, from the propoſition ſtated above, *viz.*

$$ab : aB :: \text{ordinate} : \text{ſubtangent},$$

we have

$$p : 2\sqrt{px} :: \sqrt{px} : 2x, \text{ the ſubtangent required.}$$

Such were the principles employed in the ſolution of this intereſting problem prior to the brilliant diſcovery of the fluxional calculus, which from its generality ſupplanted them all, and they are now therefore merely matters of hiſtorical curioſity; but as they exhibit the flow and progreſſive advances of genius and ſcience towards an ultimate ſtate of perfection, they are highly deſerving of the attention of the mathematician, who will find in them much to admire; they will at the ſame time enable him duly to appreciate the tranſcendant talents of that great philoſopher, who formed out of them one general and comprehenſive principle of ſolution, which will apply with equal facility to algebraical curves of every order.

The Method of Tangents according to the Doctrine of Fluxions.—Its uſe is very great in *Geometry;* becauſe in determining the tangents of curves, we determine at the ſame time the quadrature of the curvilinear ſpaces: on which account it well deſerves to be here particularly inſiſted on.

To find the Sub-tangent in any algebraic Curve.—Let the propoſed curve be AMO (*Plate* XIV. *Anal. fig.* 19.), and the right line TMQ a tangent to it at the point M; let the ſemiordinate pm be infinitely near another PM, and MR parallel to AH; then the relative celerities of the point M, moving along the curve from A towards O, in the directions MR and PM, with which AP and PM increaſe in this poſition, will be truly expreſſed by MR and Rm; but the celerities by which quantities increaſe are as the fluxions of thoſe quantities; therefore (Mm being the fluxion of the curve line AM) MR and Rm are the correſponding fluxions of the abſciſs AP, and the ordinate PM; and, becauſe the triangles MmR and TMP are ſimilar, we have Rm : MR :: PM : PT. Let, therefore, the abſciſs AP be put $= x$, and the ordinate PM $= y$, and we ſhall have $\dot{y} : \dot{x} :: y : \frac{y\dot{x}}{\dot{y}} = $ PT. By means of this general expreſſion for the ſub-tangent, and the equation of the curve expreſſing the relation between x and y, the ratio of the fluxions $\dot{x}$ and $\dot{y}$ will be found, and from thence the length of the ſub-tangent; whence the tangent itſelf may be eaſily determined and drawn. This we ſhall illuſtrate in the following examples:

I. The equation defining a circle is $ax - xx = y^2$; and by taking the fluxions of theſe quantities, $a\dot{x} - 2x\dot{x} = 2y\dot{y}$; conſequently $\frac{\dot{x}}{\dot{y}} = \frac{2y}{a - 2x} = \frac{y}{\frac{1}{2}a - x}$; and, multiplying both ſides by y, we have $\frac{y\dot{x}}{\dot{y}} = \frac{y^2}{\frac{1}{2}a - x} =$ the ſub-tangent PT (ſee *fig.* 20.); whence $(\frac{1}{2}a - x)$, or AC − AP, *i.e.* CP : (y) PM :: (y) PM : PT; a property of the circle deduced from the principles of common geometry.

II. The equation defining the common parabola is $ax = y^2$, a being the parameter, x the abſciſs, and y the ordinate; hence $a\dot{x} = 2y\dot{y}$, and $\frac{\dot{x}}{\dot{y}} = \frac{2y}{a}$; conſequently, $\frac{y\dot{x}}{\dot{y}} = \frac{2y^2}{a} = \frac{2ax}{a} = 2x$; therefore the ſub-tangent PT (*fig.* 19.) is the double of its correſponding abſciſs AP; which is a well-known property of the parabola.

III. The general equation for parabolas of any kind being $a^m x^n = y^{m+n}$; we have $n a^m x^{n-1}\dot{x} = \overline{m+n} \times y^{m+n-1}\dot{y}$; and, therefore, $\frac{\dot{x}}{\dot{y}} = \frac{\overline{m+n} \times y^{m+n-1}}{n a^m x^{n-1}}$; whence $\frac{y\dot{x}}{\dot{y}} = \frac{\overline{m+n} \times y^{m+n}}{n a^m x^{n-1}} = \frac{\overline{m+n} \times a^m x^n}{n a^m x^{n-1}}$ (becauſe $y^{m+n} = a^m x^n$) $= \frac{\overline{m+n}}{n} \times x =$ the true value of the ſub-tangent; which, therefore, is to the abſciſs in the conſtant ratio of $m + n$ to n.

IV. The equation defining an ellipſis is $b^2 \times \overline{ax - x^2} = a^2 y^2$, AP (*fig.* 21.) being $= x$, MP $= y$, AB $= a$, and the leſſer axis $= b$; for by the property of the ellipſis, we have $a^2 : b^2 :: \overline{ax - x^2}$ (AP × PB) : y^2 (MP²); and, therefore, $b^2 \times \overline{ax - x^2} = a^2 y^2$; whence $b^2 \times \overline{a\dot{x} - 2x\dot{x}} = 2a^2 y\dot{y}$, and $\frac{\dot{x}}{\dot{y}} = \frac{2a^2 y}{b^2 \times \overline{a - 2x}}$; and, conſequently, the ſub-tangent PT $\left(\frac{y\dot{x}}{\dot{y}}\right) = \frac{2a^2y^2}{b^2 \times \overline{a - 2x}} = \frac{a^2y^2}{b^2 \times \overline{\frac{1}{2}a - x}} = \frac{b^2 \times \overline{ax - x^2}}{b^2 \times \overline{\frac{1}{2}a - x}} = \frac{\overline{ax - x^2}}{\overline{\frac{1}{2}a - x}}$: whence the point T being given, through which the tangent muſt paſs, the tangent itſelf may be drawn.

V. Becauſe the equation, exhibiting the nature of all

kinds

kinds of ellipſes, (putting a and c for the two principal diameters) is $\overline{a-x}|^m \times x^n = \frac{c}{a} \times y^{m+n}$, we ſhall have $-m\dot{x} \times \overline{a-x}|^{m-1} \times x^n + n\dot{x}x^{n-1} \times \overline{a-x}|^m = \frac{c}{a} \times \overline{m+n} \times y^{m+n-1}\dot{y}$; and, therefore, $\frac{y\dot{x}}{\dot{y}} =$

$$\frac{\frac{c}{a} \times \overline{m+n} \times y^{m+n}}{-m \times \overline{a-x}|^{m-1} \times x^n + nx^{n-1} \times \overline{a-x}|^m} =$$

$$\frac{\overline{m+n} \times \overline{a-x}|^m \times x^n}{-mx^n \times \overline{a-x}|^{m-1} + nx^{n-1} \times \overline{a-x}|^m}$$ (becauſe $\frac{c}{a} \times y^{m+n} = \overline{a-x}|^m \times x^n$) $= \frac{\overline{m+n} \times \overline{a-x} \times x}{-mx + n \times \overline{a-x}} = \frac{\overline{m+n} \times \overline{ax-x^2}}{na - \overline{n+m} \times x}$ = the ſubtangent required.

VI. The equation defining the hyperbola is $c^2 \times \overline{ax + x^2} = a^2y^2$, a and c being uſed to denote the two principal diameters; whence we have, $c^2 \times \overline{a\dot{x} + 2x\dot{x}} = 2a^2y\dot{y}$; conſequently $\frac{\dot{x}}{\dot{y}} = \frac{a^2y}{c^2 \times \overline{\frac{1}{2}a + x}}$; and $\frac{y\dot{x}}{\dot{y}} = \frac{a^2y^2}{c^2 \times \overline{\frac{1}{2}a + x}} = \frac{c^2 \times \overline{ax + x^2}}{c^2 \times \overline{\frac{1}{2}a + x}} = \frac{\overline{ax + x^2}}{\frac{1}{2}a + x}$ = the ſubtangent; whence the diſtance of the point of interſection of the tangent and axis from the vertex, which is equal to the difference of the ſub-tangent and abſciſs, may be found; for $\frac{ax + x^2}{\frac{1}{2}a - x} - x = \frac{\frac{1}{2}ax}{\frac{1}{2}a - x}$; and, therefore, that point being given, the tangent may be eaſily drawn.

The manner of drawing tangents to all ſorts of hyperbolas univerſally, will be the ſame as in the ellipſes, the equations of the two kinds of curves differing in nothing but their ſigns.

After the manner above explained, the ſubtangent, in curves whoſe abſciſſes are right lines, may be determined; but if the abſciſs, or line terminating the ordinate, on the lower part, be another curve, then the tangent may be drawn as in the following example.

VII. Let the curve B R F (*Plate* XIV. *Anal. fig.* 22.) be a cycloid; whoſe abſciſs is here ſuppoſed to be the ſemicircle B P A, to which let the tangent P T be drawn, as above. Moreover, let r R H be a tangent to the cycloid, at the correſponding point R, and let G R e be parallel to T P v; putting the arc, or abſciſs, B P $= z$, its ordinate P R $= y$, A F $= b$, and B P A $= c$; then, by the property of the cycloid, we ſhall have c (B P A) : b (A F :: z (B P) : y (P R)); therefore $y = \frac{bz}{c}$, and $\dot{y} = \frac{b\dot{z}}{c} = re$. But by ſimilar triangles, re ($\dot{y}$) : R e (= P v $= \dot{z}$) :: P R (y) : P H $= \frac{y\dot{z}}{\dot{y}} = z$ (becauſe $y = \frac{bz}{c}$); conſequently, if in the right line P T, there be taken P H equal to the arc P B, we ſhall have a point H, through which the tangent of the cycloid muſt paſs.

The preceding examples relate to curves, whoſe ordinates are parallel to each other. We ſhall now briefly illuſtrate the method of drawing tangents to curves of the ſpiral kind, all whoſe ordinates iſſue from a point: ſuch as the ſpiral B A G (*Plate* XV. *Anal. fig.* 1.) whoſe ordinates, C B, C A, C G, are referred to the point C, called the centre of the ſpiral. Let S A N be a tangent to the ſpiral at any point A, and let C T be perpendicular to it, and let the arc C B A (conſidered as variable by the motion of A towards G) be denoted by z, and the ordinate C A by y. Then $\dot{z} : \dot{y}$ :: A C (y) : A T $= \frac{y\dot{y}}{\dot{z}}$. Hence, if upon C A, as a diameter, a ſemicircle be deſcribed, and in it, from A, a right line equal to $\frac{y\dot{y}}{\dot{z}}$ be inſcribed, that right line will be a tangent to the ſpiral at the point A.

VIII. Let the nature of the curve C B A be ſuch, that the arc C B A may be, always, to its correſponding ordinate C A in a conſtant ratio, *viz.* as a to b: then, becauſe $z : y :: a : b$, we have $z = \frac{ay}{b}$, and $\dot{z} = \frac{a\dot{y}}{b}$; and, conſequently, A T $\left(\frac{y\dot{y}}{\dot{z}}\right) = \frac{by}{a} = \frac{b}{a} \times$ A C: therefore A C and A T being in a conſtant ratio, the angle C A T muſt alſo be invariable; which is a known property of the logarithmic ſpiral.

IX. Let B A A (*fig.* 2.) be the ſpiral of Archimedes; whoſe nature is ſuch, that the part E A of the generating ordinate, intercepted by the ſpiral, and a circle, B E D, deſcribed about the ſame centre C, is always in a conſtant ratio to the correſponding arc B E of that circle. Suppoſe A n perpendicular to A C; B C $= c$, C A $= y$, and the given ratio of A E to B E, that of b to c; then $b : c :: y - c$ (A E) : $\frac{cy - cc}{b}$ = B E; whoſe fluxion is $= \frac{c\dot{y}}{b}$. If the right line C E A a be ſuppoſed to revolve about the centre C, the angular celerity of the generating point A, in the perpendicular direction A n, will be to that of E, as A C to E C; and as the latter of theſe celerities is expreſſed by $\frac{c\dot{y}}{b}$, the former will be expreſſed by $\frac{y}{c} \times \frac{c\dot{y}}{b}$, or $\frac{y\dot{y}}{b}$; which is to $\dot{y}$, the celerity of A in the direction A a, as $\frac{y}{b}$ to unit, or as y to b. Conſequently, C T and A T are in the ſame ratio, and A C : C T :: $\sqrt{yy + bb}$: y; and A C : A T :: $\sqrt{yy + bb} : b$; whence C T and A T are given, equal to $\frac{y^2}{\sqrt{yy + bb}}$, and $\frac{by}{\sqrt{yy + bb}}$ reſpectively; from either of which expreſſions the tangent A T may be drawn; and, in the ſame manner, may the poſition of the tangent of any other ſpiral be determined. Simpſon's Flux. vol. i. ſect. 3.

As to the method of inveſtigating tangents by fluxions, ſee Macl. Flux. book i. c. 7. where it is demonſtrated independently of infiniteſimals.

To

To determine the tangents of curves, fuppofed to be defcribed by the interfections of right lines revolving about given poles, fee Mr. Maclaurin's Fluxions, art. 210, feq. In finding the tangents of curves by the method of infinitefimal differences, it has been objected that the conclufion is found by a double error. 1. By taking the curve for a polygon of an infinite number of fides. 2. By the falfe rule for taking the differential of a power. But there is no need of fuch fuppofitions in the method of fluxions, for it may be geometrically demonftrated, that the fluxions of the bafe, ordinate, and curve, are in the fame proportion to each other, as the fides of a triangle refpectively parallel to the bafe, ordinate, and tangent. When the bafe is fuppofed to flow uniformly, if the curve be convex towards the bafe, the ordinate and curve increafe with accelerated motions; but their fluxions at any term are the fame as if the point which defcribes the curve had proceeded uniformly from that term in the tangent. Any farther increment which the ordinate or curve acquires, is to be imputed to the acceleration of the motions with which they flow. See Maclaurin's Fluxions, book i. chap. vii. and viii.

Any two arcs of curve lines touch together, when the fame right line is the tangent of both at the fame point. But when they are applied to each other in this manner, they never perfectly coincide, unlefs they be fimilar arcs of fimilar and equal figures.

In the Philofophical Tranfactions, we have the following method of drawing tangents to all geometrical curves, without any labour or calculation, by M. Slufius.

Suppofe a curve, as D Q (*Plate* XV. *Anal. fig.* 3.) whofe points are all referrible to any right line given, as E A B, whether that right line be the diameter or not; or whether there be more given right lines than one, provided their powers do but come into the equation. In all his equations, he puts v for the line D A, y for B A; and for E B, and the other given lines, he puts b, d, &c. that is, always confonants only.

Then, fuppofing D C to be drawn touching the curve in D, and meeting with E B produced in C, he calls the fought line, C A, by the name of a.

To find which, he gives this general method. 1. Reject out of the equation all members which have not either v or y in them; then put all thofe that have y on one fide, and all thofe which have v on the other; with their figns + or −; and the latter, for diftinction and eafe fake, he calls the right, the former the left fide. 2. On the right fide, let there be prefixed to each member the exponent of the power, which v hath there; or, which is the fame thing, let that exponent be multiplied into all the members. 3. Let the fame be done alfo on the left fide, multiplying each member there by the power of the exponent of y; adding this moreover, that one y muft, in each part, be changed into a. This done, the equation thus reformed will fhew the method of drawing the required tangent to the point D; for, that being given, as alfo y, v, and the other quantities expreffed by confonants, a cannot be unknown. Suppofe an equation $by - yy = vv$, in which E B is called b; B A $= y$, D A $= v$, and let a, or A C, be required fo as to find the point C, from whence C D being drawn, fhall be a true tangent to that curve Q D in D. In this example, nothing is to be rejected out of the equation, becaufe y or v are in each member: it is alfo difpofed, as required by the rule 1; to each part, therefore, there muft be prefixed the exponent of the powers of y or v, as in the rule 2; and on the left fide, let one y be changed into a, and then the equation will be in this form, $ba - 2ya = 2vv$, which equation reduced, gives eafily the value of $a = \frac{2vv}{b - 2y} =$ A C. And fo the point C is found, from which the tangent D C may be drawn.

To determine which way the tangent is to be drawn, whether towards B or E, he directs to confider the numerator and denominator of the fraction. For, 1. If in both parts of the fraction all the figns are affirmative; or if the affirmative ones are more in number; then the tangent is to run towards B. 2. If the affirmative quantities are greater than the negative in the numerator, but equal to thofe in the denominator, the right line drawn through D, and touching the curve in that point, will be parallel to A B; for in this cafe a is of an infinite length. 3. If in both parts of the fraction the affirmative quantities are lefs than the negative, changing all the figns, the tangent muft be drawn now alfo towards B; for this cafe, after the change, comes to be the fame as the firft. 4. If the affirmative quantities are greater than the negative in the denominator, but in the numerator are lefs, or *vice verfâ*, then changing the figns in that part of the fraction where they are lefs, the tangent muft be drawn a contrary way; that is, A C muft be taken towards E. 5. But whenever the affirmative and negative quantities are equal in the numerator, let them be how they will in the denominator, a will vanifh into nothing: and, confequently, the tangent is either A D itfelf, or E A, or parallel to it; as will eafily be found by the data. This he gives plain examples of, in reference to the circle, thus: let there be a femicircle, whofe diameter is E B; in which there is given any point, as D (*fig.* 4.), from which the perpendicular D A is let fall to the diameter. Let D A $= v$, B A $= y$, B E $= b$: then the equation will be $by - yy = vv$, and drawing the tangent D C, we have A C, or $a = \frac{2vv}{b - 2y}$. Now, if b be greater than $2y$, the tangent muft be drawn towards B; if lefs, towards E; if it be equal to it, it will be parallel to E B, as was faid in the firft, fecond, and fourth rules.

Let there be another femicircle inverted, as N D D (*fig.* 5.), the points of whofe periphery are referred to the right line B E, parallel and equal to the diameter. Let N B be called d, and all things elfe as before; then the equation will be $by - yy = dd + vv - 2dv$; which being managed according to his rules, you have $a = \frac{2vv - 2dv}{b - 2y}$.

Now, fince v here is fuppofed to be always lefs than d; if b be greater than $2y$, then the tangent muft be drawn towards E; if equal, it will be parallel to B E; if lefs, changing all the figns, the tangent muft be drawn towards B, as by rules fourth, fifth, and third. But there could be no tangent drawn, or at leaft E B would be it, if N B had been taken equal to the diameter. Let there be another femicircle, whofe diameter N B (*fig.* 6.) is perpendicular to E B, and to which its points are fuppofed to be referred.

Let N B be called b, and all things elfe as above; the equation will be $yy = bv - vv$, and $a = \frac{bv - 2vv}{2y}$. If, now, b be greater than $2v$, the tangent muft be drawn towards B; if lefs, towards E; if equal, D A will be the tangent, as appears by rules fourth and fifth.

Tangents, *Inverfe Method of*, is a method of finding the equation, or the conftruction, of any curve; from the tangent

gent of any other line, whose determination depends on the tangent given.

This method is also one of the great results of the new *calculus integralis*.

Its application we shall give in what follows. The fluxional expressions of the tangent, sub-tangent, &c. being delivered under the last article, if you make the given value equal to the fluxional expression, and either sum up the fluxional equation, or, if that cannot be, construct it, the curve required is had. For example:

1. *To find the curve-line, whose sub-tangent* $= \frac{2y^2}{a}$.

Since the sub-tangent of an algebraic line is $= \frac{y\dot{x}}{\dot{y}}$; we have $\frac{y\dot{x}}{\dot{y}} = \frac{2y^2}{a}$, and $ay\dot{x} = 2y^2\dot{y}$, and $a\dot{x} = 2y\dot{y}$; therefore (taking the fluents by the inverse method of fluxions) $ax = y^2$.

The curve sought, therefore, is a parabola; whose construction is shewn under PARABOLA.

2. *To find the curve, whose sub-tangent is a third proportional to* $\frac{1}{2}a - x$ and y. Since $\frac{1}{2}a - x : y :: y : \frac{y\dot{x}}{\dot{y}}$, we have $\frac{1}{2}a - x : y \; (:: y\dot{y} : y\dot{x}) :: \dot{y} : \dot{x}$; consequently $\frac{1}{2}a\dot{x} - x\dot{x} = y\dot{y}$, and, taking the fluents, $\frac{1}{2}ax - \frac{1}{2}x^2 = \frac{1}{2}y^2$, i. e. $ax - x^2 = y^2$. The curve sought is, therefore, a circle.

3. *To find a line, wherein the sub-tangent is equal to the semiordinate.* Since $\frac{y\dot{x}}{\dot{y}} = y$; $y\dot{x} = y\dot{y}$, and $\dot{x} = \dot{y}$; therefore $x = y$.

Hence it appears, that the line sought is a right line, which respects the cathetus of an equicrural triangle, as an axis, or the hypothenuse of an equicrural rectangled triangle. If x had been taken for the arc of a circle, the line sought had been a cycloid.

TANGER, in *Geography*, a river of Westphalia, which runs into the Elbe at Tangermunde.

TANGERE, *Noli me*. See NOLI.

TANGERMUNDE, in *Geography*, a town of Westphalia, in the Old Mark of Brandenburg, situated on the Elbe, where vessels pay a toll: the chief trade of the town is brewing; 24 miles N. of Magdeburg. N. lat. 52° 32′. E. long. 12° 2′.

TANGHOO, or TENHOA, a capital of a province of Tonquin, situated on a small river near the W. coast of the gulf of Cochinchina. Rice and cattle constitute the chief riches of the province. The town is called "Cuabang." N. lat. 19° 40′.

TANGIA, a town of Arabia, in the province of Hedsjas; 50 miles W.N.W. of El Catif.

TANGIBLE. See TACTILE.

TANGIER ISLANDS, in *Geography*, several islands of the Chesapeak, near the coast of Maryland, opposite to the mouth of the Potomack. N. lat. 38° 12′. W. long. 76° 12′.

TANGIERS, anciently called *Tinjis* and *Tingia*, and now by the Arabs *Tinjiah*, a town of Africa, in Fez, situated at the western mouth of the straits of Gibraltar, about a day's journey from Tetuan. This town was first possessed by the Romans, who took it under Sertorius; next by the Goths; and it was surrendered by count Julian to the Saracens. It was taken in 1471 by Alonso, king of Portugal; and given to Charles II., king of England, in 1662, as a marriage portion with the princess Catherine of Portugal. The English abandoned it in 1684, after destroying the mole and fortifications. Although now almost in ruins, it still retains some batteries, in tolerable condition, facing the bay; at the bottom of which are a river, and the remains of the bridge of Old Tangiers; but on account of the accumulated sand, the bridge, if it had continued, as well as the river, would be useless. The bay of Tangiers, independently of Ceuta, is so situated, being the narrowest part of the straits, that it must be favourable to Moorish piracy; but Tangiers can never be a commercial town, as it has few productions in its vicinity; the Spaniards, however, formerly shipped in this place, eggs, vegetables, and some fruits; and the English at present obtain supplies for their garrison at Gibraltar. The bay of Tangiers is not very safe when the wind is in the west, having been encumbered by the ruins of the mole and fortification, as the cables are liable to be rent, and the ships to be driven on shore. The best anchorage for frigates and the larger vessels, is at the eastern point, whence they may easily sail whatever way the wind sets: however, the bay is only dangerous in winter; 108 miles N.N.W. of Fez, and 38 W.S.W. of Gibraltar. N. lat. 35° 42′. W. long. 5° 50′. Chenier's Morocco.

TANGLAKE, in *Ichthyology*, the viviparous blenny of Pennant; the mustela vivipara of Willughby, Ray, &c.; and the blennius viviparus of the Linnean system.

TANGMEW, in *Geography*, a town of the Birman empire, on the right bank of the Ava; 10 miles N.W. of Prome.

TANGO, a town of Japan, in the island of Niphon; 65 miles S.W. of Meaco.

TANGOLOTANGO, a seaport town of Mexico, in the province of Guaxaca, near the gulf of Mexico; 100 miles S.S.E. of Guaxaca. N. lat. 16° 8′. W. long. 97° 36′.

TANGONE, a town of New York; 9 miles W. of Kingston.

TANGOUZI, a town on the east coast of Madagascar. S. lat. 19° 5′. E. long. 49° 12′.

TANGOUZLIO, a town of Asiatic Turkey, in Natolia; 70 miles E.S.E. of Smyrna.

TANGU, a city of Pegu, and capital of a province which was formerly a kingdom; situated a considerable distance to the north of Pegu.

TANGUEY, or TONGUEY, a town of Chili, on the coast. S. lat. 30° 30′.

TANGUIA, a river of Chinese Tartary, which rises near mount Ilha, and running nearly south, falls into the river Ya-lou-kiang.

TANGULAW, a small island in the Spanish Main, near the Mosquito shore. N. lat. 13° 35′. W. long. 83° 55′.

TANGUT. See THIBET.

TANG-YANG, a lake of China, about thirty miles in circumference; 32 miles N. of Hoai-ngan.

TANIALA, a town of Hindoostan, in Palnaud; 25 miles E.N.E. of Timerycotta.

TANIBOUCA, in *Botany*, a Caribæan name, to be tolerated only till the genus is properly understood.—Aubl. Guian. 448. Juss. 76.—Class and order, *Decandria Monogynia*. Nat. Ord. *Elæagni?* Juss.

Gen. Ch. *Cal.* Perianth superior, of one leaf, bell-shaped, internally downy; its limb in five deep, roundish, acute segments. *Cor.* none. *Stam.* Filaments ten, thread-shaped, inserted into the tube of the calyx, as long as its limb; anthers oval, of two lobes. *Pist.* Germen inferior, roundish; style solitary, thread-shaped, curved; stigma simple. *Peric.* . . . .

Eff. Ch. Calyx bell-fhaped, five-cleft, fuperior. Corolla none. Fruit . . . . .

1. T. *guianenfis.* Aubl. t. 178.—Native of marfhes in Guiana, flowering in May. A *tree*, whofe trunk is twenty feet, or more, in height, and two feet in diameter, with a whitifh, light and brittle wood; the bark greyifh. *Branches* fpreading every way; their young fhoots leafy at the ends. *Leaves* deciduous, alternate, ftalked, obovate, pointed, entire, coriaceous, fmooth; the largeft feven inches long, and three broad. *Spikes* axillary, folitary, ftalked, about three or four inches long, of many fmall, alternate, greenifh, fragrant *flowers*, clothed internally with white hairs. Aublet not having met with the *fruit*, nor having been able to determine any thing of the internal ftructure of the minute *germen*, we are left in great doubt as to the effential character of this genus, and even its natural order. Nothing is recorded of its ufe or qualities.

TANICHI, in *Geography*, a town of Hindooftan, in the Carnatic; 16 miles S.S.W. of Tritchinopoly.

TANILA, a river of Mexico, which runs into the gulf of Mexico, N. lat. 18° 10′. W. long. 95° 6′.

TANINGE, a town of France, in the department of the Leman; 24 miles S.E. of Geneva.

TANJONG *Currang*, a town on the weft coaft of the ifland of Lombock. S. lat. 8° 31′. E. long. 115° 48′.

TANJONG *Putus*, a town of Malacca, on the north fide of the river Pera, where the Dutch have a factory.

TANJORE, a country of Hindooftan, included in the Carnatic; bounded on the north and weft by part of the Carnatic, and on the eaft and fouth by the gulf of Bengal: about ninety-five miles in length from north to fouth, and fifty in breadth from eaft to weft; watered by the river Cauvery, which divides itfelf into feveral ftreams. Though forming a part of the Carnatic, it is governed by a prince or rajah, and pays an annual fubfidy to the Englifh of 160,000*l.* fterling.

TANJORE, a town of Hindooftan, and capital of a country to which it gives name, fituated in a plain between two branches of the Cauvery; including the fuburbs, about two leagues in circumference; a double wall and a large ditch are the only defence. The palace is fituated to the eaft of the town, and is a grand fquare, fortified with a wall and a wet ditch, abounding in crocodiles. It was originally only a pagoda. In 1773, this city was taken by the Britifh under general Jofeph Smith; 176 miles S.E. of Seringapatam. N. lat. 10° 46′. E. long. 79° 10′.

TANIS, in *Ancient Geography*, a town of Egypt, fituated between the Mendefian mouth of the Nile towards the weft, and the Pelufian mouth to the eaft. It lay on a fmall branch of the Nile, and gave its name to one of the mouths of the river. This town was the capital of the nome called Tanites.

TANISTRY, TANISTRIA, an ancient municipal law, or tenure, which allotted the inheritance of lands, caftles, &c. held by this tenure, to the oldeft and moft worthy and capable perfon of the deceafed's name and blood, without any regard to proximity. This, in reality, was giving it to the ftrongeft; and this naturally occafioned bloody wars in families; for which reafon it was abolifhed under king James I.

Sir John Davies defcribes it thus: " Quant afcun perfon moruft feifie des afcuns caftles, manors, terres ou tenements del *nature et tenure de teniftry*; que donques mefmes le caftles, &c. doent defcender, et de temps dont memory ne court ont ufe de defcender, *Seniori et digniffimo viro fanguinis et cognominis* de tiel perfon," &c.

TANITICUM OSTIUM, in *Ancient Geography*, the name of the fixth mouth of the Nile, in paffing from the weft to the eaft.

TANKABAT, in *Geography.* See TANTABEE.

TANKARD TURNIP, in *Agriculture*, the common Englifh name of a particular fort of this kind of root, which has the property of ftanding high above the ground. It is a good fort for feeding off before the froft fets in, in the winter feafon; but after that has taken place, it is not fo valuable or ufeful, as being more liable to be injured and affected by it than the other forts, in confequence of ftanding expofed fo much above the furface of the land. See TURNIP.

TANKERDSONG, in *Geography*, a town of Thibet; 230 miles E. of Laffa. N. lat. 29° 50′. E. long. 100°.

TANKESIR, a town of Perfia, near the gulf; 9 miles N. of Bufheer.

TANKISA, a town and fortrefs of Thibet, at the foot of a mountain, which is faid to exhale fuffocating fumes; 120 miles N.W. of Taffafudon. N. lat. 28° 23′. E. long. 87° 20′.

TANKROWAL, a town of Africa, in the kingdom of Kaen, with a factory belonging to the Englifh African company, near the river Gambia. The Portuguefe have a church there. The chief trade is in wax. N. lat. 13° 10′. W. long. 14° 27′.

TANKUNNY, a town of Hindooftan, in Berar; 20 miles W. of Ellichpour.

TANLAY, a town of France, in the department of the Yonne; 6 miles E. of Tonnerre.

TANLOCOM, a town of Mexico, in the province of Guafteca; 40 miles S.W. of St. Yago de los Valles.

TANNA, an ifland in the South Pacific ocean, and one of thofe called *New Hebrides*, difcovered by captain Cook in the year 1774; about twenty-two miles in length, and ten in breadth. The inhabitants would not fuffer captain Cook, or any of his company, to advance far into the ifland. The produce, as far as could be feen, is bread-fruit, plantains, cocoa-nuts, a fruit like a nectarine, yams, tarra, a fort of potatoe, fugar-cane, wild figs, a fruit like an orange, which is not eatable, and fome other fruits and nuts. Captain Cook doubts not but nutmegs likewife grow in this ifland. The bread-fruit, cocoa-nut, and plantains, are neither fo plentiful nor fo good as at Otaheite; on the other hand, fugar-canes and yams are not only in great plenty, but of fuperior quality, and much larger. One of the latter weighed fifty-fix pounds, every ounce of which was good; hogs did not feem to be fcarce; but they faw not many fowls. Thefe are the only domeftic animals they have. Land-birds are not more numerous than at Otaheite, and the other iflands; but they faw fome fmall birds, with a very beautiful plumage, which they had never feen before. There is a great variety of trees and plants. The inhabitants of this ifland, as well as thofe of Erromango, were at firft thought to be a race between the natives of the Friendly Iflands and thofe of Mallicollo; but upon further acquaintance, it was found that they had little or no affinity to either, except in their hair, which is generally black and brown, growing to a tolerable length, and very crifp and curly. Their beards, which are ftrong and briftly, are generally fhort. One of the languages which they fpeak is nearly, if not exactly, the fame with that of the Friendly Iflands: the other, which is alfo that of Erromango and Annatom, is properly their own. Thefe people are of the middle fize, rather flender than otherwife; many are little, but few tall or ftout; moft of them have good features and agreeable countenances, are, like all the

the tropical race, active and nimble, and feem to excel in the ufe of arms, but not to be fond of labour. Both fexes are of a very dark colour, but not black; nor have they the leaft characteriftic of the negro about them. They make themfelves blacker than they really are, by painting their faces with a pigment of the colour of black lead. They alfo ufe another fort, which is red; and a third fort, brown, or a colour between red and black. All thefe, but efpecially the firft, they lay on with a liberal hand, not only on the face, but on the neck, fhoulders, and breaft. The men wear nothing but a belt, and the wrapping-leaf, as at Mallicollo. The women have a kind of petticoat, made of the filaments of the plaintain-tree, flags, or fome fuch thing, which reaches below the knee. Both fexes wear ornaments, fuch as bracelets, ear-rings, necklaces, and amulets. The bracelets are chiefly worn by the men; fome made of fea-fhells, and others of thofe of the cocoa-nuts. The men alfo wear amulets; and thofe of moft value being made of a greenifh ftone, the green ftone of New Zealand is valued by them for this purpofe. Necklaces are chiefly ufed by the women, and made moftly of fhells; ear-rings are common to both fexes, and thofe valued moft are made of tortoife-fhell. Thefe people, befide the cultivation of ground, have few other arts worth mentioning. They know how to make a coarfe kind of matting, and a coarfe cloth of the bark of a tree, which is chiefly ufed for belts. The workmanfhip of their canoes is very rude; and their arms, with which they take the moft pains in point of neatnefs, come far fhort of fome others. Their weapons are clubs, fpears, or darts, bows and arrows, and ftones. The clubs are of three or four kinds, and from three to five feet long. Captain Cook knew no more of their cookery, than that it confifts of roafting and baking; for they have no veffels in which water can be boiled. Nor did he know that they had any other liquor but water, and the juice of the cocoa-nut. They were utter ftrangers to their religion, and but little acquainted with their government. They feem to have chiefs among them, at leaft fome were pointed out to him by that title; but they appeared to have very little authority over the reft of the people. They gave intimations that they practifed circumcifion, and that they allowed themfelves to eat human flefh; but captain Cook fays, that it admits of doubt whether they are cannibals. The ifland contains a very confiderable volcano, and fome hot fprings were difcovered, which raifed the thermometer from 80° to 170°, and in one place to 202°. Captain Cook named the harbour where he lay, *Port Refolution*, from the name of the fhip, which was the firft that had ever entered it: which is fituated in S. lat. 19° 32′ 25″. E. long. 169° 44′ 35″. The variation of the needle was 7° 14′ 12″ E.; and the dip of its fouth end 45° $2\frac{1}{3}$′. The time of high water on full and change days was about 5^h 45^m, and the tide rofe and fell three feet.

TANNA, a town of Hindooftan, in the ifland of Salfette, on the eaft coaft; 15 miles N.E. of Bombay. N. lat. 19° 13′. E. long. 72° 53′.

TANNA, or *Thann*, a town of Saxony, in the county of Reuffen; 17 miles S.W. of Greitz. N. lat. 50° 25′. E. long. 11° 57′.

TANNA *Balloo*, a fmall ifland in the Eaft-Indian fea, near the eaft coaft of Borneo. N. lat. 4° 52′. E. long. 118° 21′.

TANNA *Mera*, a fmall ifland in the Eaft-Indian fea, near the eaft coaft of Borneo. N. lat. 3° 45′. E. long. 117° 5′.

TANNAR, a town of Bengal; 35 miles E.S.E. of Moorfhedabad.

TANNAS, a town of Sweden, in Harjedalen; 15 miles N.W. of Langafchantz.

TANNASER, a town of Hindooftan, in the fubah of Delhi. This place was formerly held facred by the Hindoos. In 1011 it was taken by Mamhood, king of Gizni; 45 miles N.E. of Hiffar. N. lat. 29° 31′. E. long. 76° 20′.

TANNAY, a town of France, in the department of the Nievre; 16 miles S.S.E. of Clamecy.

TANNDORF, a town of the principality of Culmbach; 8 miles S. of Culmbach.

TANNEBERG, a town of Auftria; 8 miles S. of Aigen.

TANNED HIDE. See HIDE and LEATHER.

TANNENBERG, in *Geography*, a town of Pruffia, in the province of Oberland; 6 miles S.S.W. of Hohenftein. —Alfo, a town of Saxony, in the circle of Erzgebirg; 6 miles S.W. of Wolkenftein.

TANNER, THOMAS, in *Biography*, an Englifh prelate, and eminent antiquary, was the fon of a clergyman, who was vicar of the parifh of Market Levington, in Wiltfhire, where he was born in the year 1674. He entered into Queen's college, Oxford, in 1689, and having graduated as B.A., he removed to All-Souls college in 1694, of which he became a fellow in 1696. At the univerfity he devoted himfelf very much to the ftudy of antiquities, and in 1695 publifhed his "Notitia Monaftica," or "A fhort Account of the religious Houfes in England and Wales," which attracted notice; and foon after Dr. Moore, bifhop of Norwich, appointed him his chaplain, and in 1701 made him chancellor of his diocefe; which office led him to acquire an extenfive and correct acquaintance with municipal and ecclefiaftical law, fo that he was often confulted by the dignitaries of the church. Having married the bifhop's daughter, he obtained in fucceffion various preferments; and in 1710 he took the degree of D.D. In 1723 he became canon of Chrift-church, Oxford; in 1727, prolocutor of the lower houfe of convocation; and in 1732, bifhop of St. Afaph. He died at Chrift-church, in 1735, where he was buried. He was thrice married, but left only one fon. He was diftinguifhed by the exemplary difcharge of his clerical functions, and by the liberality of his charities. Availing himfelf of papers prefented to him by Wood, he publifhed a fecond edition of his "Athenæ Oxonienfes," much corrected and enlarged, with the addition of more than five hundred lives from the author's MS. Lond. 1721. 2 vols. fol. A pofthumous work, founded on his Notitia, and entitled "Notitia Monaftica; or, an Account of all the Abbies, Priories, and Houfes of Friars, heretofore in England and Wales, and alfo of all the Colleges and Hofpitals founded before 1540," was publifhed by his brother, the Rev. John Tanner, Lond. 1744. fol. Another elaborate work, on which he had beftowed the application of forty years, entitled "Bibliotheca Britannico-Hibernica; five, de Scriptoribus qui in Anglia, Scotia, et Hibernia, ad Sæculi xvii. initium floruerunt, literarum ordine juxta familiarum nomina difpofitis Commentarius, &c." was publifhed in 1748, fol. under the care of Dr. Wilkins, who prefixed to it a learned preface. He had alfo made collections for the hiftory of his native county of Wilts, but by removal to a diftance he was prevented from profecuting his defign. To the Bodleian library he bequeathed many valuable papers, tending to illuftrate the hiftory of thefe iflands, and he made feveral communications of a fimilar nature to the Society of Antiquaries, of which he was a member. His various labours in this way rank him among the moft valuable contributors to Britifh literature and ecclefiaftical hiftory. Biog. Brit. Gen. Biog.

TANNER, a perfon who manufactures hides and fkins by tanning.

It is only within a few years paft, that the tanners of this country have been liberated from a variety of penalties and prohibitions, which were extremely oppreffive, and long retarded the progrefs of the manufacture.

In the reigns of Elizabeth and James I. when *patents of monopoly* were in exiftence—when the true principles of trade were not well underftood—and when the leather manufacture was conducted by unfkilful perfons, fome rules and regulations as to the mode and manner of tanning, the materials to be employed, and the time to be confumed in the procefs, might, perhaps, be in fome degree neceffary: but fuch prohibitions and reftrictions were wholly inapplicable to the prefent enlightened age. It was not, however, till 1808, after a long parliamentary inveftigation, that the act 1 James I. c. 22, and others of a fimilar tendency which had long difgraced our ftatute-book, were at length repealed by the 48 Geo. III. c. 60. By this act, the tanner is now allowed, like all other manufacturers, to exercife his ingenuity in the difcovery of new materials or new methods, in abridging the time or improving the procefs. Nor can any injury thereby arife to the community; for the competition which in this country exifts in every branch of trade, combined with the credit and the intereft of the parties, will always infure to the public the production of the beft articles which can be manufactured. See LEATHER, TAWING, and VELLUM.

TANNER'*s Bark*, is the bark of the oak or other tree, which, after it has been ground in a mill into a coarfe powder, is ufed in tanning of leather. When the tanning principle has been wholly exhaufted, it is taken out of the pits, and called *tan*. It is then fold to the gardeners, who ufe it in hot-houfes to produce an artificial heat, for the purpofe of raifing pine-apples, &c. After a certain time the tan ceafes to caufe fermentation: it is then taken out of the hot-houfe, and, when entirely rotted, becomes a vegetable mould, and is employed as a manure in kitchen-gardens and on grafs-land.

With refpect to its advantages as a manure, different opinions are entertained. Miller, Mortimer, and others, have reprefented it as highly nutritious, while more modern agriculturalifts confider it of very little value. When, however, it is blended and incorporated with other vegetable fubftances, or with lime or earthy matter in certain proportions, cautioufly employed, and laid on foon after Michaelmas, it will be found a good top-dreffing for ftiff and cold grafs-land.

TANNETE, in *Geography*, a town on the W. coaft of the ifland of Celebes. S. lat. 4° 14'. E. long. 120° 4'.

TANNEWANG, a river on the S. coaft of the ifland of Celebes, which runs into the fea, 5 miles W. of Bonthain.

TANNHAUSEN. See THANNHAUSEN.

TANNIN, in *Vegetable Chemiftry*, a peculiar fubftance which is naturally formed, and exifts in a great number of vegetable bodies, fuch as oak bark, galls, fumach, catechu, &c. Its name is derived from the effect it has in converting the gelatine into leather.

Several proceffes have been given to obtain pure tannin, which have been fo various in their refults, as to induce chemifts to fufpect the identity of tannin.

The procefs recommended for procuring pure tannin, is to powder nutgalls, and make an infufion in water, which will be of a deep brown colour. Evaporate the infufion with a gentle heat till it is very ftrong, but ftill retaining its humidity. Add to this a faturated folution of carbonate of potafh. A yellowifh-white precipitate is formed, which is faid to be pure tannin. When the liquid part is poured off, a little cold water muft be added to wafh the precipitate, as a large quantity would diffolve it again. When the precipitate is feparated and dried, it affumes the appearance of refin, having a vitreous fracture. It is of a brown colour. Its tafte is bitter, and ftrongly aftringent. It is very foluble in water. The folution becomes frothy by agitation, as if it contained foap. It diffolves ftill more plentifully in alcohol. The folution is of a dark-brown colour, differing little in its properties and appearance from what has been termed tincture of galls.

For our firft knowledge of this fubftance in a definite ftate, we are indebted to Deyeux. Seguin afterwards feparated it by means of a folution of gelatine, the matter which was precipated being a fubftance, having the fmell and many other properties of leather. Thefe facts led to the great improvements he made in the procefs of tanning, of which no true theory was known before his time.

For a more minute inveftigation of the properties of tannin, we are indebted to Prouft. He obtained his tannin by adding an acid to a concentrated infufion of nutgalls. A precipitate is obtained of the confiftency of pitch. This precipitate is to be wafhed with a little cold water, with the fame caution obferved in the laft procefs. The precipitate is now to be diffolved in boiling water, and carbonate of potafh added, which takes up the acid and precipitates the tannin.

Prouft recommends the following procefs for procuring pure tannin. Drop into an infufion of nutgalls, a folution of muriate of tin. This gives a yellow precipitate, which being feparated, wafhed, and dried, is of a buff-colour. This is a compound of oxyd of tin and tannin. He then mixes this powder with water, and paffes through it fulphuretted hydrogen gas. The fulphur combines with the tin, and becomes infoluble, while the tannin diffolves in the water. When the fulphuret is feparated, and the folution of tannin evaporated with a gentle heat, a brown fubftance is left behind, which he confidered as pure tannin.

Another procefs for obtaining tannin from infufion of nutgalls, has been given by Merat Guillot. This confifts in mixing pure water with an infufion of galls. If to this mixture dilute nitric or muriatic acid be added, a deep brown precipitate is formed, which, when dry, becomes black. This he fuppofes to be pure tannin.

Trommfdorff has fhewn that all thefe proceffes are infufficient to produce pure tannin. As the fubftance called extract was contained in all the above precipitates, and more or lefs gallic acid, he made a great number of experiments to obtain pure tannin; and although he obtained it nearer to a ftate of purity than any of his predeceffors, his labours were not completely fuccefsful. He evaporated the infufion of galls with a gentle heat to one-fourth its bulk. The liquid became muddy from the precipitation of extractive matter, and was feparated by ftraining. It was now further evaporated to the confiftence of jelly, and ultimately dried by a gentle heat. He now digefted the mafs with pure alcohol, till no more gallic acid could be taken up. He then confidered the mafs left behind as pure tannin, or nearly fo. In order to afcertain if it ftill contained extract, he re-diffolved it in pure water, and evaporated this and future portions of water from it, judging that if any extract ftill remained it would become infoluble by oxygenation, and thus be precipitated, but no depofition took place. Sufpecting it might contain mucilage, he left the folution in a warm place for fome time. It became covered with mould, which he attributed to the prefence of mucilage. The mould was feparated by filtration, and the folution evaporated

rated to dryneſs, which left the tannin in a ſtate of conſiderable purity.

He ſtill, however, found that it contained a portion of ſulphate of lime. In order to ſeparate this ſalt, he diſſolved the tannin in water, to which he added carbonate of potaſs: this cauſed a precipitation, which has been already noticed. The clear liquor being ſeparated, a ſolution of acetite of lead was added to it. A precipitate fell down, which conſiſted of tannin, combined with oxyd of lead, and probably ſulphate of lead. The lime alſo combined with the tannin, forming an inſoluble compound. He then ſeparated this precipitate, mixed it with water, and paſſed a ſtream of ſulphuretted hydrogen gas through it. The lead and ſulphur became ſeparated, and the combination of lime and tannin unchanged, while the pure tannin remained in ſolution, which was obtained by evaporating the ſeparated liquid to dryneſs. The tannin thus obtained, approaches much nearer to purity than that obtained by any of the former proceſſes. But we ſhall ſhew further on, that, even in this ſtate, its purity is doubtful.

Tannin obtained by the above proceſs does not differ much from that formed by the other proceſſes. We have already ſtated it to be ſoluble in alcohol: when, however, both the tannin and alcohol are pure, the tannin does not diſſolve.

Moſt of the metallic oxyds form inſoluble compounds with tannin. There is, however, great reaſon to believe that the gallic acid, which is difficult to ſeparate from it, has a much greater effect upon theſe bodies. It is ſuppoſed that when the metallic oxyds are precipitated by tannin, the latter combines with the oxygen, and, in ſome inſtances, converts the tannin into extract.

The common method of detaching the preſence of tannin is by a ſolution of gelatine in water. Iſinglaſs is moſtly uſed for this purpoſe. The ſolutions both of the tannin and the gelatine ſhould be in a conſiderably concentrated ſtate; as weak ſolutions of either rediſſolve, to a certain extent, the precipitate which the tannin forms with the gelatine.

The gelatine ſhould be quite freſh, as the precipitate is imperfect when it has the leaſt ſigns of putridity.

Sir Humphrey Davy ſtates that the proportion of the gelatine to the water ſhould be 120 grains of the former to 20 ounces of the latter.

According to the authority of the ſame chemiſt, the compound formed by the tannin and gelatine dried at 150°, is compoſed of

Gelatine - - - - -	54
Tannin - - - - -	46
	100

Potaſh, ſoda, and ammonia, combine with tannin, forming compounds which are leſs ſoluble in water than pure tannin. Theſe alkalies have a ſtronger attraction than gelatine for tannin; as the alkaline ſolutions do not precipitate gelatine till the alkali is ſaturated by an acid.

The combinations of the earths with tannin are moſtly inſoluble. Thoſe with barytes and lime are ſlightly ſo, and do not precipitate gelatine till an acid is added.

Moſt of the acids form inſoluble compounds with tannin; but when extract is preſent, it is alſo precipitated: hence the imperfection of the proceſs for ſeparating tannin by acids.

When perfectly free from gallic acid it has no action upon ſulphate of iron; but it produces a deep blue precipitate from the oxyſulphate: hence its effect in common writing-ink and black dye. The black is not complete without expoſure to the air. The precipitate which the tannin forms is very heavy, and almoſt immediately ſeparates from the water; while that formed by the gallic acid remains longer ſuſpended, and certainly, on that account alone, is an eſſential ingredient in writing-ink.

Tannin exiſts in a great number of vegetables in ſome proportion, but is the moſt abundant in nutgalls; and of them, the Aleppo galls afford the moſt. Sir Humphrey Davy has given the following analyſis of the Aleppo galls. He extracted, by infuſion with water, all the ſoluble part from 500 grains of powdered galls. This ſolution he ſubmitted to ſlow evaporation, from which he obtained, in ſolid matter, 185 grains. Theſe he found to conſiſt of

Tannin - - - - - - -	130
Gallic acid, with extractive matter -	31
Mucilage and matter rendered inſoluble by evaporation - - - -	12
Calcareous earth and ſaline matter -	12
	185

We are indebted to the ſame diſtinguiſhed chemiſt for bringing into notice a new ſubſtance, which contains a large proportion of tannin. This ſubſtance is brought from the Eaſt Indies, and is known by the names of catechu, or terra Japonica. It is produced by the evaporation of a vegetable fuſion from the wood of a ſpecies of *mimoſa*, which grows in India.

There are two varieties of this ſubſtance, one brought from Bengal, and the other from Bombay. The former is of a chocolate colour, of the ſpecific gravity 1.28; the latter of a lighter colour, of the ſpecific gravity 1.39. Both have an aſtringent taſte, leaving an impreſſion of ſweetneſs. They are not changed by expoſure to the air.

Sir Humphrey procured an infuſion from this ſubſtance by long decoction, the ſpecific gravity of which was 1.102: 500 grains of this infuſion yielded, by evaporation, 41 grains of ſolid matter; 34 of which were tannin, and 7 of a peculiar extractive matter.

This ſubſtance, in its original ſtate, ſeems to contain a very large proportion of tannin. The above chemiſt found that 100 grains of the powdered catechu required 18 ounces of water for its infuſion. The reſiduum, or undiſſolved part, is ſeldom more than $\frac{1}{14}$th of the original weight, and conſiſts of calcareous and aluminous earth, with a little fine ſand: 200 grains of the Bombay catechu gave

Tannin - - - - - - -	109
Peculiar extract - - - - -	68
Mucilage - - - - - - -	13
Of the reſiduum above-mentioned -	10
	200

The catechu from Bengal gave, in 200 grains,

Tannin - - - - - - -	97
Peculiar extractive matter - - -	73
Mucilage - - - - - - -	16
Reſidual matter, conſiſting of lime, alumine, and ſand - - - -	14
	200

The

The great uncertainty which has prevailed refpecting the definite nature of tannin, feems to have been completely removed by the very important difcovery made by Mr. Hatchett, who has fucceeded in forming artificial tannin. An account of his experiments may be found in three papers in the Philofophical Tranfactions for 1805 and 1806.

The moft direct procefs which is given for obtaining it, is by pouring an ounce of nitric acid, diluted with two parts of water, upon 100 grains of charcoal, in a matrafs. This is to be placed in a fand-heat. Great effervefcence takes place, and much nitrous gas is difengaged. At the end of two days he added a fecond ounce of acid, and fometimes even a third. The digeftion is continued till the whole is diffolved. This folution is of a reddifh-brown colour. It is then to be flowly evaporated to drynefs, which produces a brown gloffy fubftance, exhibiting a refinous fracture.

This fubftance has the following properties:

1. It diffolves in cold water and alcohol.

2. The flavour is highly aftringent.

3. Expofed to heat, it fmokes a little, fwells up, and affords a bulky coal.

4. The folution in water reddens litmus paper.

5. It copioufly precipitates the metallic falts, efpecially the muriate of tin, acetite of lead, and oxyfulphate of iron. The precipitates are commonly of a brown colour.

6. It precipitates gold in the metallic ftate.

7. It precipitates the earthy falts; fuch as the nitrates of lime, barytes, &c.

8. When the alkalies are added to this folution, the colour becomes deeper, and ultimately turbid.

9. A folution of ifinglafs added to the fame folution produces a precipitate, which is infoluble in boiling water, refembling in its effential properties the precipitate formed by the natural tannin.

Mr. Hatchett produced the fame fubftance by treating various kinds of coal in the fame way, fuch as pit-coal, coke, and animal charcoal. What may feem very curious, he formed it from the coal of one portion of ifinglafs to precipitate another portion diffolved in water; and hence afferts that one portion of the fkin of an animal may be employed to convert the other into leather.

Of the different fubftances employed, he found thofe the beft which confifted of carbon unmixed with other vegetable matter, which always reduced the quantity; and that thofe vegetable fubftances which contained gum or mucilage, produced the leaft tannin.

When he fucceeded in producing tannin from other vegetable fubftances, fuch as indigo, refin, lac, and many other bodies, it was by repeatedly adding frefh nitric acid; by which he very properly fuppofes that the carbon becomes feparated, fo as to put it under fimilar circumftances to the charcoal itfelf. Indigo produced the moft in this way. At the commencement of his paper he mentions the fact of Mr. Chenevix having found that coffee-berries acquired, by roafting, a portion of tannin. He made fome experiments which, although not very fuccefsful, convinced him that the chief characteriftic properties of tannin may be formed or developed at fome particular temperature and under favourable circumftances, by very fimple means.

He ingenioufly conjectures, that the tannin found in fome varieties of peat has been produced in this way.

In making ufe of fulphuric acid to char various fubftances, he found that, in fome inftances, the artificial tannin, or a fubftance nearly refembling it, was formed. He firft diffolved 100 grains of camphor in an ounce of concentrated fulphuric acid. The camphor firft diffolved, without producing much change of colour. In a little time it became brown, and ultimately black. During this change, fulphurous acid gas was difengaged. After two days, during which time the alembic had not been heated, the difengagement of gas diminifhed, and the veffel was placed in a moderately heated fand-bath. This increafed the action. At the end of two days, fix ounces of cold water were added; the liquid changed to a reddifh-brown colour; the difengagement of gas ceafed, and was fucceeded by a fmell refembling a mixture of the oils of lavender and peppermint. By gradual diftillation, the water came over impregnated ftrongly with the above odour, and accompanied by an effential oil, which weighed three grains.

When the whole water had come over, two ounces more were added. The fmell before mentioned did not return, and the evaporation was continued to drynefs. The blackifh-brown refiduum was not acted upon by water, but by feveral digeftions with alcohol, leaving behind a compact coaly refiduum, which, when dried and heated to a red heat in a clofe veffel, weighed 53 grains. The alcohol was then drawn off from the folution by diftillation in a water-bath, leaving a blackifh-brown mafs, of the appearance of a gum refin, and the fmell of calomel. Its weight was 49 grains. The whole of this therefore confifted of

The effential oil above-mentioned - - - - -	3
A compact hard coal in fmall fragments - -	53
And the blackifh-brown mafs above-mentioned -	49
	105

This increafe of five grains Mr. Hatchett attributes to the oxygen united to the carbon by the acid, or the water combined with the blackifh-brown fubftance.

This latter fubftance had the following properties:

1. It had an aftringent tafte, and when diffolved in cold water, formed a dark-brown folution.

2. It yielded a dark-brown precipitate with fulphate of iron, acetite of lead, muriate of tin, and nitrate of lime.

3. It precipated gold in its metallic ftate.

4. It formed fo complete a precipitate with a folution of ifinglafs, that the liquid became colourlefs as water.

The precipitate was nearly black, and was, like the other compounds of tannin and gelatine, infoluble in hot water.

Mr. Hatchett obferves that although this fubftance poffeffes the general character of that obtained by the nitric acid with charcoal, yet it feems to act lefs powerfully upon fkin. The precipitate, at the time of its formation, is more flocculent and lefs tenacious than that produced by the other procefs.

Mr. Hatchett fuppofes this difference may arife from the want of azote, which feems to exift in that produced by nitric acid and charcoal.

He afcertained this by fubjecting to analyfis a portion which had been prepared from vegetable charcoal. He expofed in a retort fome of this tannin in the dry ftate, to the heat of a lamp connected with a jar, to obtain the gafeous product.

Firft a fmall quantity of water rofe; then a little nitric acid, which had not been expelled in the evaporation. Next a fmall quantity of yellowifh liquor, which ftained the neck of the retort. The fire was then raifed, when a quantity of gas was explofively difengaged, and upfet the jar. This gas he judged from the fmell to be ammonia. He alfo obferved obſerved ſome white fumes, which reſulted from the nitric acid uniting with the ammonia.

On replacing the jar, he continued the proceſs. The future gas which came over was carbonic acid, and a little of another, which he ſuppoſed to be nitrogen.

Although the artificial tannin appears in almoſt every reſpect ſimilar to the natural tannin, it might be expected that each would have been ſimilarly affected by nitric acid, yet Mr. Hatchett found that the one was deſtructible by that acid, while the other was not in the leaſt affected by it. He frequently diſtilled nitric acid from the artificial tannin, without producing any change upon it.

The ſame acid being added to infuſion of galls, ſumach, Pegu cutch, and kaſcutti, completely deſtroyed the tannin. The common catechu and oak bark treated in the ſame way, had not the whole of their tannin deſtroyed. He then made infuſions of equal ſtrength of nutgalls, ſumach, ſhavings of oak wood, oak bark, and the artificial tanning ſubſtances. To half an ounce of each of theſe, one drachm in meaſure of ſtrong nitric acid was added. The tannin of all were deſtroyed, with the exception of the oak bark and the artificial tannin. Mr. Hatchett obſerves that the tannin of thoſe bodies containing much mucilage is the moſt liable to deſtruction by the nitric acid; and that in the caſes where the tannin is deſtroyed, the oxalic acid is moſtly formed. The oak bark and the common catechu contain little or no mucilage, and hence have leſs of their tannin deſtroyed.

Theſe facts ſeem to prove that pure tannin, unmixed with other matter, is not affected by nitric acid, and that in thoſe inſtances in which it is deſtroyed, the effect muſt ariſe from ſome new ſubſtance being formed by the action of the acid upon the extraneous matter, and alſo that mucilage contributes the moſt to this change.

Mr. Hatchett has not given us any preciſe analyſis of this ſubſtance, but concludes, from its formation, that it has carbon for its baſe. From the circumſtance of its being formed with greater facility when the nitric acid is diluted, he thinks that the water is decompoſed, and that the hydrogen enters into its compoſition.

In the caſe of its decompoſition by heat, the formation of ammonia led him to believe that azote was alſo one of its elements.

This, however, does not agree with the fact of its being formed with ſulphuric acid and vegetable matter only. Although this objection ſeems partly to be removed by the circumſtance of the tannin from ſulphuric acid being different in ſome of its properties from that produced from the nitric acid and charcoal, it may, however, be here obſerved that the natural tannin, which is not known to contain azote, more nearly reſembles that formed with nitric acid, than that from the ſulphuric acid.

It does not appear probable that azote is a component part, even of the natural tannin. The ammonia which Mr. Hatchett obtained might be in combination with the tannin, and may perhaps always be formed when the tannin is formed. The circumſtance of the tannin not being changed by repeatedly digeſting it with nitric acid, would ſeem to favour the idea of its conſiſting of carbon and oxygen only. The importance of this ſubſtance in the art of tanning, ought to be a ſufficient ſtimulus to future experiments.

If in the proceſs of forming artificial tannin, the nitric acid is decompoſed merely into nitrous gas, it might be practicable to bring it back to its original ſtate by the oxygen of the atmoſphere only, and thus produce a valuable product, which is now obtained at conſiderable expence from certain vegetables.

The following table ſhews the proportions preſent of natural tannin in a variety of ſubſtances.

Catechu from Bombay - - -	54.5
———— Bengal - - -	48.5
Aleppo nutgalls - - - -	26
Sumach - - - - - -	18
Souchong tea - - - - -	11
Green tea - - - - -	9.2
Leiceſterſhire willow bark - - -	7.5
Oak bark - - - - -	6.6
Spaniſh cheſnut bark - - -	5
Elm bark - - - -	3
Common willow bark - - -	2.5

Mr. Biggin alſo has publiſhed, in the Philoſophical Tranſactions for 1799, the reſult of ſome experiments on the proportions of tannin in various kinds of bark, which nearly correſponds with the preceding ſtatement, as will be ſeen by the following table, in which the *maximum* of the tanning principle is ſuppoſed to be 20.

	Tanning Principle.	
	By the Hydrometer.	Weight in Grains.
Elm - - - - - -	2.1	28
Oak (cut in winter) - -	2.1	30
Horſe cheſnut - - -	2.2	30
Beech - - - - -	2.4	31
Willow (boughs) - -	2.4	31
Elder - - - - -	3.0	41
Plum-tree - - - - -	4.0	58
Willow (trunk) - - -	4.0	52
Sycamore - - - - -	4.1	53
Birch - - - - -	4.1	54
Cherry-tree - - -	4.2	59
Sallow - - - - -	4.6	59
Mountain aſh - - -	4.7	60
Poplar - - - - -	6.0	76
Hazel - - - - -	6.3	79
Aſh - - - - - -	6.6	82
Spaniſh cheſnut - - -	9.0	98
Smooth oak - - -	9.2	104
Oak (cut in ſpring) - -	9.6	108
Huntingdon or Leiceſter willow	10.1	109
Sumach - - - - -	16.2	158

It appears from this table that ſimilar barks, when taken from trees at different ſeaſons of the year, differ as to the quantities of tannin contained in them. In the winter they contain the leaſt, and in the ſpring (which is the uſual time of felling oak-timber), if the ſeaſon is very cold and ungenial, the quantity is diminiſhed. This is well known to practical men, as likewiſe that all barks contain the greateſt proportion of tannin; at the time when the buds of the trees begin to germinate. It is found by experience that, on an average, four or five pounds of good oak bark are required to form one pound of leather.

Sir Humphrey Davy obſerves that the aſtringent principles in barks vary conſiderably, according as their age and ſize are different. That in every aſtringent bark, the interior white bark (which is the part next to the alburnum) contains the largeſt quantity of tannin. The proportion of extractive matter is generally greateſt in the middle; but the epidermis ſeldom furniſhes either tannin or extractive matter. The white cortical layers are, comparatively, moſt abundant in young trees; and hence their barks contain, in the ſame weight, a larger proportion of tannin than the barks of old trees. (Phil. Tranf. 1803, p. 264.) From thefe obfervations, founded on experiments, Mr. Hatchett infers that there is an intimate connection between the formation of new wood and the formation of tannin in fuch vegetables as afford the latter; and this idea is corroborated by the chemical nature of thofe fubftances.

It has been fuggefted that the extractive matter found in barks, or in fubftances ufed in tanning, affects the colour, if not the quality of leather. Thus, fkin tanned with gall-nuts is much paler than fkin tanned with oak bark, which contains a brown extractive matter. Leather made from catechu is of a reddifh tint.

It is found that the precipitates obtained from infufions containing this principle or tannin by ifinglafs, when dried, contain at a medium rate about 40 *per cent.* of vegetable matter; and that it is eafy to obtain the comparative value of different fubftances for the ufe of the tanner, by comparing the quantities of precipitate afforded by infufions of given weights mixed with folutions of glue or ifinglafs. In order to make experiments of this kind, an ounce or 480 grains of the vegetable fubftance in coarfe powder, fhould be acted upon by half a pint of boiling water: the mixture fhould be frequently ftirred, and fuffered to ftand twenty-four hours; the fluid fhould then be paffed through a fine linen cloth, and mixed with an equal quantity of folution of gelatine, made by diffolving glue, jelly, or ifinglafs in hot water, in the proportion of a drachm of glue or ifinglafs, or fix table fpoons full of jelly, to a pint of water. The precipitate is to be collected by paffing the mixture of the folution and infufion through folds of blotting paper, and the paper expofed to the air until its contents are quite dry. If pieces of paper of equal weights are ufed, in cafes in which different vegetable fubftances are employed, the difference of the weights of the papers when dried, will indicate, with tolerable accuracy, the quantities of this principle or tannin contained in the fubftances, and their relative value for the purpofes of manufacture.

TANNING, the art of converting the gelatinous part of the fkins of animals into the fubftance called leather, by impregnating it with tannin or the tanning principle, in fuch a manner as to render it tenacious, durable, and impermeable to water.

It is difficult to fay at what period the art of tanning was difcovered. It was doubtlefs known to the ancients in fome degree of perfection; and it is highly probable that the fkins of animals were employed by man as a covering long before the art of tanning was known: but they would require in this ftate to be conftantly kept dry, as moifture would foon bring them into a ftate of putrefaction.

The aftringent matter, which converts the fkin into leather, abounds in fo many vegetables in every country, that accident would foon lead to fome method of producing the change. Independent, however, of vegetables, many earthy and metallic fubftances have the property of rendering fkins incorruptible to a certain extent; and fome mineral waters containing copper or iron will occafion this change. Hence we may conclude that fome means of giving prefervation to the fkins of animals muft have been known at a very early period.

Though there has been no radical alteration or any great practical improvements in the art of tanning, yet for the laft twenty or thirty years it has attracted the attention of many celebrated chemifts and philofophers in all countries, who have inveftigated the fubject with great accuracy and precifion. Previous to this period we occafionally find fome experiments and obfervations by men of fcience on the materials of tanning, as by the Hon. Charles Howard in 1674, (Phil. Tranf. vol. ix.) by the abbé Nollet, Gefner, Gleditfch, Buffon, de la Lande, and others, in Mem. Acad. Sc. Paris and Berlin.

In the year 1765, the Society of Arts and Sciences in London granted a premium of 100*l.* for the difcovery of a method of tanning with oak faw-duft; and in 1795 the Rev. G. Swayne fuggefted the ufe of oak leaves. It is unqueftionably true that all thofe fubftances, and indeed every part of almoft every vegetable in nature, poffeffes a certain portion of the tanning principle; but, exclufive of oak bark and two or three other well-known articles, the quantities of all the reft added together would be fo inconfiderable, and the proportion of tannin contained in them fo inadequate to the purpofes of manufacture, that, except for philofophical curiofity and chemical experiment, they are unworthy of notice. As the theories of fpeculative minds they are ingenious and amufing, but they afford very little ufeful information on the nature and properties of tannin, and have produced no beneficial refults in practice.

Deyeux, about 1793, (Annales de Chimie, vol. xvii.) appears to be the firft chemift who fuccefsfully explained the true principles of tanning; which afterwards, with more practical application, were ftill further developed by the labours of M. Seguin in 1795. Before his inveftigation of this fubject, the theory of tanning was ftrictly mechanical. The aftringency of vegetables, which produced the change in the fkin, was confidered as a refinous body, which had the effect of giving firmnefs to the fibres of the fkin, and rendering it infoluble.

Seguin faw the operation in a chemical point of view: he examined the nature of the procefs fcientifically, and difcovered that the change which the fkin underwent in the operation of tanning, was the refult of a chemical union between a fubftance furnifhed by the vegetable employed, and the gelatinous part of the fkin. Thefe principles he confirmed, by combining the vegetable fubftance in queftion with the gelatine of a folution of ifinglafs.

It will be feen, from our article TANNIN, that the compound difcovered by Seguin, and which is precipitated when an infufion of nutgalls is added to a folution of ifinglafs, is an infoluble fubftance, having many properties common to leather. See Nicholfon's Journal, vol. i. p. 271. 4to.

The practice which M. Seguin founded upon his theory was generally admired. He firft extracted the tannin from the vegetable, which was oak bark, and applied it to the prepared fkin in a more concentrated form, with a view to impregnate it as fpeedily as poffible with the tannin. This was faid to be done with great fuccefs in one-third of the ufual time, and to have produced fuperior leather. The fame of this difcovery foon fpread throughout Europe, and Mr. Defmond, a man of education and intelligence in this country, took out a patent for the exclufive right of ufing M. Seguin's method of tanning.

Although this procefs of fufpending the hides vertically in a very ftrong folution of bark faved much time, yet it was foon found to be adapted only to the thickeft hides ufed for fole leather, and quite unfit for the lighter kind of fkins which required flexibility and tenacity. This method, therefore, of Seguin's, however chemical and philofophical it might appear, did not anfwer in the refult; and as it was attended with much additional expence, has never been generally practifed in England.

It was not, however, till 1803, when fir Humphrey Davy (a name ever to be recorded in the annals of fcience with gratitude and admiration) began to inveftigate the fubject,

ject, that the art of tanning was thoroughly underftood, and reduced to fcientific principles. He inftituted a feries of experiments on the various fubftances employed—examined their chemical affinities and agencies—their action upon animal matter, and combination with other bodies—and developed and explained the whole with a fimplicity and perfpicuity which forcibly elucidated the effential principles on which the art depends. If this elucidation has not been productive of any material improvements in the mode of manufacturing leather, it may perhaps be attributed more to the prejudices arifing from long habit, than to any defect in the theory and demonftrations of that enlightened philofopher. And here it may be remarked, that thefe demonftrations and that theory derive additional importance, and are entitled to peculiar attention, from having been ftrongly confirmed and fuccefsfully practifed by an intelligent and refpectable manufacturer (now retired from bufinefs), to whom we are chiefly indebted for this article.

From thefe and other fources of information now open to the public, and from the general diffufion of knowledge among all claffes, the man of fcience and the manufacturer are daily becoming more affimilated to each other; and if the latter fhould be taught to difcard all unfounded prejudices, and to adopt more fcientific principles, there is reafon to believe that the various proceffes of the art of tanning may yet be capable of great practical improvement.

In the two valuable papers which fir Humphrey Davy has given in the Philofophical Tranfactions for 1803, he confiders the procefs of tanning as depending fimply on the chemical union of the tanning principle with the matter of fkin, fo as to form an infoluble compound. He has fhewn that Seguin's quick method of tanning is not the beft; becaufe the exterior ftrata of fkin being perfectly combined with tannin, before the interior ftrata are materially acted upon, thereby prevent the latter in fome degree from imbibing the full action of the folution. This renders the texture of the leather lefs equable, makes it harfh and brittle, liable to crack, and of courfe lefs durable.

Sir Humphrey thinks it probable that another fubftance, befides tannin, combines with the fkin, namely, the extract, to which it owes much of its fupplenefs and tenacity—that the leather gets more of this fubftance from weak infufions of bark, than from the ftrong ones recommended by Seguin—that it is equally infoluble in water—and that, upon the whole, the methods now generally in ufe, may, with a few alterations, be confidered the beft.

The various difcoveries pretended to have been made, and the numerous patents obtained for their ufe and application, have hitherto tended very little to the advancement of fcience or the progrefs of the art. This may fairly be inferred from the conclufion of the celebrated chemift above-mentioned. Indeed it appears by the fpecifications annexed to the patents, that moft of thefe projected improvements purport to be either for the different conftruction and arrangement of the various pits—for the application of mechanical apparatus to diminifh labour—or for extracting the tannin and warming the infufion by artificial heat, with a view to accelerate the procefs. Thefe fancied improvements are only the idle theories and vifionary projects of fpeculative minds: but as it may afford information to the curious, and furnifh hints for future difcovery, we fubjoin

A Lift of Patents for Tanning.

1790. Anthony Fay, efq. of London, for a mechanical apparatus to diminifh the labour of *handling*, to grind the bark very fmall, and to concentrate it, by boiling, into a ftrong extract.

1794. Samuel Afhton of Sheffield, for tanning hides and fkins with certain mineral productions. As fuch materials were prohibited by the ftatute of James I. an act of parliament was paffed to legalize the ufe of them.

1795. Mr. Tucker of Wickham, Hants, for triple pits compofed of wood, metal, and bricks, to keep up a conftant fire at the bottom, to warm the infufion and expedite the procefs.

1796. William Defmond, efq. of London, for a new mode of tanning, according to M. Seguin's method, as before ftated.

1797. Robert Crofs of Lancafter, for pits on a new conftruction, to enable him to apply artificial heat and to tan quickly.

1799. Francis Brewin, efq. of London, for a peculiar conftruction and arrangement of pits, and for the ufe of machinery, &c.

1802. John Lawrence, for the ufe of oak faw-duft in tanning.

1802. Thomas Martin of London, for conftructing pits on a new plan, &c.

1802. John Cant and John Miller of Montrofe, for boiling the bark, &c. fo as to extract the tanning principle more effectually.

1807. Robert John Stanley of Lincolnfhire, for tanning light leather without bark, for a peculiar preparation previous to the application of ooze, and for boiling the materials of tanning.

1813. Sparks Moline, for the ufe of the folid extract of bark.

1815. Thomas Afhmore, efq. for the ufe of all kinds of foot, whether from coal, wood, peat, or bones, and the oils and empyreumatic liquors arifing from them by diftillation or combuftion, to be applied to the purpofes of tanning.

Of the utility of the laft-named patent, we fhall give no opinion at prefent; but of the remainder it may be affirmed that none of the methods therein recommended have ever been much practifed: fome of them which were adopted by a few individuals, were attended with confiderable lofs; and as moft of them are now laid afide, we may reafonably conclude that they have not proved beneficial to the projectors or to the public.

Before we defcribe the prefent method, it may be neceffary to premife, that in different parts of the kingdom, the fame terms and denominations are fometimes employed to defignate diftinct kinds of leather: but all tanned leather is technically claffed and univerfally known under two general denominations; namely, *hides* and *fkins*. The former term being commonly applied to the larger animals, as bulls, oxen, cows, &c. which are chiefly intended for the foles of ftout fhoes, and other purpofes requiring very thick and folid leather; while the latter term is ufed for calves, feals, &c. which, being thinner and more flexible, are intended for the upper leathers of fhoes and boots, for faddles, harnefs, &c.

The heavieft and ftouteft of the bull and ox hides are generally felected to make what are technically called *butts* or *backs*, and are manufactured in the following manner.

When the horns, &c. have been removed, the raw hides are laid on a heap for two or three days, and are then fufpended on poles in a clofe room, called a fmoke-houfe, which is heated fomewhat above the common temperature by a fmouldering fire: this occafions incipient putrefaction, which

which loosens the epidermis, and renders the hair and other extraneous matter easy of separation from the true skin. This is effected by extending the hide on a wooden horse or beam of a convex form, and scraping it with a large two-handled knife, called a *fleshing-knife*, which is bent, to suit the convexity of the beam.

The hides are then immersed in a pit containing water slightly impregnated with sulphuric acid. This operation, which is called *raising*, by distending the pores and swelling the fibres, prepares the hide for the reception of the tannin, and renders it more susceptible of its action.

When the hides are sufficiently *raised*, they are removed into a pit, in which they are lain smooth with a stratum of oak bark ground to a coarse powder between each.

The pit is then filled with the tanning lixivium or ooze, prepared from oak bark and water, and the hides remain a month or six weeks without being moved. At the end of this time, the tanning principle being exhausted, the ooze and spent bark are taken out of the pit, and the hides put in again, stratified with fresh bark, and covered with fresh ooze as before. Here they remain about three months, when the same process is repeated, at about the same intervals, three several times or more, according to the strength of the lixivium and the substance of the hides. When sufficiently tanned, they are taken out of the pit, hung up in a shed to dry gradually, and being compressed with a steel instrument, and beaten smooth to render them firm and dense, the operation is complete; and having been numbered, weighed, and stamped by the excise officer, to ascertain the amount, and denote the payment of the duty (which will be noticed at the end of this article), they are ready for sale, and are termed *butts* or *backs*. These form the thickest and most substantial sole leather for very strong shoes, and are chiefly intended for exportation.

Crop hides are thus manufactured. The horns having been removed, the hides are immersed in pits containing a mixture of lime and water, where they remain three or four days, being occasionally moved up and down, that each part may be uniformly exposed to the action of the lime-water. They are then taken out of the lime-pits, and the hair and other extraneous matter being scraped off on a wooden beam, as before described, are washed in water, to free them from the lime and filth adhering. They are now immersed in a weak ooze, and by degrees are removed into other pits, containing solutions gradually increasing in strength, during which time they are taken up and put down (technically termed *handling*) at least once in every day, that all parts of the hide may be acted upon by the tanning principle equally and uniformly. This is continued for about a month or six weeks, when they are put into other pits with stronger ooze and a small portion of ground bark; from whence, as the tannin becomes exhausted, they are removed to other pits in regular succession, with fresh ooze and fresh bark, for two or three months.

At the end of this period, the hides are put into larger vats, called *layers*, in which they are stratified, or lain smooth, in a lixivium of greater strength, and with a larger quantity of ground bark between each fold. Here they remain about six weeks, when they are taken up and relaid in the same manner, with fresh bark and strong ooze, for two months. This process is repeated, with little variation, once, twice, or thrice, at the discretion of the manufacturer, till the hides are thoroughly tanned; when they are taken out of the pits, suspended on poles to dry, and being compressed and smoothed, nearly in the manner before described, are called *crop hides*, and form the principal part of the sole leather which is used in England.

The process of tanning *skins* (calves, seals, &c.) is somewhat different from *hides*. They are continued in the lime-pits for ten or fifteen days; they are then depilated and washed in water, after which they are immersed in an infusion of pigeon's dung, called a *grainer*, having the property of an alkali. Here they remain for a week or ten days, according to the state of the atmosphere and other circumstances, during which time they are frequently *handled*, and scraped on both sides upon a convex wooden beam. This scraping, or *working*, as it is termed, with the action of the *grainer*, helps to discharge all the lime, oil, and saponaceous matter, and renders the skin soft and pliant, fitted to imbibe the tanning principle. They are now removed into pits containing a weak solution of bark, where they undergo nearly the same process of handling, &c. as *crop hides*; but they are seldom stratified in *layers*; and the time occupied in tanning them is usually from two to four months, according to their nature and substance. The skins are then dried, and sold to the currier, who dresses and blacks them for the upper leathers of boots and shoes, for harness, and various other purposes.

The light and thin sort of cow-hides and horse-hides undergo nearly the same process in tanning as calf-skins, and are applied to similar uses.

These processes are such as are now commonly practised, varying, however, with the nature and condition of the peculiar kind of hides and skins—with local habits and circumstances—and with the skill and experience of the manufacturer. The greatest defect in the common methods appears to exist in the means of extracting the tannin from the bark. Cold water is chiefly used for that purpose; but some persons conceiving that this does not entirely exhaust the tanning principle, subject the bark, as before observed, to the action of boiling water, &c. If, however, as sir Humphrey Davy has stated, the extract as well as the tannin combines with the skin, the extraction of the tannin by heat would tend to oxygenate the former, and render it insoluble in the liquid.

The late ingenious Dr. Macbride of Dublin invented and published in 1778 a new method of tanning, the leading feature of which was the use of lime-water, which he conceived would extract the virtues of oak bark more completely than plain water.

It has, however, been observed, that both natural and artificial tannin form compounds with the alkalies and the alkaline earths, and these compounds are not decomposable by skin. Lime forms with tannin a compound not soluble in water, and therefore Dr. Macbride's system is founded on erroneous principles, as so much of the tannin as combined with the lime contained in the water was lost. It was also found, by the practical experience of tanners, that this method was in all respects injurious rather than beneficial; and as it has long been universally rejected, it is not necessary to enter into the detail. The reader who is desirous of further information on this point, may refer to Phil. Trans. vol. lxviii. part i. art. 8.

The application of some new and cheap substitute for oak bark has been long a desideratum in tanning. Catechu, the substance we have spoken of under the article Tannin, has been recommended, and its powerful tanning properties have been fully ascertained by experiment and actual practice: but it is not likely that the article can be procured in sufficient quantity, or at an adequate price, for the purposes of manufacture. The bark of elm, willow, larch, and other trees, together with *vallonia* (the acorn of a peculiar species of oak in Turkey), have all been employed in tanning with considerable effect.

The greatest hope which chemical science presents, is the pro-

probability that the tanning principle will, at some future period, be formed artificially in such quantities and at such expense as will admit of its general application to practical purposes. The important discovery of Mr. Hatchett already goes far towards the accomplishment of this object. He has distinctly ascertained that a substance very analogous to tannin may be produced by exposing carbonaceous matter, whether vegetable, animal, or mineral, to the action of nitric acid; and has actually converted skin into leather by deal saw-dust, asphaltum, pit-coal, wax-candle, and even by a part of the same sort of skin itself. The changes produced in these bodies, by disuniting and recombining their elementary principles, may by further developement lead to a more economical process of tanning, and thus render essential service to the arts and manufactures.

Tanned leather is subject to a very heavy excise duty. In the ninth year of queen Anne, a duty of 1*d. per* lb. was laid on all hides and skins tanned in Great Britain. In the following year an additional ½*d. per* lb. was imposed. Thus it remained, amidst all the financial difficulties of successive chancellors of the exchequer, till 1812, when, by the act 52 Geo. III. c. 94. a further duty of 1½*d. per* lb. was added, making the whole duty on tanned hides and skins 3*d. per* lb. The annual revenue arising therefrom now amounts to upwards of 500,000*l.*

It may not be improper here to remark, that the excise duty on leather tanned in Ireland, is levied and collected in a different manner.

The act 40 Geo. III. c. 9. passed in Ireland in 1800, instead of imposing a certain duty *per* pound weight, as in England, on all hides and skins tanned with oak bark, imposes a duty of nine pence by the year, for every cubic foot contained in all the pits in the yard of the tanner, allowing a deduction of two-ninths for certain pits called *latches*, which are used solely for the purpose of preparing the lixivium or ooze. By this act the tanner was permitted, on giving certain notice, to discontinue not less than one-fourth, and by 43 Geo. III. c. 97. not less than one-eighth for six months, receiving a proportionate deduction from his monthly payments of the duty. By the 48 Geo. III. c. 62. those acts were made perpetual.

Previous to the passing the Irish act 40 Geo. III. the writer of this article was consulted by the then chancellor of the exchequer in Ireland, on the relative amount of the intended duty of nine pence *per* cubic foot; and upon accurate calculation it was found to bear a fair proportion to the duty then existing in England. If the present duty on leather tanned in this part of the united kingdom were proportionably commuted on a similar plan, it would materially tend to the progress of the manufacture.

The chief obstacle to great practical improvement is the excise duty—not so much from its amount (though that is very considerable), as from the mode in which it is now levied and ascertained, namely, by weight, when the leather is dry and fit for sale. This mode necessarily requires a system of rules and regulations, which, from their multiplicity and complicated nature, subject the manufacturer to daily inconvenience, and to occasional hardships. For, notwithstanding the repeal of the oppressive act 1 James I. cap. 22, and other subsequent statutes, the tanner is still restricted, by various excise laws, from advantageously shaving and reducing his hides and skins—from mixing and removing them at his discretion—and also from exercising the trades of a currier, &c.

Those restrictions, it must be acknowledged, are in some degree necessary for the protection and security of the revenue, while the duties are imposed and collected upon the present system. But if a different mode of taxation and collection (as in Ireland, on the admeasurement of the pits; or on the raw material, or any other plan) could be adopted, the benefits which would result, both to the manufacturer and to the community, are incalculable. It would leave the tanner at full liberty to conduct his business entirely according to his skill and judgment, and to unite with it the trades of currier and leather-cutter, which are so naturally connected with his own. It would enable him to facilitate the process; to save much superfluous labour; to economize the materials of tanning, which are now unavoidably wasted on useless or inferior leather; to shave, divide, select, and appropriate certain hides and skins, or parts of hides and skins, at the proper time for their peculiar purposes; to prevent the injury which leather often receives in drying at particular seasons; and ultimately to improve the quality and reduce the price of one of the most useful articles of general consumption.

These are matters well worthy the consideration of the executive government and the legislature. Some attention has already been given to this subject by the house of commons in the sessions of 1815 and 1816, and we have no doubt that by further investigation, intelligent and unprejudiced persons might easily arrange and complete a plan which would afford perfect security to the revenue, would simplify the collection, would prevent the possibility of fraud, and at the same time prove extremely beneficial to the manufacture and to the public.

TANNRODA, in *Geography*, a town of the principality of Weimar; 9 miles S.S.W. of Weimar.

TANORE, a town of Hindoostan, in the country of Calicut; 25 miles S.S.E. of Calicut. N. lat. 10° 58′. E. long. 75° 54′.

TANOS, in *Ancient Geography*, a town of the island of Crete.

TANOT, in *Geography*, a river of North Wales, which rises in the county of Montgomery, and runs into the Severn, 7 miles below Welshpool.

TANOUMDAIN, a town of the Birman empire; 30 miles N.E. of Pagahm.

TANREC, in *Zoology*, a name given by Buffon to the ERINACEUS *Ecaudatus*; which see.

TANSA, in *Geography*, a branch of the river Mobile.

TANSCHA. See TANGIA.

TANSE, a town of Brasil, in the jurisdiction of St. Paul.

TANSIFT, or TENSIFT, vulgarly called Wed Marakosh, or the river of Morocco, because it passes through the district of that name, a river that rises in mount Atlas, E. of Morocco, and taking its course about five miles N. of that city, proceeds through the territory of Morocco, and Rahamana, and nearly divides the two maritime provinces of Shedma and Abda; discharging itself into the Atlantic ocean, about 16 miles S. of the town of Saffy. In its course it receives some tributary streams issuing from the Atlas, the principal of which is the Wed Niffis. In many places it is very deep; and about six miles from Morocco it is crossed by a bridge, erected by Muley El Mansor, which is very strong, but flat, with many arches. At the mouth of this river, on the N. side, amid some sands and marshes, are the ruins of a small town, called by the Moors Suera, from which the insalubrity of the air, or the inundations of the Tansif, have driven the inhabitants. On the other side of the river, which is passed by fording, or on rafts made of reeds tied to leathern bags inflated with wind, is a square castle, built in the reign of Muley Ishmael, to defend the passage of the river, during the time of the intestine disturbances of the empire. This castle at present only contains a few families; and the country round it is uncultivated.

TANSILLO, Luigi, in *Biography*, an Italian poet, was a native of Nola, and born about the year 1510. The firſt ſpecimen of his talents in Tuſcan poetry, when he was twenty-four years of age, was his " Il Vandemmiatore," firſt printed in 1734, and it afterwards paſſed through ſeveral editions, under the title of " Stanze amoroſe ſopra gli orte della Donne." This poem was ſucceeded by another of the ſame licentious character, entitled " Stanze in lode della Menta." His reputation was ſo much ſunk by theſe publications, that all his poems and other pieces were conſigned by pope Paul IV. to the liſt of prohibited books. The author, deeply mortified by this circumſtance, addreſſed a penitential letter to the pope, ſupplicating forgiveneſs, and informing him that he had made reparation by compoſing a devout poem, entitled " Le Lagrime di San Pietro," or, " The Tears of St. Peter." The apology was admitted, and his name was eraſed from the liſt. In 1569 he was judge-royal at Gæta, and being then declining in health, he probably did not long ſurvive. His " Tears of St. Peter" was publiſhed, after his death, in fifteen cantos, and much applauded. It was tranſlated into French by Malherbe, and alſo into Spaniſh. His other poems have been often printed; but the moſt complete edition is that of Venice in 1738. Two other elegant poems, entitled " La Balia" and " Il Podera," were publiſhed in the year 1767 and 1769. Some perſons have repreſented Tanſillo as equal to Petrarch; but though this degree of praiſe ſhould not be allowed, he is conſidered by the beſt judges as one of the moſt elegant and ſpirited poets of his age. Moreri. Gen. Biog.

TANSITARO, in *Geography*, a town of Mexico, in the province of Mechoacan.

TANSOR, a town of Africa, in the kingdom of Fez, 30 miles N. of Fez.

TANSOU, a town on the E. coaſt of Madagaſcar. S. lat. 15° 40′. E. long. 50° 8′.

TANSUCHE, a town of Mexico, in the province of Guaſteca; 83 miles N.W. of Panuco.

TANSY, or Tanzy, in *Botany*. See Tanacetum.

Tansy, in the *Materia Medica*. The leaves and flowers of tanſy have a ſtrong, not very diſagreeable ſmell, and a bitter ſomewhat aromatic taſte. They give out their virtue both to water and ſpirit, but moſt perfectly to the latter: the tincture made from the leaves is of a fine green; from the flowers, of a bright pale yellow colour. Diſtilled with water, they yield a greeniſh-yellow eſſential oil, ſmelling ſtrongly of the herb, and probably containing camphor; the remaining decoction, inſpiſſated, affords a ſtrong, bitter, ſubſaline extract.

According to Bergius, the virtues of tanſy are tonic, ſtomachic, anthelmintic, emmenagogue, and reſolvent, qualities uſually attributed to bitters of the warm or aromatic kind. Tanſy has been much uſed as a vermifuge, and its efficacy has been aſcertained by the teſtimonies of many reſpectable phyſicians.

The ſeeds have been chiefly recommended in this laſt intention, and ſubſtituted for thoſe of the *ſantonicum*, from which they differ not a little in quality as well as in appearance, being much leſs bitter, and of a more aromatic flavour.

Dr. Clark informs us (Eſſ. and Obſ. Phyſ. and Lit. vol. iii.) that in Scotland tanſy was found to be very beneficial in various caſes of gout, and Dr. Cullen ſays, that he has known ſeveral who have taken it without any advantage, and ſome others who reported that they had been relieved from the frequency of their gout. Tanſy is alſo recommended in the hyſteria, eſpecially when this diſeaſe is ſuppoſed to proceed from menſtrual obſtructions.

The leaves of this plant may be given in powder to the quantity of ℈j to ʒj, for a doſe twice a day; but it has been more commonly taken in infuſion, or drank as tea. It is now ſcarcely ever uſed, except as an anthelmintic for expelling lumbrici, to which it has certainly ſome pretenſions. Lewis. Woodville. Thomſon.

Tansy, *Wild*. See Cinquefoil.

TANT, in *Natural Hiſtory*, an Engliſh name for a ſmall ſpider of the *phalangium* kind, having only two eyes, and eight very long legs, and commonly ſuppoſed to be very poiſonous.

It is all over of an elegant ſcarlet colour, reſembling that of the flowers of the red poppy when full blown, except that the belly has a whitiſh caſt. Four of its legs are inſerted in the upper part of the breaſt, and the other four near the belly; and near the origin of each leg there is a ſmall black ſpot. Its body is round and full, and it is all over covered with a fine, ſhort, velvety down. It is not unfrequent in dry paſtures in the ſpring-ſeaſon. It is terribly dreaded by our farmers, who ſuppoſe that an ox will die who chances to ſwallow it. Ray's Hiſt. Inſects, p. 44.

TANTABEE, or Tankabast, or *Lop*, in *Geography*, a town of Little Bucharia, on the river Yarkan; 100 miles S. of Tourfan.

TANTALAM. See Ligor.

TANTALITE, in *Mineralogy*, the ore of a newly diſcovered metal called tantalium, or tantalum. (See Tantalium.) This ore has been called columbite by Mr. Hatchett, who obtained a ſpecimen of it from Maſſachuſetts bay, in North America, and diſcovered the metal which he denominated columbium, and which is now found to be the ſame with tantalium. The colour of tantalite is iron-black, ſometimes with a tinge of blue. It occurs imbedded in angular pieces, from the ſize of a pea to that of an hazle-nut. It is alſo cryſtallized in acute octohedrons, with ſquare baſes. The ſurface of the angular pieces is uneven; that of the cryſtals is ſometimes ſmooth, and ſometimes ſtreaked; it has a ſhining metallic luſtre, inclining to reſinous. The fracture is uneven and granular, inclining to compact or conchoidal. The fragments are irregular, ſharp, and angular. It ſcratches glaſs, and gives a few ſparks with ſteel. The ſtreak is dull, and the powder a browniſh-black. The ſpecific gravity varies from 7.15 to 7.953. The columbite, according to Hatchett, is 5.918. Tantalite is infuſible before the blow-pipe, without addition; and it ſuffers no change but a diminution of luſtre.

The conſtituent parts of tantalite from Finland are, according to

	Wollaſton.	Vauquelin.	Klaproth.	Berzelius.
Oxyd of tantalium	85	83	88	83.2
Oxyd of iron	10	12	10	7.2
Oxyd of mangancſe	4	8	2	7.4
Oxyd of tin -	0	0	0	0.6

The North American columbite contained, according to an analyſis of Dr. Wollaſton, 80 parts of oxyd of tantalium, 15 of oxyd of iron, and 5 of oxyd of manganeſe.

Tantalite occurs in the pariſh of Kemito, in Finland, diſſeminated in coarſe red granite. It bears a conſiderable reſemblance to ſeveral other minerals, particularly to magnetic iron-ſtone, tin-ſtone, wolfram, yttryotantalite, and gadolinite. It is diſtinguiſhed from magnetic iron-ſtone by its greater ſpecific gravity, and by not affecting the magnetic needle; from compact black tin-ſtone, by its metallic luſtre, and by the action of the blow-pipe, which reduces tin-ſtone on charcoal; from wolfram, by the abſence of the foliated fracture; from yttryotantalite, by the form of the

cryſtals,

cryſtals, and by reſiſting the action of the blow-pipe, by which yttryotantalite is melted into a greeniſh-yellow ſlag; laſtly, tantalite is diſtinguiſhed from gadolinite, by its greater ſpecific gravity, uneven fracture, and infuſibility. Yttryotantalite, another ore of tantalium, contains the newly diſcovered earth called yttria, from Ytterby, near Roſlagen, in Sweden, where it was firſt diſcovered. See Tantalium and Yttryotantalite.

TANTALIUM, or Tantalum, the metal obtained from tantalite and yttryotantalite. The method of reduction conſiſts in boiling the ores with alkalies, and adding nitro-muriatic acid to the ſolution. The oxyd of tantalium is thrown down in white powder: this muſt be waſhed, dried, and ſtrongly ignited in a crucible lined with charcoal.

Berzelius preſſed the oxyd into a cavity of the ſize of a gooſe-quill, made in a lump of well-burned charcoal, and expoſed it to a violent heat, in a Heſſian crucible. The reduced metal was not melted, but the particles of it firmly adhered together, and formed a maſs, through which water would not penetrate. The grains were hard enough to ſcratch glaſs. The ſpecific gravity, as aſcertained by Dr. Wollaſton, was 5.61; but as the maſs had not been melted, the weight of tantalium muſt be ſomething heavier. Its colour is dark grey; and when ſcratched with a knife, it aſſumes the metallic luſtre, and has the appearance of iron. It may be reduced to powder by trituration; the powder is of a dark brown colour, without the ſmalleſt metallic luſtre. This powder is not in the leaſt altered by muriatic or nitric acids, nor by aqua regia, though it be digeſted with them for ſeveral days. In this reſpect it agrees with chromium, titanium, oſmium, iridium, and rhodium.

When heated to redneſs, it takes fire, burns feebly without flame, and goes out directly if it be removed from the fire. By this means it is converted into a greyiſh-white matter, which may again be reduced to the metallic ſtate by heating it with charcoal: 100 parts of tantalium, treated in this manner, combine with 8.5 or 4.5 of oxygen. But by this proceſs it is ſcarcely poſſible to oxydize tantalium completely.

If tantalium, when pulverized, is mixed with nitre, and thrown into a red-hot crucible, a feeble detonation takes place. The maſs is ſnow-white, and is a compound of potaſh and oxyd of tantalium.

The mean of four experiments on the reduction of the oxyd of tantalium to the metallic ſtate, makes it a compound of 100 metal with 5.485 oxygen. The ſuppoſition that the oxygen in the water, which converts the oxyd into a hydrate, is twice as great as that in the oxyd, would make it a compound of 100 metal with 5.5 oxygen. Muriatic acid throws down oxyd of tantalium, from its combinations with potaſh: it is then a hydrate of a white colour; and when waſhed and dried, it is compoſed of 100 of oxyd of tantalium and 12.5 water. From experiments of Berzelius, it appears that the oxyd of tantalium poſſeſſes acid properties. He ſucceeded in alloying ſeveral metals with tantalium, as tungſten and iron. Thomſon's Annals, September, 1816, p. 233.

TANTALUS, in *Ancient Geography*, a town in the iſle of Leſbos.—Alſo, a town in Aſia Minor, upon the bank of the Meander.

Tantalus, one of the many names given by chemiſts to mercury.

Tantalus, in *Mythology*, a king of Lydia, Phrygia, or Paphlagonia, according to ſome, but, according to others, the ſon of Jupiter by the nymph Plota, who is ſaid to have preſented the mangled members of his ſon Pelops, whom he murdered, to the gods, at a feaſt, in order to prove their divinity; or, according to the modern explication of this fable, he offered up his ſon as a ſacrifice to the gods. Others, however, have charged him with revealing the ſecrets of the gods, *i. e.* the myſteries of their worſhip, of which he was the high-prieſt. But whatever was the nature of his crime, the poets repreſent him as condemned to hell, and tormented there with perpetual hunger and thirſt in the midſt of plenty of both meat and drink. Some repreſent him as ſtanding up to the chin in water, which he was incapable of reaching; or as ſtanding under a tree, ſome of the branches of which, loaded with the fineſt ripe fruits, hung down juſt before his mouth, which, the moment he endeavoured to take, always waved out of his reach. Others repreſent him as ſtanding under a heavy ſtone, which was ſuſpended over his head, and which he ſuſpected would every moment fall and cruſh him.

Horace (lib. i. ſat. i. v. 71.) ſeems to make Tantalus only an emblem of the covetous: as Lucretius (lib. iii. v. 1015.) makes Siſyphus, who is repreſented as bending under the weight of a great ſtone, or labouring to heave it againſt the ſide of a ſteep mountain, and which always rolls precipitately down again before he can fix it on the top, as an emblem of the ambitious.

Tantalus, in *Ornithology*, a genus of the order of Grallæ. Its characters are, that the bill is long, thick at the baſe, and ſomewhat incurvated; the face naked; the tongue ſhort and broad; the noſtrils linear; and the feet, with four toes, palmated at the baſe. Linnæus enumerates twenty-one

Species.

Loculator. With a blueiſh face, reddiſh bill, quills and tail-feathers black, and white body: the curicaca of Marcgrave, the wood pelecan of Cateſby, and wood ibis of Pennant. It is found in New Holland and South America.

Falcinellus. With a black face, blueiſh legs, wings and tail violet, and cheſnut body: the bay ibis of Pennant and Latham, and green courlis of Buffon. A variety is the numenius caſtaneus of Briſſon. It is found in flocks about the lakes of Italy, ſouth of Germany, Denmark, the Ural deſert, and the Caſpian and Euxine ſeas.

Minutus. With face, bill, and legs greeniſh, ferruginous body, beneath white: the leſſer ibis of Edwards and Latham. Found in Surinam.

Ibis. With red face, luteous bill, grey legs, black quill-feathers, and reddiſh-white body: the Egyptian ibis of Latham. Found plentifully in Egypt. See Ibis.

Ruber. With face, bill, and legs red, ſanguineous body, and the apices of the wings black: the guara of Marcgrave, Willughby, Ray, &c. and the ſcarlet ibis of Pennant and Latham. Found gregarious in the Bahama iſlands, in parts of America between the tropics, particularly Eaſt Florida.

Albus. With red face, bill, and legs, white body, and the tips of the wings green: the white curlew of Cateſby, and white ibis of Pennant and Latham. Found in the Braſils and in Carolina.

Fuscus. With red face, bill, and legs, brown body, beneath white: the brown curlew of Ibis, and brown ibis of Pennant and Latham. Found in the warmer parts of America, and in ſummer in Carolina.

Viridis. With black face and legs, green and cyaneous wings, neck cinereous-black, beneath faſciated with white, upper part of the body and tail green-golden, beneath and rump brown-blackiſh: the green ibis of Latham.

Igneus. With black head and neck, green legs, body cyaneous, reſplendent with green, beneath blackiſh-red, with the quills and tail-feathers green-golden: the gloſſy ibis of Latham.

Leuco-

Leucocephalus. With white head, neck, and body, bill and face yellow, legs pale, and rump with very long rufous feathers: the white-headed ibis of Latham. Found in Ceylon.

Calvus. With white head, the hinder part of the neck tuberculated, with the jugular bag bare, the crown, bill, and legs black, and body black: the bald ibis of Latham. Found in the weftern parts of Africa.

Manillensis. With the bill and orbits greenifh, legs vermilion-coloured, and body red-brown: the Manilla ibis of Latham. Found in the ifland of Luçon.

Cristatus. With pale face, head, part of the neck, tail, and vent black, the creft on the hinder part of the head long with feathers partly white and partly black, ferruginous body, and whitifh wings: the crefted ibis of Latham. Found in Madagafcar.

Niger. With face, bill, and legs red, and black body: the black ibis of Latham. Found in Egypt, near Damietta.

Coco. With face and bill yellow-flefhy, legs flefhy pale, body white, wings as far as the apex white, the three outer quill-feathers black above at the apex. Found in the Caribbee iflands.

Pillus. With face, bill, and legs brown, body white, quill and tail-feathers black. Found near the rivers and lakes of Chili.

Cayennensis. With face obfcurely reddifh, obfcure bill, body black and fhining green: the Cayenne ibis of Latham.

Mexicanus. With blueifh bill, reddifh face, head and neck obfcure and white, a little varied with green and yellow, back, rump, and legs black, breaft and abdomen brown, tail and quill-feathers braffy-green: the acalotl of Ray and Willughby, the acalot of Buffon, and the Mexican ibis of Latham. Found near the lakes of New Spain.

Melanopis. With bill, face, and nails black, crown yellow, neck and breaft yellowifh, the feathers of the back, the fcapulars, and tail-feathers, and pectoral band, cinereous, brown at the margin, the eyes and tail green and black, and the legs red: the black-faced ibis of Latham.

Albicollis. With black bill, head and neck rufous-white, body brown with grey waves and fhining green, and red legs: the white-necked ibis of Latham. Found in Cayenne.

Griseus. With fpadiceous bill, face and nails black, hind part of the head and neck grey, body whitifh, back, rump, quills, and tail greenifh-black, and reddifh legs: the grey ibis of Latham, and matuiti of Willughby and Buffon. Found in Brafil.

Tantalus's *Cup*, in *Hydraulics*, is a cup, as A (*Pl.* VIII. *Hydraulics*, *fig.* 6.) with a hole in the bottom, and the longer leg of the fiphon B C E D cemented into the hole; fo that the end D of the fhorter leg D E, may almoft touch the bottom of the cup within. Then, if water be poured into this cup, it will rife in the fhorter by its upward preffure, extruding the air before it through the longer leg; and when the cup is filled above the bend of the fiphon at F, the preffure of the water in the cup will force it over the bend of the fiphon; and it will defcend in the longer leg C B G, and even through the bottom, until the cup be emptied. The legs of this fiphon are almoft clofe together, and it is fometimes concealed by a fmall hollow ftatue, or figure of a man placed over it; the bend F being within the neck of the figure as high as the chin. So that poor thirfty Tantalus ftands up to the chin in water, according to the fable, imagining it will rife a little higher, and he may drink; but, inftead of that, when the water comes up to his chin, it immediately begins to defcend, and therefore, as he cannot ftoop to follow it, he is left as much tormented with thirft as ever.

TANTAMOUNT, fomething that amounts to, or is equivalent to, fome other.

TANTANEH, in *Geography*, a mountain of Africa, which forms the fouth boundary of Berdoa.

TAN-TCHING, a town of Corea; 33 miles W.S.W. of Tfin-tcheou.

TANTECO, a town of Mexico, in the province of Guafteca; 25 miles N. of Panuco.

TAN-THOUI-TCHING, a town on the W. coaft of the ifland of Formofa. N. lat. 25° 8′. E. long. 120° 49′.

TANTRA, the name of a branch of literature among the Hindoos, of which we have hitherto received but very imperfect information. The books bearing this title appear to contain directions for certain religious ufages adopted by fome fects and condemned by others. (See Sakta.) The name Tantra, or Yantra, is alfo given to myfterious hieroglyphics, facred to particular deities. See Mantra, Yantra, and Parusha.

TANTUM Decies. See Decies.

TANTUMQUERI, in *Geography*, a town of Africa, in the country of Fantin, on the Gold Coaft, with two forts, one belonging to the Englifh, the other to the Dutch. N. lat. 5° 20′. W. long. 2° 54′.

TANTUR. See Tortura.

TANUM, a town of Sweden, in Weft Gothland; 31 miles N.W. of Uddevalla.

TANUO, a town of Peru, in the archbifhopric of Lima, and jurifdiction of Cagnete.

TANURI, a town of Sweden, in the government of Bahus; 30 miles N.N.W. of Uddevalla.

TANUS, in *Ancient Geography*, a river of Greece, in the Peloponnefus, which had its fource in mount Parnon, traverfed the Argolide, and difcharged itfelf into the gulf of Thyræa.

TANXIPA, in *Geography*, a town of Mexico, in the province of Guafteca, at the foot of a mountain; 70 miles N.N.W. of Panuco.

TANYGONG, a town of Hindooftan, in Berar; 36 miles W. of Nagpour.

TANZIPAO, a river of Louifiana, which runs into Pontchartrain lake, N. lat. 30° 18′. W. long. 90° 10′.

TANZU, a town of Africa, in Angola, near the coaft; 20 miles S.W. of Loando.

TANZY, in *Botany*, &c. See Tanacetum and Tansy.

TAOCE, in *Ancient Geography*, a town of Afia, in the interior of the Perfide, near the town of Orebatis.—Alfo, a promontory of Afia, on the coaft of the Perfide, 500 ftadia from the mouth of the river Oroatis, and 700 ftadia from that of the river Rhogomagus.

TAOCENA, a country of Afia, in the Perfide.

TAOCHI, a people of Afia, in the mountains of Armenia.

TAO-LOU-SAC, or Ta, in *Geography*, a town of Lower Canada. N. lat. 48° 5′. W. long. 69° 30′.

TAONABO, in *Botany*. See Tonabea and Ternstromia

TAONEROA, in *Geography*. See Poverty *Bay*.

TAOO Island, one of the Friendly iflands, in the South Pacific ocean, about 24 miles in circumference.

TAOOK, a town of Curdiftan, fituated in a barren country, N. of an extenfive vale, which is about 20 miles over, and has a chain of mountains on each fide, running E. and W.

TAORMINA, the ancient *Tauromenium*, a town of Sicily, in the valley of Demona, fituated on the E. coaft, on on a narrow level above a precipice of mount Taurus, and overhung by immenfe maffes of rocks. According to Swinburne it contains 3000 inhabitants. It has been much celebrated for its coftly marble and excellent wine. The ancient Tauromenium was much more extenfive than the prefent town, and comprehended within its walls the town of the promontory of St. Andrew, where was a theatre placed between two high rocks, and commanding a full view both of Ætna and of the plains. This theatre is reckoned the moft beautiful monument of antiquity extant. A confiderable portion of this building has efcaped the ravages of time, and affords the antiquary, as well as the architect, an opportunity of examining that divifion of a theatre on which the actors ftood; a part that is wanting in almoft all other ruined theatres. The arcades are all compofed of brick, the reft of the walls of pebbles, and covered with cafings of marble. The whole range of the vomitoria and galleries that encircled the feats is yet ftanding as high from the ground as the bottom of the fecond order; the profcenium, which formed the chord of the arch, is almoft entire; it is a thick wall, with a large opening in the centre, and three niches; a fmall door, and a fourth niche on each fide; between each of thefe apertures, or receffes, are marks in the wall, where columns were placed. According to the plan deduced from thefe ruins, the ftage was a parallelogram of 138 feet by 58; on each fide was a lofty fquare building, confifting of a bafement and two upper ftories, from the higheft of which a communicating gallery was carried along the back fcenes: the diameter of the femicircular part of the theatre, where the audience fat, was 142 Englifh feet. The ftreets of the modern town, the courts and houfes, are every where interfperfed with fragments of antique walls, aqueducts, and mofaic pavements. The afcent to Taormina is very fteep and difficult; but the charms of the landfcape amply recompenfe the labour of attaining the height. Every thing belonging to it is drawn in a large fublime ftyle; the mountains tower to the clouds; the caftles and ruins rife on weighty maffes of perpendicular rock, and feem to defy the attacks of mortal enemies; Ætna, with all its fnowy and woody fweeps, fills half the horizon; the fea is ftretched out upon an immenfe fcale, and occupies the remainder of the profpect. The beach is confined by high cliffs, that are calcareous and confifting generally of a fpecies of red and white marble, which was in high efteem among the ancients. The houfes in the vicinity are inhabited by peafants, who occupy them with their children and cattle. Thefe feveral monuments are undoubtedly coeval with the Romans; that is, pofterior to Cæfar, who, having expelled the inhabitants of Tauromenium, placed in it a Roman colony. The origin of this city is loft in the obfcurity of ages. It is known that it was confiderably augmented, when Dionyfius, in the 94th Olympiad, 443 years B.C., having taken and deftroyed Naxos, caufed it to be deferted by its inhabitants, who fettled here. This proud city was at length deftroyed by the Venetians, and fortified by the Norman conquerors; and it ftill exifts in a reduced ftate. When it was taken by the Saracens from the Greek emperor in the 10th century, it was one of the ftrongeft places in the ifland, and called by them "Al Moezzia," which name it retained for a confiderable time; 27 miles S.S.W. of Meffina. N. lat. 37° 51'. E. long. 15° 23'.

TAOS Lapis, the *peacock-ftone*, a name given by fome of the ancient writers to a very beautiful variegated agate, refembling, in fome degree, the great variety of colours in the peacock's tail.

TAOSANLU, in *Geography*, a town of Afiatic Turkey, in Natolia; 20 miles N.W. of Kiutaja.

TAOUKA, one of the Society iflands, in the South Pacific ocean. S. lat. 14° 30'. W. long. 145° 9'.

TAP, among *Hunters*. A hare is faid to tap, or beat, when fhe makes a particular noife at rutting-time.

Tap. See Tapping.

Tap-*Root*, that fort of root which fhoots directly downwards to a great depth. There are many roots of this nature, which are in conftant ufe by the farmer, fuch as the carrot, parfnip, beet, &c.; and there are many plants of the tree kind which have tap-roots, as the oak, &c. See Tapping.

In the vegetable kinds of tap-rooted plants, they all require a deeply broken-down and prepared foil, in order to grow them with any fuccefs, and to any confiderable fizes. And, as in the tree forts, they muft always rife from the feeds where they are fown; as they cannot be tranfplanted out with any kind of propriety or advantage. Where the land is not properly prepared to a fuitable depth, they are ufually fhort, forked, and of aukward growth; and when raifed by tranfplanting, very fmall and ftunted; but fome of them cannot be at all grown in the laft method.

Tap-*Rooted Turnip*, in *Agriculture*, that fort which grows much with this kind of root. It is not a favourable kind of growth for this fort of crop. See Turnip.

TAPACRI, in *Geography*, a town of Peru; 20 miles N.E. of Cochabamba.

TAPAJOS, a river of Brazil, in the Capitania of Matto Groffo, which runs N. between the Madeira and the Chingu for 300 leagues, flowing into the Amazons, in lat. 2° 24' 50" and long. 55°, the geographical pofition of the town of Santarem fituated at its mouth. This river rifes in the plains of the Parexis, fo called from an Indian nation which inhabits them. From thefe elevated plains defcend the two greateft rivers of South America, *viz.* the Paraguay, and the Madeira, the largeft river that flows into the Amazons on the fouth. The Tapajos flows in a contrary direction from thefe mountains. Its wefternmoft branch is the river Arinos, which entwines its fources with thofe of the Cuiaba at a fhort diftance from thofe of the Paraguay. The largeft and wefternmoft branch of the Tapajos is the Juruena, which rifes in lat. 14° 20', 20 leagues N.N.E. of Villa Bella, and running N. 120 leagues, flows into the Arinos, and with it forms the bed of the Tapajos. The Juruena may be navigated to its upper fall, within two leagues of its own fource. From the geographical pofition of the Tapajos, it is evident that this river facilitates navigation and commerce from the maritime city of Peru to the mines of Matto Groffo and Cuiaba, by means of its large branches, the Juruena and Arinos. The Tapajos is known to be auriferous through a great part of its courfe.

TAPANA, a name of the Hindoo regent of the fun. It means the *inflamer*. (See Surya.) One of the five arrows with which the Hindoo Kama, or cupid, wounds his votaries, is named Tapana. Its head is formed of a flower of a fuppofed inflaming quality.

TAPARICA, in *Geography*, an ifland at the entrance of All Saints' bay, on the coaft of Brafil, about 25 miles long, and 5 broad. S. lat. 13°.

TAPAS, the name of a fpecies of devotion, to which great merit and efficacy are afcribed by the Hindoos. It confifts of intenfe contemplation, accompanied by aufterities. See Jap.

The performance of the Tapas, or, more correctly written, Tapafya, is ftrongly recommended in Hindoo books; and numerous inftances are there given of benefits conferred on the fuppliants by the gods fo propitiated. An individual, while in the performance of the penances of Tapafya, is called

called Tapafwi: he is much revered, and his prayers are earneftly folicited by the fuperftitious as neceffarily efficacious. (See RAVENA.) Among his aufterities he went through the following feries, each of the eleven fpecific mortifications enduring one hundred years.

1. He ftood on one foot, holding the other and both hands up toward heaven, with his eyes fixed on the fun. 2. He ftood on one great toe. 3. He took as fuftenance nothing but water. 4. He lived fimilarly on air. 5. He remained in the water. 6. He was buried in the earth, but continued, as in the other inflexions, in inceffant adoration. 7. The fame in fire. 8. He ftood on his head, with his feet upwards. 9. He ftood on one hand. 10. He hung by his hands on a tree. 11. He hung on a tree with his head downwards.

Some of the Puranas, or books of divine authority, contain a feries of eighteen fpecific mortifications. One is now lying before us, and we give their denominations, with fome explanatory obfervations.

1. *T'hedefir*, is an elevation of the head, as the word denotes, during life: in this penance fome devotees profefs never to fit. 2. *Akas-muni:* this means etherial contemplation: the afpirant in this cafe looks conftantly on the heavens. 3. *Med'ha-muni*, indicates felf-examination: the arms are ufually croffed over the breaft, and the penitent preferves a thoughtful pofture or gait, with downcaft looks. 4. *Pherfabahu*, with arms projected horizontally. 5. *Dhamr-pana*, inverfion; by fufpenfion on a tree, &c. head downwards, over a fire. 6. *Patala-muni:* this is the reverfe of Akasmuni, meaning fubterrene contemplation; Patala being the name of the lower regions, and Yama the lord thereof. The Patala-muni conftantly looks downwards to the earth. 7. *Muni*, preferving continued filence in aid of abftraction. The word means a wife man, a fage, or faint, as well as wifdom and contemplation. We know of no difference between this fpecies of devotion and that called *Jap*, which fee. 8. *Chourafi-afin:* the meaning of this compound word is eighty-four fitting pofitions; but it may have fome other more myfterious and lefs obvious meaning. It would feem to be the reverfe of fome other penances, the merit of which confift in preferving one pofture; whereas this implies an inceffant variation to the extent of eighty-four changes. 9. *Kaffali:* the Areka or betle-nut penance. This confifts in ftanding foles upwards, the head refting on the nut placed on the ground. This is done at ftated times; but cannot, one would think, be long continued. 10. *Patali*, the earthly or fubterrene penance. This is defcribed to be a partial burying of the body up to the breaft, head downwards, and of courfe under ground, with the feet in the air, as in the laft. One can fcarcely fee at firft how this can be done; but probably the earth is placed very loofely about the head, &c. with the body or legs fupported againft a tree or wall. 11. *Urd'ha-bahu*, with elevated hands, keeping them above the head. This is a common penance, perfevered in fometimes till the arms become mere fkin and bone, the fore-arms fixed immoveably, croffing horizontally, and the finger-nails perhaps perforating the palms. A moft eminent Urdha-bahu is defcribed, with a portrait, in the fifth volume of the Afiatic Refearches, art. ii. 12. *Bäitfiri*, fitting pofture, never rifing or lying. 13. *Nyas-d'hean*, retaining the breath. To this practice great merit is afcribed, and it is perfevered in to a very extraordinary extent; till at length no refpiration is vifible. In this ftate impoftors pretend to beatific vifions, and the credulous of courfe admire the wonders they relate. 14. *Chourangi-afin*, a quadrupedal pofition, obtained by refting on the elbows and knees, putting the hands backwards over the fhoulders, and keeping hold of the toes. This muft be a very aukward and uneafy pofture, and not obtainable without much practice. 15. *Brahm-hanfa:* this is a ftage of aufterity much venerated, and eafily practicable, at leaft oftenfibly. The devotee profeffes total indifference to every thing fublunary: he provides or afks for no food or clothing: he wanders or fits naked: if any one bring him food, he eats: his whole time, in fhort, is occupied in divine contemplation. 16. *Panch-agni*, five fires. The devotee fits on the ground, with a fire to the cardinal points, intenfe and near in proportion to his ability to bear them. The fun over head is the fifth fire. (See PANCH-AGNI.) 17. *Tirbanghi*, ftanding on one foot. This Lakfhmi is related to have done for 100,000 years in the flower of the lotos, during one of her terreftrial incarnations, that fhe might be reunited to her lord Vifhnu. (See PAVAKA.) 18. *Surya-varti*, propitiating Surya, or the fun. This is done in various ways. Sometimes by abftinence merely till he is rifen, or until other prefcribed ceremonies have been performed. Fixing the eyes conftantly on the fun is another mode. See SURYA.

TAPASSANT, among *Hunters*, denotes *lurking*, or *fquatting*. Hence alfo, *to tappy*, is to lie hid, as deer may do.

TAPA-TACSO, in *Geography*, a town of Thibet; 45 miles N.E. of Laffa.

TAPAUACA, a town of South America, in the province of Darien; 40 miles E.S.E. of St. Maria de Darien.

TAPAYAXIN, in *Zoology*, the name of a very remarkable fpecies of lizard, called by Hernandez the *lacertus orbicularis*.

It is not of the long and flender fhape of the common lizards, but as broad as it is long, and much refembling the ray-fifh in fhape, though feldom exceeding four inches in length or breadth. It is a cartilaginous lizard, of a very beautiful variety of colours, always very cold to the touch, and fo fluggifh a creature, that it often will not move out of its place even on touching it. Its head is exceedingly hard and elate, and has a fort of crown of prickles for its defence; yet it is a perfectly harmlefs animal, and fo far from having the fear of man, and fhynefs that other beafts have, that it loves to be taken up and played with, and will ftand perfectly ftill, and feem very happy while played with. Hernandez, lib. ix. cap. 16.

TAPE-WORM, a fpecies of worm breeding in the human bowels, and called by authors *tænia*, and *lumbricus latus*, or the broad worm. See TÆNIA.

The Greek and Roman phyficians, as well as thofe of our own time, have defcribed thofe forts of worms to which the human bowels are fubject. The common long worms, which refemble earth-worms; the afcarides, or fmall worms; and this tape-worm, which they have alfo called *vermis cucurbitinus*, or the gourd-worm, from its refembling, in fome degree, the feeds of that fruit.

The interpreters of fome of the Greek phyficians have, however, been guilty of a great error, in confounding the gourd-worms and the afcarides together, though nothing can be more unlike. The ancients feem to have had a very juft opinion of this animal in calling it *vermis cucurbitinus*, fince it is plain by this, that they underftood every joint, as we call them, of this creature, to be a diftinct worm; and what we call a fingle worm, to be a long feries of thefe worms, joined together end to end.

The true hiftory of this animal is, that it is fhort and broad. What is called a link of the long worm is really a diftinct worm; and when one of thefe multiplies in the bowels, its young adhere to it, and to each other endwife, fo as to form a fort of chain, which lengthens as they continue

tinue to increafe, and in fine becomes immoderately long. Hence it is that the breaking, as it is called, of this worm, does not deftroy it, and that the voiding large pieces of it is no cure, fince it ftill recovers that length again by new young ones. Every feparate link of fuch a chain, if examined, is found to be entire, lively, and brifk, and not at all injured by the feparation.

Dr. Tyfon, in the Phil. Tranf. N° 146, gives a curious account of this worm: it is always fingle; it lies varioufly convoluted, being fometimes as long as all the guts, and fometimes it very much exceeds that length. Olaus Borrichius affures us, that a patient of his, in a year's time, voided eight hundred feet in meafure of this worm, though in that length he did not meet with the head; in voiding, the patient always obferved it to break off.

Dr. Tyfon parallels this cafe with that of a patient of his, who difcharged vaft quantities of this worm for feveral years, but in various pieces, of two, three, four, fix, or more yards long, but all put together, would (he fays) much exceed the length of that of Borrichius.

The joints in this worm are very numerous. In one of twenty-four feet long, Dr. Tyfon numbered five hundred and feven joints. Above the middle of the edges of each joint, he obferved a protuberant orifice. Thofe orifices he takes for fo many mouths; the beft microfcopes difcovering no mouth in that part which ufually paffes for the head. This worm is common in moft kinds of animals, as dogs, oxen, crabs, herrings, pikes, &c.

Some authors have afferted, that it is not one, but many worms linked together, and included in a fpolium of the inteftines; and that this fpolium is not animated, but receives its fenfe and motion from a fort of vermiculi cucurbitini enclofed in it. This Gabucinus, de Lumb. Com. fays, he has plainly difcovered; but Dr. Tyfon abundantly evinces the contrary.

Authors who have treated of thefe worms as a difeafe, have given a canine appetite, or unnatural appetite to food, as one of the fymptoms; but this is wrong, for it has never been found, in reality, that thefe worms, even where moft numerous, have at all increafed the natural appetite; and indeed it is very difficult to judge of their being in the body by fymptoms, fince they occafion none which are not alfo common in many other difeafes. Many people have had them a long courfe of time, without being fenfibly hurt by them; and there has never been known an inftance of their occafioning any one's death, or indeed any confiderable diforder.

Fern-root has been long known as a remedy againft worms. See *Difeafes of* INFANTS, and WORMS.

However, it was funk into neglect till a few years ago, when it again came into notice, by being difcovered to be the remedy which had become greatly celebrated in Switzerland as a fpecific in the cure of the *tænia* or tape-worm. The fecret was purchafed by the king of France, after its efficacy had been attefted upon trial by fome of the principal phyficians at Paris.

The following has been publifhed as the mode of its exhibition. After the patient has been prepared by an emollient clyfter, and a fupper of panada with butter and falt, he is directed to take in bed in the morning a dofe of two or three drachms of the powder of male fern-root. The dofe to infants is only one drachm. The powder muft be wafhed down with a draught of water, but nothing elfe muft be taken till two hours after, when a bolus of calomel, joined with fome of the ftrongeft cathartics, is to be given. If this does not operate, it muft be followed by a dofe of purging falts. By this method the worm is commonly expelled in a few hours. If the trial does not fucceed, the procefs muft be repeated at due intervals. Lewis's Mat. Med. by Aikin, 1784.

TAPEANDURIAN, in *Geography*, a town on the E. coaft of the ifland of Borneo. N. lat. 1° 24'. E. long. 117° 54'.

TAPEANTAN, a fmall ifland in the Sooloo Archipelago. N. lat. 6° 15'. E. long. 122° 9'.

TAPECON, in *Ichthyology*, a name given by fome to the fifh generally called the *uranofcopus*, or ftar-gazer.

TAPEINIA, in *Botany*, a little plant of the ftraits of Magellan, fo named by Commerfon, from ταπεινος, *humble*, or *low*; Juff. 59. This is the *Ixia pumila* of Forfter, Pl. Magell. 11. t. 2, referred by Vahl to WITSENIA. See that article.

TAPER, TAPERING, is underftood of a piece of timber, or the like, when broad at one end, and gradually diminifhing to the other; as is the cafe in pyramids, cones, &c.

To meafure taper timber, &c. fee SLIDING-*Rule*.

TAPER-*Bored* is applied to a piece of ordnance, when it is wider at the mouth than towards the breech.

TAPER alfo denotes a kind of tall wax-candle, placed in a candleftick, and burnt at funeral proceffions, and in other church folemnities.

Tapers are made of different fizes; in fome places, as Italy, &c. they are cylindrical; but in moft other countries, as England, France, &c. they are conical or taper; whence poffibly the name; unlefs we rather choofe to derive taper in the adjective fenfe from the fubftantive *taper*, in the Saxon *tapen* or *tapon*, *cereus*, *wax-candle*.

Both kinds are pierced at bottom, for a pin in the candleftick to enter.

The ufe of lights in religious ceremonies is of a long ftanding; the ancients, we know, ufed flambeaux in their facrifices, and particularly in the myfteries of Ceres; and they had tapers placed before the ftatues of their gods.

Some fuppofe that it was in imitation of this heathen ceremony, that lights were firft introduced into the Chriftian church; others take it, that the Chriftians borrowed the practice from the Jews; but recourfe need not be had to the one or the other. Doubtlefs, as in the firft ages of Chriftianity, they had their meetings in obfcure fubterraneous vaults, there was a neceffity for tapers, &c.; and there was even occafion for them after they had the liberty of building churches, thofe being contrived in fuch a manner as only to receive very little light, that they might infpire the greater awe and refpect by the obfcurity.

This original of tapers in churches is the moft natural; but it is now a long time fince the ufe of tapers, which neceffity firft introduced, is become a mere ceremony. St. Paulinus, who lived at the beginning of the fifth century, obferves, that the Chriftians of his days were fo fond of tapers, that they even painted them in their churches.

There are two ways of making tapers, the firft with the ladle, the fecond by hand.

In the firft, after the wicks (which are ufually half cotton, half flax) have been well twifted, and cut of the due length, a dozen of them are hung, at equal diftances, around an iron hoop, directly over a large copper bafon full of melted wax.

Then taking an iron ladleful of the wax, they pour it gently over the wicks, a little below the tops of them, one after another; fo that, the wax running down them, they become foaked and covered with it, and the furplus returns into the bafon, under which is a pan of coals to keep it in fufion.

Thus they continue to caft on more and more wax for ten or or twelve times, till the tapers be brought to the required dimenfions. The firft caft only foaks the wick, the fecond begins to cover it, and the reft give it the form and thicknefs; in order to which, they take care that every caft, after the fourth, be made lower and lower below the wicks to make them taper. The tapers, thus formed, are laid, while yet hot, one againft another, in a feather-bed, folded double, to preferve them foft; and afterwards taken out thence, one after another, to be rolled on a long fmooth table, with an oblong inftrument of box, polifhed at the bottom, and furnifhed with a handle above.

The taper thus rolled and polifhed, a piece of its larger end is cut off, and a conical hole bored in it, with a boxen inftrument, into which the pin or point of the candleftick is to be received.

While the broach is yet in the hole, they ufe to ftamp the maker's name and the weight of the taper, with a boxen ruler, on which proper characters are cut. The taper is then hung up to harden, after which it is fit for ufe.

Making of Tapers by Hand.—The wicks being difpofed, as in the former manner, they begin to foften the wax, by working it in hot water, in a narrow, deep, copper veffel. They then take a quantity of this wax out with the hand, and apply it gradually on the wick, which is faftened to a hook in the wall, at the end oppofite to the collet; fo that they begin to form the taper by the large end, and proceed, ftill leffening the thicknefs to the neck or collet.

The reft is performed after the fame manner as in tapers made with the ladle, except that they do not lay them in the feather-bed, but roll them on the table as faft as they are formed.

Two things there are to be obferved in the two kinds of tapers; the firft, that, in the whole procefs of tapers with the ladle, they ufe water to moiften the table, and other inftruments ufed therein, that the wax may not ftick; and that, in the other, they ufe oil of olives, or lard, for the fame end.

Taper, *Pafchal*, among the *Romanifts*, is a large taper, on which the deacon applies five bits of frankincenfe, in holes made for the purpofe, in form of a crofs; and which he lights with new fire in the ceremony of Eafter-Saturday.

The Pontifical makes pope Zofimus the author of this ufage; but Baronius will have it more ancient; and quotes a hymn of Prudentius to prove it. That pope he fuppofes to have only eftablifhed the ufe of it in parifh-churches, which till then had been reftrained to greater churches.

F. Papebroch explains the original of the pafchal taper more diftinctly in his "Conatus Chronico-Hiftoricus," &c. It feems that, though the council of Nice regulated the day on which Eafter was to be celebrated, the patriarch of Alexandria was enjoined to make a yearly canon of it, and to fend it to the pope. As all the other moveable feafts were to be regulated by that of Eafter, a catalogue of them was made every year; and this was written on a taper, *cereus*, which was bleffed in the church with much folemnity.

This taper, according to the abbot Chaftelain, was not a wax-candle made to be burnt; it had no wick, nor was it any thing more than a kind of column of wax, made on purpofe to write the lift of moveable feafts on; and which would fuffice to hold that lift for the fpace of a year.

For, among the ancients, when any thing was to be written to laft for ever, they engraved it on marble or fteel; when it was to laft a long while, they wrote it on Egyptian paper; and when it was only to laft a fhort time, they contented themfelves to write it on wax. In procefs of time, they came to write the moveable feafts on paper, but they ftill faftened it to the pafchal taper; which practice was obferved for a long time at Notre Dame, in Rouen, and throughout the order of Cluny. Such is the original of the benediction of the pafchal taper.

TAPERA, in *Ornithology*, a fpecies of fwallow. See Hirundo.

Tapera *dos Bocas*, in *Geography*, a town of Brafil, in the government of Para, on the Guanapu; 90 miles S.W. of Para.

TAPERI, a town of Peru; 16 miles N.E. of Cocha.

TAPESTRY, or Tapistry, a curious kind of manufacture, ferving to adorn a chamber, or other apartment, by hanging or lining the walls of it.

Some ufe tapeftry as a general name for all kinds of hanging, whether woven or wrought with the needle; and whether filken, woollen, linen, leathern, or of paper, (in which they are countenanced by the etymology of the word, formed from the French *tapiffer, to line;* of the Latin *tapes*, a cover of a wall or bed, &c.) But, in the common ufe of our language, the term is now appropriated to a kind of woven hangings of wool and filk, frequently raifed and enriched with gold and filver, reprefenting figures of men, animals, landfcapes, &c.

The invention of tapeftry feems to have come from the Levant; and what makes this the more probable is, that formerly, the workmen concerned in it were called, at leaft in France, *Sarazins*, or *Sarazinois.*

Some have fuppofed that the Englifh and Flemifh, who were the firft that excelled in it, might bring the art with them from fome of the croifades or expeditions againft the Saracens. Accordingly they fay, that thofe two nations were the firft who fet on foot this noble and rich manufacture in Europe, which afterwards became one of the fineft ornaments of palaces and churches, &c. At leaft, if they be not allowed the inventors, they have the honour of being the reftorers, of this curious and admirable art, which gives a kind of life to wools and filks, in fome refpects not inferior to the paintings of the beft mafters. However, it does not appear at what precife era this manufacture was introduced into Europe; nor is it certain to whom it was owing.

Guicciardin, in his "Defcription and Hiftory of the Netherlands," printed at Antwerp in 1582, afcribes the invention of the art of making tapeftry hangings to the Netherlanders, but he does not affign the time of the invention.

The art of weaving tapeftry was brought to England by William Sheldon, efq. about the end of the reign of Henry VIII. See Dugdale's Warwickfhire in Stemmate Sheldon, p. 584.

In the reign of king James, the manufacture of tapeftry was fet up at Mortlake, in Surrey. Aubrey, indeed, in his hiftory of that county, dates its inftitution in the fubfequent reign; but Lloyd (State Worthies, p. 953.) is not only pofitive for the former era, but affirms, that at the motion of king James himfelf, who gave two thoufand pounds towards the undertaking, fir Francis Crane erected the houfe at Mortlake for the execution of the defign; and this is confirmed by authentic evidence; for, in Rymer's Fœdera, vol. xviii. p. 66, there is an acknowledgment from king Charles in the firft year of his reign, *viz.* 1625, that he owes fix thoufand pounds to fir Francis Crane for tapeftry; and he grants to him two thoufand pounds yearly, for ten years, towards the maintenance of the faid work.

Thefe works at Mortlake, which at firft had been conducted after old patterns, were afterwards formed from defigns, deſigns, both in hiſtory and groteſque, furniſhed by Francis Cleyn, and thus carried to ſingular perfection.

From the deed above recited, it is plain that the manufacture was then arrived at great perfection. See Mr. Walpole's Anecdotes of Painting in England, vol. ii. p. 36.

In the year 1663, a ſtatute was enacted (cap. 15.) for the encouragement of the linen and tapeſtry manufactures of England, and diſcouragement of the very great importation of foreign linen and tapeſtry.

The firſt eſtabliſhment of a tapeſtry manufacture at Paris was under Henry IV., in the year 1606 or 1607, by means of ſeveral excellent artiſts, whom he invited from Flanders.

But this fell with the death of that prince. Under Lewis XIV. the manufacture was retrieved by the care and addreſs of the great M. Colbert, to whom is owing the eſtabliſhment of the Gobelins, a royal tapeſtry manufactory, which has produced works of this kind ſcarcely inferior to the fineſt Engliſh or Flemiſh tapeſtry, either with regard to the deſign, the colours, or the ſtrength.

In this manufactory both wool and ſilk are uſed, and ſometimes gold and ſilver. The fineſt paintings may be copied in this work, and the greateſt maſters have been employed in draughts for the tapeſtry weavers.

The weavers of the Gobelins work behind, or on the wrong ſide of the loom, which ſtands upright, and the pattern is placed on either ſide of the workman.

As the tapeſtry of the Gobelins is made of pieces of a certain breadth only, there are other workmen, called rentrayeurs, or fine-drawers, who are employed in ſewing or fine-drawing the ſeveral parts together, ſo that no ſeam is diſcernible, but the whole appears as one deſign, like a piece of ſilk from a loom. Theſe workmen are alſo uſeful in mending and cleaning tapeſtry when damaged or ſullied.

The tapeſtry-men diſtinguiſh two kinds of work; *viz.* tapeſtry of the *high* and the *low warp*, though the difference is rather in the manner of working, than in the work itſelf, which is, in effect, the ſame in both, only the looms, and conſequently the warps, are differently ſituated; thoſe of the *low warp* being placed flat, and parallel to the horizon, and thoſe, on the contrary, of the *high warp*, erected perpendicularly.

The French have had three conſiderable tapeſtry manufactories beſides that of the Gobelins; the firſt at Aubuſſon, in Auvergne; the ſecond at Felletin, in the Upper Marche; and the third at Beauvois: they were all equally eſtabliſhed for the high and the low warp; but all laid aſide the former, excepting that of the Gobelins.

There are admirable low warps in Flanders, generally exceeding thoſe of France; the chief and almoſt only Flemiſh manufactories were at Bruſſels, Antwerp, Oudenard, Liſle, Tournay, Bruges, and Valenciennes.

At Bruſſels and Antwerp they ſucceeded both in human figures and animals, and in landſcapes: and that both with reſpect to the deſigning and the workmanſhip. At Oudenard their landſcapes and animals were good, but their human figures not well executed. Liſle, and the other cities named, came behind Oudenard. The French manufacture of Felletin has done tolerably well in landſcapes, Aubuſſon in figures, and Beauvois in both.

The uſual widths of tapeſtries were from two ells to three ells and a half, Paris meaſure.

The manufacture of tapeſtry of each kind (though leſs faſhionable and in uſe than formerly) is too curious to be here paſt over without a ſhort deſcription. We ſhall give each under its ſeparate article.

Manufacture of Tapeſtry of the High Warp.—The loom on which this is wrought is placed perpendicularly: it conſiſts of four principal pieces; two long planks or cheeks of wood, and two thick rollers or beams. The planks are ſet upright, and the beams acroſs, one at top, and the other at bottom, a foot diſtance from the ground. They have each their trunnions, by which they are ſuſpended on the planks, and are turned with bars. In each roller is a groove, from one end to the other, capable of containing a long round piece of wood, faſtened in it with hooks. Its uſe is to tie the ends of the warp to. The warp, which is a kind of worſted, or twiſted woollen thread, is wound on the upper roller; and the work, as faſt as woven, is wound on the lower.

Withinſide the planks, which are ſeven or eight feet high, fourteen or fifteen inches broad, and three or four thick, are holes pierced from top to bottom, in which are put thick pieces of iron, with hooks at one end, ſerving to ſuſtain the coat-ſtave: the pieces of iron have alſo holes pierced in them, by putting a pin in which, the ſtave is drawn nearer, or ſet farther off; and thus the coats or threads are ſtretched and looſened at pleaſure. The coat-ſtave is about three inches diameter, and runs all the length of the loom; on this are fixed the coats, or threads, which make the threads of the warp croſs each other. It has much the ſame effect here as the ſpring-ſtave and treddles have in the common looms. The coats are little threads faſtened to each thread of the warp, with a kind of ſliding-knot, which forms a ſort of maſh or ring. They ſerve to keep the warp open, for the paſſages of broaches wound with ſilks, woollens, or other matters uſed in the piece of tapeſtry.

Laſtly, there is a number of little ſticks, of different lengths, but all about an inch diameter, which the workman keeps by him in baſkets, to ſerve to make the threads of the warp croſs each other, by paſſing them acroſs: and that the threads thus croſſed may retain their proper ſituation, a packthread is run among the threads above the ſtick.

The loom thus formed, and mounted with its warp, the firſt thing the workman does, is to draw, on the threads of this warp, the principal lines and ſtrokes of the deſign to be repreſented on the piece of tapeſtry; which is done by applying cartoons made from the painting he intends to copy, to the ſide that is to be the wrong ſide of the piece; and then with a black-lead pencil following and tracing out the contours of them on the thread of the right ſide; ſo that the ſtrokes appear equally both before and behind. As to the original deſign the work is to be finiſhed by, it is hung up behind the workman, and wound on a long ſtaff, from which a piece is unrolled, from time to time, as the workman proceeds.

Beſides the loom, &c. here deſcribed, there are three other principal inſtruments required for working the ſilk, or wool of the woof within the threads of the warp. Theſe are a broach, a reed, and an iron needle.

The broach is of hard wood, ſeven or eight inches long, and two-thirds of an inch thick, ending in a point, with a little handle. It ſerves as a ſhuttle, the ſilks, woollens, gold, or ſilver, to be uſed in the work, being wound on it. The reed, or comb, is alſo of wood, eight or nine inches long, and an inch thick at the back; whence it uſually grows leſs and leſs, to the extremity of the teeth, which are more or leſs apart, according to the greater or leſs degree of fineneſs of the intended work.

Laſtly, the needle is in form of a common needle, only bigger and longer. Its uſe is to preſs cloſe the wool and ſilks, when there is any line or colour that does not ſit well.

All things being prepared for the work, and the workman

man ready to begin, he places himfelf on the wrong fide of the piece, with his back towards the defign; fo that he works, as it were, blindfold, feeing nothing of what he does; and being obliged to quit his poft, and go to the other fide of the loom, whenever he would view and examine the piece, to correct it with his preffing-needle.

To put any filk, &c. in the warp, he firft turns and looks at his defign; then taking a broach full of the proper colour, he places it among the threads of the warp, which he brings acrofs each other with his fingers, by means of the coats or threads faftened to the ftaff: this he repeats every time he is to change his colour.

The filk, or wool, being placed, he beats it with his reed, or comb; and when he has thus wrought in feveral rows over each other, he goes to fee the effect they have, in order to reform the contours with his needle, if there be occafion.

As the work advances, they roll it up on the lower beam, and unroll as much warp, from the upper beam, as fuffices them to continue the piece: the like they do of the defign behind them. When the pieces are wide, feveral workmen may be employed at once.

We have but two things to add: the firft, that this high-warp tapeftry goes on much more flowly than the low-warp, and takes almoft double the time and trouble. The fecond, that all the difference the eye can obferve between the two kinds confifts in this, that in the low warp there is a red fillet, about one-twelfth of an inch broad, running on each fide from top to bottom; which is wanting in the high warp.

Manufacture of Tapeftry of the Low Warp.—The loom, or frame, on which the low warp is wrought, is much like that of the weaver's: the principal parts of it are two ftrong pieces of wood forming the fides of the loom, and bearing a beam, or roller, at each end: they are fuftained at bottom with other ftrong pieces of wood, in manner of treftles; and to keep them the firmer, they are likewife faftened to the floor with a kind of buttreffes, which prevent any fhaking, though there are fometimes four or five workmen leaning on the fore-beam at once.

The rollers have each their trunnions, by which they are fuftained: they are turned by large iron pins three feet long. Along each beam runs a groove, in which is placed a *wich*, a piece of wood of about two inches diameter, and almoft of the length of the roller: this piece fills the groove entirely, and is faftened in it, from fpace to fpace, by wooden pins. To the two wiches are faftened the two extremities of the warp, which is wound on the farther roller; and the work, as it advances, on the nearer.

Acrofs the two fides, almoft in the middle of the loom, paffes a wooden bar, which fuftains little pieces of wood, not unlike the beam of a balance: to thefe pieces are faftened ftrings, which bear certain fpring-ftaves, with which the workman, by means of two treddles, under the loom on which he fets his feet, gives a motion to the coats, and makes the threads of the warp rife and fall alternately. Each loom has more or fewer of thefe fpring-ftaves, and each ftaff more or fewer coats, as the tapeftry confifts of more or fewer threads.

The defign or painting, the tapeftry-man is to follow, is placed underneath the warp; where it is fuftained from fpace to fpace with ftrings, by means of which the defign is brought nearer the warp.

The loom being mounted, there are two inftruments ufed in working of it: *viz.* the reed, and the flute. The flute does the office of the weaver's fhuttle; it is made of an hard polifhed wood, three or four lines thick at the ends, and fomewhat more in the middle, and three or four inches long. On it are wound the filks, or other matters, to be ufed as the woof of the tapeftry. The comb or reed is of wood or ivory; it has ufually teeth on both fides; it is about an inch thick in the middle, but diminifhes each way to the extremity of the teeth: it ferves to beat the threads of the woof clofe to each other, as faft as the workman has paffed and placed them with his flute among the threads of the warp.

The workman is feated on a bench before the loom, with his breaft againft the beam, only a cufhion or pillow between them; and, in this pofture, feparating, with his fingers, the threads of the warp, that he may fee the defign underneath, and taking a flute, mounted with a proper colour, he paffes it among the threads, after having raifed or lowered them, by means of the treddles moving the fpring-ftaves and coats.

Laftly, To prefs and clofe the threads of the filk or yarn, &c. thus placed, he ftrikes each courfe (*i. e.* what the flute leaves in its paffing and coming back again) with the reed.

What is very remarkable in the manufacture of the low warp, is, that it is all wrought on the wrong fide; fo that the workman cannot fee the right fide of his tapeftry, till the piece be finifhed and taken out of the loom.

M. Le Blon, in endeavouring to fix the true harmony of colouring in painting, found that all vifible objects may be reprefented by the three primitive colours, red, yellow, and blue; becaufe out of thefe, all others, even black itfelf, may be compounded.

From the principle of producing any vifible object with a fmall number of colours, and from obferving the compounded colours which were reflected from two pieces of filk of different colours, placed near to one another, he arrived at the fkill of producing in the loom all that the art of painting requires. In weaving, indeed, he hath been obliged to make ufe of white and black threads, befides red, yellow, and blue; and though he found that he was able to imitate any picture with thefe five colours, yet for cheapnefs and expedition, and to add a brightnefs where it was required, he found it more convenient to make ufe of feveral intermediate degrees of colours.

In his new way of weaving tapeftry in the loom with a draw-boy, it may be performed almoft as expeditioufly as fine brocades; for when the loom is once fet and mounted, any common draught-weaver, unacquainted with drawing or painting, and indeed hardly knowing what figure he is about, may exactly produce what the painter hath reprefented in the original pattern: and thus a piece of tapeftry may be woven in a month or two, which, in the common way of working, would take up feveral years; and what in the common way cofts a thoufand pounds, may, by this means, be afforded finer and better for a hundred.

The main fecret of this confifts in drawing the patterns, from which any common draught-weaver can mount the loom; and when that is done, the piece may be made of any fize, by only widening the reeds and the warp; and a reverfe may be made with the fame eafe; which is done by the boy's pulling the lafhes up again in the fame order in which he pulled them down before: by which contrivance the tapeftry may be fuited to any room, whether the light comes in on the right, or on the left. The patterns are painted upon paper, on which are printed fquares from copper-plates, and thefe fubdivided by as many lines as anfwer to the threads of the warp, which run lengthwife of the piece; then they try how many threads of the fhoot anfwer in breadth to every fubdivifion of the fquares. Every thread of of the warp goes through a fmall brafs ring called a *male*, or through a loop in the leifh, and hath a fmall long weight or lingoe hung below, to counterbalance the packthreads, which going from the top of the rings or loops, are paffed over the pullies in the table directly over the loom, and are continued nearly in an horizontal pofition on one fide of the loom to a convenient diftance; where they are all fpread on a crofs piece faftened to two ftaples: thefe are called the *tail of the mounture;* and from each of thefe packthreads, juft by the fide of the loom, are faftened other packthreads, called *fimples,* which defcend to the ground; fo that by pulling thefe fimple cords, you raife any of the threads of the warp at pleafure: wherefore they faften a loop or potlart to as many of thefe fimple cords as there are threads of the warp to be pulled up at every fhoot, or every throw of the fhuttle; by which means the fhoot fhews itfelf on the right fide, where the warp is pulled up: and in ordering this, they are guided by the pattern, on which they count the diftances of the fubdivifions, which contain the fame colours in the fame line, and can be fhot at once: then they faften potlarts to the feveral fimple cords that draw up the rings, through which thofe threads of the warp run, which are to lie behind this colour; they tie all thefe loops together, and faften a piece of worfted or filk to the knot, of the fame colour that the workman is to throw; and the boy, when he pulls each loop, names the colour, that the weaver may take the proper fhuttle, and fo on for every colour to be thrown. Phil. Tranf. abr. vol. vi. p. 469, &c.

In connection with this fubject, we are naturally led to give a brief account of the manufacture of carpets. This is faid to have been introduced into France from Perfia, in the reign of Henry IV., where it has been diftinguifhed by extraordinary encouragement. The moft confiderable manufactory of this kind was that of Chaillot, or the royal manufactory of La Savoniere, or the Soap-houfe, about a league from Paris. This manufacture was altogether of wool, and worked in the manner of velvet. All forts of figures of animals may be imitated in this work, but fruits and flowers anfwer beft; and it is moft fuccefsfully applied to the manufacture of carpets and all forts of fcreens.

The carpets are, in fome refpect, wrought by the upright way of tapeftry. The two rollers are placed the fame way: the warp is braced from the top downward; the chain, with its loops, keeps all the threads of the warp equally perpendicular; the ftick, which facilitates their croffing, runs through them in the fame manner, and feparates the foremoft threads from the reft; the lizier-pole holds all the ftrings, which ferve to draw the fore-threads in their turns, and then the oppofite threads, in order to infert the fpindles of wool. But the method of working in this manufactory differs from the upright way of tapeftry in the following particulars.

The warp is divided, both before and behind, into parcels of ten threads, nine white and one blue; which is regularly continued through the whole width of the piece. The weaver works on the fore-fide, and confequently fees what he does. The defign or pattern is traced in its proper colours on cartons, tied about the workman, who looks at it every moment, becaufe every ftitch is marked upon it, as it ought to be in his work. By this means he always knows what colours and fhades he is to ufe, and how many ftitches of the fame colour. In this he is affifted by fquares, into which the whole defign is divided; each fquare is fubdivided into ten vertical lines, correfponding with each parcel of ten threads of the warp; and befides, each fquare is ruled with ten horizontal lines, croffing the vertical lines at right angles. The workman having placed his fpindles of thread near him, begins to work on the firft horizontal line of one of the fquares. Thefe lines marked on the carton are not traced on the warp, for this would be endlefs; becaufe an iron-wire, which is longer than the width of a parcel of ten threads, fupplies the place of a crofs line. This wire is managed by a crook at one end, at the workman's right hand; towards the other end it is flatted into a fort of knife, with a back and edge, and grows wider to the point. The workman fixes his iron wire, or rod, horizontally on the warp, by twifting fome turns of a fuitable thread of the woof round it, which he paffes forward and backward, behind a fore-thread of the warp, and then behind the oppofite thread, drawing them in their turn by their leifhes. Afterwards, if it be neceffary, he brings his woof-thread round the wire, in order to begin again to thruft it into the warp. He continues in this manner to cover the iron rod or wire, and to fill up a line to the tenth thread of the warp, which is the blue one. He is at liberty either to ftop here, or go on with the fame crofs line in the next divifion. According as he paffes the thread of the woof round the iron wire, and into the warp, the threads of which he caufes to crofs one another at every inftant; when he comes to the end of the line, he takes care to ftrike in, or clofe again all the ftitches with an iron reed, whofe teeth freely enter between the empty threads of the warp, and which is heavy enough to ftrike in the woof he has ufed. This row of ftitches is again clofed and levelled, by a dweet of blue thread doubled, which the workman puts into the warp, fliding his hand over the whole length of line he has wrought. He croffes the fame threads of the warp, and then ftretches through them another fingle blue thread. He beats in thefe two threads, one after another, with his reed; thefe dweets of crofs-thread, which are a fupport to each line, will be hid by the pile on the fore-fide, and they indeed diminifh the beauty of the wrong fide; but this is of no confequence. This done, the workman draws the iron rod or knife out of the loops of the woof that covered it; and as it is wider towards its end, thefe loops refift its paffage; but being edged at its fore part, it cuts them through. Then the workman with his left hand lays a ftrong pair of fhears along the finifhed line, cuts off the loofe hairs, and thus forms a row of tufts perfectly even, which, together with thofe before and after it, form the fhag. One line of this fort comprehending the row of ftitches and woollen pile, with the two blue threads which fupport them, fomewhat furpafs in thicknefs the fpace between the firft and fecond crofs line of a fquare. By this means the workman always fees what he is doing. He follows, ftitch for ftitch and colour for colour, the plan of his pattern which he is at, and paints magnificently, without having the leaft notion of painting or drawing.

The manufacture of carpets, after the manner of Chaillot, was introduced into London in the year 1750, by two workmen who left the manufactory in difguft, and came here to procure employment. They were encouraged and furnifhed with materials by Mr. Moore, to whofe affiduity and zeal the eftablifhment of this fort of manufacture has been principally owing. However, thefe men afterwards connected themfelves with a Mr. Peter Parifot, who, under the patronage, and by means of the pecuniary affiftance of his royal highnefs the duke of Cumberland, purfued the manufacture of a carpet already begun at Paddington. This undertaking was foon removed to Fulham, and, under the munificence of the duke, promifed to be durable and advantageous. In 1752, Parifot, the undertaker, propofed a plan of fubfcription, the nature of which it is now needlefs to recite; as the whole fcheme, as far as he was concerned in it, foon came to nothing. But Mr. Moore, being provided

vided with the neceffary materials, and engaging proper workmen, and rifking a very confiderable expence, fucceeded in eftablifhing this important and ufeful manufacture, infomuch that, in 1757, he obtained a premium from the Society of Arts, &c. for the beft carpet in imitation of the Turkey carpets; and by his ingenuity and perfeverance in bringing this manufacture to perfection, it is now arrived at a very high degree of reputation.

Mr. Whitby and Mr. Paffavant were alfo honoured with premiums for carpets of their manufacture by the Society of Arts in 1757 and 1758. We have alfo manufactories for carpets that are much efteemed at Axminfter and Wilton; not to mention thofe of Kidderminfter and other places.

TAPETI, in *Zoology*, the name of an animal common in the Weft Indies, and called by fome *cuniculus Americanus*, the American rabbit. In the Linnæan fyftem, this animal is a fpecies of hare, or *lepus Brafilienfis*. (See LEPUS.) It has large ears like the common hare; a white ring round the neck, though fome have not this ring; the face of a reddifh colour; the chin white, the eyes black; colour of the body like that of the common hare, but darker; the body whitifh, without a tail. Thefe animals inhabit Brafil, live in woods, do not burrow, are very prolific, and afford good meat. The tapeti is found alfo in Mexico, where it is called *citli*. Pennant.

TAPHICESIUS LAPIS, a name given by Pliny and the ancients to a fpecies of ætites, or eagle-ftone, found in a place of that name near Leucadia.

TAPHNEUS, a word ufed by fome writers to exprefs any thing when depurated or purified to the greateft degree, as the falts, by repeated folutions and cryftallizations, and the like. Paracelfus ufes it for a fpecies of earth, the things produced from which, he fays, never alter their nature by calcination or reverberation, or the like operations.

TAPHNIS, in *Ancient Geography*, a town of Egypt, mentioned by the prophet Jeremiah, to which he and the Ifraelites that were with him retired.

TAPHRA, a town fituated in the ifthmus of the Tauric Cherfonefus, mentioned by Pliny and Strabo.

TAPHROS, a name which was given to the ftrait that feparates the ifland of Sardinia from that of Corfica.

TAPHRURA, or TAPHRA, a town of Africa Propria, upon the gulf of Numidia.

TAPHUA, a town of Paleftine, in the tribe of Juda. —Alfo, a town of Paleftine, which belonged to the tribe of Ephraim, and was fituated upon the frontier of that of Manaffeh.

TAPIA, in *Botany*, an American name, adopted by Plumier from Pifo. See CRATEVA.

TAPIA, in *Geography*, a town of South America, in the kingdom of New Granada, and province of St. Martha.

TAPIAN POINT, a cape on the W. coaft of Mindanao. N. lat. 7°. E. long. 124° 30′.

TAPIAU, a town of Pruffia, in Samland, on the Pregel; 20 miles E.S.E. of Konigfberg. N. lat. 54° 36′. E. long. 21° 13′.

TAPICURU, a river of Brafil, which runs into the fea, S. lat. 12° 20′.

TA-PI-HOTUN, a town of Corea; 690 miles E. of Peking. N. lat. 40° 20′. E. long. 125° 22′.

TAPINOSIS, ταπεινωσις, in *Rhetoric*, the fame with *diminution;* which fee.

TAPION, LE, in *Geography*, a town on the W. coaft of Hifpaniola; 10 miles E. of St. Marc.

TAPIR, or TAPIJERETE of Marcgrave, in *Zoology*, the name of an animal found in fome parts of America, and called by the Portuguefe *anta*, by others *danta*, by Dampier *vache montagnarde*, and by others *elan*, and *fus aquaticus*, and in the tenth edition of the Linnæan Syftem, *hippopotamus terreftris*. Gmelin makes it a diftinct genus; and his generic characters, amended by Dr. Shaw, are as follow; *front teeth* in both jaws ten; *canine teeth* in both jaws fingle, incurvated; *grinders* in both jaws five on each fide, very broad; *feet* with three hoofs, and a falfe hoof on the fore-feet. This animal (*Tapir Americanus*) is of the fize of a young calf, or heifer, and in fhape fomewhat approaching to the figure of the hog, and the back arched; its head is thicker than a hog's, and ends in a fharp ridge at top; and the male has a fnout, or fort of probofcis, hanging over the opening of the mouth, in which he has a very ftrong mufcle, ferving to retract it at pleafure; the nofe of the female is deftitute of the probofcis, (this circumftance is doubted by Sonnini,) and the jaws are of equal length; its eyes are fmall, and very like thofe of the hog; its ears roundifh, bordered with white; and thefe he can draw forward at pleafure; its legs are thick, and not longer than thofe of our hogs; its fore-hoofs are divided into three portions; and a fort of falfe hoof behind; but its hind-hoofs into three; its tail is very fmall; the fkin is hard and folid; and the hair fhort, and of a pale brown, and when young, variegated with white fpots; and along the neck is a briftly mane, an inch and a half high. It lives in thick woods, on the eaftern fide of South America, from the ifthmus of Darien to the river of the Amazons; and fleeps all day, but at night, or early in the morning, goes out for its prey: it feeds on vegetables, and is particularly fond of the ftalks of the fugar-cane; it often takes the water, and fwims excellently: the natives, in places where it is common, eat its flefh, which is faid to be good: the Indians fhoot it with poifoned arrows, and cut the fkin into bucklers. This animal is falacious, flow-footed, and fluggifh, and makes a kind of hiffing noife; but perfectly harmlefs: the young are eafily tamed, and may be rendered domeftic, which is faid to be the cafe in fome parts of Guiana. When attacked by dogs, it makes a vigorous refiftance. The tapir produces but one young at a birth, of which it is very careful, leading it at an early age to the fea, and inftructing it to fwim. Ray and Pennant.

TAPIRIA, in *Botany*, Juff. 372, flightly altered from the ftill more barbarous *Tapirira*, Aubl. Guian. 470. t. 188, which is itfelf an alteration of the Caribbean name *Tapiriri*, by which this tree is known in Guiana. See JONQUETIA.

TAPIR-TALA, in *Geography*, a town of Chinefe Tartary. N. lat. 43° 15′. E. long. 120° 39′.

TAPIS. See TUNICA.

TAPL, in *Geography*. See TOPEL.

TAPLAKEN, a town of Pruffia, in Samland, on the Pregel; 24 miles E. of Konigfberg.

TAPLEYS, a town of North Carolina; 12 miles N.E. of Hillfborough.

TAPLINGS, in the *Englifh Salt-Works*, the name given to certain bars of iron which fupport the bottom of the pan in which the brine is boiled.

Thefe pans are very large, and cover a wide furnace; but as their width would make them apt to bend in the middle, which would fpoil the working of the falt, there is a fort of wall of brick carried along the middle of the furnace, and on the top of this are placed thefe taplings: they are about eight inches high, and from four to fix in thicknefs, being fmalleft at the top. Thefe are placed at about three feet diftance one from another, and the wall which fupports them, and which is called the *mid-feather*, is broad at the bafe, and fo narrow at the top, as barely to give room for the bafes of the taplings.

TAPOAMANAO, in *Geography*. See *Sir Charles* SAUNDERS's *Iſland*.

TAPOANA, a river of Brafil, which runs into the fea, S. lat. 21° 10'.

TAPOCOROI, a river of Brafil, which runs into the fea, S. lat. 27°.

TAPOGOMEA, in *Botany*, from the Caribbean name of one of the fpecies, *Tapogomo;* Aubl. Guian. 157. Juff. 208. See CALLICOCCA.

TAPOOKAS, in *Geography*, a town of the ftate of Georgia, on the Yazoo. N. lat. 35° 57'. W. long. 89° 51'.

TAPOOL, a fmall ifland in the Sooloo Archipelago. N. lat. 5° 37'. E. long. 120° 52'.

TAPOOR, a town of Hindooftan, in the Myfore; 15 miles S.S.W. of Darampoory.—Alfo, a river of Hindooftan, which runs into the Cauvery, 4 miles N. of Caveripatam.

TAPOSIRIS, in *Ancient Geography*, a town of Egypt, at fome diftance from the fea, between Cynoffema and Pinthyna.—Alfo, another town, called *Parva Tapoſiris*, on a tongue of land between the fea and the canal which paffed from Canopus to Alexandria.

TAPPA, in *Geography*, one of the fmall Molucca iflands; feparated by a narrow channel from Latalatta: on it is a pool of frefh water; a little to the north of the line. E. long. 127° 5'.

TAPPAHANOCK, a town of the United States of America, in Virginia, on a fmall river, which runs into the Rappahanock; 43 miles N.E. of Richmond. N. lat. 37° 58'. W. long. 76° 55'.

TAPPALANG, a town on the weft coaft of the ifland of Celebes. S. lat. 2° 25'. E. long. 119° 5'.

TAPPAN. See ORANGE-TOWN.

TAPPANOOLY, a fea-port town of the ifland of Sumatra, fituated on the weft coaft, in the country of Batta, on a fmall ifland called Punchongcacheeie. The bay is very deep, capable of containing the united navies of Europe, and confifting of a number of harbours within one another. The bay ftretches into the heart of the Batta dominions, and its borders are inhabited by that people, who barter here the produce of their country for fuch articles as they want. The Englifh Eaft India company have a factory here. N. lat. 1° 40'. E. long. 98° 12'.

TAPPI, or TAPI, called by the Moors *Chedder*, a river of Hindooftan, which, as Thevenot fays, has its fource ten miles from the little town of Brempore, in the kingdom and mountains of Deccan, and runs into the fea about 2½ leagues below Surat. The Banians and Gentoos efteem this a very holy river.

TAPPING, the act of piercing a hole in a veffel, and applying a tube, or cannula, in the aperture, for the commodious drawing off the liquors contained therein.

TAPPING, in *Agriculture*, is the making an incifion in the bark of a tree, and letting out the juice.

To tap a tree at the root, is to open it round about the root.

Ratray, the learned Scot, affirms, that he has found by experiment, that the liquor, which may be drawn from the birch-tree in the fpring-time, is equal to the whole weight of the tree, branches, roots, and all together.

In the tapping of trees, the juice, taken in from the earth, afcends from the root; and, after it is concocted and affimilated in the branches, &c. it defcends, like a liquor in an alembic, to the orifice or incifion where it iffues out.

One of the moft effectual ways of tapping, fo as to obtain the greateft quantity of fap in the fhorteft time, is not only to pierce the bark, or to cut the body of the tree almoft to the pith, with a chiffel (as fome have directed), but to bore it quite through all the circles, on both fides of the pith, leaving only the outermoft and the bark on the north-eaft fide unpierced.

This hole is to be bored floping upwards, as large as the largeft auger will make; and that alfo through and under a large arm near the ground. So will it not need any ftone to keep open the orifice, nor tap to direct the fap into the receiver.

By this method the tree will, in a fhort time, afford liquor enough for brewing; and with fome of this fweet fap, one bufhel of malt will make as good ale as four bufhels of malt with ordinary water. The large maple, which we call the fycamore, is faid to yield the beft brewing fap, its juice being very fweet and wholefome. See BETULA.

To preſerve the Sap for Brewing.—Infolate it by a conftant expofure to the fun in proper veffels, till the reft be gathered and ready, otherwife it will contract an acidity: when there is enough, put into it as much very thin cut and hard-toafted rye-bread, as will ferve to ferment it; and when it works, take out the bread, and bottle up the liquor. A few cloves in each veffel that receives the fap, as it oozes from the tree, will alfo, certainly, preferve it a twelvemonth. See Dr. Tonge's Obf. in the Philofophical Tranfactions, N° 43, 44. 46. 68. or Abr. vol. ii. p. 673, &c.

TAPPING *of Oaklings and other Trees*, the practice of cutting off the tap-roots of young oaks and other trees or plants of that kind.

It has been noticed by Mr. Nicol, in his work on planting, that thofe who are in favour of this method, rather than that of fowing the feeds of thefe forts of trees, fuppofe that tapping the downward roots of the young plants while they are in the nurfery plantation, has the power and capability of making their roots ever afterward have a horizontal tendency in the earth or foil; that in confequence of it they are not liable to injury by infinuating themfelves downwards into bad foil; and that by a plentiful planting of nurfing plants, to draw them upright, the neceffity of heading them down is prevented. But that thefe are correct and folid arguments, he thinks, it is much to be queftioned. No doubt, he fuppofes, exifts that tapping is of infinite advantage to all taprooted plants of the tree kind, previous to their removal, fince it caufes them to put forth fibres on the upper part of the root, which they otherwife would not have done; fitting them thereby for being tranfplanted into fhallow foils, and for feeking pafturage for the fuftenance of the plants. But that the roots will, ever afterwards, have a horizontal tendency, may, it is believed, be fairly denied. Every plant, unlefs conftrained, it is maintained, will follow its own natural inclinations and habits of growth. Nor can all the art of man prevent a downward tendency in the roots of thefe forts of tree-plants, and at the fame time allow them *depth* of foil. See TAP-*Root*.

TAPPING *of Springs*, the practice of boring through the furface covering materials of land with the auger, and letting off the hurtful water which is pent up, confined, and contained in the clayey bed or ftratum below. See SPRING-*Drain*.

TAPPING, a term applied to an operation which is fometimes performed on fheep for removing a difeafe of the local dropfical kind in the head. It is executed either by means of a very large pin, or a trocar made for the purpofe. See STURDY.

TAPPING, in *Mechanics*, a term applied to the making and rectifying of female fcrews by means of a tap, *i. e.* a fcrew prepared and referved for this purpofe. The procefs, which

 confifts

confifts of various manipulations, is minutely defcribed in Nicholfon's Journal, vol. i. p. 160—163. See SCREW.

TAPPING, in *Surgery*. See PARACENTESIS.

TAPPOOS, in *Geography*, a town on the W. coaft of Sumatra; 25 miles N. of Tappanooly.

TAPROBANA, or TAPROBANE, in *Ancient Geography*, a name anciently given to the ifland of *Ceylon;* which fee.

TAPSAGUN, a town in the interior of Africa, and one of thofe which were fubjugated by Cornelius Balbus.

TAPSAS, a river of Africa, which ran near the town of Rufìcada.

TAPSON, in *Geography*, a town of Thibet; 50 miles E. of Tchontori.

TAPSUS, or THAPSUS, in *Ancient Geography*, a peninfula on the eaftern coaft of Sicily, between Hybla parva and Syracufe.—Alfo, a promontory of Africa, 12 leagues E. of the promontory Tritum. This formed the eaftern extremity of the Sinus Numidicus.

TAPTEE, in *Geography*, a river of Hindooftan, formed by the union of feveral fmaller rivers in the Candeifh country, which runs into the gulf of Cambay, about 12 miles below Surat. See TAPPI.

TAP-TOO. See TAT-TOO.

TAPUI-TAPERA, in *Geography*, a town of Brafil, on the coaft; 15 miles N.W. of St. Luis de Marannon.

TAPURA, in *Botany*, an unexplained name of Aublet's. See ROHRIA.

TAPURA, in *Ancient Geography*, a town of Afia, in the mountains of Leffer Armenia.

TAPURI, or TAPYRI, a people of Afia, in Media.

TAPURI *Montes*, mountains of Scythia, on this fide of mount Imaus. Ptolemy.

TAPUYAS, in *Geography*, a river of Brafil, which runs into the river of the Amazons; the banks of which are inhabited by Indians, independent of the Portuguefe.

TAQUARI, a river of Brafil, having the largeft of its many mouths in the Paraguay, in lat. 19° 15', and long. 54°.

TAR. See PAMLICO.

TAR, or *Tarr*, a thick dark-brown or black refinous adhefive juice, iffuing from the wood and bark of old pines or firs, either naturally, or by burning. See PINUS.

Some modern writers inform us, that tar flows from the trunks of pines and firs, when they are very old, through incifions made in the bark near the root; that pitch is only tar infpiffated; and both are the oil of the tree grown thick and black with age and the fun. The trees, like old men, being unable to perfpire, and the fecretory ducts obftructed, they are, as one may fay, choaked and ftuffed with their own juice. But the method ufed by our colonies in America of making tar and pitch, is, in effect, the fame with that of the ancient Macedonians; as appears from the account given in the Philofophical Tranfactions. And the relation of Leo Africanus, who defcribes, as an eye-witnefs, making of tar on mount Atlas, agrees in fubftance with the methods ufed by the Macedonians of old, and the people of New England of this day. The greater part of the tar imported into Britain is brought from the Baltic, and is ftill prepared in nearly the fame method which is defcribed by Diofcorides as having been practifed by the ancients. The branches of the trees are cut into billets, and piled up in large ftacks, which are covered with turf. Fire is then applied to the wood, and it is fuffered to burn with a flow fmothered flame, during which procefs the tar is formed by the decompofition of the refinous juice, which flows to the bottom, and runs out through a fmall channel cut for the purpofe. The ftacks are generally built on the flope of a hill, fo that the tar is eafily collected, and put into barrels; in which ftate it is brought into this country. The procefs now defcribed is termed "diftillatio per defcenfum." See PINE.

A more expeditious and economical method of obtaining tar is practifed in France and Switzerland. The wood is heated in large brick ovens, conftructed for the purpofe, and thus it is charred more equally, and the tar is of a more uniform and better quality. In the Vallais the pines are felled in the preceding year, that the wood may be fufficiently dry, and when the outer bark and twigs are ftripped off, the remainder of the tree is cut into billets of tolerably equal fize. The oven is conftructed of ftone or brick, of the fhape of an egg placed on its fmall end: the floor is made either of a flat ftone, fcooped out into a hollow, or of feveral ftones accurately joined together. On one fide of it, about five inches above the loweft part, is a hole, in which a gun-barrel is thruft, and this ferves to convey off the liquid tar that is collected. A large iron grate is laid at the bottom of the oven. The largeft of thefe ovens are about ten feet high, and five or fix feet in the largeft diameter. In charging the oven, bundles of billets are thrown in and fpread as evenly as poffible, the interftices being filled with chips, till the charge nearly reaches the top. The whole is then covered with a layer of chips, and the top of the furnace is clofed with flat ftones heaped upon one another, gradually leffening the opening, and forming a kind of vaulted chimney, the mouth of which is four or five inches acrofs. The dry chips at the top of the furnace are then fet on fire, and the heat fpreads downwards, till the whole charge is fufficiently kindled. The chimney is then entirely clofed with a large ftone, and wet earth is heaped on the ftones at top, and thrown on wherever the fmoke is obferved to burft out too ftrongly. The melting then begins, and the tar falls to the bottom, fills the hollow of the floor (which detains any bits of wood and other impurities), and runs off through the gun-barrel into cafks placed for receiving it. The fire muft be occafionally refrefhed by letting in a fmall draught of air through fmall holes left for the purpofe in the fides of the kiln. When the procefs is finifhed, the wood, completely charred, is taken out, and the oven, after having been cleared out, is again filled. The red wood and knots, being the richeft in refin, are found to yield about one-fourth of their weight of tar; but the general average product is about 10 or 12 *per cent.* of the weight of the whole charge. After each procefs, a quantity of "lamp-black" is collected beneath the ftones that form the vault of the temporary chimney.

According to Theophraftus, not only the turpentine-trees, the pines, and the firs yield refin or tar, but alfo the cedars and palm-trees; and the words *pix* and *rofin* are taken by Pliny in fo large a fenfe, as to include the weepings of the lentifcus and cyprefs, and the balms of Arabia and Judæa; all which perhaps are near of kin, and in their moft ufeful qualities concur with common tar, efpecially the Norwegian, which is the moft liquid and beft for medicinal ufes. Thofe trees that grow on mountains, expofed to the fun or north wind, are reckoned to produce the beft and pureft tar; and the Idæan pines were diftinguifhed from thofe growing on the plain as yielding a thinner, fweeter, and better fcented tar. Every part of the tree, which is at all refinous, is fit for yielding tar; but the red wood and the hard roots yield the beft in quality as well as the greateft in quantity.

Every kind of wood will produce the *pyroligneous* acid (which fee), and tar by the deftructive diftillation. Peat alfo will yield it in abundance.

There

There is alſo a kind of tar, the project of making which was ſuggeſted by Becher, the celebrated chemiſt, in the time of king Charles II., which has for ſeveral years been prepared from coal in the biſhopric of Liege, and in other parts of Germany: we alſo make conſiderable quantities in England, eſpecially near Broſeley, in Shropſhire, and at Briſtol. In the biſhopric of Liege the coal is diſtilled in a kind of ſtill, compoſed of two large caſt-iron pots. In England the coal is put into ovens, which are heated by fires lighted under their bottom, and the liquid matter is forced through an iron pipe inſerted into the top of the oven, and which communicates with proper condenſing veſſels. Watſon's Chem. Eſſ. vol. ii. p. 346, &c.

The earl of Dundonald, in Scotland, has lately invented the art of extracting tar and pitch from pit-coal, by a new proceſs of diſtillation. See Addreſs and Propoſals by ſir John Dalrymple, 1784.

A ſubſtance reſembling tar, called "brai-gras," and much uſed by the French for careening ſhips, is made in the following manner. The oven, deſcribed in the preceding part of this article, is charged with alternate layers of chips of green wood, and billets of dry, and all the refuſe matter of turpentine, &c. Over the whole is laid a ſtratum of "braihee," or roſin, and the gun-barrel pipe is ſtopped up, and not tapped till the whole of the wood is reduced to charcoal. The vault of the oven is alſo covered more carefully after the charge is ſufficiently kindled, and the whole proceſs is carried on more ſlowly, and the heat of the fire melts the roſin at the top, which mixes with the reſinous ſap, and the whole concretes into a dark reſinous liquid at the bottom. When it is ſufficiently cooled, it is drawn off and barrelled. This "brai-gras" is of an intermediate conſiſtence between tar and roſin. Aikin's Dict.

Tar is properly an empyreumatic oil of turpentine, and has been much uſed as a medicine both internally and externally.

Tar in ſubſtance, mixed with honey, has been found an excellent medicine for coughs.

The ancients eſteemed tar good againſt poiſons, ulcers, the bites of venomous creatures; alſo for phthiſical, ſcrofulous, paralytic, and aſthmatic perſons. But the method of rendering it an inoffenſive medicine, and agreeable to the ſtomach, by extracting its virtues in cold water, was unknown to them. Siris, ſect. 9. 16, 17. 21. 28. See TAR-*water*, infra.

Tar is ſometimes given in ſubſtance, mixed with ſo much powdered liquorice, or other ſuch powdery matter, as is ſufficient to render it of a fit conſiſtence to be formed into pills. An ointment of tar has been directed in the pharmacopeias, which has been chiefly employed in cutaneous diſorders. See UNGUENTUM *è Pice*.

Dr. Cullen mentions an empirical practice, with reſpect to tar, which is as follows. A leg of mutton is laid to roaſt, and whilſt it is roaſting it is baſted with tar. Whilſt the roaſting is continued, a ſharp ſkewer is frequently thruſt into the ſubſtance of the mutton, ſo that the gravy may run out: with a mixture of the tar and gravy found in the dripping-pan, the body is to be anointed for three or four nights ſucceſſively, and during the time the ſame linen is to be worn. This is alleged to be a remedy in ſeveral caſes of lepra; and Dr. Cullen knew one inſtance of its having been employed in a lepra icthyoſis with great ſucceſs; but he had no opportunities of repeating the practice.

But the chief uſe of tar is for paying the ſides of ſhips and boats, and their rigging, in order to preſerve them from the effects of the weather, which would otherwiſe crack or rot them.

The tar obtained from the depoſition of pyroligneous acid has been recommended as the beſt preſervative for every kind of wood-fence. For this purpoſe, it ſhould be gently heated in an iron pot, and laid on with a bruſh. It ſoaks into the wood, and ſeems to leave no body, as the artiſts expreſs it; but after ſome days' expoſure to the ſun, the ſurface and texture of the wood will be much altered; for it will be found ſo impervious and hard, that it will be very difficult to make any impreſſion upon it. If a ſecond, and eſpecially if a third coat of this tar be put upon wood, it will then *bear out*, as the painters call it, ſufficiently well; and Mr. Parkes is of opinion that it will preſerve all outſide wood-work much more effectually than any other means that have hitherto been employed for the purpoſe. For ornamental paling, and all outſide work, a firſt, and perhaps a firſt and ſecond coat of this tar might be uſed with great advantage; and when theſe are dry, white lead and oil might be uſed to finiſh the work. This ſubſtance not only hardens the wood, but effectually preſerves it from worms and from all other inſects. It will ſtop the progreſs of decay, when wood has become worm-eaten. It is obſerved, however, that this tar is very different from that which is diſtilled from mineral coal, but which the earl of Dundonald recommended for a ſimilar purpoſe. The appearance of the application may be very conſiderably improved by the following preparations; *viz.* 1 gallon of tar, 1 oz. of tallow, 2 oz. of pulverized roſin, melted together and put on warm; — or, 1 gallon of the tar and 2 oz. of pulverized ſulphate of iron, uſed as the other. This tar has alſo been found an uſeful varniſh for articles made of rolled iron, or of caſt-iron. A beautiful varniſh for theſe purpoſes may be formed by intimately mixing in a gentle heat one gallon of the wood-tar with half a pint of rectified ſpirits of wine. If this be laid on hot and properly hardened, it will prove a beautiful and durable black varniſh. Parkes's Chem. Eſſ. vol. ii.

Tar may ſometimes be found uſeful as an application for cuts in ſheep by clipping, and alſo to the parts affected by the fly; as well as in thoſe of many other ſorts of animals. It is likewiſe applied to the axles of wheel-carriages, in order to prevent friction, and might probably be ſtill more beneficially made uſe of in this intention, by having a portion of black-lead incorporated with it, as it would laſt longer, and be, at the ſame time, more powerful in obviating the effects of friction.

It is a material which has alſo been recommended for being applied to the parts of trees from which boughs are taken; in which caſes, the faces of the wounded parts and the edges of the bark are to be made perfectly ſmooth by means of a proper knife; and in a few hours afterwards, or as ſoon as the parts are become quite dry, they are to be carefully plaiſtered over with the tar, which is ſimilar to that employed for ſmearing of ſheep; or they may be laid over with white or blue lead paint, well mixed with oil, and made rather thicker than that commonly uſed in painting. The tar is, however, certainly preferable, being of a more adhering, healing nature; and, when laid on in a thin ſtate, is not ſo apt to fall off in a ſcaly manner by the action and effects of the weather, as is the caſe with the other ſubſtances.

As the component parts of vegetable tar have been found to conſiſt of oil, reſinous matter, pyroligneous acid, and water; that which is of the fineſt brown colour, has the leaſt acridity, and which is the freeſt from a dark black appearance, is probably the beſt and moſt proper for uſe in applications as dreſſings to animals; though the other kinds may be equally or more beneficial in different other intentions.

Tar, when in intimate mixture and union with butter or lard, and the different precipitates of mercury or ſulphur, forms an excellent application in different difeafes of various kinds of animals, efpecially thofe of the fkin.

Tar, *Barbadoes*. See Bitumen, and Petroleum *Barbadenfe*.

Tar, *Mineral*. See Bitumen.

Tar-*Water*. As the cold infufion of tar has been formerly much in vogue, and has been recommended by one of the moft learned and ingenious writers of the age, it may not be improper to give fome account of its virtues from the bifhop of Cloyne's Siris, or chain of reflections concerning the virtues of tar-water.

In fome parts of America, tar-water is made by putting a quart of cold water to a quart of tar, and ftirring them well together in a veffel, which is left ftanding till the tar finks to the bottom. A glafs of clear water being poured off for a draught, is replaced by the fame quantity of frefh water, the veffel being fhaken, and left to ftand as before. And this is repeated for every glafs, fo long as the tar continues to impregnate the water fufficiently, which will appear by the fmell and tafte.

But as this method produces tar-water of different degrees of ftrength, the author fays he chufes to make it in the following manner: Pour a gallon of cold water on a quart of tar, and ftir and mix them thoroughly with a ladle or flat ftick, for the fpace of three or four minutes; after which the veffel muft ftand eight-and-forty hours, that the tar may have time to fubfide; when the clear water is to be poured off, and kept for ufe, no more being made from the fame tar, which may ftill ferve for common purpofes.

This cold infufion of tar hath been ufed in fome of our colonies as a prefervative or preparative againft the fmall-pox, which foreign practice induced the bifhop to try it in his own neighbourhood, when the fmall-pox raged with great violence. He fays the trial fully anfwered his expectation; all thofe within his knowledge, who took the tar-water, having either efcaped that diftemper, or had it very favourably. Several were preferved from taking the fmall-pox by the ufe of this liquor; others had it in the mildeft manner; and others, that they might be able to take the infection, were obliged to intermit drinking tar-water. He fays, he has found it may be drank with great fafety and fuccefs for any length of time, and this not only before, but alfo during the aforefaid diftemper.

The general rule for taking it is, about half a pint night and morning, on an empty ftomach, which quantity may be varied according to the cafe and age of the patient; provided it be always taken on an empty ftomach, and about two hours before or after a meal.

It has been found, that feveral perfons infected with cutaneous eruptions and ulcers were immediately relieved, and foon after cured, by the ufe of this medicine. It is faid, that even in the fouleft diftempers, it proved much more fuccefsful than falivations and wood-drinks had done. It alfo fucceeded, beyond expectation, in a tedious and painful ulceration of the bowels, in a confumptive cough, and (as appeared by expectorated pus) an ulcer in the lungs, in a pleurify and peripneumony. And when a perfon who had been for fome years fubject to eryfipelatous fevers, perceived the ufual forerunning fymptoms to come on, the drinking of tar-water prevented the eryfipelas.

Tar-water cures indigeftion, and gives a good appetite. It is an excellent medicine in an afthma; it imparts a kindly warmth, and quick circulation to the juices, without heating, and is therefore ufeful, not only as a pectoral and balfamic, but alfo as a powerful and a fafe deobftruent in cachectic and hyfteric cafes. As it is both healing and diuretic, it is very good for the gravel. The bifhop fays he believes it to be of great ufe in a dropfy, having known it cure a very bad anafarca in a perfon whofe thirft, though very extraordinary, was in a fhort time removed by the drinking of tar-water. From the fuccefs of this medicine in five or fix inftances, the bifhop believes it to be the beft and fafeft, either for preventing the gout, or for fo ftrengthening nature againft the fit, as to drive it from the vitals.

It may likewife be fafely ufed in inflammatory cafes; and, in fact, hath been found an admirable febrifuge, at once the fafeft cooler and cordial.

The falts and more active fpirits of tar are got by infufion in cold water; but the refinous part is not to be diffolved thereby. Hence the prejudice which fome, perhaps, may entertain againft tar-water, the ufe of which might inflame the blood by its fulphur and refin, as a medicine, appears not to be well grounded. It is obferved by chemifts, that all forts of balfamic wood afford an acid fpirit, which is the volatile oily falt of the vegetable. Herein is chiefly contained their medicinal virtues; and this author affirms, that by the trials he has made, it appears that the acid fpirit in tar-water poffeffes the virtues, in an eminent degree, of that of guaiacum, and other medicinal woods.

It is certain tar-water warms, and therefore fome may perhaps ftill think it cannot cool. The more effectually to remove this prejudice, let it be farther confidered, that, as on one hand, oppofite caufes do fometimes produce the fame effect; for inftance, heat by rarefaction, and cold by condenfation, do both increafe the air's elafticity; fo, on the other hand, the fame caufe fhall fometimes produce oppofite effects. Heat, for inftance, in one degree thins, in another coagulates, the blood. It is not therefore ftrange, that tar-water fhould warm one habit and cool another; have one good effect on a cold conftitution, and another good effect on an inflamed one; nor, if this be fo, that it fhould cure oppofite diforders.

A medicine of fo great virtue in fo many different diforders, and efpecially in that grand enemy the fever, muft needs be a benefit to mankind in general. There are neverthelefs three forts of people to whom the bifhop fays he would peculiarly recommend it; fea-faring perfons, ladies, and men of ftudious and fedentary lives. See Two Letters from the Bifhop of Cloyne, &c. publifhed in 1747.

If it be afked, what precife quantity, or degree of ftrength, is required in tar-water? It is anfwered, that the palate, the ftomach, the particular cafe and conftitution of the patient, the very feafon of the year, will difpofe and require him to drink more or lefs in quantity, ftronger or weaker in degree. Precifely to meafure its ftrength by a fcrupulous exactnefs, is by no means neceffary.

It is to be obferved, that tar-water fhould not be made in unglazed earthen veffels, thefe being apt to communicate a naufeous fweetnefs to the water.

The fame ingenious author recommends tar-water in the plague, and for the diftemper among the horned cattle; with what fuccefs, muft be left to experience.

Though this medicine, fays Dr. Lewis, is undoubtedly very far inferior to the character that hath been given of it, it is apparently capable of anfwering important purpofes, as a deobftruent balfamic folution, moderately warm and ftimulating. It fenfibly raifes the pulfe, and increafes either perfpiration or the groffer evacuations. He adds, "I have been informed of fome late inftances of its good effects in diforders of the leprous kind." Mat. Med.

Dr. Cullen thinks that the acid principle gives the virtue to tar-water, and on this account the bifhop of Cloyne properly preferred the Norway tar to that of New England, as the former contains more acid than the latter. This eminent

phyfician

phyſician acknowledges that he found this preparation in ſeveral caſes to be a valuable medicine; and that it appeared to ſtrengthen the tone of the ſtomach, to excite appetite, to promote digeſtion, and to cure all ſymptoms of dyſpepſia. At the ſame time, it manifeſtly promotes the excretions, particularly that of urine. From all theſe operations, it will be obvious, as the doctor thinks, that in many diſorders of the ſyſtem this medicine may be highly uſeful. Lewis. Woodville.

It has been lately obſerved by Dr. Darwin, that the watering of ground with tar-water is capable of deſtroying the white ſlug, which is ſo highly deſtructive to vegetables.

Tar-*Kettle*, in *Rope-Making*, is made of copper, and holds from ten to twenty barrels of tar. It is ſet in ſtrong brick-work, and over it is faſtened, from ſide to ſide, in the direction of the nipper, a bridge, made of three-inch oak-plank, thirteen inches broad, through the middle of which is a mortiſe for the ſtep to go through, to keep the yarn down and clear of the bottom, when drawing through the kettle. On the ſide of the kettle next the capſtern, is an upright poſt, twelve inches ſquare, in which is fixed a nipper to preſs the tar out of the yarn; and a ſtaff, with a weight ſuſpended at the end, is fixed on the ſide of the nipper to keep it down, that the yarn may imbibe no more tar than is neceſſary.

Tar-*Rope*, a term uſed to ſignify tarred rope, or rope-yarn, ſuch as the thread of old cables, &c. This ſort of tar-rope is uſeful for a great number of different purpoſes, ſuch as thoſe of tying up the wads or ſheaves of beans in the field, and many other ſimilar articles; the faſtening of plants and trees to various kinds of ſupports; and for being applied to a variety of other little uſes of the more domeſtic kind, as being cheap and readily procured.

Tar, in *Commerce*, a ſmall ſilver coin on the coaſt of Malabar.

Tar, in *Sea Language*, a figurative expreſſion for a ſailor of any kind.

TARA, in *Geography*, a town of Ruſſia, in the government of Tobolſk, on the Irtiſch; 220 miles E.S.E. of Tobolſk. N. lat. 57°. E. long. 74° 43′.—Alſo, a town of Japan, in the iſland of Xicoco; 28 miles N.N.E. of Ovutſi.

Tara *Hill*, a mountain of Ireland, in the county of Wexford, near the ſea-coaſt; 4 miles N. of Newborough. See Taragh.

Tara, the name of a ſimian hero renowned in the Hindoo epic the Ramayana, for mighty deeds in battle with the hoſts of the tyrant Ravena, for the recovery of Sita, the raviſhed ſpouſe of Rama.

TARAAN, in *Geography*, a town of Grand Bucharia; 50 miles E. of Samarcand.

TARABAD, a town of Hindooſtan, in Baglana; 13 miles E. of Saler Mooler.

TARABE, in *Ornithology*, the name of a Braſilian parrot, larger than the common green parrot. Its general colour is green; but its head, breaſt, and the origin of its wings, are red; its beak and legs are of a duſky grey. Marcgrave. See Psittacus.

TARACASSA, in *Geography*, a diſtrict of South America, in the viceroyalty of Buenos Ayres, part of the juriſdiction of Carangas.

TARAE Lapis, the name given by the writers of the middle ages to a ſtone which they ſay had the power of ſtopping all ſorts of fluxes. They have left us no deſcription of it, and it ſeems to have been loſt even in their times; for they obſerve that the phyſicians uſed the *ſanguis draconis*, or dragon's-blood, in its place.

TARAGH, in *Geography*, a ſmall town or rather village of the county of Meath, Ireland, on the noted hill of Taragh; where the ſtates of Ireland are ſaid to have aſſembled, and where ſome pretend that there was a magnificent palace belonging to the kings of Ireland; but as no trace of any ſuch palace is to be found, its having exiſted muſt be regarded as improbable. General Vallancey accounted for there being no trace of it, by ſuppoſing it to have been made of mud and ſtraw. A Daniſh invader is alſo ſuppoſed to have taken up his abode here, and to have built the fine Daniſh fort, or rath, on the ſouth-eaſt ſide of the hill, which is now beautifully planted. It is 5 miles N. by W. from Dunſhaghlin, and 19 miles from Dublin, on the road to Cavan. There are two other hills of the ſame name, one in the county of Down, and the other in the county of Wexford, both of them near the ſea.

TARAGOT, or Taragale, a town of Africa, in the country of Darah; 130 miles S.E. of Morocco.

TARAGUICO Aycuraba, in *Zoology*, the Braſilian name for a ſpecies of lizard, much approaching to the nature of the taraguira; but its tail is covered from its beginning with ſmall triangular ſcales, and very regularly marked with four brown ſpots; the back alſo, particularly that part which is next the head, is variegated with undulated brown lines. Ray.

TARAGUIRA, the name of an American lizard. It grows to about a foot long; its body is rounded, and every where covered with ſmall triangular duſky grey ſcales; its back is ſmooth, and it has not that falſe gullet under the throat which the iguana has.

This is the ſpecies of lizard of which it is reported, that it will wake a ſleeping perſon, if it ſee him in danger of being bitten by a ſerpent. It is very common about houſes and gardens in South America, and runs very ſwiftly, but with a waddling motion; and when it ſees any thing at a diſtance, has an odd way of nodding its head very ſwiftly. Ray.

TARAGUPALA, in *Geography*, a town of Hindooſtan, in Tellingana; 25 miles N.W. of Warangole.

TARAKLI, a town of European Turkey, in Beſſarabia; 24 miles S.S.W. of Bender.

TARALEA, in *Botany*, a barbarous name of Aublet's. See Dipteryx, ſpecies 2d.

TARAMA, in *Geography*, a juriſdiction of Peru, in the audience of Lima. The air is healthy, and the ſoil fertile.

TARAMAMON, a name given by Loubere to a ridge of mountains that paſſes E. and W. in Siam, not far to the north of Yuthia.

TARAMANDAHU, a river of Braſil, which runs into the Atlantic, S. lat. 30° 40′.

TARAMEH, Al, a town of Egypt, in ruins; 2 miles N.E. of Tineh.

TARAMUNDE, a town of Spain, in Aſturia; 45 miles W. of Oviedo.

TARANCON, a town of Spain, in New Caſtile; 33 miles S.E. of Madrid.

TARANDUS, in *Entomology*, a ſpecies of *Lucanus*; which ſee.

Tarandus, in *Zoology*, a name given by Agricola, and ſome other authors, to the rein-deer. See Cervus *Tarandus*.

TARANIOLO, in *Ornithology*, a name by which the whimbrel, or ſmall curlew, called the *arquata minor* by authors, is known in the markets of Italy.

TARANIS, probably from *taran*, thunder, in *Ancient Mythology*, a name given by the Gauls to Jupiter, under which appellation they ſacrificed human victims to him.

Taranis correfponded to the Jupiter Tonans of the Romans. See Thor.

TARANNON, in *Geography*, a river of North Wales, which runs into the Severn; 4 miles W. of Newtown in Montgomeryfhire.

TARANSA, one of the Weftern iflands of Scotland, about four miles in length, and two in breadth, where wideft, but in fome places fcarcely half a mile acrofs; 5 miles N.E. from Toe-Head. N. lat. 57° 52′. W. long. 6° 59′.

TARANTA, the name of mountains of Abyffinia, that lie on the eaft of the kingdom.

TARANTARA, according to Ennius, the military trumpet's flourifh of the Romans.

TARANTELLA, a rapid tune played to perfons in Calabria, fuppofed to be bitten by the tarantula, in order to excite them to dance, which has been thought, while the difeafe was believed, to be the only fpecific.

TARANTISMUS, in *Medicine*, the difeafe or affection of thofe bit by the tarantula.

The patients under this malady are denominated *tarantati*.

Dr. Cornelio, in the Philofophical Tranfactions, reprefents this as an imaginary difeafe; and tells us, that the tarantati, or thofe that think themfelves feized with it, (excepting fuch as for particular ends feign themfelves fo,) are moft of them young wanton girls, fuch as the Italian writers call *Donne di fale*, who, falling from fome particular indifpofition, into melancholy madnefs, perfuade themfelves, according to vulgar prejudice, that they have been bitten by a tarantula.

But the evidence, on the other fide of the queftion, has gained confiderable credit, as will appear from the article Tarantula.

TARANTOLA, in *Geography*, a town of Naples, in Abruzzo Citra; 10 miles E.N.E. of Sulmona.

TARANTULA, or Tarentula, in *Natural Hiftory*, a venomous infect, whofe bite gives name to a new difeafe, called *tarantifmus*.

The tarantula is a kind of fpider, the *aranea tarantula* of Linnæus, fo denominated from the city of Tarentum, in Apulia, near which it is chiefly found. It is alfo called *phalangium Apulium*. Valetta, a monk of Apulia, who had always refided about the places where this mifchievous animal is moft frequent, and had many opportunities of tracing its feveral qualities, publifhed a fuccinct, but very accurate hiftory of it in the year 1706, under this name.

It has its name *phalangium*, from the three phalanges or joints of its legs, and this name equally fuiting many other fpiders, as well as this, it ceafed to be its appropriated name, and was applied as a generical term to feveral other fpiders of the larger kind, among which this fpecies was always diftinguifhed by the epithet *Apulian*, from the place where it was fo frequently found.

The tarantula, or Apulian phalangium, is frequent in all parts of this country, in uncultivated places, but more efpecially it breeds moft in funny dry hills, and particularly in fuch parts of them as are expofed to the fouth.

It is faid not to be found any where except in Apulia, but probably it is an inhabitant of many other places, though its poifon may not be violent enough any where elfe to bring on the effects it does there: as we find in vipers and many other poifonous creatures, that the ftrength of their poifon differs greatly in degree in different places.

M. Geoffroy fays, that it is the opinion of fome that the tarantula is never venomous but in the coupling feafon; and Baglivi fays, that it is never fo but in the heat of fummer; particularly in the dog-days, when, becoming enraged, it flies on all that pafs by.

As this fpider is very tender, and eafily injured by cold winds and rain, it always digs itfelf a cave in the fide of a hill for its habitation; and ufually chufes for this purpofe the hardeft ground it can find, which is better able to defend it, and which it eafily works into, with its forceps and claws. This always is hollowed upward in the hill, and by that means is fafe from wet, all the water in rainy feafons running down over its top. Sometimes it burrows itfelf a cave in a valley or plain, but then it always chufes a dry, ufually a chalky foil. In this cafe, the entrance into its cave is fmall, and within, there are feveral winding paffages: if it happens to be furprifed with wet in this place, from hard rains, it quits the floor and hangs by its feet againft the top of the cave. It preys upon a number of fmall infects, with which the fields of Apulia abound, and feldom appears in the day-time, but creeps out about the time of fun-fet, and preys at large upon the animals which are then betaking themfelves to reft; without the danger it would be expofed to from its own enemies by day-light. If at any time he remains the whole evening in his cave or den, it is only to practife another method of hunting his prey. In this cafe, he comes forward to the mouth of the hole, and there lies in wait; his fore-legs are placed at the extremity of the hole, and his eyes have a clear view all round. The other infects are not aware of this trick, but as they walk near his hole he burfts out upon them, and feizing them, he conveys them into his habitation; where, as foon as he has eaten them, he retires back into his cell to difpofe of the wings and other fragments, till he can carry them out at a more convenient time, and then places himfelf in his former pofture for another prey.

The peafants of Apulia have a method of getting him out of his hole in the day-time, in order to deftroy him. This they do by making a foft hiffing noife through an oat ftraw: whether it be that the creature loves this found, or rather that he takes it for the voice of fome infect that he is ufed to prey upon, he always comes out, and falls a facrifice to his greedinefs.

The creature has eight legs, and walks very well; his legs have each three joints, and are covered with a fine downy hairinefs; they are of a whitifh colour at the bottom, and variegated with black lines, and are wholly black in their upper part, where they are joined to the breaft: thefe all arife from a kind of oval fhield, which is placed upon the breaft, and is black, hairy, and very hard: this is called by fome the *fpeculum* of the tarantula. From the fhoulders there grow a pair of horns, at leaft they are ufually called fo, though they feem much better to deferve the name of *arms*; the ufe of thefe is to hold faft the prey, that it may not be able to efcape while he is killing it with his forceps: thefe horns or arms have the fame number of joints that the legs have, but they greatly differ from the legs, in that they are fhorter, and of a yellowifh colour; they are alfo covered with a longer and thicker hair, for the more certainly holding the prey, and are terminated by black claws, and they are much fmaller and more capable of motion every way. The belly is either white, or of a pale yellow, and is marked with a tranfverfe black ftreak: this is furrounded with feveral other fmall fpots of the fame colour, and is clothed with a very fine and fhort down; the whole body befide is covered with longer hairs, and is of a whitifh or brownifh colour; the apex of the head, the fhield of the breaft, and the ends of the forceps, are as hard as a crab's claws; but the reft of the body is covered with a tender fupple fkin: the eyes are very large, and of a fine ſhining black; they are continually in motion, and, when ſeen in the night, or in a duſky place, they ſhine like the eyes of a cat. In the place where the mouth is placed in other animals, there ariſes in this a black hard forceps; the upper part of this inſtrument is covered with a yellow hairineſs, and it is terminated by extremely fine and ſharp claws, which the creature can open or cloſe up at pleaſure. While the arms hold the prey in a proper poſition, theſe ſharp points make wounds in the body, and the other parts of the forceps ſqueeze the body till all its juices are preſſed out, and the creature feeds on them: the mouth is placed much below theſe, and ſtands exactly in the proper place to receive the juices expreſſed by this operation. The tarantula ſleeps in his cave the whole winter, and a great part of the autumn and ſpring; and if during this time he is ploughed up, as is often the caſe, or is any other way taken out of his hole, he is found quite torpid and numbed, and is unable to do any miſchief by biting.

The hole or mouth of a tarantula's cave always gives ſome idea of the ſize of the creature within: he makes it ſmall if he enters it while young; and as he grows larger, he eats away more and more of the earth to widen it ſtill more, ſo that the diameter of it is uſually about equal to the diameter of the body. The ſize of a cheſnut is about the ſtandard of a full-grown tarantula; but there are ſome old ones found much larger and more hairy. The female is known from the male by having longer legs and a larger belly. They copulate in June and July, and at that ſeaſon the females are often met with in the fields carrying the males upon their backs. In Auguſt and September they lay their eggs, which remain the whole winter; and in the ſummer after are hatched.

Pliny tells a ſtory of the young ones always eating up their mother for the firſt food, which is countenanced by the relation of the peaſants in thoſe parts, who ſay that they all ſwarm about her and ſuck her juices from many places at once, till they leave her a lifeleſs carcaſe on the field, and then go each their ſeveral ways in ſearch of other food. The bite of the tarantula, as it is called, is not properly a bite, but a wound inflicted in a very peculiar manner. The creature pierces the ſkin with its forceps, and at that inſtant injects from its mouth a poiſon into the wound. The time in which their wounds are fatal, is that of their copulation; at this time they are in their utmoſt vigour and power of hurting. People of faſhion are rarely hurt by them, but principally the poor labourers, who ſleep half naked in the field, and the women who travel the country with naked feet, gathering medicinal herbs.

The bite occaſions a pain, which at firſt ſeems much like that felt on the ſtinging of a bee, or an ant: in a few hours the patient feels a numbneſs, and the part affected becomes marked with a little livid circle, which ſoon after riſes into a very painful tumour; a little after this he falls into a profound ſadneſs, breathes with much difficulty, his pulſe grows feeble, and his ſenſes fail; at length he loſes all ſenſe and motion; and dies, unleſs relieved. But theſe ſymptoms come ſomewhat differently, according to the nature of the tarantula, and the diſpoſition of the patient. An averſion for black and blue; and, on the contrary, an affection for white, red, and green; are other of the unaccountable ſymptoms of this diſeaſe.

All the aſſiſtance medicine has been able to diſcover by reaſoning, conſiſts in ſome chirurgical applications on the wound, and in cordials and ſudorifics; but theſe are of little efficacy: a thing that avails infinitely more, is, what reaſon could never have diſcovered—muſic.

As ſoon as the patient has loſt his ſenſe and motion, a muſician tries ſeveral tunes on an inſtrument; and when he has hit on that, the tones and modulations of which agree with the patient, he is immediately ſeen to make a faint motion: his fingers firſt begin to move in cadence, then his arms, then his legs, by degrees his whole body; at length he riſes on his feet, and begins to dance; his ſtrength and activity ſtill increaſing. Some will continue the dance for ſix hours without intermiſſion.

After this he is put to bed, and when he is judged ſufficiently recruited from his firſt dance, he is called out of bed, by the ſame tune, for a ſecond.

This exerciſe is continued for ſeveral days, ſix or ſeven at leaſt; in which time the patient finds himſelf exceedingly fatigued, and unable to dance any longer; which is the characteriſtic of his being cured; for as long as the poiſon acts on him, he would dance, if one pleaſed, without any diſcontinuance, till he died of the mere loſs of ſtrength.

The patient, on this, perceiving himſelf weary, begins to come to himſelf; and awakes as out of a profound ſleep; without any remembrance of what had paſſed in his paroxyſm, not even of his dance.

Sometimes the patient, thus recovering from his firſt acceſs, is quite cured; if he be not, he finds a melancholy gloom hanging on him; he ſhuns the ſight of men, and ſeeks water; and, if he be not carefully looked to, throws himſelf into ſome river. If he do not die, the fit returns at that time twelvemonth, and he is driven to dancing again. Some have had returns regularly for twenty or thirty years.

Every tarantula has his particular and ſpecific tune; but, in the general, they are all very briſk, ſprightly ones, that work cures.

This account was given in the Royal Academy of Sciences, by M. Geoffroy, at his return from Italy, in 1702, and confirmed by letters from F. Gouye. The like hiſtory is given by Baglivi, in an expreſs diſſertation on the tarantula, publiſhed in 1696.

Authors are divided about the nature of the poiſon of the tarantula. Cardan ſays it is a cold one, and Scaliger ſays it is a hot one; but, be this as it will, Valetta informs us, that its effect is very ſudden; it is no ſooner received into the fleſh, but the veins take it up and carry it to the heart, where it becomes diffuſed through the whole maſs of blood, and gives an immediate trembling of the limbs, and a difficulty of breathing. The next part it ſeizes is the brain, where it produces different effects in different ſubjects; and, according to their ſtate of health, and the condition of their juices, brings on various ſpecies of phrenſies. The patient ſees a thouſand phantoms, ſometimes all jovial and merry ones, and ſometimes imaginary ſcenes of blood and cruelty. Some are fond of ſeeing little ſtreams of water trickling down into a baſon; others are never eaſy unleſs they have green leaves before them. this indeed is almoſt an univerſal ſymptom. Some are delighted with various colours, and ſome are fond of violent motion, ſuch as dancing, leaping, and the like; and ſome are in love with ſlow and graceful movements, as walking majeſtically, bowing, and dancing ſlow dances. Some are military mad, and call out for the noiſe of drums and trumpets, and the claſhing of ſwords; but all of them, as well the briſk and noiſy, as the lethargic and dull, are pleaſed with muſic.

They will get up and dance to any inſtrument; and the moment it ceaſes playing, they will fall down to the ground as if apoplectic, and not ſtir again till the muſic is renewed. Many people have laughed at the whole hiſtory of the bite of a tarantula, from this one accident of its poiſon being

cured

cured by muſic; but all who have been upon the ſpot atteſt it. Valett. de Phaleng. Apulo.

To ſuch extraordinary facts, it is no wonder a few fables ſhould be added; as, for inſtance, that the patient is no longer infected than while the inſect lives; and that the tarantula itſelf dances, all the while, to the ſame air with the perſon bitten.

Dr. Dominico Cirillo, profeſſor of natural hiſtory at the univerſity of Naples, poſitively contradicts the teſtimonies above recited. Having had an opportunity of examining the effects of this animal, in the province of Taranto, where it is found in great abundance, he affirms that the ſurpriſing cure of the bite of the tarantula by muſic, has not the leaſt truth in it; and that it is only an invention of the people, who want to get a little money, by dancing when they ſay the tarantiſm begins. He makes no doubt but the heat of the climate contributes very much to warm their imagination, and to throw them into a delirium, which may be in ſome meaſure cured by muſic: but ſeveral experiments have been tried with the tarantula; and neither men nor animals, after the bite, have had any other complaint, except a very trifling inflammation on the part, like that produced by the bite of a ſcorpion, which goes off by itſelf without any danger at all. In Sicily, where the ſummer is ſtill warmer than in any part of the kingdom of Naples, the tarantula is never dangerous, and muſic is never employed for the cure of the pretended tarantiſm. It is without doubt very extraordinary, ſays this writer, that a man of ſenſe, and a phyſician of great learning, as Baglivi was, ſhould have been ſatisfied with the account of this diſorder; and that, inſtead of examining the facts by experiments, he ſhould rather have tried to explain it: but even philoſophers like very much to meet with wonderful and extraordinary things, and though they are againſt all reaſon, ſtill they want them to be true, and endeavour to find out the cauſe of them. Every year this ſurpriſing diſorder loſes ground; and he is perſuaded, that in a very little while it will entirely loſe its credit. The Neapolitan phyſicians all look upon the tarantula in the ſame light, particularly after the ingenious book publiſhed on this ſubject by the learned Dr. Serao; who, by various experiments, has proved, that the bite of the tarantula never produced any bad effects, and that muſic never had any thing to do with it. Phil. Tranſ. vol. lx. art. 22.

The bite of the tarantula, and the method of its cure, were, however, for many years ſubjects of elaborate diſcuſſion; and different theories were propoſed for explaining them, ſome account of which it may not be improper to preſerve.

Theory of the Tarantula's Bite, by M. Geoffroy. The poiſonous juice injected by the tarantula, M. Geoffroy conceives, may give the nerves a degree of tenſion greater than is natural to them, or than is proportionate to their functions: and hence may ariſe a privation of knowledge and motion. But, at the ſame time, this tenſion, equal to that of ſome ſtrings of an inſtrument, puts the nerves in uniſon to certain tones, and obliges them to ſhake, after being agitated by the undulations and vibrations of the air proper to thoſe tones. And hence this wonderful cure by muſic: the nerves, thus reſtored to their motion, call back the ſpirits thither, which before had abandoned them.

It may be added, with ſome probability, and on the ſame principles, that the patient's averſion for ſome colours ariſes hence, that the tenſion of his nerves, even out of the paroxyſm, being ſtill different to what it is in the natural ſtate, the vibrations thoſe colours occaſion in the fibres of the brain, are contrary to their diſpoſition, and occaſion a kind of diſſonance, the effect of which is pain.

Theory of the Effects of the Tarantula's Bite, by Dr. Mead. The malignity of the poiſon of the tarantula ſeems to conſiſt in its great force and energy, whereby it immediately raiſes an extraordinary fermentation in the whole arterial fluid, by which its texture and craſis are conſiderably altered: the conſequence of this alteration, when the ebullition is over, muſt neceſſarily be a change in the coheſion of its parts, by which the globules, which did before with equal force preſs each other, have now a very differing and irregular niſus, or action; ſo that ſome of them do ſo firmly cohere together, as to compoſe moleculæ, or ſmall cluſters: upon this account, as there is now a greater number of globules contained in the ſame ſpace than before, and the impulſe of many of theſe, when united together, differing according to the conditions of their coheſion, as to magnitude, figure, &c. the impetus with which this fluid is driven towards the parts, will not only be ſeen at ſome ſtrokes greater than ordinary, but the preſſure upon the blood-veſſels muſt be very unequal and irregular; and this will be particularly felt in thoſe which are moſt eaſily diſtended, as thoſe of the brain, &c.

Upon this, the nervous fluid muſt neceſſarily be put into various undulatory motions, ſome of which will be like thoſe, which different objects, acting upon the organs or paſſions of the mind, do naturally excite in it; upon which ſuch actions muſt follow in the body, as are uſually the conſequences of the ſeveral ſpecies of ſadneſs, joy, deſpair, or the like determinations of thought.

This, in ſome degree, is a coagulation of the blood, which will, the more certainly, when attended with uncommon heat, as is the caſe in thoſe countries where theſe creatures abound, produce ſuch like effects as theſe: becauſe the ſpirits ſeparated from the blood thus inflamed, and compounded of hard, fixed, and dry particles, muſt unavoidably ſhare in this alteration; that is, whereas their fluid conſiſts of two parts, one more active and volatile, the other more viſcid and glutinous, which is a kind of vehicle to the former; their active part will bear too great a proportion to the viſcid; and conſequently they muſt have more than ordinary volatility and force; and will, therefore, upon the leaſt occaſion imaginable, be irregularly determined to every part.

Whereupon will follow tremblings, anger, or fear, upon a light cauſe; extreme pleaſure at what is trivial, as particular colours, or the like; and, on the other hand, ſadneſs at what is not agreeable to the ſight; nay laughter, obſcene talk and actions, and ſuch other ſymptoms as attend perſons bit; becauſe, in this conſtitution of nervous fluid, the moſt ſlight occaſion will make as real a reflux and undulation of it to the brain, and preſent as lively ſpecies there, as the ſtrongeſt cauſe and impreſſion can produce in its natural ſtate and condition: nay, in ſuch a confuſion the ſpirits cannot but ſometimes, without any manifeſt cauſe at all, be hurried towards thoſe organs, to which, at other times, they have been moſt frequently determined; and every one knows which theſe are in hot countries.

The effect of muſic on perſons touched with this poiſon confirms the doctrine above delivered. For muſcular motion, we know, is no other than a contraction of the fibres, from the arterial fluid's making an effervefcence with the nervous juice, which, by the light vibration and tremor of the nerve, is derived into the muſcle.

Thus there is a twofold effect and operation of the muſic, that is, upon the body and the mind: a briſk harmony excites

cites lively ſpecies of joy and gladneſs, which are always accompanied with a more frequent and ſtronger pulſe, or an increaſed impulſe of the liquor of the nerves into the muſcles; upon which ſuitable actions muſt immediately follow.

As for the body, ſince it was ſufficient to put the muſcles into action, to cauſe thoſe tremors of the nerves, by which their fluid is alternately dropped into the moving fibres, it is the ſame thing whether it be done by the determination of the will, or the outward impreſſions of an elaſtic fluid: ſuch is the air; and that ſounds are the vibrations of it, is beyond diſpute: theſe, therefore, rightly modelled, may ſhake the nerves as really as the *imperium voluntatis* can do; and, conſequently, may produce the like effects.

The benefit of muſic ariſes not only from their dancing to it, and ſo evacuating by ſweat a great part of the inflammatory fluid; but, beſides this, the repeated percuſſions of the air hereby made, by immediate contact, ſhaking the contractile fibres of the membranes of the body, eſpecially thoſe of the ear, which, being contiguous to the brain, communicate their tremblings to its membranes and veſſels: by theſe continued ſucceſſions and vibrations, the coheſion of the parts of the blood is perfectly broken, and the farther coagulation prevented; ſo that the heat being removed by ſweating, and the coagulation by the contraction of the muſcular fibrillæ, the wounded perſon is reſtored to his former condition.

If any one doubts of this force in the air, he may conſider, that it is demonſtrated in mechanics, that the ſmalleſt percuſſion of the ſmalleſt body may overcome the reſiſtance of any the greateſt weight, which is at reſt; and that the languid tremor of the air, which is made by the ſound of a drum, may ſhake the largeſt edifices.

But, beſides this, we muſt allow a great deal to the determinate force, and particular modulation of the trembling percuſſions; for contractile bodies may be acted upon by one certain degree of motion in the ambient fluid, though a greater degree of it, differently qualified, may produce nothing at all of the like effect. This is not only apparent in two common-ſtringed muſical inſtruments, tuned both to the ſame height; but alſo in the trick which many have of finding the tone or note peculiarly belonging to any wine-glaſs, and, by accommodating their voice exactly to that tone, and yet making it loud and laſting, make the veſſel, though not touched, firſt to tremble, and finally to burſt; which it will not do, if the voice be either too low, or too high.

This makes it no difficult matter to conceive, why different perſons, infected with this ſort of venom, do require a different ſort of muſic, in order to their cure; inaſmuch as the nerves and diſtractile membranes have different tenſions, and conſequently are not all alike to be acted upon by the ſame vibrations.

Tarantula, in *Zoology*, is alſo the name given by the Italians to a peculiar ſpecies of lizard, called by Aldrovand, and ſome others, *lacertus facetanus*.

It is of a grey colour; its ſkin is extremely rough; and it is thicker and rounder bodied than the other lizards. It is found, like our common eft, under old walls, and among the ruins of buildings, particularly in the neighbourhood of Rome, in great plenty; its colour looks dead and ghaſtly, and it is as odious to the ſight among the Italians, as the toad is with us, being never ſeen without a ſort of natural horror. It is eſteemed alſo a poiſonous creature, as the toad is with us; though it is not eaſy to find well-atteſted ſtories of any body's ever having been hurt either by the one or the other of theſe creatures. Ray.

TARAPACA, in *Geography*, a town of Peru, in the biſhopric of Arequipa, on a river which ſoon after runs into the Pacific ocean, S. lat. 20° 10′.

TARAPILLY, a town of Hindooſtan, in Coimbetore; 20 miles N.E. of Damicotta.

TARARE, a town of France, in the department of the Rhône and Loire; 18 miles W.N.W. of Lyons.

TARAS, in *Ancient Geography*, a ſmall river of Italy, which paſſed to Tarentum, and probably gave it its name.—Alſo, a river of Italy, in Japygia.—Alſo, a river of Epirus.—Alſo, a town of Aſia Minor.—Alſo, a river of Scythia.

Taras, in *Geography*, a town of the duchy of Wurzburg; 2 miles N.W. of Haſfurt.

TARASCO, in *Ancient Geography*, a town of Gallia Narbonnenſis, on the left of the Rhone, and weſt of Arelate.

TARASCON, in *Geography*, a town of Spain, in New Caſtile; 22 miles S.W. of Huete.—Alſo, a town of France, and principal place of a diſtrict, in the department of the Mouths of the Rhône, on the Rhône, with a caſtle, fortified in the ancient manner. It is ſituated oppoſite Beaucaire, with which it communicates by means of a bridge of boats. The number of inhabitants is about 7000; 3 poſts E. of Niſmes. N. lat. 43° 48′. E. long. 4° 44′.—Alſo, a city of France, and capital of the department of the Arriege, on the river Arriege. In it are ſeveral manufactures of iron; 48 miles S. of Toulouſe. N. lat. 42° 50′. E. long. 1° 41′.

TARASOVA, a town of Ruſſia, in the government of Irkutſk, on the Lena; 12 miles S. of Tutura.

TARATATO, a town on the eaſt coaſt of Fortaventura, one of the Canary iſlands.

TARAUMARA, a large province of North America, in the north-eaſt part of New Biſcay, bounded on the weſt by Sonora, on the eaſt by New Mexico, its limit being the Rio Bravo. On the ſouth-weſt it borders on Cinaloa. Alcedo computes the extent at 100 Spaniſh leagues from eaſt to weſt, and as much from north to ſouth. This province was diſcovered in 1614, and derives its name from a ſavage nation found there, of pacific diſpoſitions. This province contains 48 pueblos, or villages, or ſtations of Franciſcan miſſionaries, excluſive of the capital of St. Felippe de Chiguaga. It is chiefly rich in mines, the minerals being ſmelted at the Real, or royal ſtation of St. Eulalia, or probably the Real Nueva in the maps, in N. lat. 29° 36′.

TARAXACUM, or Taraxacon, in *Botany*, a name uſed by the Arabians, ſuppoſed by Ambroſini to have been derived from the Greek τρωξιμος, *eatable*, becauſe the plant to which it was applied, (our Dandelion, or ſomething nearly akin,) was uſed for food. De Theis derives it, with more appearance of probability, from ταρασσω, *to move*, or *trouble*, becauſe of the laxative and diuretic quality of the plant in queſtion, commemorated in its vulgar Engliſh, as well as French, appellation. See Leontodon; at the end of which botanical article, we muſt obſerve, *genus* of *Leontodon* is printed by miſtake for *gender*.

TARAXIPPUS, formed of ταρασσω, *I frighten*, and ιππος, *horſe*, a kind of evil genius, the ſtatue of which was erected in the Grecian hippodromes, in order to alarm and frighten the horſes in their courſe. The ſhape and form of this ſtrange deity are not deſcribed; but he certainly anſwered the end for which he was deſigned: it frequently happening, that the horſes were ſo feared at his appearance, as to turn away with the utmoſt violence, and expoſe the lives of their riders or drivers to the moſt imminent danger. Many conjectures have been formed concerning this ſtrange deity, and the means he uſed to frighten the horſes: but the moſt probable

bable

bable conclufion will be, perhaps, to fuppofe that fome tricks and artifices were practifed under the difguife of this figure, either with a defign to render the victory more honourable in proportion to the difficulty of gaining it, or elfe that this horfe-frightening deity was placed in the courfe as a touch-ftone, to prove the refolution and temper of the horfes; and to oblige the candidates to bring none into the field but fuch as by exercife and difcipline were fo affured and fteady, as not to let their obedience be fhaken upon the moft trying occafions. Berenger's Hift. and Art of Horfemanfhip, vol. i. p. 54. See STADIUM.

TARAXIS, from ταράσσω, *to difturb*, in *Surgery*, a flight ophthalmy, or inflammation of the eye. See OPHTHALMY.

TARAZ, in *Geography*, a river of Independent Tartary, which runs into the Sirr or Jaxartes at Otrur. Some fuppofe this to be the fame with the river Tulas; but others reprefent it as a much more inconfiderable ftream.

TARAZ, or *Turkeftan*, a city of Afia, and capital of the country of Turkeftan, fituated on a fmall river which runs into the Sirr, 250 miles N. of Samarcand. N. lat. 44° 45'. E. long. 69° 42'.

TARAZONA, a town of Spain, in New Caftile; 15 miles S. of Alarçon.—Alfo, a city of Spain, in Aragon, the fee of a bifhop, fuffragan of Saragoffa. This town is ancient, and was deftroyed by the Moors in the year 724, and by the fame people rebuilt in the beginning of the 12th century; 43 miles N.W. of Saragoffa. N. lat. 42°. W. long. 1° 43'.

TARBA, in *Ancient Geography*, a town fituated on the fouthern coaft of the ifle of Crete.

TARBASON, a word ufed by fome chemical writers as a name of antimony.

TARBASSUS, in *Ancient Geography*, a town of Afia, in Pifidia.

TARBAT, in *Geography*, a town of Scotland, in the county of Cromarty. This parifh originally belonged to the county of Rofs, but was feparated from it and annexed to Cromarty, in 1693; 6 miles E. of Tam.

TARBAT *Nefs*, a cape of Scotland, on the eaft coaft of the county of Rofs, between the friths of Dornoch and Murray. N. lat. 37° 50'. W. long. 3° 40'.

TARBE, a city of France, and capital of the department of the Upper Pyrenées, built on the ruins of the ancient Bigorre: before the revolution it was the fee of a bifhop, and refidence of a governor. It confifts principally of one ftreet along the Adour, and is defended by a caftle; 7½ pofts S. of Auch. N. lat. 43° 14'. E. long. 0° 8'.

TARBELLI, in *Ancient Geography*, a people of Gaul, in Aquitania, whofe territory extended along the Aquitanic gulf.

TARBERT, in *Geography*, a poft-town of the county of Kerry, Ireland, on the river Shannon, where there is a charter-fchool. It is 124 miles S.W. from Dublin. There is alfo a fmall ifland of this name off the coaft of Galway.

TARBIDO, or MARAZZO, a river of Naples, which runs into the Mediterranean, 13 miles S.W. of Cofenza.

TARBOU, a town of Hungary, on the river Theyfe; 14 miles N.N.E. of Kifwarda.

TARBURGH, or TARBOROUGH, a town of North Carolina, on the Tar; 45 miles N.N.W. of Newbern. N. lat. 35° 52'. W. long. 77° 44'.

TARBUT, a city of Perfia, in Khoraffan, eight furfungs diftant from Turfhifh; with a population of about 8000 perfons, defended by a ftrong wall, and flanked with towers. Provifions are here plentiful and cheap; it has 220 dependent villages, and is poffeffed by Ifa Khan, a powerful chief, who can bring into the field an army of 10,000 men.

TARCHI, in *Biography*, a Neapolitan compofer, who arrived in England in 1786, at the fame time as Rubinelli. He was young at that time, but though he remained here only one feafon, he difcovered confiderable abilities, and feemed advancing rapidly into fame. He had fire, tafte, and invention. If he ftill lives, we make no doubt but that he ranks high among the dramatic compofers of his country.

TARCHONANTHUS, in *Botany*, fo called from *tarcon*, or *taracon*, the Arabic name of *Artemifia Dracunculus*, our Taragon, and ἄνθος, *a flower*, becaufe its flowers refemble thofe of that plant. Vaillant contrived this name in the Mem. de l'Acad. des Sciences, for 1719, but it is not one of his happieft.—Linn. Gen. 416. Schreb. 547. Willd. Sp. Pl. v. 3. 1792. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 4. 515. Juff. 185. Lamarck Illuftr. t. 671. Gærtn. t. 166.—Clafs and order, *Syngenefia Polygamia-æqualis*. Nat. Ord. *Compofitæ Nucamentaceæ*, Linn. *Corymbiferæ*, Juff.

Gen. Ch. *Common Calyx* turbinate, of one leaf, cut half way down into (for the moft part) feven rather acute fegments, coloured internally, fhorter than the corolla, permanent. *Cor.* compound, uniform, of about twenty florets, all perfect, equal, each of one petal, funnel-fhaped, with five teeth. *Stam.* in each floret, Filaments five, capillary, very fhort; anthers united into a cylindrical tube, as long as their own partial corolla, with a filamentous appendage at the bafe. *Pift.* in each floret, Germen inferior, oblong; ftyle twice the length of the floret; ftigmas two, divaricated. *Peric.* none, except the permanent calyx. *Seeds* folitary, ovate-oblong, compreffed. *Down* woolly, invefting every part of the feed. *Recept.* minute, clothed with woolly hairs, the length of the calyx.

Obf. The *feed-down* is very remarkable, as not crowning but entirely invefting the feed. *Linnæus.*

Eff. Ch. Receptacle villous. Seeds invefted with hairs. Common calyx of one leaf, turbinate, cut half way down into feveral fegments. Anthers fpurred at the bafe.

1. T. *camphoratus.* Shrubby African Fleabane, or Aromatic Taragon-bloffom. Linn. Sp. Pl. 1179. Suppl. 361. Willd. n. 1. Ait. n. 1. (Elichryfo affinis africana arborefcens, floribus purpuro-violaceis, foliis Salviæ, odore Rofmarini; Herm. Lugd.-Bat. 228. t. 229. Pluk. Phyt. t. 174. f. 1.)—Leaves elliptic-oblong, nearly entire; denfely downy beneath. Native of the Cape of Good Hope, from whence it was brought very early into the gardens of Europe. This is a greenhoufe evergreen *fhrub*, or fmall *tree*, flowering from June to October. The *branches* are angular, tuberculated, denfely downy and hoary. *Leaves* fcattered, ftalked, two or three inches long, more or lefs acute, fomewhat wavy, entire or minutely toothed; their upper fide of a dark dull green, quite fmooth, reticulated with fine veins; the under white and cottony, with a prominent rib and veins. When bruifed they fmell like rofemary, but lefs agreeably. *Panicles* terminal, many-flowered, with numerous lanceolate *bracteas*, all together hoary, like the branches. Segments of the *calyx* from five to feven, or more. *Florets* dark dull purple, with whitifh *anthers*. *Seeds* enveloped in copious white wool, like thofe of an ERIOCEPHALUS; fee that article.

2. T. *ellipticus.* Oval-leaved Taragon-bloffom. Thunb. Prodr. 145. Willd. n. 2.—"Leaves elliptical, finely toothed; denfely woolly beneath."—Gathered by Thunberg at the Cape. We have feen no authentic fpecimen from him, but there are fome in the Linnæan herbarium which anfwer to the

the ſpecific character, though they are obviouſly a mere variety of the foregoing.

3. T. *racemoſus*. Cluſter-flowered Taragon-bloſſom. Thunb. Prodr. 145.—"Leaves elliptical, pointed, finely toothed; denſely woolly beneath."—From the ſame country. This is perhaps but another variety. The *leaves* of *T. camphoratus* vary in acuteneſs. Willdenow ſeems accidentally to have omitted this in tranſcribing. It ſhould have been his n. 3.

4. T. *lanceolatus*. Lanceolate Taragon-bloſſom. Thunb. Prodr. 145. Willd. n. 4.—"Leaves elliptical, entire, ſmooth."—Gathered at the Cape by Thunberg. His ſpecific name is exceptionable, when compared with the characters of this and the reſt of the ſpecies. We muſt rely on him for the ſynonyms of the following, it being his own diſcovery; or we ſhould have preſumed, without ſeeing ſpecimens, that the plant before us might be *T. glaber* of Linnæus.

5. T. *dentatus*. Toothed Taragon-bloſſom. Thunb. Prodr. 145. Willd. n. 5. (T. glaber; Linn. Suppl. 360, according to Thunberg.)—"Leaves oblong, entire or toothed; ſlightly downy beneath."—Gathered by Thunberg at the Cape. We have ſeen no ſpecimen. Linnæus deſcribes his plant as extremely like *T. camphoratus*, but quite ſmooth, and without any ſmell. It varies with narrower or broader *leaves*, ſometimes entire, ſometimes toothed.

6. T. *ericoides*. Heath-like Taragon-bloſſom. Linn. Suppl. 360. Willd. n. 6.—Leaves oblong, ſmooth, imbricated in four rows. Calyx in four deep ſegments.—Native of the Cape of Good Hope. A rigid *ſhrub*, with copious, round, irregular *branches*, whoſe points ſometimes taper into a ſpinous point. *Leaves* like thoſe of many *Ericæ*, minute, ſcarcely a line in length, elliptic-oblong, obtuſe, entire, concave, ſmooth on both ſides, dotted, aromatic when rubbed, imbricated in four rows on the very ſhort, oppoſite, lateral ſhoots. *Flowers* ſolitary at the end of thoſe ſhoots, each on a ſhort ſilky ſtalk. They are erroneouſly termed "*conferti*" in the *Supplement*, being no otherwiſe crowded than becauſe the little branches which bear them are ſo. *Calyx* in four very deep, elliptical, ſmooth, reddiſh diviſions, very aromatic. *Florets* few, minute, concealed in the copious woolly hair, which is twice the length of the calyx.

Linnæus juſtly obſerves of this laſt ſpecies, that its genus is rather doubtful. We conceive it might as readily be ſuppoſed an *Eriocephalus*, and if the *leaves* could by any means be called filiform, we might gueſs it to be *E. glaber*, Thunb. Prodr. 168, a ſpecies not adopted in our account of that genus; (where Lamarck Illuſtr. t. 717, ought to have been quoted after Juſſ. 186.) The above conjecture is ſtrengthened by Thunberg's having mentioned no *Tarchonanthus ericoides*, nor, as far as we can diſcover, has he deſcribed the ſhrub in queſtion under any other name. We beg leave to remark that the ſpecies of this whole genus, except the original one, are involved in much uncertainty, nor are the materials with which we are furniſhed ſufficient to enable any botaniſt to form an opinion about them.

Tarchonanthus, in *Gardening*, contains a plant of the ſhrubby evergreen exotic kind, of which the ſpecies that is moſt commonly cultivated is the ſhrubby African fleabane, (T. camphoratus,) which has a ſtrong woody ſtem, that riſes to the height of twelve or fourteen feet, ſending out many woody branches at the top, which may be trained to a regular head.

Method of Culture.—This is a plant that may be increaſed by cuttings, which ſhould be planted out in the ſpring or early ſummer ſeaſons, in pots filled with light mould, giving them ſhade and water occaſionally. They ſoon ſtrike root, and in three or four months may be potted off into ſeparate pots, affording them ſhade and water as before, and placing them under ſhelter. They alſo ſtrike root in the ſummer ſeaſon, when planted in a common border, and covered with hand-glaſſes, and may in theſe caſes be potted off in the autumn.

Afterwards they require the management of other hardy greenhouſe plants. The plants do not produce ripe ſeeds in this climate.

They afford variety in theſe different ſituations.

TARDA Avis, in *Ornithology*, a name given by many to the buſtard, more commonly known among authors by the name *otis*.

TARDETS, in *Geography*, a town of France, in the department of the Lower Pyrenees; 6 miles S. of Mauleon.

TARDIGRADUS, or Sloth, in *Zoology*. See Bradypus.

TARDO, in the *Italian Muſic*, is uſed to denote a ſlow movement, being much the ſame as *largo*.

TARDOIRE, or Tardouere, in *Geography*, a river of France, which runs into the Charente, near Rouchefoucault.

TARDOU, El, a town of Spain, in the province of Cordova; 28 miles W. of Cordova.

TARDSONG, a town of Thibet; 250 miles E. of Laſſa. N. lat. 29° 54′. E. long. 95° 34′.

TARE, in *Botany*. See Vetch.

Tare, in *Agriculture*, a well-known plant of the vetch kind, of which there are two ſorts; the common purple-flowered ſpring or ſummer tare, and the purple-flowered wild or winter tare; the latter of which ſort is by much the hardieſt.

Numerous experiments in the culture of theſe different kinds of tares, were made by the Rev. Mr. Laurents, in order to aſcertain their differences in hardineſs, for which we refer to the Corrected Agricultural Survey of the County of Suffolk.

It is evident from the tall, cloſe, hardy growth and ſucculent quality of the winter tare, that it muſt be a plant of much value to the farmer, as affording an abundant produce of green food for animals; and by being alternated with thoſe of the grain kind, in ameliorating or preventing the exhauſtion of the land that muſt otherwiſe take place. It has been ſuggeſted by the writer of the Agricultural Survey of the County of Middleſex, that it may be the means of enabling the arable farmer to ſupport as much live-ſtock as the grazier, as while crops of this ſort remain upon the ground, they afford larger ſupplies of the beſt kind of green food on the acre than the moſt rich and fertile graſs lands; and they may be taken from the ground at ſo early a period in the ſummer ſeaſon, as on the friable loamy ſoils to admit of a clean crop of turnips, &c. being obtained from the ſame land in the ſame year; and of thoſe of the more heavy kinds being prepared and ſown with wheat. And while they are capable of being raiſed with ſucceſs on moſt ſorts of ſoils and ſituations, they ſupport and fatten cattle and ſheep of different ſizes and breeds in an expeditious manner. And further, they afford a good preparation for other ſorts of green crops, and in that way keep up the ſucceſſion of ſuch ſorts of food for the fattening of additional numbers of animals, and in that manner afford abundance of manure in ſituations where it could not otherwiſe be procured. On the

the whole, he fuppofes, that by a judicious combination of this plant with thofe of turnips, clover, and fainfoin, the poor downs, fheep-walks, and other wafte lands may be rendered from ten to thirty times more valuable than they are in their prefent ftate.

The tare in all its varieties is a plant which, in refpect to foil, according to the author of the Prefent State of Hufbandry, admits of confiderable latitude, growing without difficulty or trouble on all the varieties, from that of the thin gravelly, to thofe of the deep and ftiff clayey kinds, but flourifhing in the moft vigorous and perfect manner on thofe of the gravelly, loamy defcriptions, that are not too moift or wet at particular feafons.

With regard to the preparation of the land for this fort of crop, there is lefs care neceffary than for many other kinds of graffy forts of crops, as it will fucceed well where the foil has not been fo much broken down, or reduced into fine mould; but it always grows in the moft perfect and vigorous manner where a good degree of pulverization and finenefs has been produced in the land by proper tillage. But in common, two or three ploughings, with occafional good harrowings in the intermediate times, may be fully fufficient for the purpofe, at whatever feafon the crop is to be put into the ground.

As to the fowing of the feed of this crop, it has been obferved, that as the feed of the fpring tare does not fucceed well when fown for the winter crop, nor that of the winter kind when put in for the fummer product, care fhould be taken to keep the feeds of the two forts as perfectly diftinct as poffible. And that as they are, from their being both of nearly the fame colour and fize, as well as their agreeing in other particulars, extremely liable to be mixed in the feed-fhops, it may be the beft practice for the cultivator to preferve his own feed, as by that means he may not only be certain of having the feed good in its quality, but of the right forts, and, of courfe, may depend more fully on his crops. And it has been fuggefted by the writer of the Middlefex Report on Agriculture, that fteeping the feed in dry feafons may be of utility in promoting the quick vegetation of the crop in many fituations of land and peculiarities of feafon. With regard to the quantity of feed that fhould be employed, it fhould, of courfe, vary according to the nature of the foil, and the time as well as manner of fowing. But from two bufhels to two and a half are the proportions moft commonly recommended in the broad-caft method of fowing. But on poor forts of land, where the feed is fown late, and the climate is backward, three bufhels may not be too much. And it has been alfo obferved by a late writer, that where the crops are either to be cut for foiling, or to be fed down by live-ftock, the proportion of feed fhould be confiderably increafed, as not only a greater produce is thereby provided, but the growth of the crops rendered more quick and full. In the drill method of fowing, when at the diftance of fix inches, two bufhels of feed will be quite fufficient; and where the diftances are larger, ftill fmaller proportions of feed will anfwer the purpofe.

In regard to the periods and manner of fowing thefe forts of crops, it is evident that the former muft vary with the intentions of the cultivator; but the winter fowings fhould be performed fome time between Auguft and October; and in expofed fituations and poor foils, more early than in thofe of the contrary defcription. As for the fpring fowings of thefe crops, they may be executed from the beginning of March to the end of April, or even earlier, with fuccefs. In fome places, as on the down lands in Suffex, they find great advantage from fowing fpring tares in June with a light mixture of rape or cole feed, as about a quart to the acre, on the fame land, as furnifhing a good and nutritious feed for weaned lambs in the autumnal feafon.

With regard to the mode of fowing crops of this nature, it is moftly that of the broad-caft, which fhould be performed as evenly as poffible over the furface of the well-prepared land; the feeds being afterwards well covered in by proper harrowing, in order to prevent their being picked up by birds, and to enfure their perfect vegetation and growth. It has been fuggefted, however, that in rich clean foil, it is probable the row method would fucceed well with this fort of crop, as is the practice in fome of the fouthern diftricts of the ifland, according to a late practical writer. And with fome it has been the cuftom to fow a little rye with their winter tare crops, and a fmall quantity of barley with thofe of the fpring, on which, however, it has been well obferved, that as plants of different forts never fucceed well together, it is probable that little advantage can be derived from the practice, efpecially as the tare is not a plant that ftands much in need of protection in the early ftages of its growth, and may be injured by too much fhade and clofenefs. The former of thefe forts of feed, and fome others, may, however, be occafionally blended with it, and fown as a good green feed for fome forts of young animals, as already noticed.

It has been fuggefted in the firft volume of the Farmer's Magazine, that the moft productive method of fowing this crop, when intended for feed, is to mix them amongft beans when drilled, at the rate of one firlot of tares to one boll of beans.

It is further ftated, however, as obvious, that when tares are intended for green food, there is no neceffity for mixing them with beans. But that when fuch is the purpofe, they require to be fown tolerably thick, fo as the furface may be early covered; and if the ground is good, and recently dunged, an acre of them will afford as much keep for horfes and cows, as can be gained from a full clover crop; at leaft the writer has found them fully as beneficial.

It has been found that crops of this fort are capable of being grown well after wheat or barley, but that they may be grown after almoft any fort of crop where the land is in good heart, and properly prepared for the purpofe.

In regard to the after-management of thefe forts of crops, from their covering the land in a very complete manner, when they are fufficiently full, they do not require any great attention during their growth.

And in the procefs of making tare-crops into hay, more attention is found neceffary than in thofe of moft of the artificial graffes, as wet is more injurious to them, and they require more fun and air; but in other refpects they demand the fame cautious management, in order to prevent the foliage from being loft.

The moft proper time for cutting for this purpofe is, according to the author of the Synopfis of Hufbandry, when the bloffoms have declined, and the crops begin to fall flat on the ground. When well made, the hay is of the beft and moft nutritious quality or properties, being extremely ufeful in many intentions.

The writer of the Report of the State of Agriculture in Middlefex, ftates the produce as the refult of experience, in having frequently weighed green tares, to be ten or twelve tons *per* acre, which is a large crop. And when made into hay, at about three tons the acre, which fhews the vaft difadvantage of making thefe crops into hay. The value of the produce, eftimating it as if the whole were made into hay, being in that diftrict from twelve to fifteen guineas the acre; and in fituations where other forts of hay fell at fifty fhillings or three pounds, at from about ſeven pounds ten ſhillings to nine pounds the acre. And it is found that the ſpring tare-crops are lighter, and moſt liable to be injured by a dry ſeaſon.

The produce in ſeed is likewiſe found to be conſiderable, being by ſome ſtated at from three to ſix ſacks; but in other inſtances forty buſhels or more have been obtained from the acre. It has been ſuggeſted, that this ſort of ſeed is greedily devoured by pigeons, and that it may probably be uſed for poultry with advantage and profit, as being a very ſtimulant ſort of food in the production of eggs.

In reſpect to the application of tare-crops, it has been well remarked by a late writer, that there can be little heſitation in pronouncing that of ſoiling them with horſes or other ſorts of live-ſtock on the farm, as the moſt advantageous and beneficial method of any which can be adopted for them.

It has, however, been adviſed by the author of the Agricultural Survey of the above diſtrict of Middleſex, that the farmer's ſtock ſhould be wholly ſupported on them, from the time they begin to blow till the bloſſoms begin to fall off, and the formation of pods to take place. And, on account of the riſk from wet, he adviſes that all the ſtock of a farm ſhould be ſoiled on them green, as it will have the good effect of taking the ſtock off the graſs land long enough to allow of its being mown for hay; and by this means the meadow-hay be much increaſed in quantity, and there will not be ſo much occaſion for paſture, the tares abundantly ſupplying its place. And that beſides, at the time the cattle return from green tares, the graſs land in the mean time having been mown, may be ready to receive them. The ſame able writer remarks, in addition, that as it would be waſteful in the extreme to turn live-ſtock into a field of tares, as their treading and lying down would do great miſchief to the crop, even by feeding it in ſmall patches hurdled off; the moſt adviſeable method would be to mow the tares of the firſt half acre, and to carry the produce into the ſtables, cow-houſes, and fold-yards, or on poor land, to be conſumed by ſtock; then to hurdle the growing tares from ſuch *cleared ground*, into which put the ſtock, and feed them all with the tares, given to them in racks, removing the hurdles and the racks forward daily to the edge of the growing tares; which will manure the land uniformly, and depoſit all the urine in the ſoil. But the writer of the Corrected Glouceſter Report on Agriculture, has ſtated another method of proceeding, where ſheep are the ſort of ſtock employed, which ſeems by no means ineligible, *viz.* to feed them through rack hurdles, which are made the ſame as the common five-railed ones, only leaving the middle rail out, and nailing upright pieces acroſs, at proper diſtances, to admit the ſheep to put their heads through. A ſwathe of vetches being mown in the direction you wiſh to plough the land, a ſufficient number of theſe hurdles, allowing one to five ſheep, are ſet up cloſe to it: at noon, the ſhepherd mows the ſwathe and throws it to the hurdles, and the ſame at night: next morning, a ſwathe being firſt mown, the hurdles are again ſet, thus moving them once in the twenty-four hours. By this trifling additional trouble, the vetches are, it is ſaid, eaten clean off, and the land equally benefited.

The writer of the Hertfordſhire Corrected Agricultural Report remarks, that in the heavy land diſtricts, he has found tares very generally cultivated for ſoiling the teams; a huſbandry, he thinks, that cannot be too much commended. And he contends farther, that it appears by the writings of Ellis, that this branch of agriculture was common in this county above ſixty years ago, before it was at all practiſed in many other counties, and he was glad to find it holds its place ſteadily in the management of the preſent period. It is noticed, that Mr. Leach, of the ſame diſtrict, manures for tares, and that they are mown early, and then three earths are given to the land, when he gets good turnips after them. And that they are univerſal about Rickmanſworth and Watford, many being fed off by ſheep.

And the ſame writer ſays, in his Agricultural Survey of Norfolk, that the culture of this plant has increaſed very conſiderably in that diſtrict: within his memory they are multiplied at leaſt tenfold. And that Mr. Overman there begins ſowing winter tares about Michaelmas, once more before Chriſtmas, and ſometimes twice or thrice more, with ſpring tares for a ſucceſſion. That after mowing, he does not plough the land, but runs ſheep over it till the wheat-ſowing. But that the cultivator who has made by far the greateſt exertions in this huſbandry that he ever met with, is Mr. Purdis, of Eggmore, who has 300 acres every year, feeding no more than is neceſſary to ſupply himſelf: they are fed by his ſheep; uſed in ſoiling his numerous horſes; and immenſe quantities made into hay.

It is ſuggeſted, as the remark of Mr. Blithe, that the ſowing tares for ſummer-feeding ſheep, is an abſolutely new improvement in the huſbandry of Weſt Norfolk, and that he thinks it a very great and important one.

And in both the counties of Glouceſter and Worceſter, it is the practice to ſow theſe crops as paſturage or feed for horſes, and eat or get them off early enough to allow of turnips being ſown the ſame ſeaſon. But, as in the wet ſeaſons, when the tare-crops are large, the ſtems are apt to become rotten upon the ground, and in this condition ſuch food often proves prejudicial to the horſes; in all ſuch caſes, it will be imprudent to cut or eat them any longer for the purpoſe of ſoiling in theſe ways.

It is noticed in the twenty-ſecond volume of the Annals of Agriculture, that in the county of Suſſex, theſe ſorts of crops are of ſuch uſe and importance, that not one-tenth of the ſtock could be maintained without them; horſes, cows, ſheep, and hogs, all feed upon them, the hogs are ſoiled upon them without any other food. This plant maintains more ſtock than any other plant whatſoever. Upon one acre, Mr. Davis, of this diſtrict, can maintain four horſes in much better condition than upon five acres of graſs. Upon eight acres he has kept twelve horſes and five cows for three months without any other food. No artificial food whatever is equal to this excellent plant in his opinion.

They here find this crop to be a hearty and moſt nouriſhing food for all ſorts of cattle. Cows give more butter when fed with this plant than with any other food whatſoever. And by having one crop of vetches ſucceeding another, Mr. Halſtead, in the ſame county, inſures a crop the whole ſummer of the beſt food that can be given to cattle; after this, he ſows turnips, and then wheat.

In many of the ſouthern counties, as Cornwall, Devon, Kent, and ſome others, the culture of this ſort of crop might be greatly extended with vaſt advantage, eſpecially if it were grown with the view of ſoiling different kinds of live-ſtock, to which purpoſe it is by far the beſt ſuited. Alſo, in many caſes, as a highly valuable early ſort of green ſpring feed for many kinds of young animals; the climates and ſoils being mild, and particularly favourable for their very early production and abundant growth, when ſown at the moſt proper ſeaſon.

It is remarked alſo, that they have on the South Downs an admirable practice in their courſe of crops, which cannot be too much commended, that of ſubſtituting a double crop of tares, inſtead of a fallow for wheat. Let the improving cultivator give his attention to this practice, for it is worth, in the opinion of the writer, a journey of five hundred miles.

They

They sow forward winter tares, which are fed off late in the spring with ewes and lambs: they then plough and sow summer tares and rape, two bushels and a half of tares, and half a gallon of rape; and this they feed off with their lambs in time to plough once for wheat. A variation is for mowing, that of soing tares only in succession, even so late as the end of June for soiling. See SOILING.

TARE *and Tret*, in *Commerce*, any defect, waste, or diminution in the weight, the quantity, or the quality of goods.

The seller is usually to account to the buyer for the *tare* and *tret*.

Tare is more particularly used for an abatement, or deduction in the price of a commodity, on account of the weight of chests, casks, bags, &c. in which goods are put up, and whose weight may be known separately from that of the goods: and which being subtracted from the gross weight, or that of the cask, &c. and goods together, gives the weight of the goods alone, or the nett or neat weight. But if the tare is not known separately, and an allowance made for it at so much *per* hundred weight, or hundred yards, &c. then the deduction of the tare is by the rule of three.

Before the tare is taken off, the allowance called the *draft* or draught is subtracted from the original or gross weight of goods.

Tare is distinguished by a variety of denominations; thus: *Real* tare, or *open* tare, is the actual weight of the package; *customary* tare is an established allowance for the weight of the package; *computed* tare is an estimated allowance agreed upon at the time; *average* tare is when a few packages only among several are weighed, their mean or average taken, and the rest tared accordingly; *super* tare is an additional allowance or second tare, when the commodity or package exceeds a certain weight.

When tare is deducted, the remainder is called the *nett* weight; but if tret be allowed, it is called the *suttle* weight.

Tret is a deduction of 4 lbs. from every 104 lbs. of the *suttle* weight.

There was another allowance that was formerly made for dust or sand, or for the waste or wear of the commodity on foreign articles paid by the pound avoirdupois; but this is now nearly discontinued by merchants, or rather allowed in the price. It is wholly abolished at the East Indian warehouses in London, and neither tret nor draft is allowed at the custom-house.

The allowance called *tret* is calculated in the same way with tare. *Ex.* 1.—At 7 lbs. tare, or tret, to 112 lbs. gross, what is the tare, and also the nett weight, when 746 lbs. gross was received? say, as 112 lbs. to 7 lbs. so is 746 lbs. to the tare sought, which subtracted from 746 lbs. the remainder is the nett weight.

Ex. 2.—At 5 lbs. tret to 112 lbs. gross, what gross weight must be received, when 84 lbs. nett was paid for: and how much is allowed? subtract 5 from 112, then say, as 107, the remainder to 112, so is 84 to the gross weight sought; the difference of which and 84 is the allowance. Or thus: as 107 to 5, so is 84 to the allowance sought, which, added to 84, gives the gross weight sought. Thus from the gross weight, nett weight, and allowance, or any two of these in one case given, with any one of them in another case, we find the other two in that other case.

There are sometimes two allowances deducted out of the same quantity; first tare, and then tret: after the tare is deducted, the remainder is called particularly *subtle* or *suttle* weight, out of which the tret is deducted, and the last remainder is called *nett* weight.

Ex. 3.—Tare being allowed at 4 to 112, and tret at 5 to 112, what is the nett weight in 87 lbs. gross? say, as 112 to 108 ($= 112 - 4$), so is 87 lbs. to the subtle; then as 112 to 107 ($= 112 - 5$), so is the subtle to the nett. And if you multiply 108, 107, and 87 continually, and also 112 by 112, and divide that product by this, the quotient is the nett weight sought. Malcolm's Ar. p. 564.

The tare is very different in different merchandizes: in some there is none at all allowed. It is a thing much more regarded in Holland than in England, or elsewhere: a modern author, M. Ricard, treating of the commerce of Amsterdam, observes, that the tares are one of the most considerable articles with which a merchant is to be acquainted, if he would trade with security.

Sometimes the tare is, as it were, regulated by custom; but generally, to avoid all dispute, the buyer and seller make a particular agreement about it.

For a comprehensive and accurate table of the custom-house and commercial allowances for various kinds of goods, we refer to the first volume of Dr. Kelly's "Cambist," our limits not allowing the insertion of it, though the liberality of the author would not object to our thus availing ourselves of his labours.

TAREEKAB, in *Geography*, a town of Candahar, on the Cameh; 23 miles E.S.E. of Cabul.

TAREF, a town of Arabia, in the province of Hedsjas; 25 miles N.E. of Medina.

TAREIBOIA, in *Zoology*, the name of a species of serpent found in America, and called also *cacaboia*; though, according to some authors, the tareiboia and cacaboia are two different species.

They are both of the amphibious kind, and live in lakes and waters, as well as on land; but they are not very poisonous. They are small snakes, and all over black; when offended they will bite, but the wound is curable. Authors have written differently of those serpents, some making the latter very different from the former, and of a yellow colour. Ray.

TAREINSKA, in *Geography*, a harbour of Kamtschatka, in Avatcha bay; 10 miles S. of St. Peter and St. Paul.

TAREIOU, a town of Brasil, in the government of St. Francisco; 160 miles S.W. of Fernambuco.

TAREIRA, in *Ichthyology*, the name of a fish caught in the American seas, and eaten, but of no fine flavour. It is of an oblong and thick body, gradually tapering toward the tail; its head resembles that of a snake, and is raised into two tubercles over the eyes; its eyes are yellow, with a black pupil; its nose pointed, and its mouth large and yellow within; it has extremely sharp teeth in both its jaws, and on its tongue; it has eight fins, the tail being accounted one, and this is forked; but this, as well as the rest, is of the consistence of a poppy-leaf, tender, thin, and soft, and sustained by soft rays; its scales are so nicely laid on one another, that it seems smooth to the touch; its belly is white, and its back and sides are variegated with longitudinal green and yellow lines. Marcgrave.

TAREIRI, in *Geography*, a river of Brasil, which runs into the Atlantic, S. lat. 6°. W. long. 34° 43′

TAREKA, in *Hindoo Mythology*, is the name of a sort of demon slain by Rama, in his warfare described in the Ramayana.

TAREM, in *Geography*, a city of Persia, in the province of Laristan, which is a meanly built place, situated in a

 plain

plain on the banks of a falt river. It confifts of a mud fort, furrounded on all fides by wretched huts, formed of the branches of a date-tree, which grows in great abundance on the plain. It is the refidence of many refpectable merchants, who trade to Mafcat, Gombroon, and Shirauz; and contains about 12,000 inhabitants; 30 miles N.N.E. of Lar, which is fituated in N. lat. 27° 30′. E. long. 52° 45′.

TAREMDSONG, or Tarengasong, a town of Thibet; 160 miles S.S.E. of Laffa. N. lat. 27° 40′. E. long. 92° 50′.

TARENT, a river of England, which runs into the Stour, in the county of Dorfet, 3 miles S.E. of Blandford.

Tarent, an ifland of the Perfian gulf, clofe to the fhore, and immediately oppofite to Ketif; although not fo large, is a finer ifland than Bahrein. It is about feven miles long, and about as much in breadth, well fupplied with good frefh water, and embellifhed with many delightful gardens, which produce fruits of various kinds in abundance.

TARENTAISE, *County of*, a province of Savoy, bounded north by the lordfhip of Faucigny, eaft by the duchy of Aofta, fouth by the county of Maurienne, and weft by the duchy of Savoy; erected into a bifhopric about the fifth century, and an archbifhopric in the eighth. The kings of Burgundy erected it into a county; and towards the end of the eleventh century, Humbert II., earl of Maurienne and Savoy, became mafter of it, and his defcendants held it afterwards. The foil is barren, and the afpect of the country, abounding with mountains and precipices, unpleafant, with little good land. The Ifere croffes it from eaft to weft. In its union with France, it formed part of the department of Mont Blanc.

TARENTO, a city of Naples, and province of Otranto, the fee of an archbifhop, fituated on a fmall peninfula, which projects into a bay of the Mediterranean, to which it gives name. *Tarentum* (which fee) was anciently the capital of a celebrated republic; but after undergoing many revolutions, it was deftroyed by the Saracens or Hungarians: foon afterwards it was rebuilt in a new fituation. After the total expulfion of the Greeks, duke Robert, the Norman, created his fon, Bohemund, prince of Tarento; but his iffue failing, it was beftowed on Henry, fon of king Roger, and afterwards on William, a baftard of that family. It was wrefted from him, on account of his illegitimacy, and conferred on Manfred of Swabia, who long bore the title of prince of Tarento. Its next transfer was made by Charles II. to his fon Philip, titular emperor of Conftantinople, by whofe daughter it was conveyed to the houfe of Baux. Upon the failure of this family, it was obtained by Raymond Orfini, a younger fon of the family of Nola. King Ladiflaus, by marrying the widow of Raymond, became mafter of Tarento. Queen Joan II. gave it to her hufband, the earl of La Marche; and he fold it to John Anthony Orfino Balzo, the right owner. When this prince died without iffue, Tarento efcheated to the crown. The inhabitants, neglecting the culture of the foil, directed their whole attention to fifhing. Their number is eftimated at 18,000. Its harbour, which was once excellent, is now fo fhallow as to admit only fifhing boats. It is defended by a fort. The bay of Tarento is remarkable for fprings of frefh water at the bottom, which, as it is faid, may be taken up in a calm from the furface; 60 miles W.N.W. of Otranto. N. lat. 40° 45′. E. long. 17° 10′.

TARENTUM, in *Ancient Geography*, a town of Italy, in Magna Græcia, upon a fmall promontory of the Meffapia. Tarentum was a very ancient city: fome have afcribed its origin to the Cretans, before the Trojan war. In the 21ft Olympiad, a powerful body of emigrants arrived under Phalanthus from Laconia, that it feemed to be refounded. Here they fettled upon an ariftocratical plan, enlarged the fortifications of the city, and transformed it into a near refemblance of Sparta. Places were called by new names; and as moft of the nobles had perifhed in a war with the Japyges, democracy was introduced. The favourable fituation of this city, when it was firft founded, contributed to its rapid profperity. Placed in the centre of three feas, it obtained the whole commerce of the Adriatic fea, of the Grecian or Ionian fea, and of that portion of the Mediterranean called the Tyrrhenian fea. The adjacent country was fertile in grain and fruit; the paftures were excellent; the flocks afforded a very fine wool. It is no wonder, then, that the city fhould become rich, and that riches fhould be fucceeded by luxury. Philofophy was not neglected at Tarentum; and that of Pythagoras gained the preference. The arts were alfo diligently cultivated. Strabo mentions the gymnafium of this city with high commendation, and the bronze coloffus of Jupiter, which was fcarcely inferior to that of Rhodes. Fabius Maximus found here abundance of pictures and ftatues, which ferved to adorn his triumph. With the wealth of Tarentum, its power alfo rofe above that of all the colonies of Magna Grecia: its land forces were eftimated at 32,000 foot and 3000 horfe, in conftant pay; and thirteen confiderable cities acknowledged its dominion. At fea, their fleets rode triumphant and unrivalled. The moft brilliant epoch of their hiftory was that of the government of Archytas, whofe profound learning as a philofopher, and fkill as a mechanic, was no impediment to his political talents and exertions. His virtues alfo commanded refpect. He frequently led the Tarentines to battle, and always returned after fuccefs. With Archytas, however, terminated the profperity of Tarentum. At length this city partook of the horrors of thofe wars which defolated the fouthern part of Italy. The inhabitants not only expofed themfelves to the Roman arms by fome outrages committed againft their ambaffadors, but in the year 541 of Rome, Annibal having taken poffeffion of Tarentum, the Romans fent againft them a body of troops under Fabius Maximus, who retook it, and gained poffeffion of its ample ftores of wealth. In the year 664 or 665, it was made municipal; and in procefs of time, it became a very pleafant city. Whilft Totila was ravaging Italy in the year of Chrift 546, the Greeks took poffeffion of Tarentum, but fuddenly abandoned it at the approach of a detachment of troops belonging to the king of the Goths; which event occurred in the year 548. In 552 the troops of Narfes retook it; but it was doomed to pafs under the dominion of Romwald I., duke of Beneventum, in the year 668. On the decline of the Lombard power, the Grecian emperors regained poffeffion of this country, and retained it till Robert Guifcard drove them for ever out of Italy. For its fubfequent hiftory, &c. fee Tarento.

TAREYEN, in *Geography*, a town on the weft coaft of the ifland of Celebes. N. lat. 1° 13′. E. long. 119° 12′.

TAREYRAS, a town of Brafil, in the government of Goyas; 75 miles E.N.E. of Villa Boa.

TAREZA, a river of Hungary, which runs into the Samos, 20 miles S.W. of Tokay.

TARF, a river of Tunis, which runs into the Mediterranean, 3 miles S. of Maharefs.

TARFE, a town of Egypt; 7 miles W. of Cairo.

TARFOKIRAT, a town of the kingdom of Fez, on the coaft of the Mediterranean; 22 miles W. of Melilla.

TARFOWA, a town of Africa, in Tunis, fuppofed to be be the ancient Taphrura or Taparura; 24 miles W. of Thainee.

TARFVALA, a town of Sweden, in the province of Tavaftland; 70 miles N.N.E. of Jamfio.

TARGA, a fea-port town of Fez, near which is an oyfter fifhery; 90 miles S.E. of Tangiers.

Targa. See Tirga.

TARGAR, a name given by fome of the chemical writers to oil of juniper.

TARGET, a *fhield;* thus called from the Latin, *tergum, back*, becaufe originally made of leather, wrought out of the back of an ox's hide.

Target is alfo the name of a mark for the artillery to fire at in their practice.

Target, in *Geography*, a town of France, in the department of the Allier; 2 miles S.E. of Montmarault.

TARGIONI, Tozzetti, Giovanni, in *Biography*, an eminent Italian phyfician, was born at Florence in 1712, and took his degree of M.D. at Pifa, where he had ftudied and acquired fingular reputation. Upon his return to Florence, he applied to the ftudy of botany under the celebrated Micheli, who, at his death, bequeathed to him his library, herbarium, and MSS., and alfo the fucceffion to his directorfhip of the botanical garden. He was likewife nominated profeffor of botany in the Florentine college by the grand duke; and admitted to the two academies of the Apatifti and Della Crufca. In conjunction with Cocchi, he engaged in making a catalogue of the library of Magliabecchi, which he had bequeathed to the public; and in recompence of his labour, the grand duke appointed him librarian. His various occupations, in connection with his practice, rendered it neceffary for him to refign the office of director of the botanical garden in 1749. The mind of Targioni, however, was fo active, that not content with his literary and profeffional employments at home, he made feveral fcientific excurfions, the refult of which he publifhed in his "Relazioni d'alcuni Viaggi fatti in diverfe parte della Tofcana per offervar le Produzioni naturali, e gli antichi Monumenti d'effe," Firenz. t. 1. 1751, 8vo. As a phyfician, he alfo publifhed feveral pieces, and among thefe were "Directions for the Recovery of drowned Perfons." He alfo promoted inoculation for the fmall-pox; and directed his attention to the treatment of epidemics, the draining of marfhes, the prevention of the inundations of the Arno, and the examination of vegetables to be fubftituted for bread in a time of fcarcity. Having taken leave of literary labours by a work on the progrefs of the phyfical fciences in Tufcany, comprehended in four volumes, he reftricted himfelf to medical practice from the year 1770 to 1780. At length, in January 1782, being in his 71ft year, his life terminated by a gradual decay. Haller. Gen. Biog.

TARGIONIA, in *Botany*, was fo named by Micheli, in honour of his friend and fellow-labourer in the natural hiftory of Italy and other parts of the world, Dr. Cyprian Targioni, of Florence, whofe valuable mufeum he highly celebrates. There have been feveral perfons of this name, diftinguifhed at Florence, in medicine and natural hiftory. John Targioni, who took the furname of Tozzetti for an eftate, was profeffor of botany there, and died in 1782, aged 70. He publifhed Travels in Tufcany, as well as feveral other works relating to natural fcience, and purchafed the mufeum and library of Micheli. (See that article.)—Mich. Nov. Gen. 3. t. 3. Linn. Gen. 565. Schreb. 764. Mart. Mill. Dict. v. 4. Sprengel in Stockholm Tranf. for 1802. 85. t. 4: alfo in Bullet. des Sciences, 27. t. 2. f. 2. Juff. 8. Lamarck Illuftr. t. 877.—Clafs and order, *Cryptogamia Hepaticæ*. Nat. Ord. *Algæ*, Linn. *Hepaticæ*, Juff.

Gen. Ch. *Cal.?* Perianth a continued membrane, finely reticulated, enveloping the piftil, at length burfting. *Stam.?* Anthers numerous, roundifh, feffile, fcattered over the infide of the perianth. *Pift.* Germen oval, nearly feffile, accompanied at the bafe by the rudiments of others, with abortive ftyles; ftyle terminal, awl-fhaped, tubular, deciduous; ftigma concave. *Peric.* Capfule feffile, nearly globofe, of two hemifpherical valves, burfting vertically, and one cell. *Seeds* very numerous, minute, roundifh, connected by five threads into a denfe globular mafs.

Eff. Ch. Capfule globofe, of two concave valves, and one cell. Seeds numerous, combined by fibres into a globe.

1. T. *hypophylla*. Dotted Targionia. Linn. Sp. Pl. 1603. Hudf. 519. Engl. Bot. t. 287. Dickf. Dr. Pl. 20. (T. minima et vulgaris; Mich. n. 1. Lichen petræus minimus, fructu orobi; Dill. Mufc. 532. t. 78. f. 9. L. alter acaulis ὑποφυλλοκαρπος; Column. Ecphr. part 1. 333. t. 331.)—Very common in heathy rather moift places, among moffes, on old walls and rocks, in moft parts of Italy. It is faid alfo to have been found in Devonfhire, and in Scotland. We have had living plants from a bank near Nayland in Suffolk, where the *Targionia* was difcovered by the Rev. Mr. Kirby. The *fronds* are oblong, inverfely heart-fhaped, three quarters of an inch in length, growing nearly horizontally, in denfe imbricated patches, attached by copious fine fibrous *roots;* their upper furface dark green, marked with a flight longitudinal furrow, and befprinkled with pale prominent points; the under fide black, becoming vifible when, by drought, the margins are curled in. The parts of the *flower* we have not feen. The *fruit* ftands at the back of the frond, a little below the end, and looks like the feed of a vetch, being nearly globular, of a very dark brown, almoft black; feparating when ripe into two hemifpherical valves, enclofing a globular mafs of black powdery *feeds*, connected by fibres. The habit of the plant is exactly like that of a Marchantia, (fee that article,) but the generic character differs effentially, by the fruit alone, from that genus, as well as from Jungermannia, of which latter Hedwig fufpected it to be a fpecies. We rely on the obfervations of Sprengel for the ftructure of the flower, though without any folid conviction that the *anthers* are what he defcribes. The female parts of fructification refemble thofe of true Musci, (fee that article,) but the *capfule* is totally different. This part is called *calyx* in the *Englifh Botany*, from a fuppofed analogy to *Sphærocarpus*, which we now believe to have little foundation. Whether there be any membrane extended from the bafe of the ftyle over the germen, like the *calyptra* of moffes, does not appear from Sprengel's defcription, but it is highly probable; though as he exprefsly fays the ftyle itfelf is deciduous, that circumftance would ftill afford a material diftinction.

TARGON, in *Geography*, a town of France, in the department of the Gironde; 6 miles N.E. of Cadillac.

TARGOWISKA, a town of Poland, in Volhynia; 9 miles S. of Lucko.

TARGUM, in the *Sacred Literature*, a name which the Jews give to their Chaldee gloffes and paraphrafes on the Scripture. See Paraphrase.

Thefe Chaldee paraphrafes, which were tranflations of the fcriptures of the Old Teftament, from the Hebrew text into the language of the Chaldæans, were called *Targums:* for the word *targum* fignifies in Chaldee an interpretation or verfion of one language into another, and may properly be applied to any fuch verfion or tranflation; but it is moft commonly by the Jews appropriated to thefe Chaldee paraphrafes by way of eminence.

As the Jews, during their long captivity in Babylon, had forgot their ancient language, the Hebrew; and now underſtood nothing but the language of their maſters, the Chaldeans; there was a neceſſity of explaining the prophets in that language; and to this neceſſity is owing the firſt beginning of the Chaldee paraphraſe.

To make the ſenſe of the text underſtood, each doctor made a paraphraſe of ſome part of it in the vulgar tongue; and as theſe ſeveral interpretations, in time, became very voluminous, certain rabbins undertook to collect them together; and this collection they called *The Targum.*

The Jewiſh doctors do not agree about the antiquity of the Targum; for the more modern Jews having blended their own comments with thoſe of the ancients, no certain age or era can be fixed for the whole work.

It is commonly believed, that R. Jonathan, who lived under the reign of Herod the Great, made the firſt Chaldee verſion of the prophets; and with this verſion mixed the interpretations borrowed from tradition. Onkelos, it is certain, tranſlated the Pentateuch almoſt word for word; and without any paraphraſe; and another verſion of the Pentateuch is aſcribed to Jonathan, but that without much certainty.

Dr. Prideaux thinks, that the verſion or Targum of Onkelos is the moſt ancient of all that are now extant: and the principal reaſon of his adopting this opinion is, that the ſtyle in which it is written approaches nearer to the ſtyle of that part of Daniel and Ezra, which is written in the Chaldee language, and which may be conſidered as a ſtandard of its purity, more than any other. This Targum has been held in higher eſteem among the Jews than all the other Targums, and being ſet to the ſame muſical notes with the Hebrew text, it is thereby made capable of being read in the ſame tone in their public aſſemblies. The next to this in the purity of its ſtyle, is the Targum of R. Jonathan Ben Uzziel on the prophets; that is, on Joſhua, Judges, the two books of Samuel, the two books of Kings, Iſaiah, Jeremiah, Ezekiel, and the twelve minor prophets. The Targum of Onkelos is a ſtrict verſion, rendering the Hebrew word for word; whereas Jonathan takes the liberty of a paraphraſt, by enlargements and additions to the text. The third Targum, or that on the law, aſcribed to Jonathan, is not his, becauſe the ſtyle of it is wholly different from that of his true Targum on the prophets, and ſeveral things are mentioned in it, which had no being, or at leaſt no name, till after Jonathan's time. The fourth Targum is on the law, written by an unknown author, and at an unknown period. It is called the *Jeruſalem* Targum, probably becauſe it was written in the Jeruſalem dialect, which was ſpoken by the Jews after their return from Babylon, and which contains a mixture of Hebrew words with the Chaldee. This Jeruſalem Targum is not a continued paraphraſe, as all the reſt are, but confined to ſelect paſſages, as the author ſeems to have thought the text moſt wanted an explication. In many places it is taken word for word from the Targum, ſaid to be Jonathan's on the law: and contains ſeveral things, which are delivered in the ſame words in the New Teſtament by Chriſt and his apoſtles. Dr. Prideaux accounts for this circumſtance, by ſuppoſing that theſe were ſayings and phraſeologies, which had obtained among the Jews in the time of our Saviour, and continued among them long after: and hence Chriſt and his apoſtles, and afterward the author of this Targum, derived them from the ſame ſource. The fifth Targum, which is that on the Megilloth, *i. e.* Ruth, Eſther, Eccleſiaſtes, Solomon's Song, and Jeremiah's Lamentations; the fixth, which is the ſecond Targum on Eſther; and the ſeventh, which is that on Job, the Pſalms, and the Proverbs, are all written in the moſt corrupt Chaldee of the Jeruſalem dialect. Of the two former, no author is named; but the author of the third is ſaid to be Joſeph the one-eyed, but who he was, or when he lived, we are not told: that on the Megilloth, which mentions the Miſchna and the Talmud with the explication, muſt have been written after the Babyloniſh Talmud, or the year of Chriſt 500. The eighth and laſt of theſe Targums, is that on the two books of Chronicles; publiſhed by Beckius at Augſburg in Germany, that on the firſt book in 1680, and that on the ſecond in 1683. On Ezra, Nehemiah, and Daniel, there is no targum.

That the Targum of Onkelos on the law, and that of Jonathan on the prophets, are as ancient as our Saviour's time, if not more ancient, is the general opinion of both Jews and Chriſtians. As to all the other Targums beſides theſe two, they are certainly of a much later date; the ſtyle of every one of them is more barbarous and impure than that of the Jeruſalem Talmud, and they muſt, therefore, have been written after the compoſure of that work, *i. e.* after the beginning of the fourth century after Chriſt; and if the Talmudic fables, with which they abound, were taken out of the Babyloniſh Talmud, this will bring their date ſtill lower, and prove them to have been written after that Talmud, or after the beginning of the ſixth century after Chriſt.

The Targums of Onkelos and Jonathan are in ſuch great eſteem among the Jews, that they hold them to be of the ſame authority with the original ſacred text, and for the ſupport of this opinion, they feign them to be derived from the ſame fountain. The Chaldee paraphraſe of Onkelos, they ſay, was delivered in the ſame manner with the real law, when God gave the written law unto Moſes at Mount Sinai; and when by his holy Spirit he dictated to the prophets the prophetical books, he delivered ſeverally to them upon each book the Targum of Jonathan at the ſame time. Theſe were delivered by faithful hands, the firſt from Moſes, and the other from the prophets, till they came down to Onkelos and Jonathan, who only put them into writing.

Agreeably to the high opinion that was entertained of them, they were read every Sabbath-day in their ſynagogues, in the ſame manner as the original ſacred word itſelf, of which they were verſions; and this uſe of them was continued to late times. Whether the Targums of Onkelos and Jonathan were received for this uſe ſo early as our Saviour's time is not certain; however, it ſeems that theſe, or ſome others, were uſed for the inſtruction of the people, and were read among them in private as well as in public. Agreeably to this purpoſe, they had ſome of their bibles written out in Hebrew and Chaldee together; that is, each verſe firſt in Hebrew, and then in Chaldee; and thus from verſe to verſe through the whole volume. In theſe bibles, the Targum of Onkelos was the Chaldee verſion for the law; and that of Jonathan for the prophets; and for the Hagiographa, the other Targums that were written on them. One of theſe bibles, thus written, Buxtorf tells us he had ſeen at Straſburg: and biſhop Walton acquaints us, that he had the peruſal of two others of the ſame ſort, one in the public library of the church of Weſtminſter, and the other in the private ſtudy of Mr. Thomas Gataker. The other Targums are all of a much later date than thoſe of Onkelos and Jonathan, and of far leſs authority: however, biſhop Walton has introduced moſt of them into his Polyglot. The Targums of Onkelos and Jonathan are of great uſe for the better underſtanding not only of the Old Teſtament, on which they are written, but alſo of the New. As to the Old Teftament, they ferve to vindicate the genuinenefs of the prefent Hebrew text, by proving it to be the fame that was in ufe when thefe Targums were made, contrary to the opinion of thofe who think the Jews corrupted it after our Saviour's time. They help to explain many words and phrafes in the Hebrew original, and they hand down to us many of the ancient cuftoms of the Jews. And fome of thefe, with the phrafeologies, idioms, and peculiar forms of fpeech, which we find in them, do in many inftances help as much for the better illuftration and better underftanding of the New Teftament as of the Old: the Jerufalem Chaldee dialect, in which they are written, being the vulgar language of the Jews in our Saviour's time. They alfo very much ferve the Chriftian caufe againft the Jews by interpreting many of the prophecies of the Meffiah in the Old Teftament, in the fame manner as the Chriftians do. Many inftances are produced to this purpofe by Dr. Prideaux in his Connect. of the Hift. of the Old and New Teft. vol. iv. p. 777, &c.

Thefe Targums are publifhed to the beft advantage in the fecond edition of the great Hebrew bible fet forth at Bafil by Buxtorf the father, anno 1610, for he has rectified the Chaldee text, and reformed the vowel pointings in it: the Targums having at firft been written without vowel points, which were afterwards added very erroneoufly by fome Jews.

TARHONA, in *Geography*, a town of Africa, in Tripoli; 25 miles S.W. of Lebida.

TARI, or TORN, a river of Africa, which runs through the kingdom of Popo into the fea.

TARI, in *Commerce*. See TARO.

TARICHIÆ, in *Ancient Geography*, iflands fituated on the coaft of Africa, in the Mediterranean fea, between Leptis and Thapfus, mentioned by Strabo.

TARIDEGO, in *Geography*, a town of Africa, on the river St. Domingo. N. lat. 12° 10′. W. long. 13° 56′.

TARIENTO, a town of Italy, in Friuli; 8 miles N. of Udina.

TARIER of Buffon, in *Ornithology*. See MOTACILLA *Rubetra*.

TARIERA, in *Ichthyology*, the name of a river-fifh caught in many parts of America.

It is an oblong fifh, with a ftraight back, and a belly fomewhat hanging down; its under jaw is longer than its upper, and its teeth are extremely fharp: among thefe are two longer than the reft in the middle of the under jaw, and four fuch in the upper; its fcales are large, its back brown, and its belly and fides whitifh. It is a well-tafted fifh, but full of bones. Marcgrave.

TARIF, or TARIFF, *Book of Rates;* a table or catalogue, drawn ufually in alphabetical order, containing the names of feveral kinds of merchandize, with the duties or cuftoms to be paid for the fame, as fettled by authority, and agreed on between the feveral princes and ftates, that hold commerce together.

TARIFFA, in *Geography*, a fea-port town of Spain, in the province of Seville, fituated on a bay to which it gives name, on the north fide of the Straits of Gibraltar, fortified with old walls and towers, with a caftle, in which the governor refides. By the Romans it was called "Julia Traducta," and "Julia Joza." The prefent name is from the Moors; 27 miles S.S.E. of Medina Sidonia. N. lat. 36° 3′. W. long. 5° 41′.

TARIFILON, in *Botany*, a name by which Avicenna, and fome other authors, have called the *trifolium bituminofum*, or ftinking trefoil.

TARIJA, in *Geography*, a jurifdiction of South America, in Peru, but placed under the viceroyalty of Buenos Ayres. This is reprefented a charming and fertile country, with a ferene fky and a fine temperature of air, producing wheat, maize, and all other things that are effential to the fupport of man; together with the tree, which produce, the herb of Paraguay, the cocoa, the vine, and flax, which is cultivated merely for the fake of its feed. In the abundance of paftures are fed a vaft number of cattle and fheep. The annual tranfports of black cattle alone are computed at little lefs then 10,000 head, which are valued at from eight to ten piaftres each. The hides tanned and prepared form fole-leather for the inhabitants of La Plata, Potofi, &c. The demands for Spanifh and colonial merchandife annually exceed 60,000 piaftres; the returns for which are made in productions of the province. St. Bernardo de Tarija is the chief town. Chicas and Tarija form one government.

TARIJA, a river of South America, which runs into the Vermejo, in the province of Tucuman.

TARIJA. See ST. *Bernardo de Tarija*.

TARIN, in *Ornithology*, a name given by the French, and from them by many others, to the citrinella; a bird common in Italy, and kept in cages for its beauty and fine notes. See FRINGILLA.

TARINGASONG, in *Geography*, a town of Thibet; 17 miles S.S.E. of Laffa. N. lat. 28° 6′. E. long. 93°.

TARINGTING, in *Ornithology*, a name given by the people of the Philippine iflands, to a fpecies of lapwing, which is common on the fea-fhores, and runs remarkably fwift.

TARINURAK, in *Geography*, a river of Ruffia, which runs into the Lena, N. lat. 61°. E. long. 124° 14′.

TARISKERI, a town of the ifland of Metelin, on the N. coaft; 12 miles E. of Cape Sigri.

TARITH, one of the many names given by chemifts to mercury.

TARITO, in *Geography*, a town of Thibet; 33 miles S.E. of Tchontori.

TARKA, a mountain of Tranfylvania; 28 miles N.N.E. of Udvarhely.

TARKI, a town of Hungary; 15 miles N.N.W. of Topoltzen.

TARKI, or *Tarku*, a town of Afia, in Dagheftan, capital of the diftrict of Schamgul, feated in N. lat. 42° 50′, and fuppofed to contain 10,000 inhabitants, ftands on the Cafpian fhore, in a narrow glen, through which run many ftreams of falt-water.

TARKIRA-HOUTCHIN, a poft of Chinefe Tartary, in the country of the Monguls. N. lat. 44° 34′. E. long. 113° 48′.

TARKO, a town of Hungary, 6 miles E.S.E. of Szeben.

TARKSHA, a name of the fabulous bird Garuda, on which, in the mythology of the Hindoos, their god Vifhnu rides. This vehicle, or vahan, in the Sanfcrit tongue, is reprefented as half man half eagle; and offers an argument for the identity of the Hindoo deity, and the Jupiter of the Greeks. Another name of this bird is *Superna;* which fee. See alfo VAHAN.

TARMA, in *Geography*, a jurifdiction of South America, in Peru, fituated to the north of Atun Xauxa, about 90 miles from Lima, to which diocefe it belongs, and is one of the moft extenfive in this part of Peru. The climate is temperate, and the foil fertile, except towards the mountains, where it is cold, and the land is chiefly applied to feeding of cattle; and many mines of filver are found. Tarma, the capital,

capital, is 85 miles E. of Lima. S. lat. 11°. W. long. 75° 50′.

TARMONBARRY Bridge, a village of the county of Roſcommon, Ireland, at which there is a bridge over the Shannon. The royal canal, if it ſhould ever be completed, is to join the Shannon near this place. It is 4 miles N.W. from Longford, and above 60 from Dublin.

TARMON-HILL, a mountain at the ſouthern extremity of the peninſula, called *The Mullet*, being a detached part of the county of Mayo, Ireland.

TARN, a river of France, which riſes in the mountains of Lozere, paſſes by Florac, Iſpanhac, St. Enimie, Compeyre, Milhau, St. Rome, Alby, L'Iſle, Rabaſtens, Villemur, Montauban, &c. and joins the Garonne, near Moiſſac, in the department of the Lot.

Tarn, a department of France, being one of the nine departments of the ſouthern region, and formerly a portion of Upper Languedoc, in N. lat. 43° 40′, bounded on the N. and N.E. by the department of the Aveiron, on the S.E. by that of Herault, on the S. by that of the Aude, and on the W. by the departments of the Upper Garonne and the Lot, and taking its name from the river Tarn, which traverſes it from E. to W. Its territorial extent is 6080 kiliometres, and its population comprehends 272,163 perſons. It is divided into 4 circles, 35 cantons, and 356 communes. The circles are Gaillac, including 59,501 inhabitants; Alby, 63,064; Caſtres, 106,918; and Lavaur, 42,680 inhabitants. Its contributions in the 11th year of the French era, amounted to 2,693,820 francs; and its expences to 252,749 fr. 18 cents. According to Haſſenfratz, its extent in French leagues is 30 in length, and 20 in breadth: it is divided into 5 circles and 48 cantons, and its population comprehends 289,148 ſouls. Its capital is Alby. This department is diverſified with hills and plains, and abounds in a variety of productions, *viz.* grain, flax, hemp, wine, fruits, and paſtures. It has conſiderable foreſts, with mines of iron, copper, lead, coal, quarries of marble, &c.

TARNA, a town of Sweden, in the lapmark of Umea: 145 miles N.W. of Umea.

TARNAC, a town of France, in the department of the Correze, on the Vienne; 25 miles N. of Tulle.

TARNAVAY, a town of Hindooſtan, in the county of Calicut; 20 miles N.E. of Paniany.

TARNISHING, a diminution of the natural luſtre of any thing, eſpecially of a metal.

Gold and ſilver, when tarniſhed, reſume their brightneſs, by ſetting them over the fire in certain leys. Copper, pewter, &c. that are tarniſhed, recover their luſtre with tripoli and potaſhes.

TARNOGROD, in *Geography*, a town of Poland, in the palatinate of Belcz; 52 miles W.S.W. of Belcz.

TARNOPOL, a town of Auſtrian Poland, in Galicia; 72 miles E. of Lemberg. N. lat. 49° 30′. E. long. 25° 40′.

TARNOW, a town of Auſtrian Poland, in Galicia; 52 miles S.W. of Sandomir. N. lat. 49° 56′. E. long. 20° 53′.

TARNOWITZ, a town of Sileſia, in the principality of Oppeln, near which is a ſilver mine; 6 miles N. of Ober Beuthen. N. lat. 50° 25′. E. long. 18° 47′.

TARO, a river which riſes in the ſouthern part of the duchy of Parma, and runs into the Po, 9 miles E. of Buſſeto. The country through which it paſſes is called *Val di Taro.*—Alſo, a late department of France, formed by the duchies of Placentia and Parma.

Taro, in *Commerce*, a money of account and copper coin of Naples, Sicily, and Malta. For the accounts at Malta, ſee Scudo. The banks at Naples keep their accounts in ducati, tari, and grani. A ducat contains 5 tari, 10 carlini, or 40 cinquini: a taro, or tarino, is worth 2 carlini, or 20 grani. Among the ſilver coins are tari, at 2 carlini. By the coinage of 1804, the piece of 12 carlini ſhould contain 350⅘ Engliſh grains of fine ſilver; ſo that it is worth 49*d.* ſterling; and the ducat of 10 carlini is worth 41*d.* ſterling nearly, or 1*l.* ſterling = 5 ducats 88 grani. The taro of Sicily is worth about 4*d.*, or more accurately, 1*l.* ſterling = 1 ounce 28 tari 15 grani.

TAROATAIHETOOMO, is the name of one of the two firſt or ſupreme deities at Otaheite: the other, who is ſuppoſed to have been a rock, is called *Tepapa.* Theſe produced a ſon called *Tane*, to whom their prayers are generally addreſſed, and who is ſuppoſed to intereſt himſelf in the affairs of mankind; and a daughter called *Tellowmatatayo*, the *Year*, from whom proceed the months and days. From the two firſt beings they ſuppoſe alſo to have ſprung an inferior race of deities called *Eatuas.* Hawkeſworth's Voy. vol. ii. p. 238.

TARODUNUM, in *Ancient Geography*, a town of Germany, near the Danube, and in the vicinity of Aræ Flaviæ.

TAROM, in *Geography*. See Tarum.

TARON, or Tiroan, a town of Perſia, in the province of Adirbeitzan; 120 miles S.E. of Tauris.

TARONA, in *Ancient Geography*, a town of the Tauric Cherſoneſus, S.E. of Taphra, and E. of Satarcha.

TAROONCHI, in *Geography*, a town of Hindooſtan, in Myſore; 15 miles S.S.W. of Chinna Balabaram.

TAROUC Yamdson, a lake of Thibet, about 53 miles in circumference. N. lat. 31° 52′. E. long. 84° 38′.

TAROUCA, a town of Portugal, in the province of Beira; 9 miles S. of Lamego.

TAROULA, a town on the eaſt coaſt of the iſland of Tidor. N. lat. 0° 42′. E. long. 127° 20′.

TAROURS, a town of Hindooſtan, in Berar; 30 miles N.N.E. of Neermul.

TAROUT, a town of Arabia, in the province of Hedsjas; 32 miles S.E. of El Catif.

TARP, a town of Sweden, in the province of Dalland; 12 miles N. of Uddevalla.

TARPANS, a kind of wild horſes in the Caucaſian deſert, E. of the river Yaik. They are of a middling ſize, roundiſh, ſhort, generally of a blueiſh-grey colour, with big heads, and ewe-necked. They are taken with a nooſe, and broken to the ſaddle by being coupled to a tame horſe.

TARPAULIN, or Tarpawling, is a piece of canvas, well pitched and tarred over, to cover the hatchways of a ſhip at ſea, in order to prevent the penetration of the rain or ſea-water, which may occaſionally ruſh over the decks.

The term is alſo uſed in deriſion for a perſon bred at ſea, and educated in the mariner's art. We alſo, of late, uſe it to expreſs a painted floor-cloth.

Tarpaulin *Cove*, in *Geography*, a bay on the S. of Maſſachuſetts, near Falmouth.

TARPEIAN, Tarpeius, in *Antiquity*, an epithet given to a rock in ancient Rome, of conſiderable height; whence, by the law of the Twelve Tables, thoſe guilty of certain crimes were precipitated. It was on this rock that the Capitol was built.

The Tarpeian rock might formerly be ſteep enough on one ſide to break a man's neck; but it could never have been of that ſurpriſing height mentioned by ſome writers, if any judgment can be formed from its appearance at preſent. See Burnet's Letters, p. 238, and Miſſon's N. Voyage, p. 103.

It took its name from a veſtal, called *Tarpeia*, who betrayed the Capitol, of which her father was governor, to the Sabines; on condition that they would give her all they bore

bore on their left arms, meaning their bracelets. But, inftead of bracelets, they threw their bucklers (which were likewife borne on their left arm) upon her head, and crufhed her to death.

Others afcribe the delivery of the Capitol to her father, Spurius Tarpeius; and add, that he was precipitated down this rock by Romulus's order, and that this henceforward became the punifhment of all criminals of the like kind.

Tarpeian *Games*, *Ludi Tarpeii*, were games inftituted by Romulus in honour of Jupiter Feretrius; and called alfo *Capitolini ludi*. See Capitoline.

TARPORLEY, in *Geography*, a fmall market-town in the hundred of Edifbury, and county palatine of Chefter, England, is fituated on the great road from London to Chefter, at the diftance of 172 miles N.W. from the former, and 11 miles E.S.E. from the latter. In ancient records, Tarporley is called a borough, and the houfes burgages: it had in former times a mayor, as appears by deeds of the years 1348 and 1396: it is now governed by a conftable. The market, which was originally on Tuefday, was granted in 1281 to Hugh de Tarporley, then lord of the manor: it had been many years difufed, but was reftored in 1705 by fir John Crew, who alfo procured a grant of three annual fairs, and built a market-houfe. The parifh of Tarporley, which includes the townfhips of Eaton, Rufhton, and Utkinton, contained in the year 1811, according to the population report, 365 houfes, and 1852 inhabitants. An annual fox-hunt, of great celebrity, is held at Tarporley, on the firft week in November, during which week are horfe-races, at a place called Crab-tree Green, on Delamere foreft.

About two miles fouthward of Tarporley rifes the great infulated rock of Beefton. It is compofed of fand-ftone, and is nearly perpendicular on one fide, which gives it a tremendous appearance, but the other fide gradually flopes to the level of the country. Its height is 366 feet. On the creft of this rock are the ftately ruins of the far-famed Beefton caftle, whofe almoft impregnable ftrength was once proverbial. This fortrefs was erected in 1220 by Ranulph de Blundeville, earl of Chefter. It confifted of an outer and inner area. The outer was defended by a ftrong wall, fortified with round towers, which ran acrofs the flope from one end of the precipice to the other. Some parts of this wall, and fix of the towers, are ftill extant. The area inclofed is nearly five acres. The caftle was defended, on one fide of the area, by a deep ditch cut out of the folid rock; on the other, by the abrupt precipice that overhangs the vale of Chefhire. The entrance is through a noble gateway, guarded on each fide by a great round tower, with walls of prodigious thicknefs. During the civil wars of the 17th century, this foreft was alternately befieged by the royal and parliamentary forces; and in 1646 was difmantled by order of the parliament.—Lyfons's Magna Britannia, vol. ii. part 2. Chefhire. Beauties of England and Wales, vol. ii. Chefhire, by J. Britton and E. W. Brayley.

TARPOU, a lake of Thibet, about 60 miles in circumference. N. lat. 30° 32′. W. long. 81° 54′.

TARQUINIUS PRISCUS, *Tarquin the Ancient*, in *Biography*, the fifth king of Rome, was the fon of an opulent merchant of Corinth, who, efcaping from tyranny at home, fettled at Tarquinii, in Etruria, where he married a female of rank, by whom he had two fons. One of them died, and the other, named Lucumo, was urged by his wife Tanaquil, a lady of rank and of ambition, to remove from Etruria to Rome; where he changed his prænomen Lucumo into Lucius, and his family name Damaratus into Tarquinius, borrowed from his native city. Here he ingratiated himfelf by his manners with Ancus Martius, the king, and alfo with the people; and by the liberal application of his wealth to public purpofes, particularly to the fupport of the wars in which Rome was engaged, as well as by his fkill and valour in the field, he gained a reputation which ferved to advance him to the rank of patrician and fenator. Ancus alfo appointed him to the confidential office of guardian to his two fons. Upon the death of Ancus, B. C. 616, the ambition of Tarquin prompted him to take meafures for fecuring the fucceffion to himfelf. The crown being elective, he contrived, by bribes and folicitations, to obtain the fuffrages of the people, who proclaimed him king; and in order to ftrengthen his intereft in the fenate, he introduced from plebeian families 200 new members into this body. In his wars with the Latins, he took feveral of their towns, and obliged the Sabines and Etrurians, whofe confederacy he defeated, to feek an alliance with Rome on humiliating terms. Tarquin, in honour of his fuccefs, was granted a triumph; and the fpoils of war were devoted to the erection of the Circus Maximus, for the exhibition of the Roman or great games. The Etrurians, having afterwards rebelled, obtained peace upon condition of their recognizing Tarquin as their fovereign. During an interval of peace, after a nine years' war, Tarquin employed himfelf in improving the city, by enclofing it with walls, and by conftructing thofe fewers, which were in fubfequent times the objects of admiration. On occafion of a new war with the Sabines, Tarquin, whofe army was deficient in cavalry, augmented the ftrength of each divifion; and having defeated the Sabines, they fubmitted, and furrendered all their fortreffes to the Romans. At this time Tarquin fulfilled his vow of erecting a temple to Jupiter, Juno, and Minerva, on the Tarpeian rock; and by this act he acquired the honour of founding the principal feat of the Roman worfhip. Having attained to his 80th year, the fons of Ancus took occafion to make an attempt for defeating his plan of continuing the crown in his own family by the marriage of his daughter to Servius Tullius, by confpiring againft his life. They fo far fucceeded as to procure the affaffination of the king. His queen Tanaquil, however, by keeping the event fecret, adopted meafures for fecuring the fucceffion of her fon-in-law: and the fons of Ancus, whofe plot had been detected, went into voluntary banifhment. Thus ended, in the year B. C. 570, the profperous and fplendid reign of Tarquin the elder, one of the moft illuftrious of the Roman kings, and equally diftinguifhed by his conduct in peace and in war. Univ. Hift.

Tarquinius Superbus, or *Tarquin the Proud*, fuppofed to have been a grandfon of the elder Tarquin, afcended the throne in the year B. C. 534. His government was arbitrary and tyrannical, and it was fupported by a band of foreign mercenaries, employed in the defence of himfelf and his party, who had contributed to advance him to the throne in contempt of the fuffrages of the people. Many of the principal fenators dreading the fate of thofe who were made the victims of his fufpicion and avarice, retired into a voluntary exile. The plebeians, at firft pleafed with the humiliation of the fenate, had fome reafon to complain of the yoke impofed upon themfelves. The laws that had been made in their favour were abrogated; fpies and informers watched their words and actions; and all public affemblies for bufinefs or amufement were prohibited. Tarquin, confcious of the odium of the Roman citizens, took meafures for ingratiating himfelf with the allies; and with this view, he erected a temple near the ruins of Alba, confecrated to Jupiter Latialis, at which the diets of the confederate cantons were annually to affemble; the Romans, as chief members of the confederation, prefiding at the facrifices and deliberations. This inftitution contributed to the ftrength of the Roman ftate, and the extenfion of its dominion throughout Italy. Having taken up arms againft the Volfcians and Sabines, he returned, after a fuccefsful war, to Rome, and twice triumphed; and he took occafion to finifh the great circus and the fewers, which his grandfather had begun. But a war again commenced with fome difcontented patricians, who had taken refuge at Gabii, a Latin city not far from Rome; and this war lafted feven years. At length Gabii was conquered by the treachery of Sextus, one of Tarquin's fons; and the inhabitants, whom he treated with lenity, were incorporated with the Romans. During the reign of this Tarquin, the Sibylline books were brought to Rome, as we have related under that article, and the Capitolian temple finifhed. Ardea, the capital of the Rutuli, was the next object of Tarquin's military enterprife; and this circumftance was the remote caufe of the rape of Lucretia by Sextus Tarquin, which at length occafioned the expulfion of the Tarquinian family from Rome, as well as the extinction of the kingly government. Brutus, availing himfelf of the paffions excited among the multitude by the tragic fate of Lucretia, and expofing the tyrannical government under which Rome groaned, obtained a public decree for the banifhment of Tarquin and his fons, and the army concurring in this refolution, the king was reduced to the neceffity, at the age of 76, B. C. 509, to abandon his capital, and take refuge at Cære, in Etruria. Many attempts were made for his reftoration, but all proved ineffectual. Tarquin retired into Campania, and died there, in the 90th year of his age, and 14th of his exile. Poffeffing talents fit for command, he was neverthelefs violent, cruel, and wholly unprincipled. Univ. Hift. Gen. Biog.

TARRA, in *Ancient Geography*, a town of Afia Minor, in Lydia.—Alfo, a town and mountain of Crete.

TARRABERRY, in *Geography*, a town of Bengal; 30 miles N. of Dinagepour.

TARRABOGA, a town of Bengal; 45 miles S. of Doefa.

TARRACE, TARRASS, *Terrace*, or *Terrafs*, a coarfe fort of plafter, or mortar, durable in the wet, and chiefly ufed to line bafins, cifterns, wells, and other refervoirs of water. See *Calcareous* CEMENT.

That which is called the Dutch terrafs, is made of a foft rock-ftone, found near Collen, upon the lower part of the Rhine; it is burnt like lime, and afterwards reduced to powder by means of mills: from thence it is brought to Holland in great quantities, where it has acquired the name of Dutch terrafs. It is of a greyifh colour when it is not mixt, which is very feldom the cafe: becaufe it is very dear, and the demand for it in aquatic works very great. It is faid that in fome parts of England there is found a foft ftone, refembling that of Dutch terrafs, and which might ferve as well in aquatic works.

An artificial terrafs, refembling the true, may be formed of two parts of lime, and one of plaifter of Paris, well beaten together, and ufed immediately. There is another fort of terrafs, ufed for coarfer ufes, which is fometimes called *Welfh* terrafs, formed of one part lime, and two parts of well-fifted coal-afhes, thoroughly mixt by being well beaten together. Handm. to the Arts, vol. ii. p. 32.

TARRACO, in *Ancient Geography*, a town of Hifpania Citerior, belonging to the Cofetani. This was an ancient town in the time of the Romans. Some Spanifh authors have attributed its foundation to Tubal. Others, with greater probability, afcribe it to the Phœnicians, who called it Tarcon, which the Romans changed into Tarraco. Having been deftroyed, it was re-eftablifhed by the two Scipios. At length it became the capital of that region, to which it gave the name of Hifpania Tarragonenfis. Auguftus vifited this city on occafion of his war againft the Cantabri; and it was here that the firft altar was erected to his honour. Galba, A.D. 68, was prefented by the Tarraconians with a crown of gold. It was in the year 121 or 122 that Adrian re-eftablifhed the temple built in this city in honour of Auguftus, under the reign of Tiberius. See TARRAGONA.

TARRAGON, in *Botany*, a name fometimes given to *fouthernwood;* which fee. See alfo ARTEMISIA.

TARRAGONA, in *Geography*, a town of Spain, in the province of Catalonia, fituated on a rifing ground on the coaft of the Mediterranean, at the mouth of the river Francoli, and one of the moft ancient cities in Spain, faid to have been founded by the Phœnicians. Under the Romans it was the capital of a province, called Tarragonenfis, and was fortified by Scipio as a defence againft the Carthaginians. In the year 467 it was taken by the Goths, and levelled with the ground. In 516, a council was held here, in which monks are firft mentioned; when it was ordained that the fabbath fhould commence on Saturday evening. It afterwards fell into the hands of the Moors, from whom it was recovered in the latter part of the 11th century, and rebuilt by the archbifhop of Toledo, who was by the pope abfolved of the oath he had taken of going to the holy war, on condition that he would lay out the fum defigned for that expedition in rebuilding Tarragona. In the war of the fucceffion, the Englifh obtained poffeffion of this city, and intended to keep and fortify it, by bringing the river Francoli quite round it; and for this purpofe threw up vaft outworks and redoubts, the ruins of which are yet vifible. On the poffeffion of Gibraltar, they gave up the defign. The environs at Campus Tarragonenfis they efteem one of the moft fertile fpots in Europe. Tarragona has but few remains of its ancient grandeur; infcriptions almoft deftroyed by time, fome coins, and a few ruins, give but an imperfect idea of what it formerly was. It is now depopulated, and of little importance. The harbour is dangerous, and not much frequented; there are a few baftions in bad repair, which were formerly built for its defence. Tarragona is, however, the fee of an archbifhop, the metropolis of Catalonia, and difputes with Toledo the primacy of Spain. The eftablifhment of the fee is faid to have been in the firft ages of the church: the fucceffion of archbifhops was interrupted by the Moors, and remained fufpended until the 11th century. The cathedral is worthy of attention for its vaft dimenfions, the elegance of its Gothic architecture, and a magnificent chapel, built with rich marble and jafper, in honour of St. Thecla, tutelar faint of the church; 98 miles E.S.E. of Saragoffa. N. lat. 41° 8'. E. long. 1° 33'.

TARRAGUNGE, a town of Bengal; 22 miles S.E. of Moorfhedabad.

TARRAPOUR, a town of Hindooftan, in Bengal; 17 miles S.W. of Boglipour.—Alfo, a town of Hindooftan, in Malwa, on the Nerbuddah; 12 miles S. of Mundu.

TARRAR, a circar of Hindooftan, in Allahabad, bounded on the north by Allahabad Proper, on the E. by Chunar, on the fouth-eaft by Boggilcund, and on the weft by Bundelcund; about 35 miles long, and 12 broad.

TARRASA, a town of Spain, in Catalonia; 13 miles N. of Barcelona.

TARRATZ POINT, a cape on the north coaft of St Vincent. N. lat. 13° 24'. W. long. 65° 15'.

TARREGA, a town of Spain, in Catalonia, on the Cervera;

Cervera; 5 miles W. of Cervera. N. lat. 41° 36′. E. long. 0° 19′.

TARRIE, in *Commerce*, a meafure at Algiers for corn and dry goods, holding fomewhat lefs than 2¼ pecks Englifh meafure; 16 tarries make a caffife.

TARROCK, in *Ornithology*, the name of a fea-fowl of the larus or gull-kind, and diftinguifhed by authors by the name of the *larus cinereus Bellonii;* and called by Linnæus the LARUS *tridactylus;* which fee.

It is of the fize of the common pigeon, and is not much unlike it in fhape, except that the head is larger and thicker. The bill is black, fhort, thick, and ftrong; the throat, neck, and under fide are white; near each ear, and under the throat, is a black fpot; on the hind part of the neck is a black crefcent, with the horns pointing to the throat.

Its great diftinction, however, from all the other birds of the gull-kind, is, that it has no hinder toe, but in lieu of it a fmall protuberance. It is very common on the coafts of Cornwall, and fome other of the Englifh fhores. Ray and Pennant.

TARRY-TOWN, in *Geography*, a town of New York, where major André, of the Britifh army, was apprehended as a fpy; 24 miles N. of New York.

TARSAH, a town of Hindooftan, in Berar; 18 miles E. of Nagpour.

TARSI, in the *Materia Medica*, a name by which fome authors have called the root of the *cyperus efculentus*, or fweet cyperus of the fhops, and by which it is, in fome places, ufually called by the druggifts. See AVELLANDA and HABHAZZIS.

TARSO, in the *Glafs Trade*, a fort of white ftone found in many rivers in Italy, and other places; and ufed inftead of fand for the fineft cryftal-glafs, being firft burnt, and calcined with the falt of the polverine into frit. Neri's Art of Glafs, p. 7.

Neri calls this ftone a kind of white marble; and adds a general rule, that all ftones that will ftrike fire with fteel, are fit to vitrify; and thofe that will not ftrike fire with fteel, will never vitrify.

The criteria or determinate characters of foffils were not at all fixed in this author's time, otherwife he had not called this ftone a kind of marble; fince his own general rule of trying ftones by fteel is, though liable to a few exceptions, a very good one; and, according to that, this tarfo could be of no affinity to marble; for marble will not ftrike fire with fteel, nor ever be converted into glafs.

The tarfo, therefore, of this and other authors, could be nothing of the marble kind; but is truly a cryftalline matter debafed by an admixture of white earth, and found in form of fmall pebbles, of a whitifh, yellowifh, or pale reddifh colour; and this is common in all the gravel-pits of England, and in the beds of fome of our rivers; and might be ufed with great advantage by our glafs-makers, if they knew it was fo eafily to be had.

On comparing thefe ftones of ours, with the cuogoli, or tarfo of the foreign glafs-makers, there is no difference diftinguifhable to the eye, nor will the niceft experiments by the fire, acid menftrua, &c. fhew the leaft diftinction between them. We are not to wonder, however, that the glafs-makers did not hitherto diftinguifh this to be the true cuogoli, or tarfo, fince the characters of foffils have been hitherto fo little afcertained, that the beft and lateft author on thefe fubjects, Dr. Woodward, fo far miftook the ftructure of this ftone, as to call it a fparry pebble. It is certain that fpar could never have any thing to do with glafs-making; but this ftone has no fpar in its compofition.

TARSUS, in *Ancient Geography*, a town and country of Afia, in Bithynia. Steph. Byz.

TARSUS, in *Geography*, a fea-port town of Afiatic Turkey, in the government of Marafch, faid to have been founded by Sardanapalus. It was at one time the capital of Cilicia, and traverfed by the river Cydnus. It is mentioned by Dionyfius Periegetes, Ptolemy, Mela, Pliny, and Strabo, the latter of whom fays, that it was very powerful and populous; that its inhabitants excelled in the ftudy of philofophy, and of all the fciences cultivated among the Greeks; indeed in this refpect they furpaffed Athens, Alexandria, and all other academies in the world. It is now inhabited by Turks, Greeks, and Armenians, and is the fee of a Jacobite bifhop and Neftorian archbifhop. It is large, and furrounded with a double wall. St. Paul called himfelf a native of Tarfus; and here the emperor Julian was buried. It has been faid that in the time of St. Paul, Tarfus was a Roman colony, and that the apoftle was a citizen of Rome by virtue of his nativity at Tarfus. (Acts, xxi. 37—39. ch. xxii. 3.) But Dr. Lardner has particularly examined this point, and alleged feveral arguments to prove, that Tarfus, though it was no mean city, as St. Luke fays, was not a municipium, or town of Roman citizens. (See *St.* PAUL.) Tarfus was taken by the Saracens in 640; 25 miles W. of Adana. N. lat. 37° 1′. E. long. 34° 37′.

TARSUS, in *Anatomy*, that part of the foot (confifting of about its pofterior half) to which the leg is articulated. Its front portion correfponds to the inftep in common language. Sea EXTREMITIES.

The fame name is applied to the portion of cartilage contained in each eyelid. See EYE.

TARTAGLIA, NICHOLAS, in *Biography*, a celebrated mathematician, was born at Brefcia about the beginning of the 16th century. Being left deftitute in his childhood by the death of his father, he was no lefs unfortunate at the fiege of Brefcia in 1512, in receiving feveral wounds, and particularly one which divided his lip, fo that he loft the power of diftinct articulation; and from this circumftance he got the name of Tartaglia. The defects of his early education were amply compenfated by his genius and diligence. Having refided ten years at Verona, he afterwards, *viz.* in 1534, became profeffor of the mathematics at Venice; and here, except during an interval of eighteen months at Brefcia, he remained till the time of his death, in 1557. His works are numerous. Befides tranflations of Archimedes and Euclid, he wrote many original treatifes in mathematics, one of the moft important of which, entitled "Quefiti e' inventione diverfi," was publifhed at Venice in 1546, and dedicated to Henry VIII. of England. It is comprehended in nine books, and contains anfwers to feveral queftions that were propofed to him at different times concerning mechanics, hydroftatics, &c.; and more particularly worthy of notice is the hiftory of the invention of the rules for folving cubic equations, which he communicated to Cardan, under an oath that he would keep the fecret. (See ALGEBRA and CARDAN.) Tartaglia's genius was no lefs confpicuoufly difplayed in other fciences than in algebra. He treats of artillery and gunnery, and alfo of the different methods of fortifying towns, befides various mechanical and algebraical queftions. He alfo propofes many queftions with regard to the motion of bodies, and the method of meafuring diftances, in his "Nuovia Scienzia" and "De' Numeri e Mefure." To Tartaglia we owe the firft difcovery of the beft angle, *i. e.* 45°, as it was then thought, for elevating a piece fo as to throw a ball or fhell to the greateft diftance. He alfo announced a method of raifing veffels that were

 funk,

ſunk, and other heavy bodies, from the bottom of the ſea, and the means by which a perſon may be enabled to remain a conſiderable time under water; and to him we owe a treatiſe on the ſigns which indicate changes in the atmoſphere. He has likewiſe furniſhed us with a large treatiſe on arithmetic, algebra, and geometry, publiſhed at Venice, in folio, in 1556. Tiraboſchi remarks, that all Tartaglia's works manifeſt great penetration and acuteneſs, and that they would claim higher commendation, if the author had paid more attention to his ſtyle, and if the editions were more correctly printed. But with all their imperfections and faults, and after all the improvements to which they have led the way, they were juſtly eſteemed at the time when they were written, and they have been uſeful to thoſe who have in more modern times purſued the ſame courſe of ſtudy and inveſtigation. Tiraboſchi. Montucla. Hutton.

Tartaglia is mentioned by Pietro della Valle among great Roman muſicians in 1640, and the compoſer of "Clearco," the firſt opera that was performed at a public theatre in Rome. For though ſeveral muſical dramas had been exhibited in the palaces of ambaſſadors and other great perſonages in that city, no theatre had been previouſly opened there for the public at large.

TARTAGLINI, LA ROSA, the daughter of Tibaldi, an excellent tenor ſinger in the ſervice of the emperor at Vienna. She was extremely celebrated for her beauty and agility of voice, and quitted the ſtage in 1768.

TARTALA, in *Geography*, a town of Hindooſtan, in Calicut; 21 miles E. of Paniany.

TARTAN, in *Sea Language*, a ſmall coaſting veſſel navigated in the Mediterranean ſea, and having only one maſt and a bowſprit, the principal ſail, which is extremely large, being extended by a lateen-yard.

When tartans put up a ſquare ſail, it is called *a ſail of fortune.*

TARTAR, TARTARUS, or *Tartarum*, in *Chemiſtry*, an acid concrete ſalt which riſes from wines, after complete fermentation, and ſticking to the top and ſides of the caſks, forms a cruſt, which hardens to the conſiſtence of a ſtone. It is in this ſtate a hard, brittle, brown-red maſs, interſperſed with imperfectly cryſtallized particles; and called *crude* or *rough* tartar, or *argol*, by way of diſtinction from that which is purified.

Its goodneſs rather depends on the number of repeated fermentations, which a ſucceſſion of new wines in the ſame caſks for ſeveral years makes, than on the ſoil or climate where the wine is produced.

The ſweet wines afford always leſs tartar than the ſharp ones, and it is alſo leſs valuable. The tartar of Rheniſh wine is better than that of any other; and in general thoſe wines which have the moſt acid in them, and which are the moſt coloured and ſtrongeſt-bodied, afford the greateſt quantity of tartar, and that in the largeſt cryſtals.

The taſte of tartar is vinous, and ſlightly acid. It is not entirely a product of fermentation, for it is contained in the "muſt," or grape juice, and aſſiſts in the proceſs of fermentation, and the production of alcohol. This ſalt has alſo been found native, under different combinations, in ſome other vegetable juices.

Beſides the uſual way in which tartar is produced, there is a very remarkable account in the Memoirs of the Academy of Sciences at Paris, an. 1737, of its having been found in a more than ordinary beautiful ſtate on a human ſkull: the diſcovery was owing to accident, and it was found that there had been lees of wine in the veſſel in which the ſkull had been laid ten days in ſoak.

The formation of the cryſtals of this tartar on the ſkull, while the ſides of the veſſel had none created on them, ſhews that the ſkull had a diſpoſition for receiving the cryſtals more than any other body; and their peculiar brightneſs proves, that it had ſome ſhare in their formation.

Tartar conſiſts of a large quantity of extractive matter, ſcarcely ſoluble in water, to which it owes its colour, and of a ſalt, quite white when pure, compoſed of acid of tartar united to a ſmall portion of potaſh, leſs than is required for the ſaturation of the acid, but which, in this proportion, forms a diſtinct cryſtallizable ſalt of conſiderable importance in ſeveral arts and manufactures.

Tartar is either *white*, or *red*, according to the colour of the wine from which it is produced. That brought from Germany is the beſt, as being taken out of thoſe monſtrous tuns, ſome of which hold a thouſand pipes of wine, ſo that the ſalt has time to come to its conſiſtence, which is one of the chief qualities to be regarded in tartar. That of Montpellier is the next in order; then that of Lyons, Paris, &c.

White tartar is preferred to red, and is really better, as containing leſs of the droſſy or earthy part; though both kinds, when purified, are exactly the ſame. The marks of good tartar of either kind are, its being thick, brittle, brilliant, and but little earthy.

Tartar, in its *crude* ſtate, is much uſed as a flux in the aſſaying of ores. As it contains both alkali and carbonaceous matter, it acts both in aſſiſting the fuſion of refractory ores, and in reducing metallic ſalts and oxyds. When heated *per ſe* to redneſs in cloſe veſſels, the extractive matter and the tartareous acid both become charred, and the reſult is a black alkaline carbonaceous maſs. In open veſſels the charcoal burns off totally, and at laſt nothing remains but pure white carbonate of potaſh. But tartar is for the moſt part refined, in order to obtain the pure ſalt; which is called *purified* tartar, *cream* of tartar, *cryſtals* of tartar; or more accurately, according to the modern nomenclature, *acidulous tartrite of potaſh*, or *ſupertartrite of potaſh*, and ſometimes with leſs preciſion, ſimply *tartar*. This ſalt is purified in large quantities at Venice, and in France near Montpellier, by two different proceſſes, which have been deſcribed by Deſmaret (Journ. Phyſ. tom. i. p. 67.) and by M. Fizes (Mem. de l'Acad. for 1725), and which we ſhall here extract from Aikin's dictionary. At Venice the method is as follows: "The crude tartar is firſt dried in an iron boiler, with a very gentle heat and frequent ſtirring, that the acid may not be burnt, and is then pounded in iron mortars. The ground tartar is then diſtributed into wooden tubs, and boiling water poured upon it, which diſſolves the ſalt, and leaves a ſediment, which is thrown away. The clear ſolution is left three days at reſt, during which time it depoſits browniſh cryſtals of tartar. The mother-liquor from this operation is reſerved, and is uſed hot in the ſubſequent proceſs in the firſt lixiviation of the tartar. The browniſh cryſtals of tartar are then put into a copper boiler, with the mother-liquor of former proceſſes, and ſlowly brought to boil, by which a ſaturated ſolution of a deep yellow wine-colour is produced. This is clarified in the following way: a workman ſtands by the ſide of the copper with a baſket of eggs, and a bucket full of finely ſifted wood-aſhes. He begins with breaking one of the eggs, and putting the white of it only into a bowl; he beats this up with ſome of the boiling liquor, and then pours the whole into the boiler: he then inſtantly throws in a ladleful of the wood-aſhes, and ſtirs up the liquor from the bottom. A briſk efferveſcence takes place, and the ſurface is covered with a red ſcum, which is carefully taken off with a perforated ſkimming-diſh, and put aside: a second portion of ashes is then added, and the effervescence and scum are renewed and treated as before. The whole of this operation is repeated fourteen or fifteen times, after which the liquor becomes quite clear and colourless. The fire is then withdrawn, and the liquor suffered to remain perfectly at rest for three days. On the fourth, a dirty white saline crust is removed from the surface, and two-thirds of the liquor laded out: the crystals on the sides are then collected by a ladle, and washed in the remaining liquor; they are thus obtained perfectly clean, and require no further preparation than drying on a wicker frame. The crystals from the bottom are still somewhat coloured, and are either sold as an inferior sort, or are refined again with fresh portions of the crude tartar. The liquor that remains in the boiler, after the deposition of the crystals, is a cold saturated solution of tartar, and is employed in the first lixiviation of the rough tartar."

The method used near Montpellier has been found so convenient and effectual, that it has continued without any material alteration for a century. It is as follows: "The apparatus required for this purpose is, 1st, a large copper boiler; 2d, a stone cistern, larger than the boiler; 3d, a number of glazed earthen pots (generally twenty-seven), which, together, hold somewhat more than the boiler; 4th, some strainers of coarse cloth stretched on wooden frames; 5th, four smaller copper boilers, which, together, hold as much as the larger boiler, and are used in the refining part of the process; and 6th, a mill to grind the tartar.

"The large copper is first filled with two-thirds of mother-liquor, remaining from the previous operations, and one-third of spring-water; a quantity of rough tartar is then thrown in, and, when the liquor is saturated and boiling, it is strained into the earthen pots. In about half an hour the liquor in these pots, though still very hot, begins to deposit crystals on the surface and sides of the pot; during which time, more liquor and tartar are thrown into the large copper, as at first.

"The liquor in the pots is then emptied into the stone cistern, leaving the crystallized crust of tartar behind; and when the second boiling is saturated, the pots are again filled as before, and the large copper again charged with the clear liquor from the cistern, and fresh tartar. By thus five times alternately preparing a hot saturated solution, and allowing it partially to deposit its tartar in the pots, the latter become lined to a considerable thickness with a crust of reddish-white tartar, much purer than at first, and which obviously consists of an irregular crystallized saline mass, and when washed with cold water, is fit for the second or proper refining process. For this purpose the four small boilers are filled with water, in which a small quantity of clay is diffused, which renders it milky, rejecting the stony and larger particles of earth. The half-purified tartar is then added in such proportion, that the water, when boiling, shall be sufficient to dissolve all the soluble part, and the ebullition is continued for a quarter of an hour; the fire is then withdrawn, and the liquor allowed to remain at rest till the next day. It is then found covered on the surface with a white hard saline crust, and a similar crust, but more distinctly crystallized, has concreted on the sides and bottom of the boiler. They are both very pure tartar, the crust on the surface, which is an amorphous mass, is called *cream of tartar*; and the other, *crystals of tartar;* but they are indiscriminately mixed.

"The crust is then broken down, and falls to the bottom; and the liquor, which is a clear pale red, is poured off gently into the stone cistern, till it begins to run white, owing to the clay at bottom, which latter portion passes into a separate vessel. The whole mass of solid tartar left in the boiler is then washed with cold water, till all the foulness (which is merely superficial) is got out, and the water comes away quite clear; after which the purified tartar is taken out, and dried on stoves or in the sun, and is perfectly pure and white. The ordinary rough tartar yields about three-fifths of its weight of the white pure salt. All the residuary liquors are employed in subsequent operations, in the way already mentioned."

Schaub says (Annal. de Chim. xlix. 61.), that tartar may be purified by simply boiling it with powdered recent charcoal, and thus very white crystals are obtained.

TARTAR, *Burnt*, a preparation used by glass-manufacturers, and consisting of large lumps of red tartar, burnt or calcined in earthen pans in an open fire, till they have done smoaking: it is of a blackish purple colour. Neri's Art of Glass.

TARTAR, *Cream of*, *Cremor Tartari.* See CREAM *of Tartar*, TARTAR, *supra*, *Super-tartrate of Potash*, under SALTS, and TARTRITES.

Cream of tartar has a sensibly acid taste; it reddens the blue colours of vegetables; it may be saturated by uniting with any of those substances, which are capable of forming with acids neutral salts; and it may be afterwards separated from those substances, and recover its former appearance.

In the arts, and in the materia medica, this is a very valuable salt. It is much used in dyeing, more especially in giving the scarlet and other modifications of the cochineal colours. It is also often combined with alum, as a mordant in fixing colours. (See DYEING.) As an article of the materia medica, cream of tartar, dissolved in water, forms an agreeable and cheap acidulous drink; and as a sweetener of the blood, some have taken it in whey or water-gruel, in the spring-time, to the quantity of half an ounce every morning, for three or four weeks. The solution in water, sweetened with sugar, is a pleasant beverage in febrile diseases, when its purgative quality is not likely to prove injurious. See the next article.

The difficult solubility of cream of tartar being an objection to its medical use, some experiments were made by Dr. Peter Jonas Berg, for rendering it more soluble by certain additions, without altering its medicinal qualities. Borax was found to answer best for this purpose. To four parts of cream of tartar one of borax was added. These were dissolved in a sufficient quantity of water, and the liquor strained: about a sixteenth part of impurities was left behind. The pure solution evaporated yielded an acid, and extremely soluble white salt. Lemery has also recommended borax. It has, however, been observed, that as borax contains an excess of alkali, the acid of the tartar would be neutralized, and a very different salt would be produced, *viz.* the *tartrite of potash and soda;* which see. Nova Act. Phys. Med. Acad. Cæs. Leop. Carol. Nat. Curios. tom. iv.

TARTAR, *Crystals of.* See TARTAR, *supra*, and TARTRITES.

These crystals are small and irregular, but generally run together into little masses of a white colour, semi-transparent, brittle, and easily reduced into powder. Crystals of tartar are in common use as a laxative and mild cathartic; they are also esteemed for their cooling and diuretic qualities, and have therefore been much employed in dropsies, and in other cases requiring an antiphlogistic treatment. Dr. Cullen says, that in large doses they act like a purgative, in exciting the action of the absorbents in every part of the system, and more powerfully than the operation of any entirely neutral salts. On this property is founded their utility in the case of dropsy. They occasion a considerable discharge of serous fluid into the bowels, which is thrown off in in the form of ſerous ſtools; the diſcharge by urine being alſo augmented. The water in the cavity of the abdomen is thus rapidly carried off; and the chances of a return of the diſeaſe are ſuppoſed to be fewer than when other diuretics are employed. It is remarked, that they do not readily paſs off by the kidnies, unleſs they are taken with a large quantity of water; and, therefore, when intended as a diuretic, they ought to be given in a liquid form, as Dr. Holme has directed. It has been ſuggeſted, that, in caſes complicated with hepatic obſtructions, the effects of this remedy are very uncertain. It may be advantageouſly united with ſquills; and, on account of the exhauſtion which it occaſions, the uſe of it ſhould be followed by preparations of iron, and other tonics. As a purgative and hydragogue, the doſe is from ʒiv to ʒvj, in the form of electuary; and for the latter purpoſe, this doſe muſt be repeated until the kidnies are affected; diluting freely during its uſe. Theſe ſalts enter ſeveral officinal compoſitions: ſuch as "carbonas potaſſiæ puriſſimus," Ed. Ph.; "ferrum tartarizatum," L. D.; "pulvis jalapæ compoſitus," E.; "pulvis ſcammonii compoſitus," E.; "pulvis ſennæ compoſitus," E.; "potaſſæ tartras," L.E.D.; "antimonium tartarizatum," L.E.D.; "ſoda tartarizata," L.E.D. Woodville. T. Thomſon.

Tartar, *Emetic.* See Antimony.

A conſiderable diverſity has occurred in the method of preparing this tartar, probably from want of conſidering, that the emetic quality of this preparation proceeds from the metallic earth being diſſolved by the acid of tartar, and forming with it a kind of ſoluble tartar, a true neutral ſalt, no leſs capable of a very exact ſolution than the vegetable ſalt, the ſalt of ſeignette, and all the other ſoluble tartars. By conſidering this ſaturation as a fixed point, there may be produced only one kind of emetic tartar, always equally ſtrong. See a detail of M. Geoffroy's experiments on this ſubject, in Mem. Acad. Par. for 1734. M. Beaumé directs it to be prepared by mixing together equal parts of cream of tartar, and of porphyriſed glaſs of antimony, or rather a larger quantity of the latter ingredient. This mixture is to be thrown gradually into boiling water; and the boiling muſt be continued gently, till there is no efferveſcence, and till the cream of tartar be entirely ſaturated. The liquor is to be filtrated; and when it is cooled, there will be formed in it fine cryſtals, in the form of pyramids with triangular baſes, which are a ſoluble tartar perfectly ſaturated with glaſs of antimony. Theſe are tranſparent while moiſt; but by expoſure to a dry air, they loſe a part of the water of their cryſtallization, and become opaque and white. Emetic tartar thus prepared, very well produces an emetic effect when taken from a grain to two and a half, or three, according to the conſtitution of the patient. The reſult of M. Beaumé's experiments on the manner and duration of boiling this preparation is, that veſſels of iron and copper ought to be avoided, and thoſe of ſilver or glaſs uſed, becauſe in theſe it may be boiled for any length of time, without being decompoſed; and that as the intention of the operation is to perfectly ſaturate the cream of tartar, the boiling muſt be continued till this ſaturation be effected, which requires a long time, when the glaſs of antimony is groſsly pounded, but a much ſhorter time when it is well porphyriſed. Macquer, in the Chemical Dictionary, obſerves, that we are not certain that the emetic tartar, prepared by ſaturating tartar with glaſs of antimony, has always an uniform and conſtant emetic power. And therefore he recommends the *powder of algaroth*, or mercury of life, which, however dangerous in itſelf, may be rendered ſafe, by waſhing it with a little fixed alkali, which will ſeparate all that marine acid that communicates to it a certain degree of cauſtic quality. The powder thus waſhed, he ſays, is altogether ſoluble by cream of tartar, and convertible into a ſoluble emetic tartar, perfectly neutral, by boiling it, and ſaturating it with cream of tartar, and treating it in the manner above directed, for the preparation of emetic tartar with glaſs of antimony. The powder of algaroth, thus prepared, is a calx of antimony conſtantly of the ſame degree of emetic ſtrength. The total evaporation of the fluid appears to be the beſt way of ſecuring uniformity of ſtrength to the medicine; and the ſolubility of the compound affords one of the beſt means for eſtimating its ſtrength, or the degree of its impregnation with the antimony.

Dr. Saunders relates, that an ounce of cold water, about the middle temperature of the air, diſſolved, of ſome of the common emetic tartars of the ſhop, not thirty-two grains, or one-fifteenth of its own weight; whereas of a well ſaturated ſort, which he had himſelf prepared by long boiling, the ſame quantity of water diſſolved fifty-two grains, or near one-ninth of its own weight.

The beſt way, probably, of obtaining a ſaturated and uniform preparation of this kind, would be to digeſt the common emetic tartar in eight times its weight, or leſs, of cold water, and evaporate the filtered yellow ſolution to dryneſs; or to continue the boiling of the glaſs of antimony and tartar for twelve hours, or longer, adding water occaſionally to keep the tartar always diſſolved, and at length to let the water waſte ſo far, as not to exceed eight times the quantity of the tartar employed, after which the liquor is to be ſuffered to cool, and then filtered and evaporated. The doſe of this preparation, as an emetic, is from two or three to ſix or eight grains. It may be given alſo as an alterative, or diaphoretic, in doſes of a quarter of a grain, or half a grain, or more, and added, in the quantity of a grain or two, as a ſtimulus to the milder vegetable cathartics. Lewis's Mat. Med. by Aikin.

Tartar, *Foliated*, is a preparation of tartar with diſtilled vinegar, which reduces it into white leaves. See *Acetas* Potassæ, and Terra *Foliata*.

Tartar *of Iron.* See Tartrite *of Potaſs and Iron.*

Tartar, *Oil of*, is the ſalt of tartar expoſed to the air for ſome days in an open veſſel, in a moiſt place, till it diſſolve into a fluid; though it is improperly called an oil, being no more than a diſſolved ſalt.

Oil of tartar *per deliquium* is held the beſt counter-poiſon to corroſive ſublimate.

Tartar, *Regenerated.* When cream of tartar has been made ſoluble by any alkaline ſubſtance whatever, it may be revived, or regenerated, into cream of tartar again; its acid in this ſtate has diſſolved the alkaline matter preſented to it, and that has been itſelf attenuated in ſuch a manner as to render it capable of inſinuating itſelf between the molecules or integrant parts of the conſtituent matter of the cream of tartar; on this only depends the ſolubility of this preparation: and to render the whole of its primitive nature again, there requires no more than the addition of a new acid, which ſhall free the tartar from this alkali; but this muſt neceſſarily be ſtronger than that naturally in the tartar. Thus ſpirit of nitre, or oil of vitriol, regenerate the ſoluble tartar in a moment, as being more powerful acids than that in the cream of tartar, and therefore taking from it all its alkali. The acid of diſtilled vinegar, which is not only a vegetable acid, but the ſame with that of tartar, is alſo able to regenerate the ſoluble tartars. It might ſeem wonderful that this ſhould be able to effect this change without any ſuperiority of force: but it is to be obſerved, that in the cream

cream of tartar the acid has a terreftrial and alkaline bafis, which is natural to it in that form; but in the ftate of foluble tartar it takes a new alkaline bafis, which is not natural to it: and when we view the procefs in this light, it does not appear wonderful, that an acid of its own kind fhould be able to take away from it this artificial alkaline bafis, though it was not able to take from it the natural one. Mem. Acad. Par. 1733.

This fecond or artificial bafis is different, according to the different alkalies which have been employed to render the tartar foluble, and confequently the fame acid may attach itfelf more to one than to another of thofe alkalies, or quit them the more or lefs eafily. There is one kind of foluble tartar, however, which is not to be regenerated at all; this is that which is made with borax.

Dr. Huxham fays, he has often experienced the good effects of regenerated tartar in the cure of obftructions of the bowels, and for fluggifh humours. See *Acetate of Potafh* under SALTS, and TERRA *Foliata*.

TARTAR, *Salt of*, is made of tartar wafhed, ground, purified, or cream of tartar, and calcined either *per fe* or with nitre, by a reverberatory fire; or it is made by pulverizing what remains in the retort after the diftillation of tartar, and calcining it as above by a reverberatory fire. On the one or the other of thefe preparations, they pour a great quantity of hot water, to make a ley of it; this they filtrate, and evaporate the liquor by a fand-heat, till the fixed falt be found at the bottom of the veffel. This is the pure alkali, or fixed falt of tartar. See CARBONATE *of Potafh* under SALTS, and SALT *of Tartar*.

TARTAR, *Soluble*, (fee *Tartrate of Potafh* under SALTS, and TARTRITE *of Potafh*,) may be made by the following procefs: Take of an alkaline fixed falt, a pound; of water, a gallon; and having diffolved the falt in this water boiling, throw cryftals of tartar in powder as long as any fermentation is raifed, which ufually ceafes before thrice the weight of the alkali is thrown in. Then ftrain the liquor through paper, and after due evaporation fet it by for the falt to cryftallize, or elfe evaporate the liquor wholly away, that the falt may be left dry.

This falt, by the action of the alkali on the acid of tartar, being freed from thofe grofs terreftrious parts, with which the cryftals of tartar, how pure foever, remain ftill charged, diffolves readily, and keeps fufpended in cold water.

The feveral alkaline falts, that of tartar itfelf, the common pot-afhes, borax, &c. all make a very good foluble tartar; and not only thefe, but the common terreftrial alkalies, whether of the mineral kingdom, as chalk or lime; or of the vegetable, as the afhes of plants after elixiviation; or of the animal, as oyfter-fhells calcined or not calcined, and hartfhorn: all thefe give a better or worfe foluble tartar; but of thefe, none fucceeds fo well as the oyfter-fhell, after it has been calcined; the foluble tartar, prepared with this, cofts alfo greatly lefs than when prepared with falt of tartar.

In wood-afhes there is always a part, which when mixed with water fwims, and is fufpended in it a long time, and at length fubfides into a kind of foft and impalpable matter; and another part, which fubfides readily to the bottom, and feels rough and harfh. It is the firft of thefe fubftances alone, which being mixed with cream of tartar, renders it foluble: the other part will not mix with the cream of tartar, or produce any fuch effect, unlefs reduced to the nature of the firft, by repeated and violent calcinations, and then only a part becomes fo altered, the whole never is fo. It appears that the firft portion has been wholly divefted of its acid by the fire, and thence is become fufceptible of the impreffion of the weakeft acid, fuch as is that of the cream of tartar, but in the fecond, or coarfer part, the acid it naturally contained remains fixed and concentrated, fo that it is not fufceptible of any impreffion from the weak acid of the cream of tartar. Mem. Acad. Par. 1733.

The different kinds of foluble tartar have alfo their different degrees of folubility, or different readinefs to run into a liquor *per deliquium*. The moft eafily foluble of all are thofe made with chalk, with lime, and with wood-afhes; and that which is moft difficultly fo, is the kind made with borax; it will at length run however, and is truly foluble tartar.

For the chemical and medical properties of this falt, fee *Tartrate of Potafh* under SALTS, and TARTRITE *of Potafh*.

TARTAR, *Vitriolated*, which fome call *magiftery of tartar*, is a neutral falt, compofed of a vitriolic acid, faturated with the fixed alkali of tartar, or with any other pure vegetable fixed alkali.

Vitriolated tartar may be decompofed by nitrous acid in the following manner, according to M. Baumé. Equal parts of both are put into a matrafs, and heated till the falt be diffolved. From the liquor when cold, true cryftals of nitre may be obtained. And according to M. Margraaf, vitriolated tartar may, in the fame method of treatment, be decompofed by marine acid.

This falt is not of any ufe in the arts, and little ufed in chemiftry. It is chiefly employed in medicine. Like the other neutral falts, with bafes of fixed alkali, it is aperitive in fmall dofes, as a grofs, or $59\frac{1}{2}$ grs., and it is laxative, when taken from 6 to 12 grofs. See *Sulphate of Potafh* under SALTS.

The chemifts have fometimes boafted of great virtues, in what they call the magiftery of this falt; this is the earth precipitated in the making of it. It is the opinion of fome ingenious authors, that all fixed falts are produced by a blending together of the acid and alkaline falts, which the plants they are obtained from originally contained, with fome earth. The making of this preparation of tartar and vitriol, gives great ftrength to this opinion by means of this magiftery; which fhews, that an earth neceffary to the cementing a mixture of an acid and an alkali into a neutral falt, may exift even in one of the principles themfelves, though unfeen by us; and that, as in the prefent inftance, in fo large a quantity, as not only to be fufficient for the combining the two volatile fubftances into a fixed one, but even to leave a remainder of it, that was not neceffary.

While the acid of vitriol is poured upon the diffolved falt of tartar, or its oil *per deliquium*, for the making of this falt, during the great effervefcence between the acid and the alkali, there is a precipitation made of an earth, for the feparation of all which great care is to be had to the degree of faturation of the alkali with the acid. This earth afterwards may be fevered by filtration. This earth is precipitated, not out of the fpirit of vitriol, but out of the falt of tartar; and this experiment fhews, that this fixed falt did originally contain that earth, which, according to the fyftem of the formation of fixed falts out of volatile ones, originally refiding in plants, muft neceffarily be mixed with them, and which, not being able to mix with the acid, is feparated and thrown off in the conflict, in which the acid mixes itfelf with the reft.

This earth is what is pompoufly called the *magiftery of vitriolated tartar*; but it is very wrong to give that name to an earth which has none of the properties of that or any other falt; and they greatly deceive themfelves and their patients, who prefcribe it inftead of the falt itfelf. Its faline tafte, probably, has induced them to think that it poffeffed great virtues; but this is not innate but adventi-

tious,

tious, and the effect only of the fluid in which it was precipitated: it cannot but have some of the salts of that fluid hanging about it, when first made; but these may, by repeated washings, be carried wholly off, and the magistery will then remain a pure simple earth, and shew itself to be no other than that earth, which may be properly called the earth of all fixed salts; and which, though necessary to give the salt of tartar its form as a lixivial salt, yet being not necessary to it in its new form of a neutral salt, is deposited in the making it into that form. It yet remains to be proved by more numerous experiments, that the fixed salts of plants owe that form only to a fixing earth, combining their two original volatile principles into a fixed mass; for if this be truly the case, there then needs no more to the volatilizing them again, but the divesting them of this earth. Phil. Trans. N° 90.

TARTAREOUS or TARTARIC *Acid*, was first separated from cream of tartar, and obtained in a solid crystalline form, by a method which was discovered by Scheele, and which, with little variation, is as follows: it very much resembles the mode used by the same ingenious chemist in obtaining the citric acid: Having analysed cream of tartar (see Swedish Transactions, part iii. for 1770.), he found that this is not a pure acid, but a compound salt, containing the fixed vegetable alkali, united with a superabundance of the tartareous acid, and therefore, that it differs from soluble tartar only in the proportion of acid which it contains. For obtaining this acid, he dissolved any given quantity of the cream of tartar in boiling water, and whilst boiling, added gradually some clean powdered chalk. Upon this a copious effervescence will arise, and the addition of chalk must be continued till this ceases, when the mixture may be set by to cool. It then contains a white dense sediment, which consists of the lime of the chalk, united with the excess only of the acid of the cream of tartar; and the supernatant liquor is, therefore, a solution of the cream of tartar deprived of its excess of acid, or neutral *tartrite of potash*, or *soluble tartar*, as it is also called, and which may be obtained crystallized by subsequent evaporation. Wash the precipitated tartrite of lime repeatedly with cold water, then put it into a glass vessel, and add to it a diluted sulphuric acid, composed of as much concentrated acid, as is equal to the weight of chalk employed in saturating the cream of tartar, mixed with four or five times its weight of water.

The sulphuric acid having a stronger affinity for the lime than the tartareous acid has, totally decomposes the tartrite of lime, during a digestion of two or three days (or in a shorter time if assisted by a gentle heat,) and the white sediment, though it does not alter its appearance, is changed to sulphate of lime, whilst the supernatant liquor contains naked acid of tartar. Then pour off the clear liquor, wash the sulphate of lime to extract all the adhering acid, and add the washings to the former liquor, and evaporate the whole, (at first with a boiling heat, and as it concentrates, with a much gentler warmth,) till it is of a thick syrupy consistence, and then set it by for some hours, that all the selenite, which it may hold in solution, may be deposited. Then again dilute the mixture with cold water sufficient to redissolve every thing but the selenite, and slowly evaporate the solution to a syrupy consistence, and after some hours it will deposit the pure tartareous acid in crystals, which are generally pretty large irregular hexahedrons. Cream of tartar decomposed in this way by chalk (and therefore only partially) will yield about a third of its weight of the crystallized acid. This quantity however must not be taken as the proportion of the acid in cream of tartar, for much of the weight of the crystallized acid is water of crystallization, whereas the cream of tartar contains very little water.

In the above detailed method of obtaining tartareous acid, chalk, or carbonate of lime, is used to decompose the cream of tartar, which it does merely by engaging the excess of acid, and leaving the remainder of the salt in the state of tartrite of potash. But if quick-lime be substituted to the chalk, the whole of the cream of tartar is decomposed, a much larger quantity of tartrite of lime, and consequently of tartareous acid, is obtained, and the supernatant liquor is a solution of caustic potash. It has been found however by Vauquelin, that the potash retains a small quantity of tartrite of lime in solution, so that when the alkaline liquor is evaporated nearly to dryness it gelatinizes by cooling, owing to the separation of this calcareous salt. It may be decomposed by carbonate of potash or soda, which produces carbonate of lime and tartrite of the alkali employed: or the tartareous acid may be destroyed by calcination, and the lime, carbonated in the process, will remain.

Calculating from the observed proportions of acid in the tartar, and of chalk required in the first-mentioned process, and of pure lime in chalk, we may estimate that all the acid in 100 parts of cream of tartar (which Thenard reckons at 57 *per cent.*) will require full 42 parts of pure lime for its saturation, and somewhat more lime should perhaps be added to ensure the complete decomposition of the tartar. The lime should be previously slaked and mixed with sufficient water to bring it to the consistence of paste.

Lowitz has proposed another method, which is perhaps preferable in every respect, except that it is somewhat more expensive, and that no caustic alkali is obtained. It consists first in decomposing the cream of tartar by chalk in the usual way, added as long as any effervescence takes place; and then pouring into the filtered supernatant liquor muriate of lime, as long as any precipitate falls down. By this means the tartrite of potash in liquor is totally decomposed, muriate of potash remains in solution, and the precipitated tartrite of lime is added to that produced by the chalk; and both are afterwards decomposed by sulphuric acid in the usual way. The same chemist also advises to add to the solution of tartareous acid in the last part of the process a quantity of *charcoal* powder, (the depurating power of which has been mentioned under CARBON.) This, however, is certainly not essential to the obtaining a perfectly fine colourless crystallized acid, and, we believe, is seldom, if ever, used.

The tartareous acid has a strong acid taste, and is soluble in five or six parts of water, and in a much less quantity of boiling water. The crystals are permanent in the air.

When heated *per se* in a retort with a receiver, this acid melts, boils up, and exhales a sour pungent vapour, which condenses in the receiver into a red acid empyreumatic liquor, equal to about a quarter of the weight of the tartareous acid.

This liquor has a pungent, acid, and empyreumatic taste, strongly reddens litmus, and effervesces with the alkaline carbonates. It is called the Pyrotartareous acid, which has not been much examined. The other products from the distillation of tartareous acid, are a large quantity of carburetted hydrogen and carbonic acid gas, and a soft spongy coal is left in the retort, which, heated in the open air, burns with scarcely any residue.

The tartareous acid, besides being found native in some vegetable juices, and in the deposit from wine during and after fermentation, is also produced by the action of nitric acid on alcohol. A further digestion of tartareous with nitric acid converts the former into oxalic acid, and a still further

further digeftion changes the whole of the vegetable acid into vinegar. Thefe curious experiments, which were at firft noticed by Scheele, have been fully examined by Hermbftaedt, and other chemifts.

Tartareous acid is compofed, according to Fourcroy and Vauquelin, of 70.5 of oxygen, 19 of carbon, and 10.5 of hydrogen, and differs from the oxalic acid in containing more carbon and lefs oxygen. The order of affinity of this acid for the feveral bafes is, according to Thenard, lime, barytes, ftrontian, potafh, foda, ammonia, magnefia, and alumine. Aikin's Dict.

For the combinations of the tartareous acid with the feveral bafes, we refer to the article TARTRATES or TARTRITES.

TARTARHAN, a word ufed by fome authors to exprefs fpirit of tartar.

TARTARI, in *Geography*, a mountain of Dalmatia; 8 miles N. of Trau.

TARTARIAN OAT, in *Agriculture*. See OAT.

TARTARIZATUS CHALYBS. See IRON, in the *Materia Medica*, and TARTRITE *of Potafs and Iron*.

TARTARIZING, a term ufed by fome writers for the act of refining or purifying, by means of falt of tartar.

TARTARO, in *Geography*, a river of Italy, which rifes in the Veronefe, and running eafterly, traverfes the Polefe de Rovigo, paffes by Adria, and foon after feparates into two branches, one of which runs into the Adige, and the other into the Po.

TARTARON, a fort of fine cloth or filk, mentioned in the ftat. 4 Hen. VIII. c. 6. Blount, Cowel.

TARTARUGA, in *Zoology*, a name by which the Portuguefe in America call a fpecies of tortoife, known among authors by its Brazilian name *jurucua*.

TARTARUM TARTARISATUM, *tartarifed tartar*, in *Chemiftry*, the name of a preparation of tartar; the manner of doing which is given by Boerhaave, and is as follows: Reduce fome of the pureft white tartar to powder, and boil this powder in ten times its weight of water in a large copper veffel, till it appears perfectly diffolved: let it after this continue boiling till the liquor becomes tolerably tranfparent, and of an acid tafte; then drop into it from on high oil of tartar *per deliquium*, the liquor being ftill kept boiling: upon the falling in of each drop there arifes a great ebullition, occafioned by the meeting of the acid and alkali. Large bubbles appear on this, and in thefe the chemifts have imagined they found the figures of clufters of grapes.

The operation is to be patiently continued till there is no more effervefcence made by the falling in of the drops of the oil. The acidity of the tartar will be then fo perfectly faturated with its own alkali, that it will appear neither acid nor alkaline, but a third falt; great caution however muft be ufed in obferving the true point of faturation; otherwife the falt will be when finifhed either a little acid, or a little alkaline, as the one or the other exceeds. The liquor is to be then ftrained feveral times through a flannel, till perfectly clear: it is of a deep brownifh colour, and brackifh faline tafte, but has no fcent. If this be evaporated to a pellicle, and fet to cryftallize, it forms a falt which is a tartar, eafily foluble in water, even when cold; and very properly to be called foluble tartar. Boerhaave Chem. part ii. p. 161.

TARTARUS, in *Ancient Mythology*, is one of the general divifions of the fubterraneous world, or the place of torments. The origin of the fable of Tartarus is traced in Hefiod's account of the war of Jupiter againft his father Saturn and the Titans, who, after he had gained a victory over them, was driven from Olympus, and condemned to the bottom of Tartarus, in the extremities of the earth. Typhon alfo, threatening to deprive Jupiter of his empire, was plunged into the fame abyfs. The abbé Banier has given the following explication of this fable. The Greeks, he fays, regarded the places fituated to the eaft of them as higher than thofe that lay weftward; and hence they took the former for heaven, and the latter for hell. According to this notion, they placed their hell either in Spain, the refidence of Pluto, or in Italy, and laftly in Epirus, or rather in Thefprotia, all which countries were fituated to the weft of Greece. Now as the Titans, in the feveral confpiracies they formed, were obliged to enter into Italy and Spain, the poets fabled that they were precipitated into the gulf of Tartarus; but as their notion of Tartarus was taken from Tarteffus, a river of Spain, on the banks of which Pluto refided, it is no wonder that the Titans, having been defeated near that river, were fabuloufly faid to be plunged headlong into the Tartarian gulf.

The other two divifions of Ades, according to Virgil, are Erebus and Elyfium. The prince or judge who prefides over Tartarus, is Rhadamanthus. The miferable inhabitants of this horrid region are of two forts, *viz.* the fouls of fuch as are tormented, and the infernal deities, called the Furies, who attend there either to inflict or aggravate their torments.

Virgil diftinguifhed thofe that are tormented in Tartarus, into two general claffes; the firft, of fuch as have been ungrateful or impious towards the gods; and the fecond, of fuch as have been mifchievous and hurtful among men: thofe of the latter, more particularly, who hated their brethren, ufed their parents ill, or cheated their dependents; who made no ufe of their riches; who committed inceft, or difturbed the marriage union of others; thofe who were rebellious fubjects, or knavifh fervants; who were defpifers of juftice, and betrayers of their country; and who made and unmade laws, not for the good of the public, but only to get money for themfelves. All thefe, and the defpifers of the gods, of whom the rebel giants occupied the chief clafs, Virgil places in Tartarus, and in that vaft abyfs, which was the moft terrible part of this infernal region. The great road that paffes through Erebus, is reprefented as divided into two; of which the right-hand road leads to Elyfium, or the place of the bleft; and the left-hand road to Tartarus, or the place of the tormented. Virgil Æn. vi. v. 540—549. 566—580. 607—624. Spence's Polymetis, p. 259, &c.

TARTARS, or TATARS, in *Geography*, a comprehenfive denomination, including all tribes beyond Perfia and India, as far as the Eaftern ocean, however differing from each other in regard to their origin, language, manners, cuftoms, and religion. It is now known, however, that the Tartars compofe a diftinct nation, which originally belonged to the grand Turkifh ftock. The name, it is faid, may originate either from a Turkifh horde, which bore this denomination; and accordingly it is alleged, that the Yakutes have among their deities, a Tatar, who probably enjoys that honour as the patriarch of the nation; or from the Chinefe, who call all their neighbours, without diftinction, Tata or Ta-dfe, in proof of which derivation it is intimated, that the Perfians and Arabians know nothing of the Tartars under that appellation. It was firft brought into general ufe in Europe after Baaty's incurfion into Hungary, under king Frederic II. Whatever be the origin of the name, it feems to be clear, that the Tartars are of Turkifh origin, and that their proper name was Turk or Turkman, and not Tatar. In this opinion, the learned men of their own nation concur: to which circumftance it may be added, that the Tartarian language is merely the old Turkifh; and the modern Ottoman Turks fpeak the Tartarian tongue only in another dialect. And the Tartars pretend to derive their defcent from

from Turk, the oldeſt ſon of Japhet: and although from the time in which Jenghis Khan ſubdued all Tartary and a great part of Aſia, and made irruptions even into Europe, they have been known by the name of Tartars, to which that of Monguls or Moguls, of whom he was properly the prince, appeared inferior; nevertheleſs the Tartars preſerve among themſelves the name of Turks. See MONGOLES.

The firſt known mother-country of the Turks or Tartars lies ſomewhere in the countries on the eaſtern and northern ſides of the Caſpian, where their deſcendants are ſtill ſituated. In ancient times they were ſpread from the Oxus or Gihon into the Mongoley and the Orenburg territory; that is, in regions where they had conſtantly ambitious and domineering nations for their neighbours and enemies: on the E. the Chineſe; on the S.W. the Perſians, Macedonians, Romans, Partho-Perſians, and Arabians; and towards the N.E. the Mongoles. Here they ſerved from time immemorial as a mound againſt the incurſions of the nations which could penetrate from the E. to the W., or contrariwiſe, till at length the Mongoles, like a ruſhing ſtream that has burſt its banks, ſwept away all oppoſition.

The Tartars, ſays baron de Tott, in his "Memoirs," (vol. i.) have the beſt title to the higheſt antiquity. To this purpoſe he obſerves, that the flat high land of Tartary, which extends to the north, and the chain of the mountains of Caucaſus and Thibet, continued almoſt as far as the peninſula of Corea, (if we may judge by the courſe of the water, which, from the centre of Aſia, ſpreads to the S. and to the N. of that part of the globe,) preſent the higheſt portion of land which ſeparates the Indian ſeas from thoſe of Kamtſchatka. This obſervation, it is alleged, ſeems to prove, that the country at preſent occupied by the Tartars, muſt have been the firſt land diſcovered in Aſia, the firſt inhabited, the firſt ſource of population, and the origin of thoſe emigrations, which, conſtantly repelled by the Chineſe wall, and the defiles of Thibet and Caucaſus, have paſſed from the north of Aſia into Europe. (See HUNS.) However, the annals of the Tartars are involved in conſiderable uncertainty before the time of Jenghis Khan, who was elected grand cham (khan) by the chams of the different tribes, and was only choſen to be the king of kings, becauſe he was the moſt powerful among them. It is well known, that Jenghis Khan conceived and executed projects of uſurpation, by which he formed the moſt extenſive empire known in hiſtory.

The Tartars began to acquire ſome importance in hiſtory, after the time of their ſubjugation by the Mongoles; but from the moment that their hiſtory excites attention, it ceaſes to be the hiſtory of a peculiar nation. Diſtributed under the banners and commanders of the Mongoles, theſe enjoy with poſterity the glory of their conqueſts, while the Tartars are conſtrained to lend their name to the devaſtations with which both nations every where marked the bloody progreſs of their armies. (See MONGOLES.) Subjugated in their conquered countries, and even forced from a great part of their old habitations, ſome few of the Tartar hordes (few in reference to the whole Tartarian tribes,) have preſerved their independence: *i. e.* thoſe who inhabit the ſouth-weſtern part of the former Great Tartary, towards the Perſian, Indian, and Soongarian borders. Here we find the great Kirghiſian horde, the Bukharians, the Khivans or Khivinſes, the Karakalpahs, Truchmenes, Taſchkantians, Turkeſtans, Arabians, and ſome other races, which ſtill form diſtinct ſtates, and retain a kind of national liberty; but they exiſt in ſo feeble a ſtate, that they are obliged to ſeek protection ſometimes from one power, and ſometimes from another. The whole remnant of this nation, once ſo great, ſubſiſts under foreign ſovereignty. Many hordes belong, either as ſubjects or as dependent wards of the Ruſſian empire; others are, in like manner, appanages to the Ottoman Turks, or ſubject to the Great Mogul, to China, and to Perſia.

Mr. Strahlenburg, a Swediſh officer, who reſided ſome years in Siberia, places them in ſix claſſes: the firſt, containing ſeven different nations, all in the dominions of Ruſſia, *viz.* the Mordvines, who dwell in the government of Nizegorod; the Tſcheremiſſes, or Czeremiſſes, in the government of Kazan; the Permians, in the government of Perm; the Votiaks, in the government of Viatka; the Vogouls, who dwell on both ſides of the mountains, which formed a ſeparation between Ruſſia and Siberia; the Oſtiaks, who dwell on the coaſts of the river Oby; and the Barabintzi, who inhabit the country between Tara and Tomſk. The ſecond claſs of people, called Tartars, includes the Budziaks, which dwell on the coaſts of the Black ſea; the Crim Tartars, who inhabit the province of Taurida; the Kuban Tartars, on the borders of the Kuban river; and the Tartars of Dagheſtan; the Nogais, or Tartars of Aſtrachan, of Kazan, and Upha; the Baſchkirs and the Tartars about the towns of Tiumen, Tara, Tobolſk, and Tomſk; the Uſbeck Tartars, the Turcomans, the Kurguis, the Karakalpas, the Sayantzi, who dwell near the head of the Yeniſſey; the Kirghiſes, who occupy the mountains ſouth of lake Baikal; the Burats; the Arintzi, who alſo inhabit near the ſame mountain; and the Yaktai, more to the north, on the ſides of the Lena. The third claſs includes the Samoiedes, on the coaſt of the Frozen ſea, from Archangel to the Lena. The fourth claſs includes the Kalmucks and Monguls, who were formerly but one people. The fifth claſs includes the Mantcheux and the Tunguſes. The ſixth claſs contains the ſavage nations on the north-eaſt coaſt of Aſia, as the Tſchutki, &c. with the inhabitants of Kamtſchatka, and the Kurile iſlands. Of theſe, the firſt, third, and ſixth claſs are ſubject to Ruſſia, except that a ſmall part of the ſecond is independent. The fourth is partly independent, and partly ſubject to China. The fifth claſs is wholly ſubject to China.

Abulgaſi, in his account of the Turkiſh ſtems, mentions among them the Tartarian as one of the moſt ancient and famous, and derives its origin from a khan of the name of Tatar. This ſtem, which in proceſs of time increaſed to 70,000 families, was at firſt governed by its own commander, and afterwards divided into various branches, diſperſed into ſeveral and very diſtant regions, by which diſperſion their power was weakened. The moſt conſiderable branch ſettled on the borders of Kitay (China), and fell under the ſovereignty of that empire, againſt which it frequently rebelled, and thereby gave occaſion to ruinous wars. At the time of Jenghis Khan, ſome Tartars dwelt on the Oxus or Amur, who were tributary to the emperor of Kin, reigning in Kitay.

The Tartars who belong to the Ruſſian empire inhabit the northern coaſts of the Euxine and the Caſpian, the north ſide of the mountains of Caucaſus, the extenſive ſteppes from the river Ural to the Soongarey, the ſouthern Ural, in Siberia the ſouthern frontier mountains and ſteppes from the Tobol quite over the Yeniſſey, and the deſerts in the middle region of the Lena; and ſome few Tartar colonies are diſperſed among the Ruſſian habitations, particularly in the governments of Upha, Kazan, and Tobolſk. Frequent memorials are found in various regions of their ancient grandeur, magnificence, and culture, ſome of which are demonſtrably of 1000 years' antiquity. The branches of this nation which belong to Ruſſia are the proper Tartars, or the defcendants of thofe two great ftates, which the fucceffors of Jenghis erected on the Volga and in Siberia (fee KAPTSCHAK, and the fequel of the article); the Nogayans, the Mefchtfcheryaks, the Bafchkirs, the Kirghifes, the Bucharians, the Yakutes, the Teleutes, and in part the tribes of Caucafus. The Kaptfchak Tartars are reduced to a fmall refidue, intermixed among the Bafchkirs and Kirghifes. The Kazan Tartars are alfo a feeble remnant of what they formerly were, and are difperfed in the governments of Kazan, Simbirfk, Riefen, Viatka, Perm, and Upha. The Aftrachan Tartars are for the moft part Nogayans: they are diftinguifhed into town, village, and tent Tartars. The firft dwell in Aftrachan, the fecond in fix villages near Aftrachan, and the third wander about the Cafpian. In 1772, thofe of the two former claffes were only 1200, and of the tent Tartars fcarcely 2000 kettles, or families. For the ftate of the Krim Tartars, fee CRIMEA. The ftems of the Siberian Tartars, who are numerous, are the Turalinzes, one of the firft colonies that became permanent in Siberia, when the Tartars fubjugated the country in the 13th century; the Tobolfkian Tartars, who dwell on the river Tobol; the Tomfkian Tartars, who inhabit both fides of the river Tom, above and below the city of Tomfk; the Krafnoyarfkian and Kufnetzkian Tartars; the Tartars of the Oby; the Tfchulymfkian Tartars, inhabiting the territory along the river Tfchulym; the Barabinzes, between the Oby and Irtifh; the Katfchinzes, on the left fhore of the Yeniffey; the Kiftim and Tulibert Tartars, on the left bank of the Tom; the Biriuffes; the Abintzes; the Sayane Tartars; the Beltirs, the Verchotomfkian Tartars, and fome other infignificant ftems. For the other branches of the Tartars who inhabit Ruffia, we refer to the feveral articles, NOGAYANS, &c. &c.

The Tartars who are Mahometans bordering on Ruffia, but independent of that crown, take every opportunity of robbing their neighbours: the Kalmucks and Monguls are very different in their behaviour, living quietly on the produce of their foil, without doing injury to others. The Tartars of Afiatic Ruffia are likewife reprefented as a quiet, inoffenfive people, living chiefly by the chafe and fifhing. See the following articles. See alfo MANDSHURS, MONGOLES, TUNGUSES, &c.

TARTARY, or TATARY, a vague name, as it relates to Afiatic Ruffia, which cannot be ufed with precifion as defcriptive of any particular country: inftead of it might therefore be fubftituted names derived from the feats of the chief nations, as Tungufia or Mandfhuria in the eaft, Mongolia in the centre, and Tataria in the weft. In a general fenfe, however, whilft the name remains, it may include three diftinct countries, *viz.* Chinefe Tartary, Independent Tartary, and Ruffian Tartary.

TARTARY, *Chinefe*, according to the abbé Grofier's defcription, is bounded on the north by Siberia, on the eaft by the gulf of Kamtfchatka and the Eaftern fea, on the fouth by China, and on the weft by the country of the Kalmucks, who are eftablifhed between the Cafpian fea and Kafhgar. The different tribes which at prefent inhabit it, were formerly comprehended under the general name of Mongul or Mogul Tartars, a warlike and formidable nation, who, on the one hand, conquered Hindooftan, under the famous Jenghis Khan, and on the other, fubdued China. It was in the 13th century that the Monguls took poffeffion of the latter empire; but after having reigned there for 100 years, they were expelled by the Chinefe, in the year 1368. The fugitives took different routes; fome went towards the Eaftern fea, and eftablifhed themfelves between China and the river Saghalien; the reft returned weftward to their former country, where, intermixing with the Monguls that remained, they foon refumed their ancient manner of living; thofe who fettled towards the eaft, having found the country almoft a defert, and without inhabitants, retained the fame cuftoms which they had brought from China: hence thefe two Mongul nations differ at prefent in language, government, religion, and cuftoms. Thofe of the eaft retain their ancient name of Mongul, or Mogul Tartars; the reft are known by the name of Mantchew, or Eaftern Tartars. Chinefe Tartary is therefore divided into two parts, the Eaftern and Weftern. Eaftern Chinefe Tartary extends, north and fouth, from the 41ft to the 55th degree of north latitude; and eaft and weft, from about the 120th degree of longitude, as far as the Eaftern fea. It is bounded on the north by Siberia, on the fouth by the gulf of Leao-tong and Corea, on the eaft by the Eaftern fea, and on the weft by the country of the Monguls. The Tartars who retired hither, after their expulfion from China, in the year 1368, immediately began to build cities, towns, and villages, and to cultivate the earth, after the manner of the Chinefe, among whom they had lived: hence the greater part of them have remained fixed, and are much more civilized than the reft of the Mongul nation. They were at firft governed by particular khans, each independent of the other; but fince that of Ningouta (who was the moft powerful among them) took poffeffion of China, about the middle of the 17th century; the emperor, who is ftill one of his defcendants, has reduced under his dominion all the other khans of this part of Tartary: this prince governs it immediately by himfelf, and fends thither governors and officers, as into all the other provinces of the empire. The country of the Mantchew Tartars is divided into three grand departments: *Chen-yang*, *Kirin*, and *Tcitcicar;* which fee refpectively.

Ningouta, already mentioned, which is confidered as the cradle of the prefent imperial family, is furrounded by a wooden wall, confifting of ftakes, touching each other and twenty feet high, and alfo another palifado without this, a league in circumference, and having four gates, correfponding to the four cardinal points. The Mantchew Tartar, who refides in it as lieutenant-general, extends his jurifdiction over the adjacent country, and all the villages of Yupi-tafe, and fome other petty nations that inhabit the banks of the rivers Oufouri and Saghalien, and along the fea-coaft. The Tartars of Yupi-tafe are peaceful in their difpofition, but ftupid and clownifh, without letters, and without any religious worfhip. They fow neither wheat nor rice, nor any thing elfe except tobacco, which they cultivate in fome of the fields furrounding their villages. They are fupplied with fifh from the river Oufouri, and this is their only food: nor have they any clothes befides thofe which they make of their fkins, dreffed, dyed of three or four colours, and artfully fewn together with a thread cut from an exceedingly fine fkin. The women fufpend from the bottoms of their long cloaks pieces of money and little bells; and the treffes of their hair, which hang over their fhoulders, are loaded with fmall mirrors, rings, and other toys. Of one part of their fifh, which they employ the fummer in taking with harpoons and fmall nets, they make oil for their lamps; another fupplies them with food; and a third part is referved for winter, when the ice prevents them from fifhing. Beyond the Yupi-tafe Tartars are the Ketcheng-tafe Tartars, who inhabit both banks of the river *Saghalien-oula* (which fee), and extend as far as the Eaftern fea. Thefe Tartars are lefs clownifh than the preceding, and employ much of their time in hunting fables.

The Mantchews, difperfed throughout Eaftern Chinefe Tartary, have neither temples nor idols; they adore (as they exprefs it) only the "emperor of heaven," to whom they offer

offer facrifices : but fince they have entered China, fome of them worfhip the god " Fo," and other idols reverenced in the empire. When they became mafters of China, they pretended to a celeftial extraction, and placed a god at the head of their race. Since the Tartars have had poffeffion of the throne of China (fee CHINA), their language has become familiar at the court of Pe-king. This language they are very careful in preferving, and it is faid that it may be much more eafily acquired than that of China. Although the Tartars have only one kind of characters, they write them in four different ways, which they write with a pencil, or a kind of pen, formed of the bamboo reed, and which they can read with equal eafe when reverfed.

TARTARY, *Weftern Chinefe*, is called alfo the country of the Mongoles, or Moguls ; for an account of which, fee the article MONGOLES. See alfo KALKAS, KALMUCKS, and KOKONOR. We fhall here add that the country of the Ortous, who inhabit N. of the great wall, and W. of the Moguls properly fo called, is 110 leagues in extent from E. to W., and 70 from N. to S. Thefe people are divided into fix ftandards, which comprehend 166 companies, each compofed of 150 heads of families. The Ortous are of a free difpofition, very lively, and never fubject to melancholy, and may be juftly called the " French of Tartary."

Wild animals of various kinds are innumerable in the plains and forefts of Tartary. The country abounds with game, and all the animals that are hunted in Europe, with large flocks of yellow goats, wild mules, wild camels, and horfes ; an animal refembling the elk, a fpecies of lynx, whofe fkin is highly valued, tygers of prodigious fize and agility, whofe fkins are ufed for ornament ; a fpecies of leopard, and ftags. Some of their rivers wafh down gold mixed with their fands ; and they are acquainted with the method of applying it to ufe, and of forming it into vafes and fmall ftatues, of which they often make offerings to their idols. It appears that the ufe of gold is very ancient among them.

The vulgar name of Tartary, or Tatary, fays Mr. Pinkerton, was originally extended over the vaft regions lying between Thibet, China, and the Arctic ocean ; and from the Black fea in the weft to the utmoft bounds of north-eaftern difcovery in Afia. But as geographical knowledge has improved, the northern part has acquired the name of Siberia, while the fouthern is diftinguifhed by the appellation of Weftern and Eaftern Tartary. But in this part, which might more properly be named Central Afia, the Tartars, properly fo denominated, are few, the moft numerous tribes being Monguls in the weft and Mandfhurs in the eaft. See MONGOLES and MANDSHURS.

The wide and interefting portion of Afia, formerly known by the appellation of Eaftern and Weftern Tartary, but now properly ftyled Central Afia, and comprehending the Middle Mongolia and the Eaftern Mandfhuria, which has repeatedly fent forth its fwarms to deluge the arts and civilization of Europe, fays the geographer above cited, extends from E. long. 72° to 145°, a fpace of not lefs than 73° of longitude, which, at the medial latitude of 45°, will yield about 3100 geographical miles. The breadth from the northern frontier of Thibet to the Ruffian confines, is about 18°, or 1080 geographical miles. The limit between Ruffia and Chinefe Tartary is partly an ideal line, and partly the river Argoon, which joined with the Onon, conftitute the great river Amur. From the treaty publifhed by Du Halde it appears, that the river Kerbatchi, the neareft to the river Chorna or Ourouon, and which difcharges itfelf into the great river Saghalien-oula, was the Chinefe definition of the boundary between the two empires, to which was added the long chain of mountains above the fource of the river Kerbatchi and the river Argoon. The eaftern boundary is the fea, while the fouthern extends along the great Chinefe wall, and the northern limits of Thibet. The weftern boundary is fupplied by the celebrated mountains of Belur-Tag, or the Cloudy Mountains, which divide the Chinefe empire from Balk, and the greater Bucharia ; while the range on the W. of the lake Palkati feparates the Kalmucks, fubject to China, from the Kirgufes of Independent Tartary.

The original population of Central Afia appears to have been indigenous. The weft was partly held by the ancient Scythæ, feemingly a Gothic race, who were fubdued or expelled by the Tatars, or Huns, from the eaft, preffed on the other fide by the Monguls, beyond whom were the Mantchews, who, in the 17th century, conquered China. Pinkerton's Geography, vol. ii. See MONGOLES and MANDSHURS.

TARTARY, *Independent*, an extenfive, celebrated, and interefting region, confidered as diftinct from Mongolia and Mandfhuria, or as thefe countries have been lefs properly called, Chinefe Tartary, and independent of the great neighbouring powers, China, Ruffia, and Perfia : this country was probably the feat of the moft ancient Perfian kingdom, the poffeffion of the Greek monarchs of Bactriana, and after many revolutions, diftinguifhed by the wide empire of Jenghis or Zingis, and Timur. Its extent may be meafured from the Cafpian fea to the mountains of Belur, a fpace of about 870 Britifh miles. From the mountains of Gaur in the S., to the Ruffian boundaries in the N. of the defert of Iffim, it may be near 1500 Britifh miles, of which a great part is defert. The chief divifions are the wide fteppes, or barren plains in the N., held by three hordes of Kirgufes or Kirghifes, the Great, Middle, and Leffer, befides fome fmall Tataric tribes near the fea of Aral. This portion was anciently called Turkeftan, and its capital was Taraz. (See both thefe articles.) Southwards of the mountains of Argun, the land begins to become fertile along the river Sirr or Jaxartes, called alfo the river of Shufh from the chief territory, and alfo on the banks of its tributary ftreams. Ilak and Shufh, the moft northern provinces on the Sihon, are followed by Fergana, and a diftrict called Ozrufhna, round a town of the fame name. Divided from thefe provinces by deferts and mountains is the kingdom of Kharifm, or Kharafm, which fee. South of the range of the Ak Tam is the fertile region of Sogd, or Sogdiana, with its capital Samarcand. On the S., the provinces of Balk, Kilan, Tokareftan, and Gaur, terminate the bounds of Independent Tartary, here feparated by defarts on the W. from the Perfian province of Chorafan or Khoraffan. See thefe articles refpectively. See alfo BELUR-TAG, BUCHARIA, IMAUS, KIRGHISES, MASSAGETÆ, SCYTHIA, and UZBECKS.

TARTARY, *Crim*. See CRIMEA.

TARTARY, *Ruffian*. See RUSSIA and TARTARS.

TARTARY, *Little*, a name that has been given by fome writers to the country containing the peninfula of the Crimea, the Kuban, a part of Circaffia, and all the lands which feparate the empire of Ruffia from the Black fea. This circuit, continued from Moldavia almoft to Taganrog, between the 44th and 46th degrees of latitude, is from 30 to 40 leagues wide, and nearly 200 long. From E. to W. it includes Yetitchehoolai, Dgamboylafk, Yedefan, and Beffarabia. The latter province, at prefent called Boodjak, is inhabited by Tartars, who, as well as thofe of the peninfula, have fixed habitations in their villages ; but the inhabitants of the three other provinces have only felt-tents, which they carry wherever they pleafe. Thofe people, called Noguais, and fuppofed to be Nomades, are fettled, however, in the vallies that traverfe their plains from N. to S.,

 and

and their tents, ranged in a ſingle line, form thus a kind of villages of 30 and 35 leagues in length, which diſtinguiſh the different hordes. Tott's Memoirs, vol. i. See CRIMEA and RUSSIA.

TARTAS, a town of France, in the department of the Landes, and chief place of a canton, in the diſtrict of Saint-Séver, divided into two parts, the firſt containing 1556, and its canton 6154 inhabitants, and 8 communes; and the ſecond part containing 1656, and its canton 7952 inhabitants, and 12 communes: its whole territorial extent being 540 kiliometres; 15 miles W.S.W. of Mont-de-Marſan. N. lat. 43° 50′. W. long. 0° 44′.—Alſo, a river of Ruſſia, which runs into the Om, near Tartaſkoi.

TARTASKOI, a town of Ruſſia, in the government of Tobolſk, at the union of the Om and the Tartas; 40 miles W.S.W. of Kainſk.

TARTESSUS, in *Ancient Geography*, a town of Spain, in the part called Bœtica, ſituated between the two arms by which the river Bœtis diſcharged itſelf into the ſea. One of theſe arms has diſappeared, and the other ſtill ſubſiſts and paſſes into the ſea at San Lucan de Barrameda. Some geographers have ſuggeſted that Gades was the ancient Tarteſſus. Strabo intimates that anciently the river Bœtis was called Tarteſſus, and that the town of this name was afterwards called Cartheia. M. d'Anville gives the name of Tarteſſus to the iſland formed by the two branches of the Bœtis at its mouth.—Alſo, a mountain of Spain, in Bœtica.

TARTESSUS, *Iſle of*, was ſituated near Gades, and is ſuppoſed to have been the Tarſhiſh of the Phœnicians, to whom it was known about 1000 years B. C.

TARTI LAPIS, a ſtone mentioned by Ludovicus Dulcis, and ſome other authors, and ſaid to be very beautiful, having all the colours of the tail of a peacock, and to have many medicinal virtues. It was probably ſome ſpecies of agate; but the ſhort account given of it will not enable us to gueſs what particular kind.

TARTINI, GIUSEPPE, of Padua, in *Biography*, the greateſt performer on the violin and compoſer for that inſtrument of the laſt century. We ſhall here only conſider him as a practical muſician, though he has diſtinguiſhed himſelf as a theoriſt in a way ſuperior to all other contemporary profeſſors. See SYSTEM, and STILLINGFLEET.

This admirable muſician and worthy man was born at Pirano, in Iſtria, in 1692. His father, having been a great benefactor to the cathedral church at Parenzo, had been ennobled in reward for his piety. Giuſeppe was intended for the law, but mixing muſic with his other ſtudies during the courſe of his education, it ſoon grew too powerful for the reſt, and tyrannized over the whole circle of ſiſter ſciences. This is not ſo ſurpriſing as another ſtrong propenſity, which during his youth occupied his attention very much, which was *fencing*, an art that was not likely to become neceſſary to the ſafety or honour of a man of ſo pious and pacific a diſpoſition, in a civil employment; and yet he is ſaid to have equalled in this art even the maſter from whom he received inſtructions. In 1710 he was ſent to the univerſity of Padua to purſue his ſtudies as a civilian; but before he was twenty, having married without the conſent of his parents, they wholly abandoned him, and obliged him to wander about in ſearch of an aſylum; which, after many hardſhips, he found in a convent at Aſſiſi, where he was received by a monk his relation, who, commiſerating his misfortunes, let him remain there till ſomething better could be done for him. Here he practiſed the violin, to keep off melancholy reflections; but being diſcovered on a great feſtival in the orcheſtra of the church of the convent by the accident of a remarkable high wind, which forcing open the doors of the church, blew aſide the curtain of the orcheſtra, and expoſed all the performers to the ſight of the congregation; when, being recognized by a Paduan acquaintance, differences were accommodated, and he ſettled with his wife at Venice for ſome time. This lady, indeed, was of the Xantippe kind, and being himſelf very Socratic in wiſdom, virtue, and patience, her reign was unmoleſted by any domeſtic war, or oppoſition to her ſupremacy.

While he was at Venice, the celebrated Veracini arrived in that city, whoſe performance awakened an extraordinary emulation in Tartini, who, though he had been thought to have a powerful hand, had never heard a great player before, or conceived it poſſible for the bow to have ſuch varied powers of energy and expreſſion. He, therefore, quitted Venice the next day, and went to Ancona, in order to ſtudy the uſe of the bow in more tranquillity, and with more convenience than at Venice, as he had a place aſſigned him in the opera orcheſtra of that city.

This happened in the year 1714, the year in which he diſcovered the phenomenon of the third ſound. It was at Ancona, and in the carnival of the ſame year, that he heard and perceived the extraordinary effects of a piece of ſimple recitative, which he mentions in his "Trattato di Muſica." (See RECITATIVE.) It was likewiſe during his reſidence at Ancona, that, by diligent ſtudy and practice, he acquired ſufficient abilities and reputation to be invited, in 1721, to the place of firſt violin, and maſter of the band in the celebrated church of St. Anthony of Padua.

By this time his fame was ſo extended, that he had repeated invitations from Paris and London to viſit thoſe capitals; but by a ſingular devotion and attachment to his patron ſaint, to whom he conſecrated himſelf and his inſtrument, he declined entering into any other ſervice.

Before the year 1728, he had made many excellent ſcholars, and formed a ſchool, or method of practice, for the ſtudents on the violin, that was celebrated all over Europe, and which increaſed in fame to the end of his life.

The author of the compendium of his life informs us that his firſt book of ſolos was engraved at Amſterdam, 1734; the ſecond at Rome, 1745; and that he produced above two hundred of theſe compoſitions, which were handed about in manuſcript by the curious; but does not ſeem to know that nine or ten books of Tartini's ſolos were printed at Paris, of which we are in poſſeſſion of opera third, ſixth, ſeventh, and ninth, beſides the two books printed in England, amounting to upwards of fifty ſolos, excluſive of manuſcripts.

Of his concertos, which likewiſe amount to two hundred, this author gives a very unſatisfactory account; he ſays, that a ſurreptitious copy of two ſets having firſt appeared in Holland, he would never own them. The firſt ſix ſeem to have been compoſed in his firſt manner before he changed his ſtyle. But Walther tells us, in 1732, that eighteen of his concertos for five inſtruments, principal violin, two ripieno violins, tenor, and violoncello, were publiſhed at Amſterdam. But Le Cene, the publiſher, confeſſed, that he collected them from different people who had obtained copies from the author, and there ſeems not the leaſt doubt of their being genuine.

Though Tartini's compoſitions always afforded us great pleaſure, and were never obliterated from our memory; yet as they are now as much laid aſide as thoſe of Baſſani or Locatelli, we thought it right to give them a reviſion before we ventured our ſentiments concerning their merit.

Tartini, on a recent examination of his works, ſeems, to our conception and feelings, to have had a larger portion of genius and knowledge of compoſition as a mere inſtrumental compoſer,

composer, than any other author who flourished during the first fifty or sixty years of the last century. Though he made Corelli his model in the purity of his harmony, and simplicity of his modulation, he greatly surpassed that composer in the fertility and originality of his invention; not only in the subjects of his melodies, but in the truly cantabile manner of treating them. Many of his adagios want nothing but words to be excellent pathetic opera songs. His allegros are sometimes difficult; but the passages fairly belong to the instrument for which they were composed, and were suggested by his consummate knowledge of the finger-board, and powers of the bow. He certainly repeats his passages, and adheres to his original *motivo*, or theme, too much, for the favourite desultory style of the present times; but it must be allowed that by his delicate selection and arrangement of notes, his passages are always good; play them quick, or play them slow, they never seem unmeaning or fortuitous.

Indeed, as a harmonist, he was perhaps more truly scientific than any other composer of his time, in the clearness, character, and precision of his bases; which were never casual, or the effect of habit or auricular prejudice and expectation, but learned, judicious, and certain. Yet, with all our partiality for his style, talents, and abilities, as well as veneration for his principles and character, we must, in justice to others, own, that though the adagio and solo playing in general of his scholars were exquisitely polished and expressive, yet it seems as if that energy, fire, and freedom of bow, which modern symphonists and orchestra-playing require, were wanting. Perhaps the refinement of a Nardini and force of a Viotti are incompatible.

Since the time of Tartini, the productions of Boccherini, Haydn, Vanhal, Mozart, Pleyel, and others, have occasioned such a revolution in violin-music and playing, by the fertility and boldness of their invention, that compositions which were then generally thought full of spirit and fire, appear now totally tame and insipid.

This admirable musician and worthy man died the 26th of February, 1770, to the great regret of the inhabitants of the city of Padua, where he had resided nearly fifty years, and where he was not only regarded as its chief and most attractive ornament, but philosopher, saint, and sage. He had no children.

M. de Lalande says, he had from his own mouth the following singular anecdote, which shews to what degree his imagination was inflamed by the genius of composition. "He dreamed one night, in 1713, that he had made a compact with the devil, who promised to be at his service on all occasions; and during this vision every thing succeeded according to his mind; his wishes were prevented, and his desires always surpassed by the assistance of his new servant. In short, he imagined he gave the devil his violin, in order to discover what kind of a musician he was; when, to his great astonishment, he heard him play a solo so singularly beautiful, and executed with such superior taste and precision, that it surpassed all he had ever heard or conceived in his life. So great was his surprise, and so exquisite his delight upon this occasion, that it deprived him of the power of breathing. He awoke with the violence of this sensation, and instantly seized his fiddle, in hopes of expressing what he had just heard, but in vain; he, however, then composed a piece, which is perhaps the best of all his works, (he called it the Devil's Sonata,) but it was so inferior to what his sleep had produced, that he declared he should have broken his instrument and abandoned music for ever, if he could have subsisted by any other means."

He was one of the few composers of his time, who constantly drew from his own source; his melody was full of fire and fancy, and his harmony, though learned, yet simple and pure; and as a performer, his slow movements evince his taste and expression, and his lively ones his great hand. He was the first who knew and taught the power of the bow; and his knowledge of the finger-board is proved by a thousand beautiful passages, to which that alone could give birth. His scholar, Nardini, who played to us many of his best solos, as we thought, very well, with respect to correctness and expression, assured us that his dear and honoured master, as he constantly called him, was as much superior to himself in the performance of the same solos, both in the pathetic and brilliant parts, as he was to any one of his scholars.

Of his theoretical writings, we have had occasion to speak frequently and freely in former articles, particularly in our analysis of his SYSTEM, and Stillingfleet's Commentary. See STILLINGFLEET.

His practical works or compositions, always for his own instrument, the violin, consist of twelve solos on Corelli's model, six with double stops and fugues, with six of a lighter kind, in single stops, op. 1ª, six solos, op. 2ª, published by Walsh, about the year 1746, in a more free and original style. The first of this set, in E♯, which was Brown's "Cheval de Battaille," appeared more than ten years at every concert at which he performed a solo in London. Two sets of concertos, in a very florid and difficult style, collected in MS. by travellers, and published in Holland by Le Cene and Witvogel without the author's permission, he called in, and cancelled the plates. However, we procured a copy from Holland, that was printed after the plates were scratched. We scored several of them, and found more beautiful passages, more difficulties and knowledge of the finger-board, than in any other violin solo concertos which we had ever seen. Many sets of beautiful solos were printed at Paris of his composition, which are wholly unknown in England. More than 200 of his violin concertos and solos were dispersed over the continent in MS.; many of his unedited solos we procured from his favourite disciple Nardini, at Florence, after his decease. If the concertos which he composed for his own performance in the church of St. Antonio de Padua could be procured, they would probably be in a grave and ecclesiastical style, peculiarly suitable to the place and piety of the author.

TARTON RAIRE, in *Botany*, a name used by some authors for the heath-spurge, or that species of the thymelæa which is called *sannamunda* in the catalogues of the Materia Medica.

TARTOOR, in *Geography*, a town of Hindoostan, in the circar of Cicacole; 9 miles S. of Visianagram.

TARTRATES, or TARTRITES, in *Chemistry*, salts formed by the combination of any base with the tartareous acid. These salts are numerous; as with some the acid forms two salts, differing in the proportions of the acid and base, and also as it is liable to form triple salts in which two bases are united with their respective portion of acid into one uniform compound. All the soluble alkaline and earthy tartrites, the latter being less soluble than the former, are decomposed by the salts of lead, and the acid of all is destroyed by calcination, leaving the base in the state of carbonate.

TARTRATE, *Super*, *of Potash*, is a combination of potash and tartareous acid in excess (whence its name), and to which it is owing that it has an acid taste, and that it reddens blue vegetable colours. This is the *cream of tartar*, or *tartarum acidulum*, the nature and manufacture of which have been described under the article TARTAR. (See also *Super-tartrate of potash* under SALTS.) This salt is not soluble without great difficulty, requiring about 30 parts of boiling water,

water, and at leaſt 120, or as others ſay 60 parts of cold water; and hence a hot ſaturated ſolution begins to depoſit cryſtals almoſt immediately after it begins to cool. So great is the affinity between the tartareous acid and that proportion of potaſh which conſtitutes the ſuper-tartrate, that the acid of tartar will, partially or wholly, decompoſe all the neutral ſalts of potaſh, even the ſulphate. Nevertheleſs, the affinity between the ſuper-tartrate and the additional quantity of potaſh neceſſary for the complete ſaturation of this acid is much weaker than that of moſt other acids for potaſh; and hence ariſes a great number of decompoſitions, when tartareous acid, potaſh, and any other acid are mixed in different ways. The property, which the tartareous acid poſſeſſes, of decompoſing the neutral ſalts with the baſis of potaſh, is very uſeful in analyſis, as it ſerves to diſtinguiſh them at once from the correſponding ſalts of ſoda and ammonia, which are not decompoſable in the ſame manner. By ſaturating the exceſs of acid in cream of tartar with the ſeveral baſes (potaſh excepted) various triple ſalts are produced. Although ſome inconvenience attends the uſe of borax in adding the ſolution of *Cream of* TARTAR in water (ſee that article); yet ſimple boracic acid has the power of rendering ſoluble four times its weight of cream of tartar in only five or ſix parts of hot water, and, as it is ſuggeſted, without decompoſing the tartar, ſince the affinity of the boracic acid for the ſeveral baſes is remarkably weak.

If a ſolution of cream of tartar in water is expoſed to the air for a length of time, it gradually becomes turbid, a number of mucous flocculi are depoſited, and in the courſe of ſome months it ceaſes to be acidulous, after which it becomes ſenſibly alkaline to the taſte and to chemical teſts, and it is finally converted into a weak ſolution of carbonate of potaſh, the tartareous acid totally diſappearing, and carbonic acid taking its place. Fire operates a more rapid deſtruction of the tartareous acid, for if cream of tartar is calcined in an open fire with a red heat, it firſt ſoftens, blackens, becomes of a paſty conſiſtence, the acid burns off with flame and ſmoke, and finally a white carbonate of potaſh is left. The alkali procured in this way is very pure, and is often obtained for the laboratory by moiſtening crude tartar or cream of tartar to the conſiſtence of ſtiff paſte, wrapping up ſmall parcels of it in brown paper, and arranging them in a grate or furnace of any kind with charcoal, and kindling it. After the charcoal has burnt out, the tartar is converted into lumps of carbonate of potaſh, which ſtill cohere, and may be readily picked out of the aſhes of the charcoal. A very pure carbonate of potaſh may alſo be made by deflagrating in a red-hot crucible equal parts of nitre and cream of tartar.

This ſalt is compoſed, according to Thenard, of 57 *per cent.* of tartareous acid, and 33 of potaſh, the remaining 10 parts being chiefly water of cryſtallization. Of theſe 57 parts of acid, 20 are in exceſs, ſo that the compoſition of the ſalt may be ſtated, in a different manner, to be 70 *per cent.* of tartrite of potaſh, and 20 of tartareous acid.

Cream of tartar is decompoſed by lime and barytes, and probably by ſtrontian, and cauſtic potaſh is left in the ſolution.

TARTRITE *of Potaſh.* See *Soluble* TARTAR, and *Tartrate of Potaſh* under SALTS. This ſalt, conſiſting of tartareous acid and potaſh in mutual ſaturation, is moſt conveniently prepared by adding cream of tartar to a hot ſolution of carbonate of potaſh. During the efferveſcence, the addition of cream of tartar ſhould be continued; when this ceaſes, the ſolution ſhould be boiled down till a pellicle appears on the ſurface, and then left to cryſtallize by cooling. The tartrite of potaſh then ſeparates, generally in the form of parallelopipeds, with dihedral ſummits. When the ſalt is prepared in a large way for medicinal purpoſes, the evaporation is continued nearly to dryneſs, with frequent ſtirring, by which the ſalt is obtained in a ſhapeleſs granular maſs. This ſalt is partially decompoſed by the ſtronger acids. Tartareous acid dropped into a moderately ſtrong ſolution of tartrite of potaſh cauſes an immediate depoſit of cream of tartar. For other particulars, ſee the articles above cited.

TARTRITE *of Potaſh and Soda*, a triple cryſtallizable ſalt, prepared by throwing into boiling water about a fifth of its weight of cream of tartar, and adding gradually a quantity of carbonate of ſoda, whilſt any efferveſcence is excited; then evaporating the whole to the conſiſtence of ſyrup. As it cools, the triple ſalt will be obtained in large beautiful tranſparent cryſtals, generally of the form of eight-ſided priſms, and often divided longitudinally through the axis. This ſalt, which is perfectly neutral, diſſolves in about five parts of water, and ſomewhat effloreſces by being expoſed to the air. Barytes and lime totally decompoſe it, and the ſupernatant liquor contains a mixture of potaſh and ſoda. According to Vauquelin, it is compoſed of about 54 *per cent.* of tartrite of potaſh and 46 of tartrite of ſoda. It is decompoſed by the ſtronger acids, and yields cream of tartar. See RUPELLENSIS *Sal*, and SODA.

TARTRITE *of Potaſh and Ammonia*, a triple ſalt prepared, in the ſame general manner as the preceding, by ſaturating cream of tartar with carbonate of ammonia, evaporating and cooling. Expoſed to the air it effloreſces, loſes its ammonia, and returns to the ſtate of ſimple cream of tartar.

TARTRITE *of Potaſh and Lime*, *Barytes*, &c. Between tartrite of potaſh and lime there exiſts a certain affinity, which tends to the formation of a triple ſalt, though lime will completely decompoſe any alkaline tartrite. Thus though ſimple tartrite of lime is inſoluble in cold water, no precipitate is produced by the affuſion of a ſmall quantity of lime-water into a cold ſolution of tartrite of potaſh, which muſt therefore be owing to the tartrite of lime, then formed, being rendered ſoluble by the remaining tartrite or rather ſubtartrite of potaſh. Even when cream of tartar is as completely as poſſible decompoſed by lime in ſubſtance, in the proceſs of obtaining the acid, the cauſtic alkaline liquor, ſupernatant over the precipitated tartrite of lime, ſtill holds a ſmall quantity of the latter in ſolution, as has been remarked by Vauquelin, which may be conſidered as a triple ſalt of tartareous acid, lime, and potaſh, the latter being in very large exceſs.

The ſame applies to barytes and ſtrontian, the ſolutions of which do not immediately give a precipitate with tartrite of potaſh; and even if tartrite of barytes or of ſtrontian recently formed and ſtill wet be put into a ſolution of tartrite of potaſh, it is ſoon diſſolved; though the mere quantity of liquid preſent would be entirely unable to effect a ſolution. There is therefore ſuch a ſtrong affinity between tartrite of potaſh and theſe earthy tartrites, as may perhaps entitle us to conſider theſe compound ſolutions as triple ſalts, though they have not been obtained in a cryſtallized form like the triple tartrite of potaſh and ſoda.

Alumine unites with ſtill greater eaſe with tartrite of potaſh: for when this earth, recently precipitated from alum by a cauſtic or carbonated alkali, and ſtill wet, is transferred to a ſolution of tartrite of potaſh, it readily diſſolves therein, and forms an uncryſtallizable compound, which is not rendered turbid by any addition of potaſh or its carbonate. The Rochelle ſalt has the ſame habitude with alumine as the ſimple tartrite of potaſh, which therefore forms a quadruple compound of tartareous acid, potaſh, ſoda and alumine. See ALUMINE.

Tartrite *of Soda*, a ſalt produced in ſmall needled cryſtals from a due evaporation of tartareous acid ſaturated with ſoda. This ſalt, formerly confounded with the Rochelle ſalt, or *ſal Rupellenſis*, is not very ſoluble in water; however, when tartrite of potaſh is added to this ſalt, each in ſaturated ſolution, large cryſtals of the triple tartrite, or Rochelle ſalt, are immediately depoſited.

A *ſuper-tartrite of ſoda* is formed by partially ſaturating tartareous acid with ſoda, and alſo by adding a ſtrong acid to the ſaturated tartrite, which, being leſs ſoluble than the ſaturated compound, precipitates. It is obſerved, however, that tartareous acid will not form (viſibly) an acidulous tartrite, when added to the ſulphate and other ſalts of ſoda, as it will do with the ſalts of potaſh.

Tartrite *of Ammonia*, a ſalt formed by ſaturating the tartareous acid with ammonia or its carbonate. This ſalt cryſtallizes readily, and is decompoſed by the fixed alkalies and alkaline earths.

A *ſuper-tartrite of ammonia* is formed in a ſimilar manner to the ſuper-tartrite of ſoda, and with the ſame exception of the acid not viſibly decompoſing the other ammoniacal ſalts. See Ammonia, and *Tartrate of Ammonia* under Salts.

Tartrites, *Earthy*. See *Earthy* Salts. See alſo *Tartrate of Lime* under Lime.

The *tartrite of lime* is produced in a white precipitate, by adding tartareous acid to any ſoluble ſalt of lime, or lime to a ſoluble tartareous ſalt. Although this ſalt is inſoluble in mere water in a common temperature, it diſſolves readily in an exceſs of its own, or of any other acid that does not decompoſe it, ſuch as the acetous or muriatic. It is alſo rendered ſoluble in water by the addition of potaſh. When it is heated ſtrongly in an open fire the whole acid is conſumed, and carbonate of lime remains.

Tartrites *of Barytes and Strontiam*, are formed in the ſame manner as tartrite of lime; but they are not ſo inſoluble in water as this ſalt; and the tartrite of ſtrontian will even cryſtallize from its hot-ſaturated ſolution by cooling. With *magneſia* and *alumine* this acid forms very ſoluble compounds, which do not cryſtallize by evaporation, but dry up into a gummy maſs. Aikin's Dict.

TARTSCHIN, in *Geography*, a town of the duchy of Warſaw; 20 miles S.W. of Warſaw.

TARTURA, a town of Paleſtine, near the coaſt; 10 miles S. of Acre.

TARVA, a diſtrict of Arabia, on the banks of the Julfa.

TARUD, a town of Arabia, in the province of Hedſjas; 10 miles from El Catif.

Tarud *Eſherif*, a town of Egypt, on the left bank of the Nile; 6 miles S. of Melaui.

TARUDA, in *Ancient Geography*, a town of Africa, in Mauritania Cæſarienſis, near Ægea. Ptol.

TARUDANT, or Tarodant, in *Geography*, a town of Africa, and capital of the province, formerly kingdom, of Suſe, ſituated at the extremity of Morocco. The town is ancient and extenſive, and is ſaid to contain 25,000 inhabitants. It has a noble palace, to which belong gardens abounding with the moſt delicious fruits. Its population has lately decreaſed; and it is now famous only for ſaltpetre of a ſuperior quality, for the manufacture of leather and ſaddles, and for dyeing. The town is watered by the river Suſe, which paſſes through it; and it is reported that ſhips formerly took in their cargoes at this place. It has ſuſtained ſeveral ſieges, and in the laſt, the inhabitants were reduced to the neceſſity of eating rats and burning their doors for fuel; 110 miles S.S.W. of Morocco. N. lat. 30° 29′. W. long. 8° 35′.

TARVES, a village in the diſtrict of Ellon, and ſhire of Aberdeen, Scotland, is ſituated on the banks of the river Ythan; 15 miles N. from Aberdeen, and 139 miles N. by E. from Edinburgh. The pariſh is about nine miles in length and ſix in breadth. The general appearance is flat, interſperſed with ſome ſmall hills; the ſoil is in ſome parts deep, and in others ſhallow; but moſtly fertile. About a hundred acres are covered with thriving plantations. A general poſt-office is eſtabliſhed here; and two fairs are holden annually. The public roads are in good repair. The pariſh church is ancient and ruinous. Here is a reſpectable parochial ſchool, of which the ſalary is 300 marks, with ſchool-fees and perquiſites, and a rood of land. In the population return of the year 1811, Tarves was ſtated to contain 454 houſes, occupied by 1804 perſons.—Carliſle's Topographical Dictionary of Scotland, vol. ii. Gazetteer of Scotland, 8vo.

TARVIDUM, Taruedum, or *Orcas*, in *Ancient Geography*, a promontory on the ſouthern coaſt of the iſle of Albion, near the mouth of the river Nabaus.

TARVIN, or Tarven, in *Geography*, a townſhip and pariſh in the hundred of Ediſbury, and county palatine of Cheſter, England, is ſituated on the London road, five miles N. by E. from Cheſter. It had for ſome time a weekly market, procured by ſir John Savage, in the reign of queen Elizabeth; but this has been long diſcontinued. An annual fair was alſo held here till within the laſt thirty years, but was then aboliſhed. Tarvin was one of the parliamentary garriſons during the civil wars: in Auguſt 1644, it was a ſhort time in the poſſeſſion of the royaliſts; but in the following month it was retaken for the parliament, and fortified with ſtrong works. This and Nantwich were the only garriſons in Cheſhire not abandoned on the reported approach of the king, in May 1645; and the parliament retained it till the end of the war. A grammar-ſchool was founded here in the year 1600. John Thomaſen, a celebrated penman, was maſter of this ſchool thirty-ſix years in the early part of the laſt century. On the outſide of the pariſh church is an inſcription to his memory, ſtating that he "highly excelled in all the varieties of writing, and wonderfully ſo in the Greek character. Specimens of his ingenuity are treaſured up in the cabinets of the curious and in the public libraries throughout the kingdom." The townſhip of Tarvin was ſtated in the population return of the year 1811, to contain 180 houſes, occupied by 921 perſons. The pariſh is very extenſive, and includes 11 townſhips, containing in the whole 2877 inhabitants, the number of houſes being 525.—Lyſons' Magna Britannia, vol. ii. part 2, Cheſhire. Beauties of England and Wales, vol. ii. Cheſhire, by J. Britton and E. W. Brayley.

TARVISIUM, or Tarviso, in *Ancient Geography*, a town of Italy, towards the N.W. of Venetia.

TARUM, in *Botany*, a name given by Pliny to the *agallochum ſylveſtre*, a ſpecies of aromatic plants.

TARURAW, in *Geography*, a town of the ſtate of Georgia; 14 miles N. of Tugeloo.

TARUS, or Taro, in *Ancient Geography*, a river of Gallia Ciſpadana, which ran towards the N.E., and E. of Trebia.

TARUSA, in *Geography*, a town of Ruſſia, in the government of Kaluga, on the Oka. N. lat. 54° 52′. E. long. 36° 34′.

TARUSATES, in *Ancient Geography*, a people of Gallia Aquitanica, mentioned by Cæſar in the 3d book of his Commentaries, who were compelled to ſubmit by Craſſus, Cæſar's lieutenant. Their city was named Vicus Julii and alſo Aturas.

TARUSCO, a town of Gallia Narbonnenfis, near Glenum.

TARUSCONIENSES, a people of Gallia Narbonnenfis, mentioned by Pliny, who occupied part of the territory of Tarafcon on the Rhone.

TARWAS, in *Geography*, a town of Bengal; 28 miles E. of Nattore.

TASAGORA, in *Ancient Geography*, a town of Africa, in Mauritania Cæfarienfis, on the route from Cula to Rufucurum. Anton. Itin.

TASAPAN, in *Geography*, a fmall ifland in the Eaft Indian fea, near Junkfeilou. N. lat. 8° 20'. E. long. 98° 14'.

TASCA, Luigi, in *Biography*, an opera finger with a powerful bafe, or rather baritono voice, who arrived in England in 1782, was a good mufician, and not only a ufeful performer at the opera, but at the oratorio, and in the performances at Weftminfter Abbey in commemoration of Handel. His voice, however, wanted mellownefs and flexibility: for like an oaken plant, though ftrong, it was ftiff.

TASCHENMUL, in *Ornithology*, a name given by authors to the *anas clypeata*, a fpecies of duck, remarkable for the breadth of the end of its beak, and called in Englifh the *fhoveller*. See *Broad-beaked* Duck.

TASCHIEN, in *Geography*, a river of Bavaria, which runs into the Regen, 2 miles W. of Cham.

TASCHOW, a town of Bohemia, in the circle of Leitmeritz; 5 miles N. of Leitmeritz.

TASCIO, or Tascia, in *Coinage*, is a term, which either wholly or in part, appears on many ancient Britifh coins, and which has puzzled our antiquaries, who have formed feveral different opinions concerning it. Mr. Camden, Mr. Baxter, Dr. Pettingal, and others, have thought that this word is derived from *Tafk* or *Tafcu*, fignifying in the original language of Britain any land-burthen or tribute impofed by the Tag, or prince, and that all the money which had Tafcia or any of its abbreviations upon it, had been coined for no other purpofe but to pay the tribute which had been impofed on the Britons by Julius Cæfar, and the portaria or duties upon merchandize, which had been exacted by Auguftus and his fucceffors. Againft this opinion, however, others have urged ftrong objections. The derivation of Tafcio from Tag, a prince, by the intervention of Tafcu, a burthen or tafk, it has been faid, is far from being clear. Money coined for the fole purpofe of paying tribute, is a thing, fay the objectors, unknown in the hiftory of mankind; nor is it probable that Cunobeline, who was a free and independent prince, the friend but not the fubject of the Roman emperors, would have admitted a word of fuch ignominious import as Tafcio is in this fenfe of it, upon his coins.

A modern author (fee Wife Differt. in Numm. Bodl. Catal, p. 227.), diffatisfied with the above interpretation of the word Tafcio, has propofed another. He fuppofes that Tafcio is an abbreviation of fome nation or people to whom this money belonged, and of which Cunobeline was king; and finding in Pliny (lib. iii. c. 4.) a people of Gallia Narbonnenfis, called "Tafcodunitari Conorienfes," in the MSS. "Tafcoduni Taruconienfes," he conjectures, that Cunobelin Tafcio may mean Cunobelin Tafcodunorum. But this meaning is far-fetched, and depends upon improbable conjecture.

Another modern writer (fee Pegge's Eff. on Cunobeline's Coins, p. 55.) has conjectured, that Tafcio was the name of Cunobeline's mint-mafter, who ftruck all thefe coins. Although this opinion is more probable than the former, it is neverthelefs ftrange, that this word, if it was a proper name, fhould have been fpelled by the perfon to whom it belonged in fo many different ways, as Tafcio, Tafcia, and Tafcie.

TASCO, in *Geography*, a town of Mexico, in the province of Mechoacan; 90 miles S.E. of Mechoacan. N. lat. 19° 5'. W. long. 101° 36'.

TASCONI, in *Ancient Geography*, a people of Gallia Narbonnenfis, mentioned by Pliny, who occupied part of the diocefe of Montauban. Their city bore the fame name, and was fituated N. of Tolofe..

TASGOM, in *Geography*, a town of Hindooftan, in Vifiapour; 10 miles N. of Merritch.

TASHAM Dagh, a mountain of Afiatic Turkey, between Amafreh and Samfoun.

TASHKUND, Taschkund, or *Al Shafh*, a town of Turkeftan, on the Sir. This town has been often deftroyed and rebuilt; 210 miles N. of Samarcand. N. lat. 42° 40'. E. long. 64° 48'.

TASHKUPRI, a town of Natolia; 14 miles S.E. of Caftamena.

TASIEVA, a river of Ruffia, which runs into the Tchiuma, about 20 miles N.W. of Tafievfkoi.

TASIEVSKOI, a town of Ruffia, in the government of Tobolfk, on the Tafieva; 820 miles E. of Tobolfk. N. lat. 57°. E. long. 94° 14'.

TASIO, a river of Sweden, which joins the Angermann at Liden.

TASIS, τασις, in *Rhetoric*, is ufed for the continuation of a period longer than the breath can bear. Voff. Rhet. lib. iv. p. 66.

TAS-KUJE, in *Geography*, a town of Perfia, in the province of Lariftan; 84 miles N.E. of Lar.

TASLUI, a town of Moldavia; 20 miles S. of Niemecz.—Alfo, a river of Moldavia, which runs into the Siret, near Adzud.

TASMAN's Head, a cape on the coaft of Van Diemen's Land. N. lat. 43° 33'. E. long. 147° 28'.

TASMANIA. See *Van* Diemen's *Land*.

TASOPIUM, in *Ancient Geography*, a town of India, on this fide of the Ganges, near Caricardama, affigned by Ptolemy to the Sabaræ.

TAS-POULSASON, in *Geography*, a town of Chinefe Tartary, in the country of Hami. N. lat. 40° 22'. E. long. 95° 54'.

TASPOUR, a town of Hindooftan, in Bahar; 27 miles E. of Hajypour. N. lat. 25° 52'. E. long. 85° 51.

TASSA Point, a cape on the coaft of Guinea. N. lat. 8°. W. long. 12° 10'.

TASSA-CORTA, or Tassa-Croda, a town on the W. coaft of Palma, one of the Canary iflands, which is an inconfiderable loading-place for veffels. N. lat. 28° 37'. W. long. 17° 58'.

TASSASUDON, Tassisudon, or *Taffey-Seddein*, a town of Afia, and capital of the Bootan country, fituated in a valley, computed to be about three miles in length, and one in breadth, lying N. and S., through which runs the river Tchintchieu. This valley is in a high ftate of cultivation, bearing various kinds of grain, and diverfified by clufters of houfes. The caftle, or palace of Taffifudon, ftands near the centre of the valley, and is a building of ftone, of a quadrangular form; the walls are upwards of 30 feet high, floped a little from the foundation to the top; above the middle fpace is a row of projecting balconies, to each of which are curtains made of black hair; which are always drawn at night: the walls are pierced below with fmall windows, for the admiffion of air rather than light; and there are two entrances to the palace: the one facing the fouth by a flight of wooden ſteps, edged with plates of iron, and the other, which is the grand entrance on the eaſt front, aſcended by a flight of ſtone ſteps. Even with theſe is a ſpacious gateway, with two maſſy doors, fortified with knobs of iron, and ſecured when ſhut by a large bar of timber that ſlides within the maſonry. Within is the central ſquare building, which may be denominated the citadel, and which is the reſidence of the ſupreme Lama. It contains alſo the chief of their idols, Mahomoonie, amidſt a multitude of others of inferior note. To the right and the left are avenues that lead to ſpacious ſquares, paved with flat ſtones, and to the apartments of the Lama. The citadel is ſeven ſtories high, each from fifteen to eighteen feet, and covered with a roof of low pitch, compoſed of fir timber; from the centre ariſes a ſquare piece of maſonry, ſupporting a canopy of copper, richly gilt, which is ſuppoſed to be directly over the great idol, Mahomoonie. The raja lives upon the fourth floor from the ground; above that are two other ſtories; and the ſeventh ladder reaches to the temple of Mahomoonie. The eaſt, weſt, and ſouth angles of the building correſpond with each other, and have apartments on the ground floor appropriated for depoſiting all kinds of ſtores. A covered gallery runs all round them, beneath which are ſubterraneous places ſerving for kitchens. A range of good rooms, with boarded floors, on the firſt ſtory, accommodates all the officers of ſtate attendant on the raja, and thoſe towards the ſquare are ſkirted by a varande, ſupported by a row of handſome pillars, whoſe capitals are ornamented with carved work and gilding, and their ſides painted with vermilion. Over this ſtory is a ſort of terrace of cement, with rooms more roughly finiſhed for the inferior officers, called Zeenkerbs. For further particulars we refer to Turner's Embaſſy, in which is an engraving of the palace, and of the reſidence of Lama Glaſſetoo in its vicinity. The road from Bengal to Taſſaſudon lies chiefly over the ſummits of ſtupendous mountains, or along the borders of craggy precipices: and between this city and Peridroog is a chain of mountains ſtill higher than the other. Theſe are viſible from the plains of Bengal, at the diſtance of 150 miles, and are commonly covered with ſnow. They are a continuation of the mountains Emodus and Paropamiſus of the ancients; 206 miles S.W. of Laſſa. N. lat. 27° 48′. E. long. 89° 12′.

TASSEL, a ſort of pendent ornament, at the corners of a cuſhion, or the like thing.—Alſo, a ſmall ribband of ſilk ſewed to a book, to be put between the leaves.

TASSELS, in a *Building*, thoſe pieces of board that lie under the ends of the mantle-trees.

TASSEL, or *Tiercelet*, is alſo uſed in *Falconry* for a male hawk.

TASSELS are alſo a kind of hard burrs uſed by cloth-workers in dreſſing of cloth; they are the heads of the manured teaſel.

TASSES, or TASSETS, in *Ancient Armoury*, appendages to the corſelet, conſiſting of ſkirts of iron that covered the thighs, and that were faſtened to the cuiraſs with hooks.

TASSI, AGOSTINO, in *Biography*, the cognomen of an artiſt whoſe real name was Buonamici. He was born at Perugia in 1566, and ſtudied at Rome under Paul Brill, and received ſome aſſiſtance in the ſchool of the Carracci. His looſe and irregular conduct procured a ſeat for him on the bench of a galley at Leghorn; and there, though under confinement and diſgrace, he occupied his leiſure in painting views of the objects with which he was ſurrounded; and when he obtained his liberty, ſuch ſubjects became the favourite occupation of his pencil. His ſea-ports, calms, and ſtorms, were faithful tranſcripts of nature, and touched with great ſpirit and efficacy. His views of architectural ſubjects thrown into perſpective, which are in the pontifical palace of Monte Cavallo, and in that of the Lancellotti family, are admirable in their kind. His greateſt honour, however, is having been the inſtructor of Claude de Lorraine. He died in 1642, aged 76.

TASSING, in *Geography*. See TAASINGE.

TASSO, BERNARDO, in *Biography*, an eminent poet, born at Bergamo of an ancient and noble family in the year 1493, became an early proficient in the Greek and Latin claſſics. His uncle, the biſhop of Recanati, who was his inſtructor and patron, and ſupplied the place of a parent when he loſt his father, having been aſſaſſinated by robbers in 1520, Bernardo was under a neceſſity of quitting his native city, and in 1525 became ſecretary to count Guido Rangoni, general of the papal army. Having been for a ſhort time occupied in a ſimilar ſituation under the ducheſs of Ferrara, he afterwards purſued his ſtudies at Padua and Venice. In 1531 he publiſhed at Venice a volume of poems, which induced Ferrante Sanſeverino, prince of Salerno, to invite him to his court. Having accepted this invitation, he recommended himſelf to the prince, and obtained annual ſtipends, amounting to 900 ducats. He accompanied his patron in ſeveral expeditions, and accompanying him to Naples, he there married Porzia de' Roſſi, a lady of noble family. At Sorrento, whither he removed, he for ſome time led a tranquil and ſtudious life; until his patron, in 1547, incurred the diſpleaſure of the imperial court by concurring in preſenting a petition againſt the eſtabliſhment of the inquiſition at Naples. On this occaſion the prince joined the French party, ſo that he was declared a rebel, and his property was confiſcated. Influenced by reſpect for his patron, Bernardo accompanied him to France, where at firſt he obtained encouragement, but being in proceſs of time deprived of all ſupport, and having loſt his wife, he requeſted the prince's permiſſion to leave him; and complying with an invitation to the court of Guidubaldo II., duke of Urbino, a diſtinguiſhed patron of literary perſons, he was liberally compenſated for his paſt ſufferings, and made a member of the celebrated Venetian academy. In 1563 he became ſecretary at the court of Mantua, and in the ſervice of this court he died in 1569, being then governor of Oſtiglia. The duke of Mantua cauſed his remains to be honourably interred in that city, and a marble monument to be erected over his tomb, bearing the ſimple inſcription, "Oſſa Bernardi Taſſi." Of his poems, belonging to the claſs of "Romaneſque," there were two; *viz.* "Amadigi," conſiſting of 100 cantos, and "Il Floridante," left unfiniſhed, but corrected and publiſhed by his ſon Torquato, at Bologna, in 1587. His other works are five books of "Rime," with various kinds of poems, ſuch as eclogues, elegies, hymns, odes, &c. He was alſo the author of "A Diſcourſe concerning Poetry," and "Letters," of which an edition has been given in three volumes.

TASSO, TORQUATO, pre-eminent as an Italian poet, was the ſon of Bernardo and Porzia de Roſſi, born at Sorrento March 11, 1544, and ſent at the age of five years to the Jeſuits' ſchool at Naples. Here his proficiency was ſo rapid, that in two years he recited, publicly, verſes and orations of his own compoſition. At Bergamo, whither the circumſtances of his family conſtrained him to remove, he proſecuted the ſtudy of Latin and Greek with ſuch ſucceſs, that at the age of twelve years, he was admitted into the univerſity of Padua. Here his proficiency in various branches of literature was ſo ſignal, that in his ſeventeenth year he was honoured with degrees in the four branches of canon and civil law, theology, and philoſophy. For law he had no prediléction; but all the powers and affections of his mind were devoted to poetry. Thus diftinguifhed, he was invited by the celebrated Cefi to Bologna, in the fchools and academies of which city his talents were eminently difplayed. During his refidence in Bologna, he was charged with having written fome defamatory verfes, and deprived of his books; and though he avowed his innocence, he thought proper to withdraw from the city to a place called Caftlevetro, where he was protected by the count Rangoni. Some time after this event he fettled at Padua, and acquired diftinction among the academicians denominated " Eterei." At the age of eighteen years he had publifhed at Venice his poem of the Romanefque clafs, entitled " Il Rinaldo," which he dedicated to cardinal Luigi d'Efte, in confequence of which he was invited, in 1566, to the court of Ferrara, where he was liberally accommodated, and where, it is faid, he profecuted the execution of his plan of the " Gerufalemme Liberata;" fix cantos of which were compofed in the 17th year of his life. In 1571 he accompanied the cardinal d'Efte into France, where he was honourably received by Charles IX. and his court, and alfo by all the learned men of Paris. In the following year he returned to Italy, and caufed to be reprefented his dramatic paftoral of " Aminta." Several cantos of his " Gerufalemme" were at this time difperfed in MS. throughout Italy, and in 1579 the fourth canto was printed in a collection of poems at Genoa. In the following year, fragments of 16 cantos were publifhed at Venice, and we may naturally imagine that this mode of introducing to public notice a work on which he had beftowed much attention and labour, excited his difpleafure. In 1581 three editions were printed, and of thefe, the third at Ferrara has been confidered as that which firft exhibited this celebrated work in its genuine form. It has occafioned fome degree of furprife, that Taffo himfelf did not guard againft thefe incorrect publications, by committing his work to the prefs in a more perfect ftate. His negligence in this refpect has been attributed to fome mental malady under which he laboured. Of the caufe of this malady different accounts have been given. Tirabofchi has narrated a variety of circumftances, which operating on a mind like that of Taffo, might have contributed to produce, or at leaft to aggravate the mental diforder under which he laboured. His narration is recited in the General Biography; but within our limits we cannot do it full juftice. His firft provocation feems to have been excited by a courtier, who divulged the fecret of his amours, in the prefence-chamber of Alfonfo, duke of Ferrara, and whom he publicly infulted, fo that he was under a neceffity of defending himfelf with his fword againft the aggreffor and his three brothers. The brothers were banifhed, and Taffo was confined to his apartment. Difturbed in his mind, and dreading worfe confequences, he made his efcape, wandered to Turin, Rome and Sorrento, and at length obtained permiffion to return to Ferrara. Sufpecting fome hoftile defign, he withdrew to the court of Urbino, and again returned to Ferrara. Here his diforder was fo manifeft, that Alfonfo ordered him to be fhut up in a hofpital appropriated to lunatics. The evidence of his diforder is faid by fome to have been an indecorous liberty which he took in faluting the princefs Leonora, the duke's fifter; but others have thought this circumftance very improbable, and indeed it is hardly neceffary to make an attempt for juftifying the duke's conduct in the confinement of Taffo, after he had given fo many incontestible proofs of mental derangement. At length, however, Taffo was reftored to entire liberty. But his difpofition to wander ftill continued; and it is lamentable to reflect, that, as one of his biograpers obferves, " the admired author of ' Jerufalem delivered,' the favourite of princes and the boaft of Italy, fhould have harboured in his mind fomething which defeated every plan to render his circumftances profperous." His laft retreat was with cardinal Cinzio Aldobrandini, at Rome, who obtained for him a penfion from pope Clement VIII., and had intended, as a compenfation for his fufferings, to procure for him the honour of a folemn poetical coronation in the Capitol; but the ceremony was delayed on account of the cardinal's illnefs, and Taffo manifefted fymptoms of approaching diffolution. As foon as he was apprized of his danger, he was removed to the convent of St. Onofrio, where, deriving every poffible confolation from the kindnefs of the cardinal, and exhibiting every evidence of fincere piety, he clofed his days in April 1595, at the age of 51. His remains were honourably interred, and after fome time a monument was erected to his memory by cardinal Bonifacio Bevilacque, in the church of St. Onofrio. Taffo, " in perfon, was tall, active, and well-proportioned, naturally of a firm temperament, and fit for all bodily exercifes. He was fparing of words, fedate and grave in manner, and in converfation difplayed little of the fire that animates his works. He was kind and affectionate in all his focial relations, and conducted himfelf with great propriety in company."

His works are very numerous. Thofe in profe confift of a great number of treatifes, dialogues, and letters, on moral, literary, and familiar topics. In poetry, his " Gerufalemme Liberata" is pre-eminent. " Its fubject is fingularly happy, its characters well-drawn and fupported, its fictions ftrongly imagined, its ftyle dignified, and its verfification harmonious." His " Gerufalemme Conquifata," publifhed in 1593, was a kind of recompofition of the former work, but lefs fatisfactory to its readers. His " Aminta" has been already mentioned; his " Rime" confifted of occafional and mifcellaneous pieces; his " Sella Giornata," or Works of the Seven Days, pieces on facred topics, bear the impreffion of the gloomy ftate of his mind. Tirabofchi. Gen. Biog.

Tasso, in *Geography*, a fmall ifland on the W. coaft of Africa, at the mouth of the river Sierra Leona.

Tasso, or *Thafo*, an ifland of the Grecian Archipelago, fituated in the gulf of Contefa, towards the W. extremity of Macedonia, and two leagues from the continent. The channel which feparates that ifland from the main land is alfo divided by a fterile inlet called " Little Taffo," and in Greek " Taffo-poulo," the veftige of an ancient continuity of lands, at prefent feparated. A fpacious road, where the ground is good for holding, lies between the two iflands. Taffo is the moft northern of the iflands of the Archipelago, and its high mountains, covered with forefts, are feen at a diftance. This ifland was formerly one of the moft famous for its rich gold mines. Herodotus fpeaks of them, and they were under the direction of Thucydides. Thefe mines led the Greeks to denominate it Chryfe, fignifying gold or gilt; its riches had become proverbial, and the expreffion was a " Thafos of wealth." Its natural treafures alfo were opals, amethyfts, and other precious ftones; but though thefe are loft, Taffo ftill furnifhes the beautiful marble, that forms the greater part of the mountains, which was anciently held in fuch eftimation by the Romans; the whitenefs of which vies with fnow, and the finenefs of its grain with that of Parian marble. The inhabitants of Paros are faid to have peopled the ifland of Taffo, and to have there built the town of Thafos, which was its capital, and the veftiges of which are ftill to be feen. The ifland is near 30 leagues in circumference; it produces abundance of corn, oil, wax, &c.; but the fertility, extolled by the ancients, is turned to no account for want of encouragement and culture.

ture. Its wines, famous even in the time of the Lower empire, as Chryfoftom exclaimed againft the exceffes to which they gave rife at Conftantinople, have no longer the excellent qualities which caufed them to fetch a high price. Its population has experienced the fame fate as the productions of its foil; it is confiderably diminifhed. Taffo, however, has ftill remaining a kind of wealth very important to a maritime and trading nation; this is capital wood for fhip-building. N. lat. 40° 34′. E. long. 24° 46′.

TASSONI, Alessandro, in *Biography*, an Italian poet and man of letters, was born of an ancient and noble family, at Modena, in the year 1565. Notwithftanding various difadvantages in early life, fuch as the lofs of his parents, a feeble difeafed frame, and the perfecution of enemies, he fuccefsfully cultivated Greek and Latin literature, poetry, and eloquence. At the age of twenty he fought further improvement in the univerfity of Bologna, and here, as well as at Ferrara, he directed his particular attention to jurifprudence. Being under a neceffity of feeking employment, he went to Rome, where, being known by his writings, he was admitted into the fervice of cardinal Colonne, as fecretary, and accompanied him to Spain in the year 1600. Being afterwards domefticated with cardinal Cefi, he became a member of the academies degli Umorifti and de' Lincei, and was held in high eftimation among the literati of Rome. A fpecimen of his "Penfieri diverfi" (Thoughts on various Subjects) was publifhed in 1608, under the title of "Quefiti," and the whole in 1612. His "Confiderations on Petrarch" were firft printed in 1609, and were intended to reftrain the prevalent idolatry of this author. In 1613 he entered into the fervice of Charles Emanuel, duke of Savoy, in which fituation he was regarded as an enemy to the Spanifh monarchy; and he was confidered as the author of "Philippics" againft the Spaniards, and of a book entitled "Effequie della Monarchia di Spagna." In 1623 he quitted the family of Savoy; and about this time he finifhed "A Compendium of the Annals of Baronius." In 1626 he was taken into the fervice of cardinal Lodovifio, nephew of Gregory XV.; and upon his death, in 1632, he was invited to the court of Francis I., duke of Modena, who gave him a penfion and fome honorary titles. Of this fituation death deprived him in 1635, at the age of 70. One of his biographers fays of him, that "he had a prepoffeffing countenance, with a cheerful expreffion, was open in converfation, a good fpeaker, ferious or pleafant, according to the occafion, of a lively imagination, and found judgment." The work by which the memory of Taffoni is chiefly preferved is his mock heroic poem "La Secchia Repita." Tirabofchi. Gen. Biog.

This penetrating and learned writer, in the tenth book of his "Penfieri diverfi," treats of mufic, ancient and modern, but not with his ufual acumen or feverity. He only retails the old ftories of its miraculous powers among the ancients, and tries to match them by wonders pretended to be performed by its inferior perfections in modern times, without any remarks or reflections which difcover a knowledge of the art, or doubts of the authenticity of thefe relations.

After fpeaking of extraordinary dilettante compofers of mufic in modern times, he fays, "among thefe we may enumerate James I., king of Scotland, who not only compofed facred mufic, but invented a new fpecies of plaintive melody, different from all others; in which he has been imitated by the prince of Venofa, who, in our times, has embellifhed mufic with many admirable inventions."

This paffage has given birth to two capital miftakes, into which the readers and writers of mufical hiftory have been led, particularly in Scotland. In the firft place, it infinuates that James I. was the inventor of the national melodies of that country; and fecondly, that thefe melodies had been imitated in Italy by the prince of Venofa, a voluminous and celebrated dilettante compofer of madrigals in the fixteenth century.

Unluckily for the favourers of thefe opinions, the Scots' national melodies can be proved of much higher antiquity, not only than David Rizzio, but the time of James I. See Rizzio, James I. *of Scotland*, and Ossian.

And the prince of Venofa, who was not the great mufician he was reported to be by learned men who were ignorant of mufic, has not in all his works, which we have carefully examined, a fingle paffage of melody which reminds us of the national tunes of Scotland; the melodies of which refemble thofe of no other country with which we are acquainted, except thofe of China. See Venosa, and Chinese *Mufic*.

Another Aleffandro Taffoni of Modena, born in 1488, made a compilation of the different annals of that city, publifhed in Muratori's Collection of Italian hiftorians.

TASSOW, in *Geography*, a town of Moravia, in the circle of Iglau; 30 miles S.E. of Iglau.

TASSU, a town of Perfia, in the province of Adirbeitzan; 60 miles W. of Tauris.

TASTATURA, Ital., the whole range or fet of keys, in an organ, harpfichord, virginal, fpinet, clavichord, or piano-forte. The term is naturally formed from *tafto*, *a touch*, or *key*. The Italians, we believe, call the fingerboard of the lute, guitar, viols, and all ftringed inftruments with a neck that is fretted, the *taftatura*.

TASTE, Savour, a fenfation excited in the foul by means of the organ of tafte, *viz.* the papillæ of the tongue, &c.

Dr. Grew, in a lecture on the diverfity of taftes, before the Royal Society, diftinguifhes them into *fimple* and *compound*. By *fimple* taftes he underftands fuch as are fimple modes of tafte, although mingled with others in the fame thing: thus, the tafte of a pippin is aci-dulcis; of rhubarb, amar-aftringent, and therefore compounded, in both; but yet in the pippin the acid is one fimple tafte, and the fweet another, as diftinct as the bitter and aftringent are in the rhubarb.

Two faults, he obferves, have here been committed: the firft, a defective enumeration of fimple taftes; the fecond, a reckoning of them indiftinctly among fuch as are compounded.

Simple taftes, of which we ufually only reckon fix or feven forts, are at leaft fixteen: 1. *Bitter*, as in wormwood; whofe contrary is, 2. *Sweet*, as in fugar. 3. *Sour*, as in vinegar; whofe contrary is, 4. *Salt*. 5. *Hot*, as in cloves; to which is oppofed, 6. *Cold*, as in fal prunellæ; for we may as properly fay a cold tafte as an hot one, fince there are fome bodies which do manifeftly imprefs the fenfe of cold upon the tongue, though not to the touch. 7. *Aromatic*; to which is contrary, 8. *Naufeous*, or malignant. 9. *Soft*, which are either vapid, as in water, ftarch, whites of eggs, &c. or unctuous, as in oils, fat, &c. 10. *Hard*, of which he reckons four kinds. 11. *Penetrant*, which worketh itfelf into the tongue without any pungency; as is found in the root and leaves of the wild cucumber. 12. *Stupefacient*, as in the root of black hellebore, which, being chewed, and for fome time retained upon the tongue, affects that organ with a numbnefs, or paralytic ftupor. 13. *Aftringent*, as in galls. And, 14. *Pungent*, as in fpirit of fal armoniac; which two laft taftes he makes contrary to the unctuous, as penetrant and ftupefacient are contrary to the vapid one.

The

The *compound* taftes are very numerous; but we have words to exprefs but fix of them: 1. *Auftere*, which is aftringent and bitter, as in the green and foft ftones of grapes. 2. *Acerb*, properly fo called, which is aftringent and acid, as in the juice of unripe grapes. 3. *Acrid*, which is pungent and hot. 4. *Muriatic*, which is falt and pungent, as in common falt. *Lixivious*, which is faltnefs joined with fome pungency and heat. 6. *Nitrous*, which is faltnefs joined with pungency and cold.

Tafte conftitutes one of the moft obvious characters of bodies, and much is to be judged from it of the nature of many things. Dr. Abercromby, in a treatife partly written on this fubject, has carried his obfervations fo far, as to lay down a fet of rules for the judging of any plant, or other body, without knowing what it is, merely from its tafte, in regard to its virtues in medicine.

In order to judge of what he exprefsly means by the names of the feveral taftes, it is proper to add the lift of them, with fome of the things to which they are applied.

Plants, fruits, &c. are either four as the common forrel, harfh as the medlar, auftere or rough as the quince, fweet as the frefh juice of ripe grapes, fat and oily as the fefamum, bitter as gentian or the wild cucumber, falt as common fea-falt, tart as garlic, or, laftly, infipid as the gourd, or of fome mixed taftes, made of two or more of thefe.

The harfh or acerb things are cold, repelling, and binding, hardly concocted, and they may all be known upon the tongue by their contracting or drying it. The auftere or rough things differ from thefe only in degree, as being fomewhat milder in tafte, and weaker in virtues.

The four or acid things are always cooling; but this never to excefs, by reafon of their penetrating parts: this tafte is known by a biting on the tongue, but without any heat. Sweet things are all nutritive; and taking the word in its proper fenfe, they only have this quality. Their fweetnefs arifes from their neither being too hot nor too cold upon the tongue.

Fat things are moderately hot, and, on this account they all, in fome degree, moiften and relax; but they alfo obftruct: they are known from the fweet things by filling, and, as it were, anointing the tongue, without giving that fenfe of pleafure that the others do.

Salt things are aftringent and deterfive; the one quality they have from their earthy part, the other from their watery.

Bitter things may be very beneficial to the ftomach; but, in improper cafes, they may alfo do hurt. The pungent bitters, fuch as the elaterium, or wild cucumber, are all hurtful, unlefs rendered fafe by other means.

Tart things are hot, and often bad for the head, but good in heavy and phlegmatic conftitutions: they are known by their heat in the mouth.

Laftly: infipid things in general have no peculiar quality, but are cold and watery; they are generally hurtful to the ftomach, unlefs mixed with hotter and fpicy things. Abercromb. Nov. Medic. Clavis.

It is obferved by fir John Floyer, that the tafte is fo good a judge for us, that all the chemical principles in plants may be difcovered by it, before their diftillation. All watery plants fhew their phlegm, as well to the tafte as by diftilling; and in all dry woods, the tafte difcovers the earth they contain, as well as a chemical analyfis; by the mucilaginous and gummy tafte, and by the manifeft oilinefs in fome plants, we diftinguifh their abounding in oil as well as by the retort. The fmell alfo helps us greatly in an extemporary judging of plants, and we are able to declare upon the fpot, that all the aromatic plants, and all the fetid ones, contain a large quantity of a volatile oil and falt. By the acrimony and pungency, we are well affured that there is a volatile falt in plants; and by the burning tafte of others, we find that there is a corrofive falt in them. By a crude rough acidity, we diftinguifh the tartar or effential falt of plants to be in large quantity; but if the acidity be of a vinous fmell, we obferve that it is of a middle ftate of digeftion, and may be called a vinous tartar, and diftinguifhed from the firft; but if the tartar have a pungent fmell, then it is evidently a volatile tartar, or an acid acrid tartar.

The fweet taftes are more numerous in plants, and more varied among themfelves than any other kind. Thefe, in general, fhew their oil by thin flimy fmoothnefs, and their tartar is evident in their extracts, as is very plain in the common liquorice-juice.

The grafs-fweets, as the common dogs-grafs, and the like, have much effential falt, and a moderate portion of oil; and the rufh, reed, horfe-tail, and cats-tail, are all fweet and rough; fome of thefe have more oil, and others more acid; and the moft crude among them have more oil than tartar. The corn-fweets, as barley, rye, wheat, oats, millet, and rice, have much oil and effential falt, and a little volatile; fo bread, prepared of any of thefe, yields, on analyfis, oil and effential and volatile falt.

It is to be obferved here, that fermentation and fire feverally produce a volatile falt, where it was not before, by fubtilizing and volatilizing the effential falt; and the flimy mealinefs in corn fupplies the oil. The goats-beard and fcorzonera-kind have the fame principles as the graffes, much oil and effential falt. The fub-acrid fweets, as rampions, campanulas, trachelia, and the like, contain much oil and effential falt; but the acrimony in thefe plants fhews that they have alfo a volatile falt, and that in no fmall quantity; though Lemery, and the other chemical writers, have not obferved this.

The ferns, polypodies, and all that clafs of plants, contain much oil and effential falt; but the chemifts in general have omitted to mention an acrid principle in all thefe, which befpeaks a volatile falt; and fragrancy is obferved in fome of the harts-tongues, which befpeaks a volatile falt alfo, and volatile oil, though hitherto unobferved.

All the leguminous flimy fweets have more oil than tartar; but all of them have a large quantity of both. Beans, peas, and lentils, have alfo a volatile falt, as has alfo that ftrange fruit, eaten in Ruffia, and fome other places, and called *lenticula aquatica* by fome; but by the botanical writers, *tribulus aquaticus;* the other name belonging to the common duck-weed. The aromatic legumens, fuch as melilot, have an exalted oil, and volatile falt. The honey-fuckle is faid by Lemery, and the other chemifts, only to have an effential falt and oil; but as there is a highly aromatic flavour, and great acrimony, there muft be alfo a volatile falt.

Thefe are fome few inftances, out of a vaft number recited by the author, for the reft of which we refer to the paper itfelf in N° 280 of the Tranfactions. Philof. Tranf. N° 299, p. 1160. See Tasting.

Taste is alfo ufed, in a figurative fenfe, for the judgment and difcernment of the mind.

We talk, and we hear every day of tafte, of good tafte, and of bad tafte, and yet without well underftanding what we mean by the word: in effect, a good tafte feems to be little elfe but right reafon, which we otherwife exprefs by the word judgment.

To have a tafte, is to give things their real value, to be touched with the good, to be fhocked with the ill; not to be dazzled with falfe appearances; but, in fpite of all colours,

lours, and of every thing that might deceive or amuse, to judge soundly.

Taste and judgment then should be the same thing; and yet it is easy to discern a difference: the judgment forms its opinions from reflection; the reason, on this occasion, takes a kind of circuit to arrive at its end; it supposes principles, it draws consequences, and it judges; but not without a thorough knowledge of the case: so that after it has pronounced, it is ready to render a reason of its decrees. Taste observes none of these formalities; before it has time to consult, it has taken its resolution: as soon as ever an object is presented to it, the impression is made, and the sentiment formed; and we ask no more of it. As the ear is wounded with an harsh sound, as the smell is soothed with an agreeable odour, before ever the reason has meddled with those objects, to judge of them; so the taste is struck at once, and prevents all reflection.

Reflections may come afterwards to confirm this taste, and discover the secret reasonings of its conduct; but it was not in its power to wait for them. Frequently, it happens not to know them at all; and what pains soever we use, we cannot discover what it was that determined it to think as it did.

This conduct is very different from that which the judgment observes in its decisions; unless we choose to say, that good taste is, as it were, a first motion, or a kind of instinct of right reason, which hurries us on with rapidity, and conducts us more securely than all the reasonings we could use. It is a first glance of thought, which discovers to us the nature and relation of things, as it were, by intuition.

In effect, taste and judgment are one and the same thing, one and the same disposition and habitude of the soul, which we call by different names, according to the different manners in which it acts: when it acts by sensation, by the first impression of objects, we call it taste; and when by reasoning, after having examined the thing by all the rules of art, &c. we call it judgment: so that one may say, taste is the judgment of nature, and judgment is the taste of reason.

Good taste, as defined by Madem. Scudery and Madem. Dacier, in an express treatise "Of the Corruption of Taste," is an harmony between the mind and reason; and a person has more or less of this taste, as that harmony is more or less just.

One might, perhaps, improve on this hint, and say, that good taste is nothing else but a certain ratio or relation between the mind, and the objects presented to it. Right reason cannot but be moved and affected with things conformably to it, and wounded by those contrary: there is, then, a kind of sympathy, which unites them as soon as ever they meet; and at their union, their good understandings discover each other.—Make a fine discourse; use only the richest and noblest expressions; if they contain an unhappy thought, or an incoherent reasoning, that thought, this reasoning, will immediately be felt by a person of taste: and the antipathy will shew itself by a movement of aversion, as sudden, as lively, and as natural, as that which nature inspires us withal for toads or spiders.

The term *taste*, used generally, is equivocal, and is used in at least three distinct acceptations. It sometimes means that peculiar mode of sensation, which resides in the tongue and palate; sometimes, the power of discrimination in the fine arts, or the feeling associated with it; sometimes, in a sense derived from the latter, it means liking or opinion in general.

It has been a subject of much controversy, whether taste, in the second sense, as we use the term in this article, be a distinct faculty, or merely a mode of judgment. The fact seems to be, says an anonymous writer, that pleasurable emotions are excited by certain objects or conceptions, and that, when we embody our feelings in words, we use expressions of comparison, and reference to a standard, as in other propositions. Feeling and judgment therefore concur; but to which the word *taste* should be peculiarly applied, it is not easy to determine. The primary sense of the word, and of its equivalents in modern languages, seems to imply the former, as the word *criticism* manifestly refers to the latter meaning.

Dr. Gerard, in his ingenious and elaborate "Essay on Taste," observes, that a fine taste is neither wholly the gift of nature, nor wholly the effect of art. It derives its origin from certain powers natural to the human mind, but these must be assisted by culture, in order to attain their full perfection. Taste, according to this writer, consists chiefly in the improvement of those principles, which are commonly called the powers of imagination, and are considered by modern philosophers as internal or reflex senses, supplying us with finer and more delicate perceptions, than any which can be properly referred to our external organs. The simple principles of taste are the senses of novelty, of sublimity, of beauty, of imitation, of harmony, of ridicule, and of virtue. Any one of the internal senses, existing in vigour and perfection, forms a particular branch of taste, and enables a man to judge in some one subject of art or genius; but all of them must at once be vigorous, in order to constitute taste in its just extent. Taste will also derive considerable assistance from another principle, distinct from all the internal senses; and this is such a sensibility of heart or delicacy of passion, as fits a man for being easily moved, and for readily catching, as by infection, any passion that a work is fitted to excite, to which we might add the influence of casual associations on taste. Moreover, the most complete union of the internal senses is not of itself sufficient to form good taste, even though they be attended with the greatest delicacy of passion. They must be aided with judgment, the faculty which distinguishes things different, separates truth from falsehood, and compares together objects and their qualities.—Good sense is an indispensible ingredient in true taste, which always implies a quick and accurate perception of things as they really are; and, as the poet observes,

"Is, though no science, fairly worth the seven."

Taste, like every other human excellence, is progressive and improveable: and goodness of taste lies in its maturity and perfection; consisting, as Dr. Gerard says, in certain excellencies of our original powers of judgment and imagination combined. These may be reduced to four, *viz.* sensibility, refinement, correctness, and the proportion or comparative adjustment of its separate principles. All these must be in a considerable degree united, in order to form true taste. And this excellence of taste supposes not only culture, but culture judiciously applied. Want of taste unavoidably springs from negligence; false taste from injudicious cultivation. Sensibility of taste, we are told, depends very much on the original construction of the mind, and is less improveable by use than any other of the qualities of good taste. Refinement or elegance of taste is chiefly owing to the acquisition of knowledge, and the improvement of judgment. Refinement of taste exists only, where to an original delicacy of imagination, and natural acuteness of judgment, is superadded a long and intimate acquaintance with the best performances of every kind. And as sensibility of taste disposes us to be strongly affected with whatever beauties or faults we perceive; and refinement of taste

makes

makes us capable of discovering both, even when they are not obvious; so correctness of taste prevents our being imposed upon by false appearances, and either approving shining faults, or condemning chaste virtues, and enables us to assign to every quality its due proportion of merit or demerit: thus distinguishing the various kinds, and measuring the different degrees of excellence and faultiness. The last finishing and complete improvement of taste, result from the due proportion of its several principles, and the regular adjustment of all its sentiments, according to their genuine value, so that none of them may engross our minds, and render us insensible to the rest. This due proportion of the principles of taste pre-supposes the correctness of each, and includes, besides, an enlargement and comprehension of mind. Dr. Gerard has also considered, how far taste depends on the imagination, evinced the connection of taste with genius, and the influence of taste on criticism, illustrated the objects and the pleasures of taste, and traced the effects of taste on the character and passions.

> " Ingenuas didicisse fideliter artes,
> Emollit mores, nec sinit esse feros."

Nothing is so improving, says Hume on the subject of delicacy of taste, to the temper, as the study of the beauties either of poetry, eloquence, music, or painting. They give a certain elegance of sentiment to which the rest of mankind are utter strangers. The emotions which they excite are soft and tender. They draw off the mind from the hurry of business and interest; cherish reflection; dispose to tranquillity; and produce an agreeable melancholy, which, of all dispositions of the mind, is the best suited to love and friendship. Besides, a delicacy of taste is favourable to love and friendship, by confining our choice to few people, and making us indifferent to the company and conversation of the greater part of mankind.

Taste, says Gerard, may be conceived as employing itself about nature, art, and science. With regard to nature, which is the common subject of the other two, taste and reason are employed in conjunction: as reason investigates the laws of nature, taste alone discovers its beauties. In art, taste is the ultimate judge, and reason but its minister. Scarcely any art is so mean, or so entirely mechanical, as not to afford subjects of taste. But the finer arts, which imitate the excellencies of nature, supply it with more proper materials; and thence derive their merit. Music, painting, statuary, architecture, poetry, and eloquence, (to which may be added gardening, including the art of improving grounds, and the stage,) constitute its peculiar and domestic territory, in which its authority is absolutely supreme. In science, reason is supreme, but may sometimes reap advantage from using taste as an auxiliary which serves to judge, not only of the manner in which science is communicated, but also of the subject-matter itself.

To this essay of Dr. Gerard are annexed three dissertations on the same subject; one by Voltaire; another by M. D'Alembert, read before the French academy in 1757, and intended to shew the great advantages of philosophy in its application to matters of taste, and to justify it from the accusations that have been brought against it by ignorance and envy; and the third is a fragment of Montesquieu.

We observe, that the arts above enumerated, are distinguished from those that are merely mechanical, as well as from the speculative sciences, by this circumstance; that their main end is neither utility, in the common sense of the word, nor instruction; but to minister to the pleasures of the imagination, by means of words, or of sensible images, or of both of these combined. But their most eminent characteristic, perhaps, which runs through all of them, is, that many of their principles, though in one sense founded upon nature, since their only object is to delight the imagination of men, are not derived from ordinary nature; but require a good deal of attention, and the formation of habits, before they can be relished or understood. When we say, that these eight arts are the proper objects of taste, we do not intimate that their principles are altogether in common; or that he who is thoroughly acquainted, *e. g.* with the theory of painting, will be necessarily a good judge of poetry or architecture; since all of them have many rules originally arbitrary, the accurate knowledge of which has become indispensible to the man of taste; and which, in many cases, suggest pleasures to the imagination, not inferior to those which appear more directly natural. Nevertheless, a man who has applied the accuracy of discrimination, delicacy of feeling, and habitual reference to an original standard, in which the exercise of taste consists, to any one of those arts, can hardly fail, by sufficient attention and experience, to become a judge of all the rest. This observation, however, is liable to some exceptions, particularly in reference to music, which no one whose ear is naturally imperfect, will ever be able to understand. After all it must be allowed by those who maintain the necessity of admitting principles and a standard of taste, that a prodigious difference will be found to remain in the sentiments of mankind, with regard to matters of taste; and this diversity of sentiment in judging concerning the productions of art, may be ascribed to three causes; *viz.* want of feeling, or inability to enjoy, in any great degree, the pleasures of the imagination, as in the instance to which we have above alluded; want of knowledge, because, as the principles of the fine arts are founded partly on general nature, and partly on arbitrary rules, no just judgment can be formed of their general nature without much attention and experience; and the arbitrary rules pertaining to all the arts are numerous and complicated, and easily confounded by unskilful judges; and further, hastiness or precipitance of decision, by which men are often misled. Having already remarked, that the laws of taste are partly natural, and partly arbitrary, we here suggest, that under the former fall, in poetry and eloquence, whatever suggests associations generally delightful and interesting, or awakens sympathies, which the constitution of mankind leads them to feel; in painting, truth of imitation, and forcibleness of expression; in music, gratification of the ear and power over the affections. Under the latter may be reckoned, what is called, style in writing, and the observance of those rules with which critics are conversant, in the other arts. Besides, independently of principles of approbation and disapprobation which exist in the objects of taste, all men are more or less influenced by circumstances peculiar to themselves; and to this class belongs a variety of accidental associations.

A late excellent writer has defined taste to be the power of receiving pleasure from the beauties of nature and of art. Though taste, says this writer, be ultimately founded on a certain natural and instinctive sensibility to beauty, yet reason assists taste in many of its operations, and serves to enlarge its power. In this sense, it is a faculty common in some degree to all men. Quinctilian, however, (Instit. lib. vi. c. 3.) seems to include taste under what he calls *judicium.* The characters of taste, when brought to its most perfect state, are all reducible to two, delicacy, which principally respects the perfection of that natural sensibility on which taste is founded; and correctness, which chiefly respects the improvement that faculty receives through its connection with the

the underftanding: the former of thefe qualities is more the gift of nature; the latter more the product of culture and art. Among the ancient critics, Longinus poffeffed moft delicacy; Ariftotle moft correctnefs. Among the moderns, Mr. Addifon is a high example of delicate tafte; and dean Swift, if he had written on the fubject of criticifm, would perhaps have afforded the example of a correct one. In determining the ftandard of tafte, thofe who fay that nature is this ftandard, lay down a principle very true and juft, as far as it can be applied: neverthelefs, conformity to nature is an expreffion very often ufed, without any diftinct or determinate meaning: in a more clear and precife fenfe, nothing can be confidered as the ftandard of tafte, but the tafte, as far as it can be known, of human nature. That which men concur the moft in admiring, muft be held to be beautiful. His tafte muft be efteemed juft and true, which coincides with the general fentiments of men. In this ftandard we muft reft. To the fenfe of mankind the ultimate appeal muft ever lie, in all works of tafte. But this fenfe is founded on thofe principles of reafon and found judgment, which are applicable to matters of tafte: and yet the ultimate conclufions to which our reafonings lead, refer at laft to fenfe and perception. Accordingly it is obferved, that the difference between the authors who found the ftandard of tafte upon the common feelings of human nature, afcertained by general approbation, and thofe who found it upon eftablifhed principles, which can be afcertained by reafon, is more an apparent than a real difference. For they who lay the greateft ftrefs on fentiment and feeling, make no fcruple of applying argument and reafon to matters of tafte; they appeal to eftablifhed principles, and plainly fhew that the general approbation to which they ultimately recur, is an approbation refulting from difcuffion as well as from fentiment. And they, on the other hand, who, in order to vindicate tafte from any fufpicion of being arbitrary, maintain that it is afcertainable by the ftandard of reafon, admit, neverthelefs, that what pleafes univerfally, muft on that account be held to be truly beautiful: and that no rules or conclufions concerning objects of tafte, can have any juft authority, if they be found to contradict the general fentiments of men.

However, it is not pretended, that there is any ftandard of tafte, to which, in every particular inftance, we can refort for clear and immediate determination. But it is fufficient to conclude, that tafte is far from being an arbitrary principle, which is fubject to the fancy of every individual, and which admits of no criterion for determining whether it be falfe or true. Its foundation is the fame in all human minds. It is built upon fentiments and perceptions, which belong to our nature; and which, in general, operate with the fame uniformity as our other intellectual principles. When they are perverted by ignorance or prejudice, they are capable of being rectified by reafon. Their found and natural ftate is ultimately determined by comparing them with the general tafte of mankind.

The ingenious writer to whom we are indebted for the preceding obfervations, has diftinguifhed between tafte and genius. See GENIUS.

Mr. Alifon has treated the fubject of this article with fo much ingenuity and elegance, in his "Effay on the Nature and Principles of Tafte," that it would be almoft fufficient, without further enlargement, to refer to his excellent performance.

According to this much approved writer, the perception of the qualities that are denominated *beautiful* and *fublime* in the works of nature and art, is attended with an emotion of pleafure, very diftinguifhable from every other pleafure of our nature, and to which is appropriated the name of the "emotion of tafte." Accordingly, the diftinction of the objects of tafte into the *fublime* and *beautiful*, has produced a fimilar divifion of this emotion into the "emotion of fublimity" and the "emotion of beauty." The qualities that produce thefe emotions occur amid every variety of *external fcenery*, and among many diverfities of difpofition and affection in the mind of man. The moft pleafing arts of human invention are altogether directed to their purfuit, and even the neceffary arts are exalted into dignity by the genius that can unite beauty with ufe.

Our author, in his profecution of this fubject, firft inveftigates the nature of thofe qualities that produce the emotions of tafte, and then the nature of the faculty by which thefe emotions are received. He obferves, that the theories which have been formed in relation to this fubject have uniformly taken for granted the *fimplicity* of this emotion, and have referred it to fome *one* principle or law of the human mind; and have therefore concluded, that the difcovery of that *one* principle was the effential key by which all the pleafures of tafte were to be refolved. Thefe theories are arranged, in confequence of the affumption of this fundamental principle, into two claffes of fuppofition: *one*, which reduces the "emotion of tafte" directly into an original law of our nature, which fuppofes a fenfe, or fenfes, by which the qualities of beauty and fublimity are perceived and felt, as their appropriate objects; and hence concludes, that the genuine object of the arts of tafte is to difcover and to imitate thofe qualities in every fubject, which the prefcription of nature has thus made effentially either beautiful or fublime. To this firft clafs of hypothefes belong almoft all the theories of mufic, architecture, and fculpture, the theory of Mr. Hogarth, of the abbé Winkelman, and, perhaps, in its laft refort, alfo the theory of fir Jofhua Reynolds; and of all thofe who attend more to the caufes of thefe emotions, than to their nature. The *fecond* clafs of hypothefes refifts the idea of any new or peculiar fenfe, diftinct from the common principles of our nature; which fuppofes fome *one* known and acknowledged principle or affection of mind to be the foundation of all the emotions we receive from the objects of tafte; and, therefore, refolves all the various phenomena into fome more general law of our intellectual or moral conftitution. Of this kind are the hypothefes of M. Diderot, who attributes all our emotions of this kind to the perception of relation; of Mr. Hume, who refolves them into our fenfe of utility; of the venerable St. Auftin, who, with nobler views, one thoufand years ago, refolved them into the pleafure which belongs to the perception of order and defign, &c. This hypothefis has been adopted by rational and philofophic minds: by thofe who have been led by their habits to attend more to the nature of the emotions they felt than to the caufes which produced them. Mr. Alifon, purfuing an analyfis of the effect which is produced upon the mind, when the emotions of beauty or fublimity are felt, concludes that it is very different from the determination of a "fenfe;" that it is not a fimple but a complex emotion; that it involves, in all cafes, the production of fome fimple emotion, or the exercife of fome moral affection, and the confequent excitement of a peculiar exercife of the imagination; that thefe concomitant effects are diftinguifhable, and very often diftinguifhed in our experience; and that the *peculiar* pleafure of the beautiful and fublime is only felt when thefe two effects are conjoined, and the complex emotion produced.

Our author having inveftigated the caufes which produce this effect, or, in other words, the fources of the beautiful and fublime in nature and art, and having fhewn that there is no no fingle emotion into which thefe varied effects can be refolved; but, on the contrary, that every fimple emotion, and therefore every object capable of producing any fimple emotion, *may be* the foundation of the complex emotion of beauty or fublimity; and that this complex emotion is never produced, unlefs, befides the excitement of fome fimple emotion, the imagination alfo is excited, and the exercife of the two faculties combined in the general effect;—proceeds to fhew what is that "law of mind," according to which, in actual life, this exercife of imagination is excited, and what are the means by which, in the different fine arts, the artift is able to awaken this important exercife of imagination, and to exalt objects of fimple and common pleafure into objects of beauty and fimplicity. In the laft place, he inveftigates the nature of that faculty by which the emotions defcribed by him are perceived and felt. This he fhews has no refemblance to a fenfe; wherever it is employed, two diftinct and independent powers of mind are engaged, fo that it is not to be confidered as a feparate and peculiar faculty, but to be finally refolved into fome general principles of our conftitution. Thefe fpeculations further lead to the important enquiry, whether there is any ftandard by which our fentiments on thefe fubjects may be determined; to an explanation of the means by which tafte may be corrected or improved; and to an illuftration of the purpofes which this peculiar conftitution of our nature ferves; in the increafe of human happinefs, and the exaltation of human character. Our limits will not allow any further abftract or abridgment of this valuable work; and we muft refer thofe readers who wifh to purfue difquifitions of this kind to the work itfelf, in 2 vols. edit. 4, 1815.

We cannot forbear citing fome pertinent remarks, that are prefented to our notice by a living writer of diftinguifhed celebrity, profeffor Dugald Stewart. Tafte, fays this author, is not a fimple and original faculty, but a power gradually formed by experience and obfervation. It implies, as its ground-work, a certain degree of natural fenfibility; but it implies alfo the exercife of the judgment, and is the flow refult of an attentive examination and comparifon of the agreeable and difagreeable effects produced on the mind by external objects. In tracing the progrefs of tafte from rudenefs to refinement, we find an analogy to the progrefs of phyfical knowledge from the fuperftitions of a favage tribe to the inveftigation of the laws of nature, founded on the fuppofition, that, as in the material world there are general facts beyond which philofophy is unable to proceed, fo, in the conftitution of man, there is an inexplicable adaptation of the mind to the objects with which his faculties are converfant, in confequence of which, thefe objects are fitted to produce agreeable or difagreeable emotions. In both cafes, reafoning may be employed with propriety to refer particular phenomena to general principles; but in both cafes, we muft at laft arrive at principles of which no account can be given, but that fuch is the will of our Maker. In matters of tafte it fhould be confidered, that the tendency to cafual affociation is much ftronger than it commonly is, with refpect to phyfical events; and when fuch affociations are formed, they are not fo likely to be corrected by mere experience, unaffifted by ftudy. Hence fome have erroneoufly fuppofed, that affociation is fufficient to account for the origin of the notions we form concerning matters of tafte; and that there is no fuch thing as a ftandard of tafte founded on the principles of the human conftitution. Whenever, fays our author, affociation produces a change in our judgments on matters of tafte, it does fo by co-operating with fome natural principle of the mind, and implies the exiftence of certain original fources of pleafure and uneafinefs. The circumftances which pleafe, in the objects of tafte, are of two kinds: 1ft. Thofe which are fitted to pleafe by nature, or by affociations, which all mankind are led to form by their common condition; and, 2dly. Thofe which pleafe in confequence of affociations arifing from local and accidental circumftances. Hence we derive two kinds of tafte; the one enabling us to judge of thofe beauties which have a foundation in the human conftitution; the other, of fuch objects as owe their principal recommendation to the influence of fafhion. Thefe two kinds of tafte are not always, indeed rarely, united in the fame perfon. The perfection of the one depends upon the degree in which we are able to free the mind from the influence of cafual affociations: that of the other, on the contrary, depends on a facility of affociation, which enables us to fall in, at once, with all the turns of the fafhion, and (as Shakfpeare expreffes it) "to catch the tune of the times." For the author's application of his principles and remarks to the fubject of language, which affords numberlefs inftances to exemplify the influence which the affociation of ideas has on our judgments in matters of tafte, we muft refer to his own valuable work. See Dr. Blair's Lectures on Rhetoric, and Belles Lettres, vol. i. lect. ii. and iii. See alfo Hume's Effay of the ftandard of tafte, in his Effays, &c. vol. i. eff. xxiii. p. 253, edit. 1764. Stewart's Elements of the Philofophy of the Human Mind, part ii. ch. v. § 2. Knight's Analyt. Enq. into the Principles of Tafte, 8vo. 1805. Alifon on Tafte, 2 vols. 8vo. 1815. Edin. Rev. N° XIV.

Taste, in *Mufic*, is often confounded with *graces*, or change of paffages; but a movement compofed in good tafte, is often injured by what are called graces. We rather fuppofe tafte to depend on feeling and expreffion, than in flourifhes, or, as the Italians call them, *riffioramenti*; in forrow, pathos; in joy, brilliancy and fire. Yet when changes and embellifhments are neceffary, good tafte is likewife requifite in their choice and application. The compofer difcovers his tafte by his melodies, as much as the performer by expreffing his thoughts.

Tafte, fays Rouffeau, is of all Nature's gifts the moft eafily felt, and the moft difficult to explain; it would not be what it is, if it could be defined: for it judges of objects beyond the reach of judgment, and ferves, in a manner, as a magnifying glafs to reafon.

There are fome melodies more agreeable than others, though equally well phrafed and modulated; there are combinations in harmony of great effect, and others that excite no attention, all equally regular as to compofition; there is in the texture of the parts, an exquifite art of arranging and fetting off one paffage by another, which depends on fomething more fubtle than the laws of contraft.

Genius creates, but tafte felects. Genius is often lavifh and redundant, and in want of a fevere critic to prevent him from the abufe of his riches. Many great things may be achieved without tafte; but it is tafte that renders them interefting. It is tafte which enables a vocal compofer to feize and exprefs the ideas of the poet; it is tafte which guides the performer to the true expreffion of the compofer's ideas; it is tafte which furnifhes both with whatever can embellifh and enrich the fubject; and it is tafte which enables the hearer to feel all thefe perfections. Tafte is, however, not mere fenfibility. A cold heart may have much tafte; and a man tranfported with things truly fpirited and impaffioned, is little touched by grace and elegance. It feems as if tafte attached itfelf to minute refinements, and fenfibility to grand and fublime effects.

Taste *in finging and playing; Gout du Chant*, Fr. According to Rouffeau, there was, in his time, in France, a perfon person distinct from the music-master, to teach the necessary *agrémens* or graces thought necessary to cover, in some degree, the insipidity of French melody. Most of the young students in music used therefore to have two masters, one for music and one for taste, called *Maitre de Gout-de-chant*.

Gout-de-chant likewise consisted in imitating or *taking-off* the voice and manner of a particular singer; which is always done by exaggeration. The face of a man with a mole or wart upon it, is of great use to a portrait painter in fixing a likeness: so a singer, with a little tendency to nasality, to coarseness, to singing through the throat, or of quivering upon one note in attempting to shake, which the Italians have well denominated *tosse di capra*, a goat's cough, are easily taken off.

TASTINA, in *Ancient Geography*, a town of Asia, in the Greater Armenia, between Surta and Cozala. Ptol.

TASTING, the sense by which we distinguish savours; or the perception which the soul has of external objects, by means of the organs of taste.

Authors differ much as to the organ of tasting. Bauhin, Bartholin, Vestingius, &c. place it in the laxer fleshy parts of the tongue; Dr. Wharton, in the glands at the root of the tongue; Laurentius, in the thin tunic covering the tongue; others in the palate, &c. But the great Malpighi, and after him all the latest writers, place it in the papillæ chiefly lying about the tip and sides of the tongue. See Tongue.

These papillæ arise from the corpus nervosum, which covers the muscular flesh of the tongue; whence, passing through the corpus reticulare, they stand up under the external membrane of the tongue, erect, and covered with vaginæ, or sheaths of the said membrane, to defend them from objects too violent. These vaginæ are porous, and stick out so far, that when the aliment is squeezed, they enter with the same to receive the object, or the matter of taste.

These papillæ Boerhaave conjectures to arise from the ninth pair of nerves; and these, he asserts, are the only organ of taste: the others, whether of the tongue, palate, or jaws, &c. he observes, contribute nothing to them; though probably those of the cheeks next the dentes molares may.

The *object* of tasting, is any thing, either in animals, vegetables, or minerals, from which salt or oils may be extracted.

Tasting, then, is performed by the objects being attenuated and mixed with saliva, warmed in the mouth, and applied to the tongue; where, insinuating into the pores of the membranous vaginæ of the nervous papillæ, and penetrating to the surface of the papillæ themselves, it affects and moves them: by which means a motion is communicated along the capillaments of the nerve to the common sensory, and an idea excited in the mind, of salt, acid, sweet, bitter, hot, aromatic, austere, or the like; according to the figure of the particles that strike the papillæ, or the disposition of the papillæ to receive the impulse.

The taste, considered in a medical view, may be diminished by crusts, filth, mucus, aphthæ, pellicles, warts, &c. covering the tongue: it may be depraved by a fault of the saliva, which, being discharged into the mouth, gives the same sensation as if the food which the person takes had really a bad taste; or it may be entirely destroyed by injuries done to the nerves of the tongue and palate. Few things prove more hurtful, either to the sense of tasting or smelling, than obstinate colds, especially those which affect the head. When the taste is diminished by filth, mucus, &c. the tongue ought to be scraped, and frequently washed with a mixture of water, vinegar, and honey, or some other detergent. When the saliva is vitiated, which seldom happens, unless in fevers or other diseases, the curing of the disorder is the cure of this symptom. To relieve it, however, in the mean time, the following things may be of use: if there be a bitter taste, it may be taken away by vomits, purges, and other things, which evacuate bile: what is called a nidorous taste, arising from putrid humours, is corrected by the juice of citrons, oranges, and other acids: a salt taste is cured by plentiful dilution with watery liquors: an acid taste is destroyed by absorbents, and alkaline salts, as powder of oyster-shells, salt of wormwood, &c. When the sensibility of the nerves, which supply the organs of taste, is diminished, the chewing of horse-radish, or other stimulating substances, will help to recover it.

TASTNESS, in *Geography*, a cape on the N. of the island of Sanday. N. lat. 59° 10′. W. long. 2° 20′.

TASTO, in *Italian Music*, the touch or part of any instrument, whereon, or by means of which its notes are made to sound, be it on the neck, as lutes, viols, &c. which are called fixed and immoveable; or the front of organs, spinets, or harpsichords, where the keys are disposed to raise the jacks, called moveable touches; and is properly no more than the finger-board of each.

Tasto *Solo*. These two Italian words, written over or under a base to solos that are figured, generally at a pause, or preceding a close, imply that the accompanier on a keyed-instrument ought to play no chords with the right hand; but only to strike the base note with the left hand, which is implied by the word *tasto solo*, a single key; or at most to double that sound with the right hand in the octave: as it is hardly possible to divine or figure the harmony of an *ad libitum* or cadence, either written or played extempore, which the composer or the performer is allowed to write or play on these occasions. Solos are now no longer in fashion; but the violin solos of the early part of the last century, by Corelli, Geminiani, Somis, and Tartini, have all closes of this kind, to which the base is confined to a single note, or *tasto solo*.

TATA, or Dotis, in *Geography*, a town of Hungary, built in the midst of water and swamps, with a castle; 20 miles W. of Gran.

Tata *Youba*, in *Botany*, a name used by some for the tree which yields what the dyers call the fustic, or yellow wood used in dyeing.

TATACUL, in *Geography*, a town of Hindoostan, in Mysore; 11 miles N. of Vencatighery.

TATALISGA, a town of Africa, in Galam, on the Senegal; 60 miles W. of Galam.

TATAPARY, a town of Hindoostan, in the province of Tinevelly; 15 miles N.E. of Palamcotta.

TATAPATNAM, a town of Hindoostan, in Baramaul; 22 miles S.S.E. of Darempoury.

TATAR Bassarddscihi, a town of European Turkey, in Romania, on the Mariza; 16 miles N.N.W. of Filippopoli.

Tatar *Bunar*, a town of European Turkey, in Bessarabia; 32 miles S.W. of Akerman.

TATARSKOI, a fort of Russia, in the government of Kolivan, on the E. side of the Irtisch. N. lat. 53° 44′. E. long. 85° 34′.

TATENAGUR, a town of Hindoostan, in the Carnatic; 6 miles S.W. of Devicotta.

TATENAY, the chief town of the island *Gilolo;* which see.

TATH, in *Old Laws*, a privilege which some lords of manors enjoyed, of having their tenants' sheep folded at night

night on their demefne lands, for the improvement of the ground.

TATH, in *Agriculture*, a term applied by ftock-farmers, in fome fituations, to all fuch graffes as are particularly rank and luxuriant, and which have a tendency to induce the rot in fheep.

They commonly diftinguifh two kinds of it; namely, the *water-tath*, which arifes and proceeds from an excefs of moifture; and the *nolt-tath*, which is the produce of dung. The latter, it is faid, is darker coloured than the former; but that their foftnefs, luxuriancy, and tendency to produce the rot in the animals, are nearly the fame. The water-tath is noticed to be the produce of either lands naturally too moift, of wet feafons, of accidental or artificial floodings of them, or of fome other fuch caufes. Nothing is fo apt, it is fuppofed, to produce the rot in thefe animals, as the grafs which grows in low marfhy grounds, in what is called *awald* lands, and that around the heads of fprings, efpecially on the north fide of hills, infomuch fo, indeed, that fuch paftures were formerly confidered as naturally rotten, and of courfe rejected by all intelligent fheep-farmers.

In fhort, wherever a very foft and tender tath fuddenly rufhes up in fheep-pafture lands, there is always much danger of its effects; and as dung greatly promotes the growth of very rank tath, the pernicious confequences of fuch nolt-tath are to be remedied, by not allowing horfes or neat cattle to pafture among the fheep.

TATHAA, in *Geography*, a river of Africa, which runs into the Indian fea, S. lat. 28° 20′.

TATHILBA, in *Ancient Geography*, a town of India, on this fide of the Ganges, which belonged to the Bidamæi. Ptolemy.

TATIAMBETTY, in *Geography*, a town of Hindooftan, in Myfore; 5 miles N. of Wombinellore.

TATIAN, in *Biography*, a native of Affyria, from which circumftance he is fometimes called "the Affyrian," and an ecclefiaftical writer, who, according to Cave, flourifhed about the year 172. He was originally a heathen, and by profeffion a fophift, and teacher of rhetoric. His reading appears to have been extenfive, and he is allowed to have been well acquainted with Grecian literature and philofophy. After his converfion to Chriftianity, he became a difciple of Juftin Martyr, to whom he was attached, and of whom he fpeaks with great refpect. He accompanied this father to Rome, and travelled through different countries with a view to his improvement. But fome time after Juftin's death, which happened about the year 165, he adopted a number of abfurd opinions. Accordingly he is charged, and probably not without reafon, with being the founder of the fect of the Encratites; he condemned the ufe of wine, and denied the lawfulnefs of marriage, the reality of Chrift's fufferings, and the falvation of Adam. He alfo embraced the Æons of Valentinus, and afferted with Marcion, that there are two gods. Eufebius dates his herefy about the twelfth year of the emperor Marcus Antoninus, or the year 172. But however erroneous were his principles in the latter part of his life, his works afford us fatisfactoy evidence of the antiquity and high efteem of the gofpels in his time. After propagating his doctrines for fome time at Rome, he opened a fchool in Mefopotamia, about the year 172: and he is faid to have preached at Antioch, and in fome other places. The place and time of his death are not known. He appears to have written a confiderable number of books, one of which, ftill extant in Greek, and entitled "Oratio ad Græcos," or Oration againft the Gentiles, was either an apology for Chriftianity, or an attack on Heathenifm. This was firft printed at Zurich in 1546, with the Latin verfion of Conrad Gefner. It is annexed to the edition of Juftin Martyr's works, and thofe of other fathers: but the beft edition is that of Worth, Greek and Latin, Oxon. 1700, 8vo. His defign in this work, which difplays great learning, was to prove that the Greeks were not the inventors of any of the fciences, but that they were indebted for their acquaintance with them to thofe whom neverthelefs they denominated Barbarians. This work, according to Brucker, every where breathes the fpirit of the Oriental philofophy, the leading tenets of which he details; and he feems to have adopted feveral of the opinions of Plato, and of the Alexandrian Platonifts, concerning the creation of the world by the Logos, and its animation by a fubordinate fpirit; concerning the exiftence of demons in material vehicles, who occupy the aerial regions, and that of æons, who refide above the ftars. He alfo held with Plato the imperfection of matter as the caufe of evil, and thence he inferred the meritoriounfefs of rifing above corporeal appetites and paffions. Another work of Tatian, cited by St. Clement, was entitled "Perfection according to the Saviour," in which he argued againft marriage. Eufebius cites another work compofed by Tatian, which was a "Book of difficult queftions, for the explication of feveral obfcure places of Scripture." We have alfo in Latin a work afcribed to Tatian, called "Harmony" or "Dia-Teffaron" of the Four. But fome approved writers have doubted whether we have one copy of Tatian's Harmony now extant. Dr. Lardner has inveftigated this fubject with his ufual judgment and impartiality: and he inclines to the opinion, that we are in poffeffion of this work: and he thinks that the commentaries written upon it by Ephrem, the Syrian, afford reafon for concluding that it was not fo contemptible or fo heretical as fome have thought. This Harmony is fhorter than that attributed to Ammonius, and contains a compendious hiftory of our Lord and Saviour Jefus Chrift, taken out of the four Gofpels. It confifts of four parts; the firft is a kind of introduction, containing the hiftory of our Lord's nativity, and the former part of his life; the other three parts are the three years of our Lord's miniftry. Brucker by Enfield. Lardner's Works, vol. ii.

TATIANITES, TATIANITÆ, in *Ecclefiaftical Hiftory*, a fect of ancient heretics; thus called from Tatian, a difciple of Juftin Martyr.

This Tatian, who has the character of one of the moft learned men of all antiquity, was perfectly orthodox during the life of his mafter. He was, like him, a Samaritan, by nation, not by religion, as Epiphanius feems to infinuate. They both belonged to the Greek colonies which were fpread throughout the country of the Samaritans.

Juftin being dead, Tatian is faid by fome to have inclined to many of the errors of the Valentinians; but Mofheim fays, that his doctrine approached nearer to that of the oriental philofophy concerning the two principles. He adds, that it appears from the teftimony of credible writers, that Tatian looked upon matter as the foundation of all evil, and therefore recommended, in a particular manner, the mortification of the body; that he diftinguifhed the creator of the world from the Supreme Being: denied the reality of Chrift's body; and corrupted the Chriftian religion with feveral other tenets of the oriental philofophy. (See the preceding article.) He had a great number of followers, who were, after him, called *Tatianifts*; but were neverthelefs more frequently diftinguifhed from other fects, by names relative to the aufterity of their manners. For as they rejected, with a fort of horror, all the comforts and conveniencies of life, and abftained from wine with fuch a rigorous obftinacy, as to ufe nothing but water, even at the celebration of the Lord's fupper; as they macerated their bodies by continual fafting, and lived a fevere life of celibacy and abstinence; so they were called Encratitæ, or temperate; Hydroparastatæ, or drinkers of water; and Apotactitæ, or renouncers. Mosh. Eccl. Hist. vol. i.

TATIANSKAIA, in *Geography*, a fort of Russia, in the government of Saratov, on the Volga; 12 miles S.E. of Tzaritzin.

TATIEN, a town of Chinese Tartary; 55 miles N.E. of Tam-san.

TATILLUM, in *Ancient Geography*, a town of Africa, in Mauritania Cæsariensis, on the route from Carthage to Cæsarea, between Aræ and Ausa. Anton. Itin.

TATISCHEVA, in *Geography*, a fortress of Russia, in the government of Upha, on the Ural; 28 miles W. of Orenburg.

TATISM KOH, a mountain of Persia, in the province of Irak; 12 miles N. of Com.

TATIUS, ACHILLES, in *Biography*, a Greek writer of Alexandria, is supposed to have lived in the latter part of the third century. He is known to us as the author of a work on the Sphere, of which there remains a fragment, being an introduction to a commentary on the Phenomena of Aratus. A copy of this from a MS. in the Florentine library, by Peter Victorius, was printed. It was afterwards translated into Latin by Petau, under the title of "Isagoga in Phænomena Arati." We learn from Suidas, that Tatius also wrote "Erotics," in which he includes "the Loves of Leucippe and Clitophon." This work is preserved, and affords one of the examples of Greek romance. The Latin version of it was made by Annibal Cruceius, and published at Basil in 1554. The latest edition of this piece is that of Bodem, Greek and Latin, Lipf. 1776, 8vo. It is elegantly written, but of a licentious cast; and hence it has been inferred that the author was a heathen, when he composed it; but Suidas affirms, that he afterwards became a Christian, and attained to episcopacy.

TATNALL, in *Geography*, a county of the state of Georgia.

TATOBIT, a town of Bohemia, in the circle of Boleslau; 5 miles E. of Turnau.

TA-TOU-CHE, a town on the W. coast of the island of Formosa. N. lat. 24° 8′. E. long. 119° 58′.

TA-TSIN, a river of China, which runs into the sea, N. lat. 37° 46′. E. long. 118° 19′.

TATTA, supposed to be at or near the ancient *Pattala*, a town of Asia, which, before the building of Hydrabad, was considered as the chief city of Scind, was founded, according to the tradition of the natives, in the 906th year of the Hegira, and stands on a rising ground, four miles W. of the Indus. It has still a population of 18,000 souls, and is about four miles and a half in circumference. Its wall, constructed for its defence, is now in ruins. The houses of the higher rank are built of bricks, but those of the lower class of wood, plastered with mud. The remains of the mosques, and other handsome edifices of this city, are evidences of its former prosperity; and although on the decline, it enjoys a considerable trade. Its trade is much diminished, on account of the bad government of Scind or Sindy, and the hostile or rapacious disposition of the Seiks, the present possessors of the countries of Moultan and Lahore. The country in the vicinity is a fine rich soil, being watered by canals drawn from the river. Agriculture, however, is much neglected, and the inhabitants of Tatta indicate extreme poverty and wretchedness. To the north of the city is a range of hills, extending several miles in a northerly direction; and to the south is also a range of Table land, reaching almost to the banks of the Indus. Boats trading to Tatta come no farther than Begemah, a village at the distance of about five miles. The river at this place is about a mile in breadth, and four fathoms in depth in the deepest parts. N. lat. 24° 44′. E. long. 68° 17′, as stated in Kinneir's account of Persia; but according to major Rennell, N. lat. 24° 50′. E. long. 67° 37′.

TATTAH, a town of Africa, on the frontiers of Drah and Morocco, in the route from Morocco and Suse to Tombuctoo; 170 miles S.S.E. from Morocco. N. lat. 28° 25′. W. long. 6° 15′. Tattah and its territory contain 10,000 inhabitants. Jackson's Morocco.

TATTAHAR, a town of Bengal; 13 miles N. of Toree.

TATTAMUNGALUM, a town of Hindoostan, in Calicut; 5 miles S. of Palicaudery.

TATTAR. See YOOL.

TATTARAN, a small island in the Sooloo Archipelago. N. lat. 6° 10′. E. long. 121° 58′.

TATTERSHALL, a small market-town in the wapentake of Gartree, Lindsey division of the county of Lincoln, England, is situated on the river Bain, near its junction with the Witham, 9 miles S.S.W. from Horncastle, and 130 miles N. from London. The manor was granted by William the Conqueror to Eudo, one of his Norman followers, whose descendants assumed the name of Tattershall, from this place. Robert Fitz-Eudo obtained a grant from king John, for the inhabitants of the town to hold a weekly market: and another of the family, in the time of Edward III., received the royal licence to erect a castle within his manor of Tattershall. But the present fortress was built by sir Ralph, afterwards lord Cromwell, treasurer of the Exchequer to Henry VI. The castle and manor were granted by Henry VII. to Margaret, countess of Richmond, and entailed on the duke of Richmond; who dying without issue, they were granted by Henry VIII. to the duke of Suffolk; and in the next reign passed to Edward, lord Clinton, afterwards earl of Lincoln. By marriage with an heiress of the Clintons, they are now in the possession of lord Fortescue. The castle stands on a level moor, and is surrounded by two great fosses, the outer one formed of earth, and the inner faced with brick, ten feet deep. It was originally intended as a place of defence, and was progressively raised to great height and extent. In the civil wars it was, however, dilapidated. Till very lately the principal gateway was remaining: the part at present left standing, is a square tower of brick, flanked by four octangular embattled turrets, which are crowned with spires covered with lead. It was divided into four stories. The main walls were carried to the top of the fourth story, where a capacious machicolation surrounded the tower, on which there is a parapet wall of great thickness. This was to protect the persons employed at the machicolations. The tower is constructed upon ponderous groined arches, which support the ground-floor. Near the outer moat stands the parish church, a beautiful and spacious edifice, built in form of a cross. Few churches, perhaps, have suffered more dilapidations than this. It consisted of a nave, having five large arches on a side, and eight clerestory windows, placed in pairs; on each side is a transept, and a magnificent choir. The windows of the latter were glazed with stained glass, which was removed, by a late earl of Exeter, to the chapel of Burleigh, on condition that he replaced it with plain glass, which could have been done for the sum of forty pounds; but this being neglected, the inside has suffered greatly from the weather; although the walls, roof, and pavement remain almost entire. The ruined screen and stalls of wood, richly carved, are almost rotten: behind it is a stone screen, in the arches of which are painted figures. The body of the church and transepts had their windows richly adorned with the legendary histories hiftories of Romifh faints. Before the altar lay two rich brafs figures of Ralph, lord Cromwell, who died in 1455, and of Margaret his wife, who died in 1453. This nobleman, in the feventeenth year of Henry VI., obtained a licence to make the church of Tatterfhall collegiate, for a mafter or warden, fix priefts, fix fecular clerks, and fix chorifters. He alfo founded, near the church-yard, an hofpital or almshoufe, for thirteen poor men and women. At the diffolution, the collegiate revenues were granted to Charles, duke of Suffolk. The hofpital ftill remains, with a fmall endowment. The population report of the year 1811, ftated that Tatterfhall contained 506 inhabitants, occupying 105 houfes. The market is held on Tuefdays, and there are three fairs annually.—Beauties of England and Wales, vol. ix., Lincolnfhire, by J. Britton, F.S.A. Hiftory, &c. of Tatterfhall, with plates, 8vo. 1801.

TATTICOMBA, a town of Hindooftan, in Myfore; 4 miles N. of Dindigul.

TATTO, Ital. from *Tactus*, Lat. in *Mufic*, implies a meafure, or bar, the period when the hand or foot is beaten down in marking the time. See TACTUS, and BATTUTA.

TAT-TOO, *q. d. Tap-to*, a beat of a drum, at night, to advertife the foldiers to retreat, or repair to their quarters in a garrifon, or to their tents in a camp. See RETREAT.

TATTOOING, in *Modern Hiftory*, a name given at Otaheite, and other iflands of the South fea, to the operation of ftaining the body. For this purpofe they prick the fkin, fo as juft not to fetch blood, with a fmall inftrument, fomewhat in the form of a hoe, or blade of a faw: that part which anfwers to the blade is made of a bone or fhell fcraped very thin, and from a quarter of an inch to an inch and a half wide: the edge is cut into fharp teeth or points, from the number of three to twenty, according to its fize. When this is to be ufed, they dip the teeth into a mixture of a kind of lamp-lack, formed of the fmoke that rifes from an oily nut which they burn inftead of candles, and water, or charcoal-duft diluted with water; the teeth, thus prepared, are placed upon the fkin, and the handle to which they are faftened, being ftruck by quick fmart blows, with a ftick fitted for the purpofe, they pierce it, and at the fame time carry into the puncture the black compofition, which leaves an indelible ftain. This operation is performed upon the youth of both fexes, when they are about twelve or fourteen years of age, in feveral parts of the body, and in various figures, according to the fancy of the parent, or perhaps the rank of the party. The women are generally marked with this ftain in the form of a Z, in every joint of their fingers and toes, and frequently on the outfide of their feet: the men are alfo marked with the fame figure; and both men and women have fquares, circles, crefcents, and ill-defigned reprefentations of men, birds, or dogs, and various other unintelligible devices, impreffed upon their legs and arms. But the part on which thefe ornaments are lavifhed with the greateft profufion is the breech; this, in both fexes, is covered with a deep black; above which, arches are drawn over one another, as high as the fhort ribs. Thefe are often a quarter of an inch broad, and the edges are indented. Thefe arches are exhibited, both by the men and the women, with fingular oftentation. The face in general is left unmarked. Some old men had the greateft part of their bodies covered with large patches of black, deeply indented at the edges, like a rude imitation of flame. It is only at New Zealand, and in the Sandwich iflands, that they tattoo the face. There is alfo this difference between the two laft, that, in the former, it is done in elegant fpiral volutes, and in the latter, in ftraight lines, croffing each other at right angles. The hands and arms of the women are very neatly marked, and they have among them a fingular cuftom, the meaning of which could not be learned, that of tattooing the tip of the tongues of the females. This cuftom of tattooing, it is apprehended, is frequently defigned as a fign of mourning on the death of a chief, or any other calamitous event. Perfons of the loweft clafs are often tattooed with a mark, that diftinguifhes them as the property of the feveral chiefs to whom they belong. Hawkefworth's Voyages, vol. ii. p. 189. Marchand's Voyage, vol. i. p. 99. Cook's Third Voyage, vol. iii. p. 155.

TATTUBT, anciently TADUTTI, in *Geography*, a town of Algiers, formerly a confiderable city, now almoft completely in ruins: fome beautiful granite pillars were dug up fome years ago, and placed in a mofque at Conftantina; 25 miles S. of Conftantina.

TATU, in *Ancient Geography*, an ifland fituated in the Nile, in the vicinity of the town of Meroe. Pliny.

TATU, in *Zoology*, the Brafilian name for the armadillo, or fhell-hedge-hog, or *dafypus* of Linnæus. See DASYPUS.

TATU-*Apara*, the name of a creature of the armadillo kind, being the three-banded or *tricinctus dafypus* of Linnæus. See DASYPUS.

This animal burrows under ground, keeps its hole in the day, and rambles out at night: when it would fleep, or when it is afraid of being taken up, it contracts its cruft into a round figure; and hiding its whole body within, it might fooner be taken for a fea-fhell than a land-animal. It is hunted with little dogs, feeds on potatoes, &c. drinks much, grows very fat, and is reckoned delicious eating when young, but when old, has a mufky difagreeable tafte; breeds every month, and brings four at a time. Ray and Pennant.

TATU-*Muftelinus*, the *Weafel-headed Armadillo*, the name of a fmall animal of the armadillo kind. This is the *dafypus unicinctus* of Linnæus, and banded armadillo of Pennant: it has a very flender head, fmall erect ears, the cruft on the fhoulders and rump confifting of fquare pieces; eighteen bands on the fides; five toes on each foot; length from nofe to tail about fifteen inches; the tail five and a half. It inhabits South America. Ray, Pennant, and Grew's Muf. Reg. Soc. p. 19.

TATU-*Paba* of Brafil, is the fix-banded dafypus of Linnæus, having the cruft of the head, fhoulders, and rump, formed of angular pieces, and between the bands, and alfo on the neck and belly, a few fcattered hairs; the tail thick at the bafe, tapering to a point, and not fo long as the body, and five toes on each foot. It inhabits Brafil and Guiana. Pennant.

TATU-*Porcinus*, the name of the pig-headed armadillo, or nine-banded dafypus of Linnæus, with long ears, cruft on the head, fhoulders, and rump, marked with hexangular figures; the nine bands on the fides diftinguifhed by tranfverfe cuneiform marks; breaft and belly covered with long hairs; four toes on the fore-feet, and five on the hind; the tail taper, and a little longer than the body; and length of the whole animal three feet. This animal inhabits South America: and one, that was brought into England a few years ago from the Mofquito fhore, was fed with raw beef and milk, but refufed our grains and fruit. Pennant.

TATUETE, the name of a fpecies of tatu, or armadillo, being the nine-banded dafypus of Linnæus, though Buffon and Pennant afcribe to it only eight bands; it has upright ears, two inches long; fmall black eyes; four toes on the fore-feet, and five on the hinder ones; the length from nofe to tail about ten inches, the tail nine: it is of an iron colour on the back, and whitifh at the fides; its belly alfo is whitifh and naked, except for a few hairs. It inhabits Brafil.

The

The flesh of this is accounted more delicious than that of any other creature of this kind, though they may all be eaten. Ray and Pennant.

TATULA, in *Botany*, a name used by Clusius, and some other authors, for the stramonium, or thorn-apple.

TATZO, in *Geography*, a town of Hungary; 40 miles E. of Munkacz.

TAU, in our *Ancient Customs*, signifies a cross.

"Tradendo dicto comiti Thau eboreum." So Mr. Selden, in his notes upon Eadmerus, p. 159. "Ego Eadgisa prædicti regis ava hoc opus egregium crucis Taumate consolidavi." See Mon. tom. iii. p. 121.

Tau, in *Entomology*, a species of beetle. See Scarabæus.—Also, a species of *Phalena bombyx*.—Also, a species of *Musca*.

Tau, or *Taw*, in *Heraldry*, an ordinary, in figure of a T, supposed to represent St. Andrew's cross, or a cross potence, the top part cut off.

It is thus called from the name of the Greek T, *tau*.

Tau, in *Ichthyology*, a species of *Gadus;* which see.

TAUA, in *Ancient Geography*, a town of Egypt, and the metropolis of the nome Phthemphthus. Ptol. and Steph. Byz.—Also, a town of Asia, between Namaris and Augara. Ptol.—Also, a gulf of the isle of Albion, on the south-eastern coast. This estuary is the firth of Tay.

Taua, in *Geography*, a town of Egypt; 12 miles S. of Denutar.

TAVACCARÆ, in the *Materia Medica*, the name by which many authors call the *coccus Maldiviæ*, or Maldive nut.

TAUAG, in *Geography*, a town of Persia, in Farsistan; 39 miles S.E. of Bender-Rigk.

TAVAI, an island in the Indian sea, near the coast of Siam, about 20 miles long and 3 broad. N. lat. 13°. E. long. 97° 52'.

Tavai, a town of Asia, in Lower Siam; 148 miles S. of Martaban. N. lat. 14° 10'. E. long. 98° 12'.

Tavai *Point*, the extreme point of a tract of land on the coast of Lower Siam. N. lat. 13° 40'. E. long. 98°.

Tavai or *Tovy Poenammoo*, the southernmost of the two islands into which New Zealand is divided by Cook's strait, which is for the most part mountainous and apparently barren, and in this respect of a less favourable aspect than the other island, or *Eaheinomauwe;* which see. The straits, which are about four or five leagues broad, were discovered by Capt. Cook at the close of the year 1769. The islands are situated between the latitudes of 34° and 48° S., and between the longitudes of 181° and 194° W. Tavai-Poenammoo is said to be 500 miles long from S.W. to N.E., and from 55 to 140 broad. See *New* Zealand.

TAVANAGUROY, a town of Hindoostan, in Mysore; 13 miles W. of Colar.

TAVARADO, a town of Portugal, in the province of Beira; 7 miles W.S.W. of Montemor o Velho.

TAVARES, a town of Portugal, in the province of Beira; 13 miles E. of Viseu.

TAVASTLAND, a province of Sweden, bounded on the N. by East Bothnia, on the E. by Savolax or the government of Kuopio, and the Russian government of Viborg, on the S. by Nyland, and on the W. by the government of Abo, or Finland Proper; about 150 miles in length from N. to S., and from 35 to 100 in breadth from E. to W. The country is very fertile, and consists of fine plains, watered by a great number of rivers and lakes, which abound in fish. It is diversified with arable and meadow lands; so that with respect to these natural advantages, it may not only be looked upon as the best part of Finland, but is indeed scarcely surpassed in those particulars by any province in Sweden. It is likewise stored with cattle, fish, and all sorts of game. But notwithstanding this country is so fertile, it is far from being well cultivated; and, consequently, the peasants are generally very poor. Sometimes, indeed, the corn is much damaged by keen and unexpected frosty nights. The northern part of Tavastland is more mountainous and woody than the southern. In the morasses and uncultivated sandy wilds, a ferruginous earth is dug up, from which the Eisensand ertz, or iron sandy ore, as it is called, is prepared. The inhabitants subsist by agriculture, grazing, and breeding of cattle, and some of them are employed in the fisheries. They also traffic in corn, peas, beans, flax, hemp, dried fish, cattle, leather, tallow, butter, lime, the bark of trees, &c.

TAVASTHUS, or Kroneborg, a town of Sweden, and principal place in the province of Tavastland, built in the year 1650, on a pleasant spot, by count Pehr Brahe, and endowed with considerable privileges. In 1713, this town was taken by the Russians; and in the last war between them and the Swedes, it was laid in ashes. The castle, which, exclusive of the town, is properly called "Tavasthehus," or "Tavasteborg," is well fortified, and serves for an arsenal and royal magazine; 80 miles N.N.E. of Abo. N. lat. 61° 1'. E. long. 24° 15'.

TAVAVIS, or Thaouaouis, a town of Asia, in Grand Bucharia; 15 miles N.E. of Bucharia.

TAUBATE', a town of Brasil; 130 miles W. of Rio Janeiro.

TAUBE, Frederick William *Von*, LL.D., in *Biography*, was the son of Dr. Taube, physician to queen Caroline, consort of George II., and born in London in the year 1728. After the queen's death, the father settled at Zelle, where he died in 1742; and in the following year his son was entered at the university of Gottingen. Here he assiduously applied to the study of jurisprudence; and before he left the university, being in his 19th year, he published a dissertation "De Differentiis Juris civilis a jure Naturæ," intended to prove that the principles of the Roman, Canon, and German law were contrary to the law of nature, and inconsistent with the rights of man. When he quitted the university, in the year 1747, he travelled into foreign countries, and particularly through some parts of Africa and America. On his return he practised the law at Gottingen, but finding, in consequence of some displeasure which he had excited by the freedom with which he censured the tediousness of law-suits, that he had no prospect of advancement, he removed to Vienna in 1756, where he obtained some preferment in the army. Soon after an engagement in which he was wounded during the seven years' war, he abandoned Lutheranism, and embraced the tenets of the church of Rome, hoping thus to rise in the Imperial service. Having given proof of his talents and fidelity in an honourable office, which he occupied, and being acquainted with the English language, he was appointed secretary to the Imperial ambassador at the court of London, and repaired hither in October, 1763. Here he married a niece of the celebrated Dean Tucker, with whom he lived in habits of intimacy and friendship. In 1766 he returned to Vienna, and was appointed secretary to the council of trade, which was an office of great fatigue, on account of the journies which it obliged him to take to distant places. When this college was dissolved, in 1776, he retired to Brussels. Having fulfilled another confidential commission with which he was entrusted, he returned from Belgrade to Vienna in 1777, and was ennobled by the emperor, and appointed a member of the government of Lower Austria. His health being

being much impaired, required an attention which it did not fuit his inclination or occupation to give it: his diforder, which was an inflammation of the lungs, increafed, and terminated his life in June, 1778, in the 50th year of his age. He was juftly honoured for his integrity, his zeal to ferve his friends, and his liberality. His literary labours evince the extent of his learning and refearches. His principal works are the tract already mentioned; "Thoughts on the prefent State of our Colonies in America, on their Behaviour to the Mother-Country, and on the true Intereft of the Nation in regard of the Colonies," London, 1766; "Hiftorical and Political Sketch of the prefent State of the Englifh Manufactures, Trade, Navigation, and Colonies, &c." 1774, 8vo.; "Hiftory of the Englifh Trade, &c. from the earlieft Periods till the Year 1776, with an authentic Account of the true Caufes of the prefent War with North America," 1776, 8vo.; "J. J. Schetzen's Elements of Geography, improved and enlarged," 1786, 8vo.; "Hiftorical and Geographical Defcription of the Kingdom of Sclavonia and Duchy of Syrmia, &c. in three parts," 1777, 1778; "An Account of various New Difcoveries, made in 1776 and 1777, in Sclavonia, &c. &c." Leipfic, 1777, 4to. He contributed alfo, between the years 1773 and 1778, to Bufching's periodical publications. He alfo communicated to the Royal Society of London "A fhort Account of a particular Kind of Torpedo found in the River Danube, with feveral Experiments on that Fifh," publifhed in the Phil. Tranf. for 1775. Gen. Biog.

Taube, in *Geography*, a river of Weftphalia, which runs into the Aland, near Seehaufen.

TAUBER, a river of Germany, which rifes about eight miles S. of Rotenburg, in Franconia, and runs into the Maine at Wertheim.

Tauber *See*, a lake of Bavaria; 6 miles W. of Berchtefgaden.

TAUCAEL, or Tuchel, a town of Pruffian Pomerelia. This town was taken and burned, in the year 1320, by the Teutonic knights, and afterwards rebuilt; 44 miles S.S.W. of Dantzic.

TAUCHA, a town of Saxony, in the circle of Leipfic. This town was built in the year 1221, by Albert, archbifhop of Magdeburg, afterwards rebuilt, and in the year 1431 deftroyed by the Bohemians and Huffites, when moft of the inhabitants removed to Leipfic; 6 miles N.E. of Leipfic. N. lat. 51° 22′. E. long. 12° 30′.

TAUCHIRÆ, in *Ancient Geography*, a town of Africa, in Libya, belonging to the territory of Barcé, according to Herodotus, afterwards called Arfinoe. M. D'Anville fuppofes that it is the prefent Teukéra.

TAVDA, in *Geography*, a river of Ruffia, which rifes in Pelim lake, and runs into the Tobol, 40 miles S. of Tobolfk.

TAUDECONDA, a town of Hindooftan, in Golconda; 25 miles S.W. of Warangole.—Alfo, a town of Hindooftan, in Dindigul; 7 miles N. of Dindigul.

TAUDENNY, or Tudenny, a Moorifh and Negro town or village, on the borders of the Defart in Africa; at which place are large ponds or beds of falt, which both the Moors and Negroes purchafe, as well as dates and fig-trees of a large fize. The falt-beds are about 5 or 6 feet deep, and from 20 to 30 yards in circumference. The falt comes up in red lumps mixed with earth, and part of it is red; 270 miles N.N.W. of Tombuctoo. N. lat. 21° 15′. W. long. 1° 25′.

TAUDOON, a town of Hindooftan, in Lahore; 34 miles S.S.E. of Nagercote.

TAVE, a river of France, which runs into the Rhone, about 6 miles below Loudon.

Tave, or *Taff*, a river of Wales, which runs into the fea, near Llaugharn.—Alfo, a river, which rifes in two ftreams in the fouthern part of Brecknockfhire, and runs into the Severn below Cardiff.

TAVERA, a town of Corfica, 18 miles N.N.E. of Ajazzo.

Tavera *di Orta*, a town of Naples, in Capitanata; 14 miles S.S.W. of Afcoli.

TAVERNA, a town of Naples, in Calabria Ultra, formerly the fee of a bifhop, transferred to Catanzaro; 15 miles N. of Squillace.

TAVERNER, John, in *Biography*, an eminent mufician, who flourifhed in the early part of the 16th century. He is often mentioned by Morley among our early contrapuntifts, and by Anthony Wood, as having begun his career by being organift of Bofton, in Lincolnfhire. At the eftablifhment of Cardinal college, now Chrift-church, Oxford, by cardinal Wolfey, he was appointed organift there; but narrowly efcaped martyrdom for herefy, having held frequent converfations with fome Lutherans on the abufes of religion. They were all imprifoned in a deep cave under the college, ufed for the keeping of falt-fifh, of which the ftench occafioned the death of fome of them, and fome were burnt in Smithfield.

Taverner had not gone fuch lengths as many of the fraternity; the fufpicions againft him were founded merely on his having hidden fome heretical books under the boards of the fchool where he taught, for which reafon, and on account of his profeffional eminence, the cardinal excufed him, faying "he was but a mufician," and fo he efcaped.

A fet of books containing maffes and motets to Latin words, fome of which were compofed in the time of Henry VII., and all before the Reformation, is preferved in the mufic-fchool at Oxford. Thefe volumes contain compofitions by John Taverner, Dr. Fayrfax, Avery Burton, John Marbec, William Kafar, Hugh Afhton, John Norman, John Sheppard, and Dr. Tye. The pieces by the three or four laft are entered in a more modern hand, with different characters, and paler ink. The chief parts of the compofitions are tranfcribed in a large, diftinct, and fine hand and character; but bars not having been yet introduced, and being all *ad longam*, *alla breve*, or in *tempo di Capella*, the ligatures, prolations, and moods, render thefe books extremely difficult to read, or tranfcribe in fcore. However, by dint of meditation and perfeverance, we arranged the parts under each other, of feveral movements by all thefe founders of our church mufic, particularly John Taverner, Dr. Fayrfax, and Dr. Tye; having fcored an entire mafs by each of them: as they are the moft ancient and eminent of thefe old mafters, in whofe compofitions the ftyle is grave, and harmony, in general, unexceptionable, if tried by fuch rules as were eftablifhed during their time; but with refpect to invention, air, and accent, the two firft are totally deficient.

The compofitions, however, of thefe early Englifh mafters, have an appearance of national originality, free from all imitation of the choral productions of the continent. Few of the arts of canon, inverfion, augmentation, or diminution, were as yet practifed by them: fhort points of imitation are fometimes difcoverable, but they feem more the effects of chance than defign: and to characterife the chief of thefe compofers in the order they have been named; Taverner and Fayrfax have but little defign and no melody in their compofitions; and it feems as if they fhould not have

have been ranked, as they are by Morley, with thofe of a much higher clafs, at a later period.

We can venture to give a character of Taverner, from an actual furvey of his principal works which have been preferved, and which we have taken the pains to fcore. This author is in general very fond of flow notes, fo that all his pieces which we have feen, are *ad longam*, or, at quickeft, *alla breve*. Long notes in vocal mufic, unlefs they are to difplay a very fine voice, have little meaning, and are wholly deftructive of poetry and accent; but our old compofers have no fcruples of that kind; and being as great enemies to *fhort* fyllables, as to *fhort notes*, exercifed the lungs of a finger as frequently upon one as the other.

As the firft effays at harmony were made in extemporary difcant, upon a plain-fong, fo in written counterpoint, it was long a favourite and ufeful exercife, to build the feveral parts of a movement upon fome favourite chant, making it the ground-work of the compofition. And this cuftom anfwered feveral purpofes: it excited ingenuity in the conftruction of the parts; it regulated and reftrained the modulation within the ecclefiaftical limits; and as the plain-fong had been long ufed in the church, by the priefts and people, it was ftill eafy for the mufical members of the congregation, to join the chorus in finging this fimple and effential part, while the chorifters and choirmen by profeffion, performed the new and more difficult melodies, which had been fuperadded to it by the compofer. The firft reformers, or at leaft their followers, who were perhaps no great muficians, wifhed to banifh every fpecies of art from the church; and either retaining fmall portions of ancient chants, or making melodies, in the fame plain and fimple ftyle, for their hymns and pfalms, threw afide all figurative harmony and florid counterpoint; and fung in notes of equal duration, and generally in mere unifon, thofe tunes which are ftill retained by the Calvinifts, and in moft of the reformed churches of Chriftendom. At the latter end of the fifteenth, and during the whole of the fixteenth century, as fome chant or tune was the foundation upon which the harmony of almoft every movement of a mafs or motet was built, the additional parts were the fuperior, medius, countertenor, tenor, to which was given the plain-fong in fquare black notes, of equal lengths to femibreves in alla breve time, and baffes. The clofe or final movement of one of thefe maffes is inferted in Burney's General Hiftory of Mufic, vol. ii. p. 557.

TAVERNES, in *Geography*, a town of France, and chief place of a canton, in the department of the Var, and diftrict of Brignolles. The place contains 1536, and the canton 4529 inhabitants, on a territory of 280 kiliometres, and 9 communes; 3 miles N. of Barjols.

TAVERNIER, John Baptist, in *Biography*, a diftinguifhed traveller, was the fon of a native of Antwerp, and born at Paris in the year 1605. The frequent infpection of the maps and charts fold by his father, infpired him with a paffion for travelling; fo that at the age of twenty-two he had made tours through France, England, the Low Countries, Germany, Switzerland, Poland, Hungary, and Italy. In his bufinefs as a jeweller he was eminently fkilful; and he employed 40 years in fix journies in Turkey, Perfia, and the Eaft Indies, by all the practicable routes. Having acquired great wealth, on his return from his fixth journey in 1668, he determined as a Proteftant to live under a free government; and, with this view, purchafed the barony of Aubonne, near the lake of Geneva. But having fuffered very confiderable lofs of property by the mifconduct of a nephew, he fold his barony in 1687, and commenced a feventh journey, which terminated his life at Mofcow in 1689, at the age of 84. Deftitute of talents for writing, he employed Sam. Chappuzeau of Geneva to arrange his memoirs, which is faid to have been no eafy tafk. The fruit of this labour was given to the public in two volumes, defcribing his fix journies, in 1679; and another was added in 1681, by La Chapelle, containing an account of Japan and Tonquin, with a hiftory of the colony of the Dutch in the Eaft Indies. Thefe memoirs of Tavernier, notwithftanding reflections on his veracity, and charges of plagiarifm, have been often cited as authority by later writers. Gibbon reprefents him as "the jeweller who faw fo much and fo well." Bayle. Moreri. Gen. Biog.

Tavernier *Key*, in *Geography*, a fmall ifland on the north coaft of Cuba, near Tortuga.

TAVERNY, a town of France, in the department of the Seine and Oife; 6 miles E. of Pontoife.

TAVETCH, a community which, with that of Difentis, forms one of the high jurifdictions of the Grey League in Switzerland. Thefe two communities occupy the weftern extremity of the valley of Sopra Selva, ftretching as far as the confines of Uri. Tavetch is a pleafant valley, lying at the foot of the Alps, which feparate the Grifons from the canton of Uri. The villages are numerous, confifting of fcattered cottages chiefly conftructed of wood. This valley produces pafture, hemp, and flax, and a fmall quantity of rye and barley. The trees are chiefly firs and pines, and their number gradually diminifhes towards the extremity of the vale.

TAVETSCHE, a town of the country of the Grifons; 13 miles from Ilantz, the capital.—Alfo, a mountain of the fame country; 5 miles S.W. of Ilantz.

TAUFFERS, a town of the county of Tyrol; 6 miles S.S.W. of Glurentz.

TAUGHT, or Tau't, *Tight*, in the *Sea Language*, denotes the ftate of being extended or ftretched out. Thus they fay, *fet taught* the fhrouds, the ftays, or any other ropes, when they are too flack and loofe.

TAVI, in *Geography*, a town of Sicily, in the valley of Noto; 7 miles N.E. of Caftro Giovanni.

TAVIANO, a town of Naples, in the province of Otranto; 11 miles W.N.W. of Alefano.

TAUJEPOUR, a town of Bengal; 60 miles S.S.W. of Calcutta. N. lat. 21° 52′. E. long. 87° 45′.—Alfo, a town of Bengal; 32 miles E. of Purneah. N. lat. 25° 48′. E. long. 88° 11′.—Alfo, a town of Hindooftan, in Bahar; 15 miles N. of Chuprah. N. lat. 26° 2′. E. long. 84° 50′.

TAVIGNANO, a river of Corfica, which runs into the fea, 15 miles S. of Cervione.

TAUILA, a town of Arabia, in the province of Yemen; 24 miles W. of Tana.

TAUILE, a town of Egypt, on the Nile; 2 miles N. of Manfora.

TAVIRA, or Tavila, a fea-port town of Portugal, in the province of Algarve, furrounded with walls, and defended by a caftle; the harbour is protected by two forts. It contains two churches, an hofpital, five convents, and about 5000 inhabitants; 111 miles S.S.E. of Lifbon. N. lat. 37° 7′. W. long. 7° 35′.

TAVISTOCK, an ancient borough and market-town, in a hundred of the fame name, in the county of Devon, England, is fituated on the banks of the river Tavy, 34 miles W.S.W. from Exeter, and 206 miles in the fame bearing from London. Its origin and growth feem to have arifen from the foundation and eftablifhment of a magnificent abbey in the tenth century, by Ordgar, earl of Devon, and his

his son Ordulph. Within thirty years after its foundation, this abbey was burnt by the Danes, but was soon afterwards rebuilt, and became more flourishing than before. By a charter granted by Henry I., it appears that he bestowed "the jurisdiction, and the whole hundred of Tavistock," upon the abbey, together with the privilege of a weekly market, and a three-days' fair. This charter is recited and confirmed by one granted 21 Edw. III. The riches of the abbey progressively increased; and Richard Barham, the thirty-fifth abbot, obtained from Henry VIII. the privilege of sitting in the house of peers, or, in other words, was mitred. His patent was dated January 23d, 1513; but the honour continued only till the year 1539, when John Peryn, the thirty-sixth abbot, surrendered the abbey to the crown, and had a pension of 100*l. per annum*. The possessions of the abbey, with the borough and town of Tavistock, were given by the king to John, lord Russel, whose descendant, the present duke of Bedford, is now proprietor. Various fragments of the abbey still remain, but are, for the most part, incorporated with other buildings. The abbey church is described by Leland as 126 yards in length; the cloisters as extensive; and the chapter-house as a most magnificent structure: but all these have long since been completely demolished. Several buildings, that seem to have belonged to the abbey, are now used for warehouses; and adjoining to the principal inn is a large, handsome, arched gateway, ornamented with lofty pinnacles, apparently of the time of Henry VI. The town of Tavistock is large and populous; but the streets are narrow, and indifferently paved; and many of the houses have an appearance of age. The river is here crossed by two bridges, and after storms of rain, by flowing over various ledges and masses of rock, presents a very tumultuous spectacle. The church is a spacious edifice, consisting of four aisles, a chancel, and a tower at the west end, raised on arches. Within the church are preserved some human bones of a gigantic size, which were found in a stone coffin, dug out of the ruins of the abbey, and are said by tradition to be those of Ordulph, whom William of Malmsbury represents of such immense stature, that he could stride over rivers ten feet wide! Tavistock is a borough by prescription, and has sent two members to parliament from the 23d year of Edward I. The right of election is in the freeholders resident in the borough. The town is one of the stannaries of Devonshire, but does not appear to have been incorporated. It is governed by a portreve, who is elected annually at the court of the lord of the manor. The population of the parish, according to the return of the year 1811, amounted to 4723; the number of houses to 514. Many of the inhabitants are employed in the manufacture of serges for the East India Company. Five fairs are held annually, and a weekly market on Saturdays. An institution for the study of Saxon literature existed in Tavistock at a very early period, and lectures were read in that language in a building purposely appropriated, and called the Saxon school. These lectures were discontinued about the time of the reformation. Several of the abbots were learned men; and the encouragement they gave to literature is evident, by the establishment of a printing-press in the abbey within a few years of the time when the art was brought into England. Among the books that issued from this press was Walton's translation of "Boethius de Consolatione," "emprented in the exempte Monastery of Tavestoke in Denshyre, by me Dan Thomas Rychard, monke of the said Monastery," 1525, 4to.; and the "Confirmation of the Tynners Charter," 26th of Henry VIII., 16 leaves, 4to. Bishop Gibson also mentions a Saxon Grammar as having been printed here about the commencement of the civil wars; but this assertion is supposed by other antiquaries to be unfounded.

Among the more eminent natives of Tavistock was sir Francis Drake, one of the most distinguished seamen that Britain ever produced, and the first Englishman that circumnavigated the globe.

Morwell-house, about three miles from Tavistock, was the hunting-seat of the abbots of Tavistock; and from its situation near Morvel-down, and the woods on the banks of the Tamar, was well adapted for this purpose. Its form is quadrangular, with a large arched gateway in front, ornamented in a similar manner to those of the abbey. The vaulted ceiling of this entrance has several coats of arms sculptured in moor-stone. At a little distance is Morwell-rock, which rises almost perpendicularly to an immense height from the bed of the Tamar.

About four miles north of Tavistock is Bren-Tor, a vast mass of craggy rock, which shoots up from the road between Tavistock and Lydford, and becomes a very conspicuous sea-mark to mariners in the British Channel, though more than 20 miles distant. The summit is frequently enveloped in clouds, but in fair weather commands an extensive prospect, and the ships in Plymouth harbour may be distinctly seen from its summit. Near the top is the parish church of the little village of Brent, which, like most of the churches in similar situations, is dedicated to St. Michael. On Dartmoor, about three miles east of Tavistock, are several masses of rock, and also the remains of Druidical circles and avenues.—Beauties of England and Wales, vol. iv. Devonshire, by J. Britton and E. W. Brayley.

TAVIUM, or TAVIA, in *Ancient Geography*, a town of Asia, in Galatia, and capital of the Trocmi, according to Ptolemy, Strabo, and Pliny.

TAULACUM, in *Natural History*, a name given by the people of the East Indies to a species of orpiment, which is very common with them.

It is of a dirty yellow colour, and is composed partly of an irregular mass, partly of fine flakes, like scales of fishes. These are of the best colour. The whole mass, on being exposed to the fire, burns, and emits copious fumes; but it does not melt readily. After it has been several times calcined, the Indians give it internally in intermittent fevers, with safety and success. Woodw. Catal. Foss. vol. i. p. 24.

TAULE', in *Geography*, a town of France, in the department of the Finisterre; 3 miles N.W. of Morlaix.

TAULE, a town of Hindoostan, in Mysore; 47 miles E. of Seringapatam.

TAULIGNAN, a town of France, in the department of the Drôme; 12 miles S.E. of Montelimart.

TAUMACO, a town of Greece, in the province of Thessaly; 18 miles N.W. of Zeiton.

TAUMAGO, an island in the Pacific ocean, discovered by Quiros, in 1606; about 24 or 25 miles in circumference. The island abounded with bananas, cocoa-trees, and palms: it produces also sugar-canes, and many kinds of nutritious roots. The fleet here obtained, without difficulty, refreshments, water, and wood, of which it stood in great need. The Spaniards lived on good terms with the natives, who were eager to procure them all the assistance that their island afforded; nor was peace infringed till the very moment of their departure. Thinking that it would be of service in the remainder of their voyage, to have some Indians on board, who might act as guides or interpreters, the Spaniards seized four whom they carried on board by force. Their chief was soon informed of it, and came to demand them in the most earnest manner; but they were refused, and

and war was inſtantly declared. A fleet of canoes came out to attack the Spaniſh ſhips, which their fire-arms quickly diſperſed, and would totally have deſtroyed, had not theſe brave iſlanders, with all their courage, been ſenſible of their inferiority. S. lat. 10°. E. long. 169° 25′.

TAUME, a river of England, which riſes in the county of York, and runs into the Merſey, in Lancaſhire, oppoſite Stockport.

TAUNA, a town of Egypt, on the Bahir Joſeph, or Canal of Joſeph, which forms a communication between the Nile and the Birket el Kerum; 5 miles S.W. of Aſhmunein.

TAUNDA, a town of Hindooſtan, in Oude; 50 miles S.E. of Fyzabad. N. lat. 26° 32′. E. long. 82° 53′.

TAUNNA, a town of Hindooſtan, in Oude; 30 miles W. of Lucknow.

TAUNT, a ſea-term, ſignifying high or tall. When the maſts of a ſhip are too tall for her, the ſailors ſay, ſhe is *taunt-maſted*.

TAUNTON, in *Geography*, a conſiderable market-town and borough, in the hundred of Taunton-Dean, county of Somerſet, England, is ſituated on the high road between Bath and Exeter, 52 miles S.W. from the former city, 32 miles N.E. from the latter, and 144 W. by S. from London. It was anciently called Thonodunum, or the Town of the Tone, by which river it is watered. Taunton is unqueſtionably a place of remote antiquity: from the diſcovery of coins and other relics, there is reaſon to ſuppoſe it was not unknown to the Romans; but it is certain it was of great note in the time of the Saxons. For Ina, a Weſt-Saxon monarch, built a caſtle here for his reſidence in the year 700, which was deſtroyed in 722 by his queen Ethelburga, who prevailed on him to reſign the crown, and retire to a monaſtery. A new caſtle, on the ſcite of the former, was erected by William Giffard, biſhop of Wincheſter in the time of Henry I. By various documents of the biſhops of that ſee, dated Taunton caſtle, it ſeems to have been a place of their frequent reſidence. In 1495 the whole building was repaired, and an embattled gateway built by biſhop Thomas Langton. Though the building has been much modernized, this gateway ſtill remains. Conſiderable improvements were made in 1577, by biſhop Robert Horn, who likewiſe built the great hall as it now ſtands, in which the aſſizes, county ſeſſions, and biſhop's courts are held: it is 119 feet in length, 30 in width, and 20 in height. The other apartments are applied to various public uſes. The whole caſtle occupied a front of 195 feet, with a circular tower at each end, of which only one is now remaining. Taunton had a diſtinguiſhed ſhare in the various civil commotions of this kingdom: in the conteſts of the Saxon kings; in the civil wars between the houſes of York and Lancaſter; and in the inſurrection in favour of Perkin Warbeck, in Henry VII.'s reign. In the civil wars of Charles I., it became an object of vigorous ſtruggle between the royal and parliamentary forces which ſhould poſſeſs its fortreſs, it being conſidered as the key to the weſt of England. It was alſo deeply involved in the rebellion of the duke of Monmouth, who here aſſumed the title of king, and was publicly proclaimed.

The town of Taunton, in point of ſize, buildings, and reſpectability of inhabitants, may vie with moſt cities. It contains two pariſhes, extends nearly a mile from eaſt to weſt, and conſiſts of four principal ſtreets, which are well built, and of commodious width. Though ancient and populous, it was not incorporated till the reign of Charles I., 1627. It did not long enjoy this privilege; for Charles II., on his reſtoration, out of reſentment for the town's adherence to the parliament againſt his father, deprived it of its charter. It continued disfranchiſed 17 years, when the king granted it a new charter. The corporation conſiſts of a mayor, recorder, a juſtice of the peace, two aldermen, ten capital, and ten inferior burgeſſes. The juſtice is always the laſt mayor, who, with the two aldermen, are annually elected out of the capital burgeſſes; and the vacancies occaſioned by this election are filled up from the inferior members of the corporation. The officers are a town-clerk, two ſerjeants at mace, a bell-man, and a beadle. There are acting under the mayor, and ſworn in by him, two conſtables and ſix tything-men or petty conſtables, who, with two portreves and two bailiffs, are annually choſen by a jury, and are, properly ſpeaking, the officers of the biſhop of Wincheſter, in whoſe court they are elected. The mayor's officers cannot arreſt within the borough; and there being no priſon, except a kind of town-bridewell called the Nook, debtors are ſent to the county gaol at Ilcheſter. Though the town has for ages been flouriſhing, and of great importance in the county, yet the corporation has neither land, houſes, nor joint ſtock in money; their charter excluding them from ſuch poſſeſſions.

Taunton is an ancient borough by preſcription, and has returned two members to parliament from the year 1294, 23 Edward I. The right of election is veſted in a deſcription of people called pot-wablers, or pot-wabloners. Theſe are all ſuch inhabitants as reſide within the borough, and boil their own pots, provided they are not paupers, and have not received relief from the fund of any charity within a year. The number of voters is eſtimated at about 500. The bounds of the borough, to which the right of election is limited, are ſmall in proportion to the town, comprehending only a part of the pariſh of St. Mary Magdalen. The principal article of trade in Taunton is the woollen manufacture, which has flouriſhed to a great extent almoſt ever ſince its introduction into England by the famous John Kempe, the firſt manufactory being eſtabliſhed ſo early as the year 1336. Upwards of one thouſand looms are ſaid to have been employed at one time; but the trade is now greatly reduced, and the population decreaſed: houſes in the ſuburbs have fallen to ruin, and have been deſtroyed. A large ſilk manufactory was eſtabliſhed in the year 1780. Two large markets are held on Wedneſday and Saturday, and here are two annual fairs. By the population report of the year 1811, Taunton was ſtated to contain 1371 houſes, and 6997 inhabitants.

The edifices for religious worſhip in this town are two pariſh churches, and five diſſenting meeting-houſes. The church of St. Mary Magdalen is a ſpacious beautiful ſtructure, with a lofty and ſtrong tower of excellent workmanſhip, of the florid ſtyle, having four ſtately pinnacles thirty-two feet high, making the whole height 153 feet. This tower has thirteen handſome windows, with a variety of curious prominent ornaments, that give the whole an air of magnificence, united to a delicate elegance, not to be equalled in the county, nor perhaps in the kingdom. It was probably erected by Henry VII., who, when he came to the crown, rebuilt many of the churches in Somerſetſhire, as a reward of the attachment of the county to the Lancaſtrian party. The inſide of the church is anſwerable to the exterior, and makes a grand appearance. Its curious roof is ſupported by twenty-four pillars, in four rows, dividing it into five aiſles and a chancel. There are forty-four windows, ſome of which have painted glaſs. The other church, St. James's, though every way inferior to the former, is a ſtrong, plain, ancient ſtructure, ſuppoſed to have been built in the 13th century. The meeting-houſes are St. Paul's, and the new meeting,

ing, for Proteſtant diſſenters; one for Baptiſts, one for Quakers, and one for Weſleyan Methodiſts. The buildings for charitable purpoſes are, a free grammar-ſchool, founded by Richard Fox, biſhop of Wincheſter, about the year 1500; two large and well endowed alms-houſes, founded in the 17th century, by Mr. Robert Graye and Mr. Richard Huiſh; two other alms-houſes, on a ſmaller ſcale; two work-houſes; and an hoſpital, the moſt capital of its kind in the county: it is a ſquare ſtructure, 90 feet on a ſide; contrived to admit through every part a free circulation of freſh air; and forming on the whole a commodious receptacle for the diſeaſed. The firſt corner-ſtone was laid by lord North in 1772, and the building was completed in 1774. In the centre of the town is a ſpacious building, erected in 1772, under the ſanction of an act of parliament; the lower part is the market-houſe, over which is the town-hall, where the borough ſeſſions are held.

On the eaſt part of the town was a priory for Black canons, founded in 1127, by biſhop Giffard: at the diſſolution, it was granted to Matthew Colehurſt. A leper-houſe was alſo founded about the year 1280, by Thomas Lambritz; and a houſe of White or Carmelite friars, in 1322, by Walter de Meryet. Both theſe houſes are ſuppoſed to have been private property previous to the diſſolution. —Collinſon's Hiſtory of Somerſetſhire, vol. iii. Toulmin's Hiſtory of the Town of Taunton; 4to. 1791. Maton's Obſervations on the Weſtern Counties of England, vol. ii. 8vo. 1797.

Taunton, a river of Maſſachuſetts, which runs into the ſea at Rhode iſland, N. lat. 41° 24′. W. long. 71° 10′.—Alſo, a town of Maſſachuſetts; 29 miles S. of Boſton. N. lat. 41° 48′. W. long. 71° 2′.—Alſo, a river of America, in the province of Maine, which runs into the ſea near New Briſtol.

TAUNTON-DEAN, a valley of England, extending about thirty miles in length, in the county of Somerſet, of fertility and produce equal to almoſt any in the kingdom. It takes its name from Taunton, the principal town.

TAVOLADOTO, a ſmall iſland near the eaſt coaſt of Sardinia. N. lat. 40° 54′. E. long. 9° 5′.

TAVOLARA, a ſmall iſland near the eaſt coaſt of Sardinia. N. lat. 40° 52′. E. long. 10° 5′.

TAVORA, a river of Portugal, which runs into the Duero, 5 miles N.E. of Lamego.—Alſo, a town of Portugal, in the province of Beira; 6 miles E. of Lamego.

TAVOYVOVEL, a ſmall iſland near the eaſt coaſt of Lewis. N. lat. 58° 6′. W. long. 6° 29′.

TAURAGUR, a town of Hindooſtan, in Lahore; 24 miles W.N.W. of Nogarcot.

TAURASI, a town of Naples, in Principato Ultra; 12 miles S.E. of Benevento.

TAURASIA, in *Ancient Geography*, a town of Italy, in Gallia Tranſpadana.

TAURAT, in *Geography*, a town of the iſland of Cuba; 38 miles N.N.E. of St. Jago.

TAUREA, among the Romans, a puniſhment inflicted by whipping with ſcourges made of bulls' hides.

TAUREAU, in *Geography*, an iſland on the French coaſt, with a fort to defend the harbour of Morlaix.

TAUREE, a town of Bengal; 35 miles S.S.E. of Ghidore.

TAURESIUM, in *Ancient Geography*, a town of European Dardania, on the other ſide of the territory of Duras; the birth-place of Juſtinian, who founded here a magnificent town, called after his own name.

TAURI *liberi libertas*.—In ſome ancient charters, *taurus liber* ſignifies a common bull kept for all tenants within ſuch a manor, or liberty.—"Cum libertate faldiæ, liberi tauri, et liberi apri, &c." See *Free* Bull.

Tauri, in *Ancient Geography*, a people of Sarmatia, in the vicinity of Scythia. According to Herodotus, theſe people had a cuſtom of ſacrificing to Iphigenia, the daughter of Agamemnon, the ſtrangers whom chance threw on their coaſts, and alſo the Greeks who fell into their hands.

TAURIA, Ταυρεια, in *Antiquity*, a feſtival in honour of Neptune. Pot. Archæol. tom. i. p. 432.

Tauria, in *Ancient Geography*, an iſland of the Mediterranean ſea, between New Carthage and Cæſarea of Mauritania. Anton. Itin.

TAURIANA, a town of Italy, in Brutium.

TAURICA Chersonesus. See Chersonesus *Taurica* and Crimea.

TAURIDA, Tauricheskaia, or *province of Tauris*, in *Geography*, a province of Ruſſia, being part of the government of Catherinenſlaf or Ecaterrinenſlaf or Ekaterinoſlav, bounded on the N. by the rivers Dnieper and the Konſkija, on the W. and S. by the Black ſea, and on the E. by the ſea of Azoph. This fertile peninſula, which is the great mart of commerce in the Black ſea, was colonized for the purpoſes of trade by the Greeks, Romans, Genoeſe, occupied by the Turks under Mahomet II., and governed by the khan of the Tartars, a vaſſal to the Porte. On the peace of Kninardi, in 1774, it was declared an independent ſovereignty, taken poſſeſſion of by Catharine II. on the abdication of the khan Salim Gerai, in 1783, and confirmed to Ruſſia by the Porte in the ſame year by the treaty of Conſtantinople. The empreſs revived ſeveral of the ancient Greek names. M. Pallas has exhibited an animated and delightful picture of this province in his account of a journey made in 1794, for which we refer to Tooke's Ruſſia, vol. i. For a farther account of it, ſee Crimea. See alſo Russia.

Taurida, *Mountains of*, are extended and lofty, forming the ſouthern ſide of the province, and the ſhore of the Euxine ſea. The range extends from Theodoſia in a ſtraight line weſtwards, quite up to Balbeck. At Karaſobaſar two towering pinnacles ſhoot up, and at Akmelchat a very elevated one, called Aktau. The ſmaller mountains ſtand diſtinct and ſcattered. It is very probable that this range is partly a continuation of the Caucaſian, and partly of the Carpathian mountains; and that theſe two principal chains are connected by it: which alſo ſeems apparent from the nature and qualities of the mountains oppoſite to thoſe of Taurida, which extend beyond the Danube, through Bulgaria, and are called Pulkanian. The greater part of theſe mountains of Taurida conſiſts of chalk-maſſes with petrifactions, and many beds of ſand and marle, and chalk-hills with flints. Hence it is preſumed that they are not to be claſſed with the original, but only with the alluvial or depoſited mountains. A part of them is thought to owe its origin even to the ſubterranean fires. Whether this be the caſe or not, it is ſaid that lead, copper, and iron ores are found in them, as well as jaſper, agate, and mountain cryſtal. They are very rich in lime-ſtone, marble, ſlate, ſand-ſtone, coals, naphtha, and common ſalt. The iſle of Taman conſiſts merely of beds of ſand and marle, without lime-ſtone. The height of the Taurida mountains is moderate; and they are in a great degree deſtitute of foreſts. The trees that grow upon them are thoſe of the richeſt foliage, ſuch as oak, beech, cheſnut, &c. But what they want in wood is made up very amply by the rich and beautiful herbs of the vallies. The rivers that take their riſe from theſe mountains are the Alma, Katſha, Kabarda, Salgyr, Karuſſu, and many leſſer ſtreams, that form pleaſing natural caſcades.

TAURILIA, among the Romans, games in honour of the infernal gods. They were otherwife called *ludi taurii.*

TAURINIA, in *Ancient Geography*, a town of European Sarmatia, in the peninfula called "Curfus Achillis." Steph. Byz.

TAURIS, in *Geography*. See TABREEZ.

TAURISCI, in *Ancient Geography*, a Celtic people, who were eftablifhed along the Danube. They were feparated from the Scordifci by a mountain called by Pliny Mons Claudius.

TAURO, a town of European Sarmatia, in the peninfula of "Curfus Achillis." Suidas.

TAUROBOLIUM, or TAUROBOLION, among the *Ancients*, facrifices of bulls, which were offered to Cybele, the mother of the gods, to render thanks to the goddefs of the earth, for her teaching men the art to tame thofe animals, and fit them for labour.

The Taurobolium was a kind of facrifice of expiation and purification; of which no trace occurs before the reign of Antonine, and which feems to have terminated under Honorius and Theodofius the younger. It was principally employed in the confecration of the priefts of Cybele.

TAVRO-CASTRO, in *Geography*, a town of Greece, in Livadia; 20 miles N.N.E. of Athens.

TAUROCINIUM, in *Ancient Geography*, a river of Italy, in Magna Græcia; and the people who lived upon its banks in the vicinity of the town of Rhegium, were called Taurocini.

TAUROCOLLA, *Bull-Glue*, a fort of glue much ufed among the ancients in works that required ftrength, being accounted far ftronger than any other kind. It was made by boiling down the ears and genital parts of a bull in water.

TAUROENTUM, in *Ancient Geography*, a colony founded by the ancient Marfeilloife on the fea-fhore, to the right of the entrance into the bay of Ciotat.

TAUROGEN, in *Geography*, a town of Samogitia; 30 miles S.W. of Rofienne.

TAUROMENIUM, in *Ancient Geography*, a town of Sicily. See TAORMINA.

TAUROPOLIA, in *Antiquity*, feafts celebrated in honour of Diana and Apollo, in the Icarian ifles, *viz.* thofe of the Archipelago and of the Ægean fea.

TAUROPOLIAN, in *Ancient Geography*, the name of a temple fituated in the ifle of Samos; dedicated to Artemis, or Diana.—Alfo, a temple dedicated to Diana, in the ifle of Icaria. Strabo.

TAUROPOLIS, a town of Afia Minor, in Caria.

TAURUS, in *Aftronomy*, the *Bull*, one of the twelve figns of the zodiac, and the fecond in order.

The ftars in the conftellation Taurus, in Ptolemy's catalogue are 44; in Tycho's catalogue, 43; in Hevelius's catalogue, 51; in the Britannic catalogue, 141. See CONSTELLATION.

TAURUS, in *Ancient Geography*, a name given by the ancients to a chain of mountains, which commenced in Afia Minor, occupied the northern part of Cilicia, and proceeded to join, towards the north of Syria, mount Amanus; but afterwards the name has comprehended the mountains which reach from the Taurus of the ancients to the fouth of the Cafpian fea.—Alfo, the name of a promontory on the eaftern coaft of Sicily. Ptolemy.—Alfo, a mountain of Scythia. It is a branch of mount Taurus that extends to the environs of the Palus Mæotides and the Cafpian fea. Jornandes.—Alfo, a mountain of Germany, and a mountain of Æthiopia.—Alfo, a place of Paleftine, at the entrance of the town of Jericho.—Alfo, a river of Greece, in the Peloponnefus.—Alfo, a river of Afia, in the vicinity of Pamphylia.—Alfo, the name of one of the three canals by which the town of Alexandria, in Egypt, communicates with the fea.—Alfo, a place of Sicily, 60 ftadia from the town of Syracufe.—Alfo, a marfh of Gallia Narbonnenfis.

TAURUS, in *Geography*, was a general name given by the ancients to any thing of a gigantic nature, and hence it has been applied to a celebrated range of mountains, which is faid to extend from the Grecian Archipelago to the extremities of Afia. By Strabo it is thought to originate in Caria and Pamphylia; and by fome modern geographers, on the coaft of Cilicia, not far from Scanderoon. However this be, it interfects Afia Minor from E. to W., and advancing in a N.E. direction, intercepts the courfe of the Euphrates, and fpreads itfelf over the kingdom of Armenia, where it unites with mount Caucafus. It then detaches a variety of branches into Perfia, of which the moft confpicuous is that named Mont Zagros by the ancients. This long and lofty range formerly divided Media from Affyria, and now forms the boundary of the Perfian and Turkifh empires. It runs parallel with the river Tigris and Perfian gulf, and almoft difappearing in the vicinity of Gombroon, feems once more to rife in the northern diftricts of Kerman, and following an eafterly courfe through the centre of Meckraun and Balouchiftan, is entirely loft in the deferts of Sinde.

TAURUS, in fome *Ancient Cuftoms*, fignifies a hufband.

Leg. H. I. cap. 7. "Videtur autem matris ejus, cujufcunque taurus alluferit."

TAURUS, in *Entomology*, a fpecies of *Scarabæus*.—Alfo, a fpecies of *Cicada*, found in Coromandel.—Alfo, a fpecies of *Cimex*.

TAURUS, in *Ornithology*, a name given by the ancients to the bittern or butter-bump, from its imitating the roaring of a bull in its noife.

TAURUS, in *Zoology*. See BOS and BULL.

TAURUS *Æthiopicus*, the *Æthiopian Bull*, an animal defcribed in a very remarkable manner by Pliny; but fo contrary to the courfe of nature, that we may very juftly rank it among the other extraordinary animals, fuch as the mantichora and the vermis cæruleus, of fixty or feventy feet in length.

TAUSA, in *Geography*, a town of Saxony, in the circle of Neuftadt; 2 miles N. of Ziegenbruck.

TAUSCHELIN, a town of Bohemia, in the circle of Schlan; 10 miles W.N.W. of Schlan.

TAUSCHIN, a town of Bohemia, in the circle of Kaurzim; 7 miles S.E. of Kofteletz.

TAUSEN, JOHN, in *Biography*, called the "Danifh Luther," becaufe he was one of the firft promoters of the reformation in Denmark, was born of parents who were peafants in the ifle of Fyen, in the year 1499. Having finifhed his courfe of education, he became a monk in the convent of the order of St. John of Jerufalem, at Antoorfkow, and here he ingratiated himfelf fo much with the prior, that he obtained a penfion for travelling into foreign countries, on condition that he fhould avoid Wittenberg, which was at that time the focus of herefy. In his progrefs he vifited Louvain and Cologne, where he had an opportunity of perufing fome of the works of Luther, with which he was fo captivated, that he could not refift the inclination of proceeding to Wittenberg, notwithftanding the prior's interdict. In this place he purfued his ftudies under the inftruction of Melancthon with fuch fuccefs, that he was appointed to give public lectures on theology in the univerfity of Copenhagen. In his convent, to which he was foon recalled, he frequently preached; and at length, *viz.* in 1524, publicly avowed himfelf a difciple of Luther. The confequence

quence was his expulſion from the convent at Antoorſkow, and his retirement to another at Wiborg. As he here propagated his doctrine, he was impriſoned by the prior; but by this act of ſeverity he was emboldened to proceed, and preached to the populace from a window. Being liberated in 1526, he was in the ſame year appointed chaplain to the king, and permitted to preach openly at Wiborg. He ſoon acquired a number of followers, who went to church armed, in order to protect him from the violence of the Papiſts. In 1529 he was invited to officiate in the church of St. Nicholas, at Copenhagen; and in the following year he attended, as director, at a conference which took place in that city between the Lutherans and the Roman Catholics. On the death of Frederic I. he was baniſhed from Zealand, but being after a few days invited to return, he was appointed clergyman and lecturer in theology at Roſchkild. In 1542 he was advanced to the epiſcopal chair of Ribe, and died in the year 1561. Tauſen, beſides an improved Daniſh tranſlation of the Pſalms, printed in 1544, and at Copenhagen in 1557, was the author of ſeveral works, conſiſting of Daniſh hymns, and treatiſes on the doctrine of Luther. A full account of his meritorious ſervices may be found in Profeſſor Munter's Hiſtory of the Reformation in Denmark, &c. Gen. Biog.

TAUSS, or Domazlitz, in *Geography*, a town of Bohemia, in the circle of Pilſen; 26 miles S.S.W. of Pilſen. N. lat. 49° 25′. E. long. 12° 52′.

TAUSTE, a town of Spain, in Aragon; 25 miles N.W. of Saragoſſa.

TAUTENBURG, a town and citadel of Saxony, in Thuringia; 3 miles S. of Camburg.

TAUTICA, in *Ancient Geography*, a town of Aſia, in Media.

TAUTOLOGICAL Echoes, are ſuch echoes as repeat the ſame ſound or ſyllable many times. See Echo.

TAUTOLOGY, in *Grammar*, a needleſs repetition of the ſame ſenſe in different words; or, a repreſentation of any thing as the cauſe, condition, or conſequence of itſelf. Of the firſt kind is that of Virgil:

> " ——Si fata virum ſervant, ſi veſcitur aura
> Ætherea, neque adhuc crudelibus occubat umbris."

Such alſo is this of Addiſon:

> " The dawn is overcaſt:—the morning lours;
> And heavily in clouds brings on the day." Cato.

Here the ſame thought is repeated thrice in different words.

It is alſo conſidered as of the nature of tautology, to lengthen a ſentence by coupling words altogether or nearly ſynonimous, whether they be ſubſtantives or adjectives, verbs or adverbs. This is a very common fault, and to be found even in our beſt writers. It ſhould ever be remembered, as an invariable maxim, that words which add nothing to the ſenſe or to the clearneſs, muſt diminiſh the force of the expreſſion. There are two occaſions, however, on which ſynonimous words may be properly uſed. One is, when an obſcurer term, which we cannot avoid employing, on account of ſome connection with what either precedes or follows, needs to be explained by one that is clearer: the other is, when the language of the paſſions is exhibited. Paſſion dwells on its object; the impaſſioned ſpeaker always attempts to riſe in expreſſion; but when that is impracticable, he recurs to repetition and ſynonymy, and thus produces in a degree the ſame effect. An adjective and its ſubſtantive will ſometimes include a tautology. Moreover, in ſome ſingle words, there is ſo much the appearance of tautology, that they ought, in proſe at leaſt, to be avoided; ſuch are worſer for worſe, leſſer for leſs, chiefeſt for chief, extremeſt for extreme; Moſt Higheſt, as in the liturgy, for Moſt High. Campbell's Philoſophy of Rhetoric, vol. ii.

TAUVES, in *Geography*, a town of France, in the department of the Puy de Dôme; 15 miles W. of Beſſe.

TAUVO, a ſmall iſland on the E. ſide of the gulf of Bothnia. N. lat. 64° 50′. E. long. 24° 31′.

TAVY, a river of England, which riſes in Devonſhire, paſſes by Taviſtock, &c. and joins the Tamar, two miles below Saltaſh.

TAUZIM. See Teusing.

TAW, a river of England, which riſes about three miles S.E. from Oakhampton, and runs into the Briſtol channel below Appledore, forming a large bay at its mouth, called Barnſtaple bay.

Taw, a town of Pruſſia; 23 miles W.S.W. of Tilſit.

TAWALLY, one of the Molucca iſlands, 25 miles long from north to ſouth, and from 5 to 9 broad. S. lat. 0° 21′. E. long. 127° 14′.

TAWANDEE Creek, a river of Pennſylvania, which runs into the E. branch of the Suſquehanna, N. lat. 41° 45′. W. long. 76° 30′.

TAWARRAN, a town on the N.W. coaſt of the iſland of Borneo. N. lat. 6° 9′. E. long. 116° 15′.

TAWAS, Indians in the Ohio, on the river Miami of the Lake.

TAWEE-TAWEE, an iſland in the Sooloo Archipelago, 30 miles long, and from 3 to 10 broad. N. lat. 5° 15′. E. long. 120°.

TAWING, Skinning, the art or manner of preparing or dreſſing ſkins in white, to fit them for uſe in divers manufactures, particularly for gloves, &c.

All kinds of ſkins may be tawed; but it is chiefly thoſe of ſheep, lambs, kids, and goats, that are uſed to be dreſſed this way, as being thoſe fitteſt for gloves.

Method of tawing or dreſſing Skins in White.—The wool or hair being well got off the ſkins by means of lime, &c. (as deſcribed under the article Shammy,) they are laid in a large vat of wood or ſtone, ſet in the ground, full of water, in which quick-lime has been ſlaked; in this they continue a month or ſix weeks, as the weather is more or leſs hot, or as the ſkins are required to be more or leſs ſoft and pliant.

While in the vat, the water and lime are changed twice, and they are taken out and put in again every day. When taken out for the laſt time, they are laid all night to ſoak in a running water, to get out the greateſt part of the lime; and in the morning they are laid ſix together on the wooden leg, to get off the fleſh by ſcraping them ſtoutly, one after another, on the fleſh-ſide with a cutting two-handed inſtrument, called a knife; and while this is in hand, they cut off the legs, and other ſuperfluous parts about the extremes.

This done, they are laid in a vat or pit with a little water; where, being well fulled with wooden peſtles for a quarter of an hour, the vat is filled up with water, and the ſkins are rinſed in it. They are next thrown on a clean pavement to drain; which done, they are caſt into a freſh pit of water, where being well rinſed they are taken out, and laid on the wooden leg ſix at once, with the hair-ſide outermoſt, over which they rub a kind of whetſtone very briſkly, to ſoften and fit them to receive four or five more preparations given them on the leg, both on the fleſh-ſide and the hair-ſide, with the knife, after the manner above-mentioned.

They are then put into a pit with water and wheat-bran, and ſtirred about in it with wooden poles, till the bran is perceived

perceived to ſtick to them, and then are left. After this, as they riſe of themſelves to the top of the water by a kind of fermentation, they are plunged down again to the bottom, and, at the ſame time, fire is ſet to the liquor, which takes as eaſily as if it were brandy, but goes out the moment the ſkins are all covered.

This operation is repeated as often as the ſkins riſe above water; and when they riſe no more, they are taken out, laid on the wooden leg, the fleſh-ſide outermoſt, and the knife is paſſed over it to ſcrape off the bran. The bran thus cleared, the ſkins are laid in a large baſket, where they are loaded with huge ſtones to promote their draining; and when ſufficiently drained their feeding is given them, which is performed after the following manner: For 100 large ſheep-ſkins, and for ſmaller in proportion, they take eight pounds of alum and three of ſea-ſalt, melt the whole with water in a veſſel over the fire, pouring the ſolution out, while yet lukewarm, into a kind of trough, in which are 20 pounds of the fineſt wheat-flour, with eight dozen yolks of eggs; of all this together is formed a kind of paſte, a little thicker than children's pap, which, when done, is put into another veſſel, to be uſed in manner following.

A quantity of hot water being poured into the trough in which the paſte was prepared, two ſpoonfuls of the paſte are mixed with it; in order to which they uſe a wooden ſpoon, which contains juſt what is required for a dozen ſkins; and when the whole is well diluted, two dozen of the ſkins are plunged into it, care being taken by the way, that the water be not too hot, which would ſpoil both the paſte and hurt the ſkins. Having ſtaid ſome time in the trough, they are taken out one after another with the hand, and ſtretched out; this is repeated twice; when they have all had their paſte, they are put into tubs, where they are fulled afreſh with wooden peſtles.

Then they are put into a vat, where they remain five or ſix days or more, and are at laſt taken out in fair weather, and hung out to dry on cords or racks; the quicker they dry the better, for if they be too long in drying, the ſalt and alum within them are apt to make them riſe in a grain, which is an eſſential fault in this kind of dreſſing.

When the ſkins are dry, they are put up into bundles, and juſt dipt in fair water; from which being taken out and drained, they are thrown into an empty tub, and, after ſome time, are taken out, and well trampled under foot.

They are then drawn over a flat iron inſtrument, the top of which is round, like a battledore, and the bottom fixed into a wooden block, to ſtretch and open them: when opened, they are hung in the air upon cords to dry; and when dry they are opened a ſecond time, repaſſing them over the ſame inſtrument.

Laſtly, they are laid on a table, pulled out and laid ſmooth, and are thus in a condition for ſale and uſe.

After the ſame manner are dreſſed horſes', cows', calves' ſkins, &c. for the ſadlers, harneſs-makers, &c., as alſo dogs', wolves', bears' ſkins, &c. excepting that in theſe the uſe of paſte is omitted, ſalt and alum-water being ſufficient. See Tanning.

By ſtat. 9 Ann. c. 11. and 10 Ann. c. 26. the following duties are impoſed on hides or ſkins tawed or dreſſed in Great Britain. For horſe-hides dreſſed in alum and ſalt, or meal, or otherwiſe tawed, 1*s.* 6*d.* a hide; hides of ſteers, cows, and all other (except horſe-hides) dreſſed in alum and ſalt or meal, or otherwiſe tawed, 3*s.* a hide; calve-ſkins and kips, dreſſed in alum and ſalt or meal, or otherwiſe tawed, $1\frac{1}{2}$*d.* a pound; ſkins ſo dreſſed or tawed with the hair on, 3*s.* a dozen, and without hair, 1*s.* a dozen; dog-ſkins ſo dreſſed or tawed, 1*s.* a dozen; buck and doe-ſkins (except what paid the duty on importation) dreſſed in alum and ſalt or meal, or otherwiſe tawed, 6*d.* a pound; kid-ſkins ſo dreſſed or tawed, except as before, 1*s.* a dozen; goat-ſkins ſo dreſſed or tawed, 2*s.* a dozen; beaver-ſkins ſo tawed, 2*s.* a dozen; ſheep-ſkins and lamb-ſkins ſo dreſſed or tawed, $1\frac{1}{2}$*d.* a pound; and all other tawed ſkins, not before charged, 30*l.* for every 100*l.* value. All theſe duties are to be paid by the tawers or makers.

For hides and ſkins dreſſed in oil, 6*d.* a pound; deer, goat, and beaver-ſkins dreſſed in oil, 6*d.* a pound; calve-ſkins dreſſed in oil, 8*d.* a pound; ſheep and lamb-ſkins dreſſed in oil, 3*d.* a pound; all ſkins dreſſed in oil, not before charged, 15*l.* in the 100*l.* according to the real value; all which are to be paid by the oil leather-dreſſers.

For other regulations, ſee Leather and Tanner.

TAWIXIWI, in *Geography*, a town of America, on the Miami. N. lat. 40° 35′. W. long. 84° 4′.

TAWNY, in *Heraldry*. See Tenné.

TAWY, in *Geography*, a river of South Wales, which riſes in Brecknockſhire, and runs into the ſea at Swanſea.

TAX, formed from τάξις, *order*, denotes a certain aid, ſubſidy, or ſupply, granted by the commons of Great Britain in parliament aſſembled, conſtituting the king's extraordinary revenue; and paid yearly towards the expences of the government. See Money-*Bills*, Parliament, and Supply.

Anciently, the tax ſeems to have been impoſed by the king at his pleaſure; but Edward I. bound himſelf, and his ſucceſſors, from that time forward, not to levy it, but by conſent of the realm.

To this purpoſe the celebrated Mr. Locke, in his "Eſſay on Government," (ch. xi. § 140.) lays down the following propoſition as fundamental. "'Tis true, government cannot be ſupported without great charge; and 'tis fit every one who enjoys his ſhare of protection, ſhould pay out of his eſtate his proportion for the maintenance of it. But ſtill it muſt be with his own conſent, *i. e.* the conſent of the majority, giving it either by themſelves, or their repreſentatives choſen by them: for if any one ſhall claim a power to lay and levy taxes on the people by his own authority, and without ſuch conſent of the people, he thereby invades the fundamental law of property, and ſubverts the end of government. For what property have I in that, which another may by right take when he pleaſes to himſelf?"

Dr. Adam Smith, the ingenious author of "An Enquiry into the Nature and Cauſes of the Wealth of Nations," to whoſe work we have had occaſion to refer, lays down (vol. ii. p. 2.) the four following maxims with regard to taxes in general. "1. The ſubjects of every ſtate ought to contribute towards the ſupport of the government, as nearly as poſſible, in proportion to their reſpective abilities, that is, in proportion to the revenue which they reſpectively enjoy under the protection of the ſtate. 2. The tax, which each individual is bound to pay, ought to be certain, and not arbitrary. The time of payment, the manner of payment, the quantity to be paid, ought all to be clear and plain to the contributor, and to every other perſon. When it is otherwiſe, every perſon ſubject to the tax is put more or leſs in the power of the tax-gatherer, who can either aggravate the tax upon any obnoxious contributor, or extort, by the licence of ſuch aggravation, ſome preſent or perquiſite to himſelf. 3. Every tax ought to be levied at the time, or in the manner, in which it is moſt likely to be convenient for the contributor to pay it. 4. Every tax ought to be ſo contrived, as both to take out and to keep out of the pockets of the people as little as possible, over and above what it brings into the public treasury of the state." This maxim may be counteracted by requiring for the levying of the tax a great number of officers, whose salaries may consume the greater part of the produce of the tax, and whose perquisites may impose another tax upon the people;—by obstructing their industry, and discouraging them from applying to certain branches of business, which might give maintenance and employment to great multitudes;—by the forfeitures and other penalties which those unfortunate individuals incur, who attempt unsuccessfully to evade the tax, which may ruin them, and thus put an end to the benefit the community might have received from the employment of their capitals; the penalties of smuggling being so ordered as to rise in proportion to the temptation; and by subjecting the people to the frequent visits and the odious examination of the tax-gatherers, which occasion much trouble, vexation, and oppression.

As the private revenue of individuals arises ultimately from the three different sources of rent, profit, and wages, every tax must finally be paid from one or other of these three different sorts of revenue, or from all of them indifferently. The first kind of taxes comprehends those upon the rent of land. (See LAND-TAX.) Taxes upon the produce of the land are in reality taxes upon the rent. (See TITHES.) Taxes upon the rent of houses include that which may be called the Building rent, and that which is commonly called the Ground rent; and so far as these fall upon the inhabitants, they must be drawn from the same source as the rent itself, and must be paid from their revenue, whether derived from the wages of labour, the profits of stock, or the rent of land; and it is in every respect of the same nature as a tax upon any other sort of consumable commodities. Houses not inhabited ought to pay no tax; houses inhabited by the proprietor ought to be rated, not according to the expence which they might have cost in building, but according to the rent which an equitable arbitration might judge them likely to bring, if leased to a tenant. Ground rents are still a more proper subject of taxation than the rent of houses, or even the rent of land. The principal objection to all taxes upon houses and windows is their inequality, and therefore they are directly contrary to the first of Dr. Smith's maxims above stated. Their natural tendency is to lower rents.

Taxes upon profit, or upon the revenue arising from stock, comprehend the tax upon stock, such as is imposed by the land-tax in England, by which it was intended that the stock should be taxed in the same proportion as the land, and taxes upon the profit of particular employments. Taxes upon the wages of labour must finally fall upon the consumer. Besides the taxes already enumerated, there are others, such as capitation taxes, and taxes upon consumable commodities, which must be paid indifferently from whatever revenue the contributors may possess; from the rent of their land, from the profits of their stock, or from the wages of their labour. The impossibility of taxing the people, in proportion to their revenue, by any capitation, seems to have given occasion to the invention of taxes upon consumable commodities; and these are either necessaries or luxuries. A tax upon the necessaries of life operates exactly in the same manner as a direct tax upon the wages of labour, and will fall, if the labourer be employed by a manufacturer, on the consumer; or if he be employed by a farmer, it will fall upon the rent of the landlord. But it is otherwise with respect to taxes upon luxuries. The rise in the price of the taxed commodities, will not necessarily occasion any rise in the wages of labour. Any rise in the average price of necessaries, unless it is compensated by a proportionable rise in the wages of labour, must necessarily diminish more or less the ability of the poor to bring up numerous families, and consequently to supply the demand for useful labour; whatever may be the state of that demand, whether increasing, stationary, or declining; or such as requires an increasing, stationary, or declining population.

Taxes upon luxuries have no tendency to raise the price of any other commodities except that of the commodities taxed. Taxes upon necessaries, by raising the wages of labour, necessarily tend to raise the price of all manufactures, and consequently to diminish the extent of their sale and consumption. Taxes upon luxuries are finally paid by the consumers of the commodities taxed, without any retribution. They fall indifferently upon every species of revenue, the wages of labour, the profits of stock, and the rent of land. Taxes upon necessaries, so far as they affect the labouring poor, are finally paid, partly by landlords in the diminished rent of their lands, and partly by rich consumers, whether landlords or others, in the advanced price of manufactured goods; and always with a considerable over-charge.

In Great Britain, the principal taxes upon the necessaries of life are those upon salt, leather, soap, and candles. Heavy taxes upon these commodities must somewhat increase the expence of the sober and industrious poor, and must, consequently, more or less raise the wages of their labour. Such taxes, notwithstanding their immediate effect, afford a considerable revenue to government, and accordingly they are continued and multiplied.

Consumable commodities, whether necessaries or luxuries, may be taxed in two different ways. The consumer may either pay an annual sum on account of his using or consuming goods of a certain kind; or the goods may be taxed while they remain in the hands of the dealer, and before they are delivered to the consumer. The consumable goods which last a considerable time before they are consumed altogether, are most properly taxed in the one way. Those of which the consumption is either immediate or more speedy, in the other.

Of the latter kind is the greater part of the duties of excise and customs. Those of excise are imposed chiefly upon goods of home produce destined for home consumption; and they are imposed only upon a few sorts of goods of the most general use. The duties of customs are much more ancient than those of excise. (See CUSTOMS and EXCISE.) It is observed that high taxes, sometimes by diminishing the consumption of the taxed commodities, and sometimes by encouraging smuggling, frequently afford a smaller revenue to government than what might be drawn from more moderate taxes.

When the diminution of revenue is the effect of the diminution of consumption, there can be but one remedy, and that is the lowering of the tax.

When the diminution of the revenue is the effect of the encouragement given to smuggling, it may perhaps be remedied in two ways; either by diminishing the temptation to smuggle, or by increasing the difficulty of smuggling. The temptation to smuggle can be diminished only by the lowering of the tax; and the difficulty of smuggling can be increased only by establishing that system of administration which is most proper for preventing it.

The duties upon foreign luxuries imported for home consumption, though they sometimes fall upon the poor, fall principally upon people of middling or more than middling fortune. Such are, for example, the duties upon foreign wines, upon coffee, chocolate, tea, sugar, &c.

The

The duties upon the cheaper luxuries of home produce destined for home consumption, fall pretty equally upon people of all ranks in proportion to their respective expence. The poor pay the duties upon malt, hops, beer, and ale, upon their own consumption: the rich, upon both their own consumption and that of their servants.

The whole consumption of the inferior ranks of people, or of those below the middling rank, it must be observed, is in every country much greater, not only in quantity, but in value, than that of the middling and of those above the middling rank. The whole expence of the inferior is much greater than that of the superior ranks. Although the expence of people of inferior ranks, taking them individually, is very small, yet the whole mass of it, taking them collectively, amounts always to by much the largest portion of the whole expence of the society; what remains, of the annual produce of the land and labour of the country for the consumption of the superior ranks, being always much less, not only in quantity but in value. The taxes upon expence, therefore, which fall chiefly upon that of the superior ranks of people, upon the smaller portion of the annual produce, are likely to be much less productive than either those which fall indifferently upon the expence of all ranks, or even those which fall chiefly upon that of the inferior ranks; than either those which fall indifferently upon the whole annual produce, or those which fall chiefly upon the larger portion of it.

The best taxes, says Mr. Hume, (vol. i. Ess. 8.) are such as are levied upon consumptions, especially those of luxury; because such taxes are least felt by the people. They seem, in some measure, voluntary: since a man may chuse how far he will use the commodity which is taxed. They are paid gradually and insensibly; they naturally produce sobriety and frugality, if judiciously imposed; and being compounded with the natural price of the commodity, they are scarcely perceived by the consumers. Their only disadvantage is, that they are expensive in levying. Taxes upon possessions are levied without expence; but they have every other disadvantage. Most states, however, are obliged to have recourse to them, in order to supply the deficiencies of the other. When a tax is laid upon commodities which are consumed by the common people, the necessary consequence may seem to be, either that the poor must retrench something from their way of living, or raise their wages, so as to make the burden of the tax fall upon the rich; but there is a third consequence, which often follows upon taxes, namely, that the poor increase their industry, perform more work, and live as well as before, without demanding more for their labour. Where taxes are moderate, are laid on gradually, and do not affect the necessaries of life, this consequence naturally follows; and it is certain, that such difficulties often serve to excite the industry of a people, and render them more opulent and laborious than others, who enjoy the greatest advantages. The most pernicious of all taxes are the arbitrary: they are commonly converted, by their management, into punishments on industry; and, also, by their unavoidable inequality, are more grievous than the real burden which they impose. Poll-taxes are commonly arbitrary. A duty upon commodities checks itself; and a prince will find, that an increase of the impost is no increase of his revenue.

After all the proper subjects of taxation have been exhausted, if the exigencies of the state still continue to require new taxes, they must be imposed upon improper ones. It has been well observed, "that oppressive taxation is a monster, which, after devouring every other thing, devours itself at last."

The taxes which are raised on the British subject are either annual or perpetual. The usual annual taxes are those upon land and malt.

The first of these is the land-tax, for an account of which see LAND-*tax*.

See also HIDAGE, SCUTAGE, TALLIAGE, TENTH, FIFTEENTH, and SUBSIDY.

The other annual tax is the malt-tax, which is a sum raised every year by parliament ever since 1697. See MALT.

The perpetual taxes are the customs, which are a tax immediately paid by the merchant, although ultimately by the consumer (see CUSTOMS); the excise-duty, which is an inland imposition, paid sometimes upon the consumption of the commodity, or frequently upon the retail sale, which is the last stage before the consumption (see EXCISE); the duty upon *salt*: that for the carriage of letters or *post*; the *stamp-duties*; the duty upon houses and *windows*; the duty arising from licences to hackney-*coaches* and chairs in London, and the parts adjacent; and the duty upon offices and pensions. See LAND-*tax*, &c. &c.

The assessed taxes comprehend those on windows, houses, servants, carriages, horses and mules, dogs, horse-dealers, hair-powder, armorial bearings, and game licences. For those on windows, see the following schedule.

Schedule (A.) 48 G. III. c. 55.

Number of windows according to which the duties shall be charged	Duties. £	s.	d.
Not more than 6 windows or lights (except in such houses which shall be worth the rent of 5*l.* by the year, and shall be charged to the duty mentioned in Schedule (B.), according to the rent thereof)	0	6	6
Not more than 6 windows or lights, if of the value before-mentioned, and charged to the said duty accordingly	0	8	0
7 windows or lights	1	0	0
8 do.	1	13	0
9 do.	2	2	0
10 do.	2	16	0
11 do.	3	12	6
12 do.	4	9	6
13 do.	5	6	6
14 do.	6	3	6
15 do.	7	0	0
16 do.	7	17	0
17 do.	8	14	0
18 do.	9	10	6
19 do.	10	7	6
20 do.	11	4	6
21 do.	12	1	0
22 do.	12	18	0
23 do.	13	15	0
24 do.	14	11	6
25 do.	15	8	6
26 do.	16	5	6
27 do.	17	2	0
28 do.	17	19	0
29 do.	18	16	0
30 do.	19	12	6
31 do.	20	9	6
32 do.	21	6	6
33 do.	22	3	0
34 do.	23	0	0
35 do.	23	16	6
36 do.	24	13	6

Not more than	£	s.	d.
37 windows or lights	25	10	6
38 - - do.	26	7	0
39 - - do.	27	4	0
40 to 44 do.	28	17	6
45 - 49 do.	31	13	6
50 - 54 do.	34	10	0
55 - 59 do.	37	6	0
60 - 64 do.	39	15	6
65 - 69 do.	42	0	6
70 - 74 do.	44	5	0
75 - 79 do.	46	10	0
80 - 84 do.	48	15	0
85 - 89 do.	51	0	0
90 - 94 do.	53	4	6
95 - 99 do.	55	9	6
100 - 109 do.	58	17	0
110 - 119 do.	63	6	6
120 - 129 do.	67	16	6
130 - 139 do.	72	6	0
140 - 149 do.	76	16	0
150 - 159 do.	81	5	6
160 - 169 do.	85	15	6
170 - 179 do.	90	5	0
180 and upwards do.	93	2	6
And for every fuch dwelling-houfe which fhall contain more than 180 windows or lights, for every window or light exceeding the number of 180	0	3	0

See WINDOWS.

Schedule (B.) 48 Geo. III. c. 55. Duties on inhabited dwelling-houfes.

For every fuch inhabited houfe with the houfehold and other offices, yards, and gardens, therewith occupied and charged, as are or fhall be worth the rent herein-after mentioned by the year, there fhall be charged the yearly fums following; *viz.*

	Value in the Pound. £	s.	d.
5*l.* and under 20*l.* rent, by the year	0	1	6
20*l.* and under 40*l.* rent, by the year	0	2	3
40*l.* rent by the year, and upwards	0	2	10

The duties payable by 48 Geo. III. c. 55. annually for male fervants are as below.

Schedule (C.) N° 1.

Number of Servants.	Amount of Duty for each Servant. £	s.	d.
For 1 fuch fervant	2	4	0
2 - do.	2	16	0
3 - do.	3	7	0
4 - do.	3	18	0
5 - do.	4	9	0
6 - do.	4	14	0
7 - do.	4	16	0
8 - do.	5	3	0
9 - do.	5	12	0
10 - do.	6	3	0
11 - do. and upwards	7	1	0
For every fuch fervant retained or employed by any male perfons, never having been married, over and above the before-mentioned duties, the further fum of	1	14	0

Schedule (C.) N° 2. Duties payable annually for male fervants retained or employed in the feveral capacities herein mentioned.

	£	s.	d.
For every gardener or perfon employed to work in any garden under any perfon chargeable to the duties mentioned in Schedule (C.), N° 1; and for every gardener employed in any garden wherein the conftant labour of one perfon fhall not be neceffary, the fum of	0	6	0

To be paid by each perfon in whofe garden fuch perfon fhall be employed.

Exemptions from the Duties as fet forth in Schedule (C.) N° 1. and 2.

Any perfon employed by the day or week to work as a day labourer, at the ufual rate of wages for day labourers in agriculture, in any garden belonging to a dwelling-houfe, being a farm-houfe, and exempted as fuch from the duties mentioned in Schedule (B.), or in any garden belonging to a dwelling-houfe not chargeable to the duties mentioned in the faid fchedule, fuch garden not requiring the conftant labour of one fuch labourer.

Schedule (C.) N° 3. Duties payable annually for every male perfon or fervant retained or employed in the feveral capacities herein mentioned.

	£	s.	d.
For every male perfon employed by any merchant or trader as a traveller or rider, the duties following; *viz.*			
Where one fuch traveller or rider and no more fhall be fo employed, the fum of	2	8	0
And where more than one fuch traveller or rider fhall be fo employed, for each the fum of	3	10	0
For every male perfon employed by any perfon in trade, or exercifing any profeffion whatever, as a clerk or book-keeper, or office-keeper, except apprentices, where no premium, or a premium lefs in value than the fum of 20*l.* has been paid or contracted for with fuch apprentice, the duties following; *viz.*			
Where one fuch clerk, book-keeper, or office-keeper, and no more fhall be fo employed, the fum of	1	4	0
And where more than one fuch clerk, book-keeper, or office-keeper fhall be fo employed, for each the fum of	2	8	0
For every male perfon employed by any perfon in trade as a fhopman, for the purpofe of expofing to fale or felling goods, wares, or merchandife, in fuch fhop or warehoufe, whether by wholefale or retail; and every male perfon employed as a warehoufeman, porter, or cellarman, in fuch fhop or warehoufe, except apprentices as aforefaid, the fum of	1	4	0

The faid duties to be paid by the employer or employers of fuch perfons, and to extend to every body politic or corporate, whether aggregate or fole, and to every fociety, fraternity, or partnerfhip, although not corporate; and to every manufacture or concern (except hufbandry) whereby the employer fhall feek a profit.

	£	s.	d.
For every male ſervant employed as a waiter (except occaſional waiters, over and above the ordinary number uſually kept) in any taverns, coffee-houſes, inns, ale-houſes, or other licenſed houſes, or in eating or victualling houſes, or in hotels or lodging-houſes, being eating or victualling houſes, the ſum of -	2	5	0
For every male ſervant retained by any ſtable-keeper to take care of any horſe, mare, or gelding, of any other perſon or perſons, kept for the purpoſe of racing or running for any plate, prize, ſum of money, or other thing, or any horſe, mare, or gelding, in training for any of the ſaid purpoſes, whereby ſuch ſtable-keeper ſhall gain a livelihood or profit, the ſum of - - - - - - - -	1	4	0
For every male ſervant *bonâ fide* retained for the purpoſes of huſbandry, manufacture, or trade, by which the maſter or miſtreſs ſhall gain a livelihood or profit, and at any time employed in any domeſtic employment in any of the capacities in Schedule (C.), N° 1, and not chargeable to the duties in the ſaid ſchedule, the ſum of - - - - - - -	0	6	0
For every male ſervant *bonâ fide* retained for the purpoſes of huſbandry, or any manufacture or trade, by which the maſter or miſtreſs ſhall gain a livelihood or profit, and at any time employed in the capacity of a groom, ſtable-boy, or helper in the ſtables, where the maſter or miſtreſs ſhall be chargeable for one horſe, and no more, to the duty on horſes kept for the purpoſes of riding, or drawing a taxed cart, or to the duty on ſuch taxed cart, and not on any other carriage chargeable with duty by this act, the ſum of - - -	0	6	0

The ſaid laſt-mentioned duties to be paid by the employer, or maſter or miſtreſs of ſuch perſons or ſervants.

Schedule (C.) N° 4. Duties payable on ſervants let to hire.

	£	s.	d.
For every coachman, groom, poſtilion, or helper, kept for the purpoſe of being let to hire for any period of time leſs than one year, and in ſuch manner that the ſtamp-office duty payable by law on horſes let to hire ſhall not be payable on every ſuch letting by any poſt-maſter, inn-keeper, or other perſon, duly licenſed to let poſt-horſes by the commiſſioners for managing the duties on ſtamped vellum, parchment, and paper, or by any coach-maker or maker of ſuch carriages, or other perſon, the annual ſum of - - - -	2	4	0

The ſaid duty to be paid by the perſon or perſons letting the ſame to hire.

Theſe ſeveral duties are ſubject to certain exemptions. The proviſions of 43 Geo. III. c. 161. relating to the aſſeſſments of ſervants, are as follow. Perſons liable to theſe duties are to return liſts of their ſervants, and are chargeable accordingly from the year commencing from the days ſtated in their returns; and they are ſubject to the powers of ſurcharge. Perſons beginning or ceaſing to keep ſervants are to give notice in writing to the aſſeſſor of the diſtrict in which they reſide.

Schedule (D.) N° 1. Duties payable on all carriages of any of the deſcriptions mentioned herein.

Number of Carriages.	Amount of Duty for each Carriage. £	s.	d.
For carriages with four wheels:			
For 1 ſuch carriage, the annual ſum of -	11	5	0
2 - do. - - - - - -	12	7	0
3 - do. - - - - - -	13	10	0
4 - do. - - - - - -	14	0	0
5 - do. - - - - - -	14	12	0
6 - do. - - - - - -	15	3	0
7 - do. - - - - - -	15	14	0
8 - do. - - - - - -	16	5	0
9 - do. and upwards - - -	16	16	0
And for every additional body ſucceſſively uſed on the ſame carriage or number of wheels, the further ſum of - - - - - -	5	12	0

Schedule (D.) N° 2.

	£	s.	d.
For carriages with leſs than four wheels:			
For every ſuch carriage (except taxed carts, conſtructed, kept, and uſed, under the regulations of this act) drawn by one horſe, mare, or gelding, and no more - - - - -	5	18	0
And for every ſuch carriage, drawn by two or more horſes, mares, or geldings - - -	8	5	0
And for every additional body of the deſcription herein-after mentioned, ſucceſſively uſed on the ſame carriage or number of wheels, the further ſum of - - - - -	2	16	0

Schedule (D.) N° 3.

	£	s.	d.
For carriages hired for any period of time leſs than one year, or kept to be let to hire, or to carry paſſengers:			
For every ſuch carriage kept for the purpoſe of being let to hire, with horſes to be uſed therewith, for any period of time not exceeding twenty-eight days, ſo that the ſtamp-office duty, payable by law on horſes let to hire ſhall be duly paid and ſatisfied on every ſuch letting by any poſt-maſter, inn-keeper, or other perſon duly licenſed to let poſt-horſes, by the commiſſioners for managing the duties on ſtamped vellum, parchment, and paper, and whereon the name or names and place of abode of the perſon or perſons ſo licenſed ſhall be marked or painted, according to the directions of the act in that caſe made and provided; if ſuch carriage ſhall have four wheels, the ſum of - - - -	9	9	0
And if ſuch carriage ſhall have leſs than four wheels, the reſpective ſums mentioned in Schedule (D.) N° 2, according to the number of horſes uſed therewith, as therein mentioned.			
And for every coach, diligence, caravan, or chaiſe with four wheels or more, or other carriage with four wheels or more, by whatever name the ſame ſhall be called or known, which ſhall be kept and employed as a public ſtage-coach or carriage for the purpoſe of conveying paſſengers for hire to and from different places, and which ſhall be duly entered as ſuch with the ſaid commiſſioners of ſtamp duties, the like ſum of - - - - -	9	9	0

All which laſt-mentioned duties ſhall reſpectively be paid by the perſon or perſons keeping the ſame, for the purpoſes aforeſaid. £ s. d.

For every carriage kept for the purpoſe of being let to hire for any period of time leſs than one year, and in ſuch manner that the ſaid ſtamp-office duty ſhall not by law be payable on ſuch letting by any perſon ſo licenſed as aforeſaid, or by any coach-maker or maker of ſuch carriages, or other perſon, if ſuch carriage ſhall have four wheels, the annual ſum of - - - - - - 11 5 0

The ſaid laſt-mentioned duty to be paid by the perſon or perſons keeping the ſame for the purpoſes aforeſaid.

Provided, if a due return thereof ſhall not be made by the hirer or hirers according to the directions of the acts herein mentioned, the progreſſive duty, as ſet forth in Schedule (D.) N° 1, ſhall be chargeable in reſpect of every ſuch carriage on the perſon or perſons hiring the ſame, and making ſuch default as aforeſaid, ſubject to the proviſions contained in the ſaid acts concerning the ſame.

And if ſuch carriage ſhall have leſs than four wheels, the reſpective ſums mentioned in Schedule (D.) N° 2, according to the number of horſes to be uſed therewith, to be paid by the perſon or perſons keeping the ſame for the purpoſe aforeſaid, ſubject to the proviſions herein-after contained concerning the ſame. See Coach and *Taxed* Cart.

By 50 Geo. III. c. 104. certain new duties are impoſed.

A Schedule of the Duties payable on Carriages called Taxed Carts.

N° I.

For every carriage called a taxed cart, built and conſtructed according to the regulations of the ſaid act, in every reſpect the original price of which ſhall not have exceeded, or the value whereof ſhall not at any time exceed the ſum of 15*l.* ſterling, and which ſhall not at any time be uſed with a covered or ſtuffed ſeat, or with a covered foot-board or apron thereto fixed or not fixed, there ſhall be charged the annual ſum of - - - £1 6 6 (£ s. d.)

N° II.

For every ſuch carriage called a taxed cart, built and conſtructed with a ſpring or ſprings of any materials whatever, (except of iron, ſteel, or any other metallic ſubſtance, or any compoſition of iron, ſteel, or other metallic ſubſtance, either wholly or in part,) the original price of which carriage ſhall not have exceeded, or the value whereof ſhall not at any time exceed the ſum of 20*l.* ſterling, or which ſhall be uſed with a ſtuffed ſeat or cuſhion, or with a covered foot-board or apron thereto fixed or not fixed, there ſhall be charged the annual ſum of - - - - - - 2 10 0

A Schedule of the Duties payable on Carriages with leſs than Four Wheels.

N° III.

For every carriage with leſs than four wheels chargeable by the ſaid act of the forty-eighth of his preſent majeſty's reign with the duty of 5*l.* 18*s.* if drawn by one horſe, mare, or gelding, and no more, there ſhall be charged the like amount of duty for every ſuch carriage drawn by one horſe, mare, gelding or mule, and no more, *viz.* the annual ſum of - - 5 18 0 (£ s. d.)

For every ſuch carriage chargeable by the ſaid act with the duty of 8*l.* 5*s.* if drawn by two or more horſes, mares, or geldings, there ſhall be charged the like amount of duty for every ſuch carriage drawn by more than one horſe, mare, gelding or mule, *viz.* the annual ſum of 8 5 0

And for any additional body ſucceſſively uſed on the ſame carriage or number of wheels chargeable by the ſaid act with the further duty of 2*l.* 16*s.* there ſhall be charged the like amount of further duty, for every additional body ſucceſſively uſed on the ſame carriage or number of wheels, if drawn in the manner herein mentioned, *viz.* the further annual ſum of - 2 16 0

Schedule (E.) N° 1. Duties payable for all horſes, mares and geldings, kept and uſed for the purpoſe of riding, or of drawing any carriage chargeable with duty by Schedule (D.)

Number thereof.	Amount of Duty for each Horſe, Mare, or Gelding. £	s.	d.
For 1 ſuch horſe, mare, or gelding - -	2	13	6
2 ſuch horſes, mares, or geldings - -	4	9	6
3 - do. - - -	4	18	6
4 - do. - - -	5	2	0
5 - do. - - -	5	3	0
6 - do. - - -	5	7	6
7 - do. - - -	5	10	0
8 - do. - - -	5	10	0
9 - do. - - -	5	12	0
10 - do. - - -	5	17	6
11 - do. - - -	5	17	6
12 - do. - - -	5	17	6
13 - do. - - -	5	18	0
14 - do. - - -	5	18	0
15 - do. - - -	5	18	0
16 - do. - - -	5	18	0
17 - do. - - -	5	18	6
18 - do. - - -	5	19	6
19 - do. - - -	6	0	0
20 and upwards - - - - -	6	1	0

Rules.—The ſaid duties to be payable annually for every horſe, mare, or gelding, uſed on any occaſion for the purpoſe of riding, or of drawing any carriage for which any duty is payable by this act, or hired by the year, or any longer period, and to be paid by the perſon or perſons uſing the ſame. Theſe duties are ſubject to certain exemptions in favour of huſbandry, under certain circumſtances.

Schedule (E.) N° 2. Duties payable on horſes let to hire.

For every horſe, mare, or gelding, let to hire for the purpoſe of riding, or of drawing any ſuch carriage as aforeſaid, for any period of time leſs than one year, in any manner ſo that the ſtamp-office duty payable by law on horſes let to hire ſhall not be payable, the ſum of - 2 13 6 (£ s. d.)

To

To be charged annually on the perſon or perſons letting the ſame; provided, if a due return thereof ſhall not be made by the hirer or hirers, according to this act, the progreſſive duty, as ſet forth in Schedule (E.) N° 1, ſhall be chargeable in reſpect of every ſuch horſe, mare, or gelding, on the perſon or perſons hiring the ſame, and making ſuch default as aforeſaid, ſubject to the proviſions of this act.

Schedule (E.) N° 3. Duties payable on horſes kept for the purpoſe of racing or running for any plate, prize, or ſum of money, or other thing, or kept in training for any of the ſaid purpoſes.

For every horſe, mare, or gelding, *bonâ fide* kept for the purpoſe of racing or running for any plate, prize, or ſum of money, or other thing, or kept in training for any of the ſaid purpoſes, whether in the ſtables of the proprietor or proprietors, or of any other perſon or perſons, the ſum of - - - - - - £ 2 s. 13 d. 6

The ſaid duty to be charged annually on the perſon or perſons having the cuſtody, charge, or management of ſuch horſes, mares, or geldings.

Schedule (F.) N° 1. Duties payable for all horſes, mares, and geldings, not charged with any duty according to the Schedule (E.) N° 1, 2, 3, and alſo on mules.

For every horſe, &c. not chargeable with any duty according to the Schedule (E.) N° 1, 2, and 3, as aforeſaid, and for every mule, except in the caſes herein-after mentioned, wherein other duties are made payable, the ſum of £ 0 s. 14 d. 0

Schedule (F.) N° 2. Duties payable on huſbandry-horſes, in the caſes herein-after mentioned.

Any perſon occupying a farm at rack-rent, the rent of which ſhall be leſs than 20*l.* a-year, and making a livelihood ſolely thereby, or occupying any eſtate on any other tenure than as tenant at rack-rent ſolely, or ſuch other eſtate, together with the farm at rack-rent, the value of which in the whole ſhall be leſs than equivalent to a farm at the rack-rent of 20*l.* a-year (reckoning the value of every eſtate occupied by the owner thereof, or on any tenure other than as tenant at rack-rent, as equivalent to double the amount of the like farm at rack-rent), and making a livelihood ſolely by ſuch his own eſtate, or by ſuch eſtate and farm jointly, or principally thereby, and likewiſe a profit by any trade or employment, and keeping not more than two horſes, mares, geldings, or mules, *bonâ fide* for the purpoſe of ſuch occupation, ſhall be charged for each of ſuch two horſes, mares, geldings, or mules, the ſum of - - - - - - - £ 0 s. 2 d. 10

Any perſon occupying a farm at rack-rent in Wales or Scotland, the rent of which ſhall be leſs than 10*l.* ſterling a-year, and making a livelihood principally thereby, or occupying any eſtate on any other tenure than as tenant at rack-rent, or ſuch other eſtate, together with a farm at rack-rent, the value of which in the whole ſhall be leſs than equivalent to a farm at the rack-rent of 10*l.* ſterling a-year (reckoning the value of every eſtate occupied by the owner thereof, or on any tenure other than as tenant at rack-rent, as equivalent to double the amount of the like farm, at rack-rent), and making a livelihood principally thereby, and likewiſe a profit by any trade or employment, and keeping not more than two horſes, mares, geldings, or mules, *bonâ fide* for the purpoſes of ſuch occupation, and of ſuch trade or employment jointly, or either of them ſeparately, ſhall be charged for each of ſuch two horſes, mares, geldings, or mules, the ſum of - - - - - - - £ 0 s. 2 d. 10

Rules for charging the duties, as ſet forth in Schedule (F.) N° 1 *and* 2.

The ſaid duties to be charged annually, and paid by the perſon or perſons keeping or uſing ſuch horſes, mares, geldings, or mules, and to be payable for every horſe, mare or gelding, and mule, which ſhall not be chargeable nor have been charged with any duty payable in that year, according to the preceding ſchedule marked (E.) by virtue of the rules or exemptions therein contained, except as herein-after is mentioned.

Exemptions from the duties in Schedule (E.) N° 1 *and* 2.

Any perſon whatever, for any horſe, mare, or gelding, not being by due admeaſurement of the height of thirteen hands, of four inches to each hand, or which ſhall not at any time whatever have been uſed for any purpoſe of labour or otherwiſe. See HORSE and HORSE-*Dealer*.

Schedule (G.) N° 1. Duties payable on dogs.

For every greyhound, hound, pointer, ſetting-dog, ſpaniel, lurcher, or terrier, the annual ſum of - - - - - - - - £ 0 s. 11 d. 6

For every dog, of whatever deſcription or denomination the ſame may be, where any perſon ſhall keep two or more dogs, either for his or her own uſe, or the uſe of any other perſon or perſons, the annual ſum of - - - - £ 0 s. 11 d. 6

For every dog not being a greyhound, hound, pointer, ſetting-dog, ſpaniel, lurcher, or terrier, kept by any perſon having one ſuch dog, and no more, whether the ſame be kept for his or her own uſe, or the uſe of any other perſon or perſons, the annual ſum of - - - £ 0 s. 7 d. 0

The ſaid duties to be paid by the perſons reſpectively keeping ſuch dogs.

Exemptions from the duties in Schedule (G.)

Caſe 1.—Any dog belonging to his majeſty, or any of the royal family.

Caſe 2.—Any perſon who, on account of poverty, ſhall be diſcharged from the aſſeſſment made in reſpect of his or her dwelling-houſe, in purſuance of the regulations of any of the acts herein-mentioned, and having one dog, and no more, the ſame not being a greyhound, hound, pointer, ſetting-dog, ſpaniel, lurcher, or terrier.

Caſe 3.—Any perſon, in reſpect of a dog or whelp, which at the time of returning the liſts of dogs as by this act is required, ſhall not actually be of the age of ſix calendar months.

Caſe 4.

Caſe 4.—Any perſon in reſpect of the whole number of hounds by him or her kept in Great Britain, who ſhall compound for the ſame, in any year within thirty days after the 5th day of April in ſuch year, in purſuance of notice given to the collector or collectors of the ſaid duty for any pariſh or place, where ſuch perſon ſhall be liable to be aſſeſſed, of his or her intention ſo to do, and on payment of the full ſum of 34*l.* ſterling to ſuch collector or collectors, for which a receipt ſhall be given within the period before-mentioned.

Schedule (H.) Duties payable by horſe-dealers.

	£	s.	d.
Every perſon who ſhall uſe or exerciſe the trade and buſineſs of a horſe-dealer within the cities of London and Weſtminſter, and the liberties of the ſame reſpectively, the pariſhes of St. Mary-le-Bone and St. Pancras, in the county of Middleſex, the weekly bills of mortality, or the borough of Southwark, in the county of Surrey, the annual duty of - - - -	22	10	0
Every perſon who ſhall uſe or exerciſe the trade and buſineſs of a horſe-dealer in any other part of Great Britain, the annual duty of - -	11	5	0

Schedule (I.) Duties payable by perſons in reſpect of hair-powder uſed or worn by them.

	£	s.	d.
By every perſon who ſhall have uſed or worn any hair-powder within the period limited by any of the acts herein mentioned, the annual ſum of - - - - - - - -	1	3	0

Schedule (K.) Duties payable by perſons in reſpect of any armorial bearing or enſign, uſed or worn by them, by whatever name the ſame ſhall be called; *viz.*

	£	s.	d.
By every ſuch perſon chargeable with any duty made payable by this act, for any coach or other carriage, the annual ſum of - -	2	8	0
By every ſuch perſon not chargeable for any ſuch coach or other carriage, but who ſhall be chargeable to any of the duties on inhabited houſes, or to the duties on houſes, windows, or lights, made payable by this act, the annual ſum of - - - - - - - -	1	4	0
By every ſuch perſon not chargeable for any ſuch coach or other carriage, nor being chargeable to the ſaid duties on inhabited houſes, or to the duty on houſes, windows, or lights, the annual ſum of - - - - -	0	12	0

Schedule (L.) Duties payable in reſpect of killing game.

	£	s.	d.
Upon every perſon who ſhall uſe any dog, gun, net, or other engine, for the purpoſe of taking or killing any game whatever, or any woodcock, ſnipe, quail or landrail, or any conies, in any part of Great Britain:			
If ſuch perſon ſhall be a ſervant to any perſon duly charged in reſpect of ſuch ſervant to the duties granted on ſervants by this act, and ſhall uſe any dog, gun, net, or other engine, for any of the purpoſes before-mentioned, upon any manor or royalty in England, Wales, or Berwick-upon-Tweed, or upon any lands in Scotland, by virtue of any deputation or appointment, duly regiſtered or entered as game-keeper thereto, there ſhall be charged the annual ſum of - - -	1	1	0
And if ſuch perſon as laſt aforeſaid ſhall not be a ſervant, for whom the ſaid duties on ſervants ſhall be charged, there ſhall be charged the annual ſum of - - - - -	3	3	0
Upon every other perſon who ſhall uſe any dog, gun, net, or other engine for any of the purpoſes before-mentioned, there ſhall be charged the annual ſum of - - - - - -	3	3	0

By the 46 Geo. III. c. 84. every perſon having more than two children born in lawful wedlock, and *bonâ fide* maintained at the expence of ſuch perſon, ſhall for every ſuch child above two be allowed at the rate of 4 *per cent.* on the amount of all the aſſeſſments on ſuch perſon by virtue of the 43 Geo. III. c. 161. 45 Geo. III. c. 13. 46 Geo. III. c. 78. in caſe the total amount of all the aſſeſſments ſhall be under 40*l.* in any one year, which allowance ſhall be made annually out of the duties ſo charged, at any time in the year of aſſeſſment, on delivery of a declaration in writing, containing the whole number of ſuch children, and their reſpective names and places of reſidence, and which of them are of the family, or reſide elſewhere.

By ſ. 2. this proviſion ſhall extend to children by a former marriage, either of the huſband or wife.

The ſtatute 43 Geo. III. c. 99. reciting that it is expedient that certain of the proviſions contained in any acts relating to the duties on windows or lights, on inhabited houſes, ſervants, carriages, horſes, mules, and dogs, and other duties lately transferred to the commiſſioners for the affairs of taxes, ſhould be conſolidated and amended: enacts that all the ſaid duties under the management of ſuch commiſſioners (except the land-tax) ſhall, from and after April 5, 1804, be aſſeſſed, raiſed, levied, and paid under the regulations thereof.

And as new duties may hereafter be placed under their management, to be aſſeſſed in like manner, it is declared that this act ſhall, with reſpect to ſuch duties, take effect after the time fixed by the act or acts granting them for the commencement of the ſame. See the proviſions of this act detailed in Burn's Juſtice, ubi ſupra.

The property-tax being now extinct, we are happily relieved from giving any account of it.

For the qualifications and powers of commiſſioners, the appointment of aſſeſſors and collectors, the mode of making aſſeſſments, ſurcharges, appeals, &c. &c. we refer to Burn's Juſtice, art. *Taxes*.

For the duty on poſt-horſes, &c. ſee Post-*Horſe*.

The revenue ariſing from the ſeveral taxes, which is annually paid to the creditors of the public, or carried to the ſinking fund, is firſt depoſited in the royal exchequer, and thence iſſued out to the reſpective offices of payment: for the manner in which it is applied, ſee Fund and National *Debt*. See alſo Revenue.

The people of France were ſtrangers to tailles or taxes till the time of St. Louis, when they were firſt impoſed in form of ſubſidies neceſſary for the ſupport of the war in the Holy Land. See Croisade.

They were then extraordinary levies, and were raiſed by capitation; but they were afterwards made perpetual under Charles VII. and Philip the Fair, who, to raiſe money without diſturbing the people, called the people, as a third eſtate, into the general councils of the realm.

Tax alſo denotes the tribute which tenants were occaſionally to pay their lord.

Moſt lords had a right of taxing on four occaſions: *viz.* when the lord was taken priſoner in a juſt war; when he made

made his eldest son a knight; when he married his eldest daughter to a gentleman; and when he made the voyage of the Holy Land.

Naude shews the extravagant rise of this kind of taxes: those, he observes, which under Charles VI. only amounted to the sum of 40,000 livres, were increased under Charles VII. to the sum of 1,800,000; under Louis XI. to 4,740,000; under Charles VIII. to 6,000,000; and under Louis XII. to 7,640,000 livres.

Taxes were distinguished into *free*, which were those due, in the four cases, by freemen, or those who held free lands; and *servile* and *base*, which were those due from persons of base condition.

They were also distinguished into *real* and *personal*. The personal were imposed on the head of the servant or man in mainmort, and so followed him wherever he went.

TAXA, in *Geography*, one of the small Western islands, near the south-east coast of Ilay. N. lat. 55° 43′. W. long. 6° 3′.

TAXAMALCA, a town of Mexico; 60 miles S. of Mexico.

TAXAMARCA, a town of Mexico, in the province of Mechoacan; 40 miles E. of Mechoacan.

TAXANTHEMA, in *Botany*, so named by Necker, from ταξις, *a row*, and ανθημα, *inflorescence*, because some of the plants on which this supposed genus is founded differ from other species of *Statice*, in having their flowers disposed in a regular series, or row, and not in a round head; witness *S. Limonium* and its allies. These species indeed constitute Tournefort's genus of *Limonium*, but he associates with them others with dispersed flowers. (See STATICE and LIMONIUM.) Mr. Brown, Prodr. Nov. Holl. v. 1. 426, adopts Necker's genus and name, citing Tournefort's *Limonium* as a synonym. The latter name was probably judged too near *Limonia* to be retained. We presume to think the genus of *Statice* is in itself so natural, and so well distinguished from every other, that if a practical example were desired, to warn us against founding generic distinctions upon inflorescence alone, no better could be selected. See CYME and GENUS.

TAXERS, two officers yearly chosen in Cambridge, to see the true gauge of all weights and measures observed.

The name took beginning from taxing and rating the rents of houses, which was anciently the duty of their office.

TAX-GUTIUM, in *Ancient Geography*, a town of Rhætia, towards the source of the Rhine, near Brigantium. Ptol.

TAXIANA, an island situated in the Persian gulf, on the coast of Susiana, west of the isle of Tabiana. Ptol.

TAXILA, a large town of India, on this side of the Ganges. Ptol. and Strabo.

TAXIMIRA, a town of Phœnicia. Strabo.

TAXIPA, in *Geography*, a town of Mexico, in the province of Guasteca; 30 miles N.N.W. of Panuco.

TAXIS, ταξις, in the *Ancient Architecture*, signifies the same with ordonnance in the new, and is described by Vitruvius to be that which gives every part of a building its just dimensions with regard to its use.

TAXIS, from τασσω, *to put in order*, in *Surgery*, the operation of reducing a hernia with the hand. See a particular account of it in the article HERNIA.

TAXITLAN, in *Geography*, a town of Mexico, in the province of Guasteca; 38 miles S. of St. Yago de los Valles.

TAXUS, in *Botany*, the ancient Latin name of the Yew-tree, used by Pliny. The word is supposed by some to be derived from τοξον, *a bow*, *arrow*, or *dart*, because missile weapons were poisoned with its berries. We are confident that this precise explanation is erroneous, because, whatever may be the noxious qualities of any other part of the plant, the berries are simply mucilaginous and saccharine, eatable with impunity, as we have often experienced. The ancient use of this wood for bows, perhaps also for arrows or darts, might more truly account for the above etymology, did not Dioscorides expressly tell us ταξος was Latin. — Linn. Gen. 532. Schreb. 706. Willd. Sp. Pl. v. 4. 856. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 1086. Prodr. Fl. Græc. Sibth. v. 2. 265. Ait. Hort. Kew. v. 5. 415. Pursh 647. Juss. 412. Lamarck Illustr. t. 829. Gærtn. t. 91. — Class and order, *Dioecia Monadelphia*. Nat. Ord. *Coniferæ*, Linn. Juss.

Gen. Ch. Male, *Cal.* none, except the scales of the bud, resembling a perianth of four leaves. *Cor.* none. *Stam.* Filaments numerous, united below into a column, longer than the bud; anthers depressed, blunt, with eight notches, at the edge, splitting all round at the base, and after shedding their pollen becoming flat and peltate, remarkable for their eight marginal segments.

Female, *Cal.* inferior, of one leaf, close, undivided, entire. *Cor.* none. *Pist.* Germen superior, ovate, acute; style none; stigma obtuse. *Peric.* none, except a spurious incomplete berry, formed of the calyx elongated into a globose juicy coloured sheath, open at the top, at length shrivelling and drying away. *Seed* one, ovate-oblong, projecting with its summit beyond the berry.

Ess. Ch. Male, Calyx none. Corolla none. Stamens numerous. Anthers peltate, with eight segments.

Female, Calyx cup-shaped, entire. Style none. Seed one, partly enveloped in the pulpy calyx.

Obs. Linnæus properly mentions that the berry of this genus cannot, strictly speaking, be denominated a pericarp. "It is a remarkable species of berry, like which nothing else is to be seen, except perhaps in *Gaultheria*." If the analogy here cited be just, the part in question is a real calyx, not more extraordinary in its change than that of *Blitum*, or of *Morus*, and we have always ventured to term it such, trusting to the analogies of *Juniperus* and *Ephedra* for our support.

1. T. *baccata*. Common Yew. Linn. Sp. Pl. 1472. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 746. (Taxus; Ger. Em. 1370. Matth. Valgr. v. 2. 444. Camer. Epit. 840.)—Leaves linear, two-ranked, crowded, nearly flat. Male flowers globose.—Native of mountainous woods, particularly in the clefts of high calcareous rocks, in various parts of Europe, from Norway to Greece, flowering in March or April. Dioscorides indeed, who calls this tree σμιλαξ, speaks of it as an exotic, the ταξος of the Romans; but Mr. Hawkins noticed it wild on the rocks of mount Cyllene in Laconia. Thunberg says it is common in Japan. The *trunk* is straight, of slow growth, with a smooth deciduous bark, and very hard, tough, close-grained wood. *Branches* spreading horizontally in two directions. *Leaves* numerous, scattered, crowded, spreading in two rows, nearly sessile, linear, entire, slightly revolute, obtuse with a small point, smooth, of a dark shining green, permanent, about an inch long. *Flowers* axillary, solitary, nearly sessile, enveloped with imbricated *bracteas*; the male ones numerous, sometimes two or three together, cream-coloured, half the size of a pea, globose, abounding with pollen; females drooping, their green entire *calyx* just visible beyond the *bracteas*. This afterwards assumes the appearance of a bright scarlet *berry*, the size of a currant, open at the top, where the *seed* appears. The *leaves* are very poisonous, and if accidentally eaten by domestic cattle, prove fatal. The ancients

ancients report that it is dangerous to fleep under this tree. It was formerly much planted in church-yards; and many Yews, perhaps "the tenants of a thoufand years," ftill remain in the northern and Welfh village cemeteries. This was the favourite tree for clipping into any fantaftic fhape, on which art our old gardeners fo much valued themfelves; but the art and the material are now nearly alike difcarded; and the garden is freed from one of the greateft afylums for vermin, the trim yew hedge.

2. T. *canadenfis*. North American Yew. Willd. n. 2. Purfh n. 1. (T. baccata β, minor; Michaux Boreal.-Amer. v. 2. 245.)—Leaves linear, two-ranked, crowded, revolute. Male flowers globofe, always folitary.—In fhady rocky places in North America, flowering in March and April. In Canada. *Michaux*. Covering a great part of the rocky banks of the Antietum, in Maryland. Under the fhade of other trees, it does not rife above two or three feet. *Purfh*. Michaux defcribes this fpecies as of humbler growth than the former, fpreading, and with fmaller *flowers* and *fruit*. Willdenow fays it is fmaller and narrower in all its parts, nor does it alter by culture, and yet a fpecific diftinction is hardly to be detected. The *leaves*, however, are narrower, fmaller, and revolute at the margin. Male *flowers* always folitary in the bofoms of the leaves.

3. T. *elongata*. Long-leaved African Yew. Ait. ed. 1. v. 3. 415. ed. 2. n. 3. Willd. n. 3. Thunb. Prodr. 117.—Leaves fcattered, linear-lanceolate. Branches fomewhat whorled. Male flowers cylindrical, with fpirally imbricated, very numerous, anthers.—Native of the Cape of Good Hope. Sent to Kew in 1774, and kept in feveral curious greenhoufes in England as well as on the continent, flowering in July. Wild fpecimens, anfwering to Thunberg's character of the whorled *branches*, but without a name, are preferved in the Linnæan herbarium. In thefe the *leaves* are fcattered, on fhort broad ftalks, flat, coriaceous, fomewhat glaucous, occafionally falcate, from one to two inches long. *Male flowers* axillary, folitary, cylindrical, obtufe, about half an inch in length, their fcale-like *anthers* imbricated, exactly like thofe of a Fir. The garden plant has *leaves* half as long again, not glaucous, fometimes oppofite on the young branches.

4. T. *montana*. Mountain Peruvian Yew. Willd. n. 4.—"Leaves two-ranked, linear, with a callous point; their upper edge rounded at the bafe; lower contracted."—Gathered by Humboldt and Bonpland on the mountains of Peru. Akin to *T. baccata*, but differing in the above character of the *foliage*. The fame travellers noticed, in Mexico, what Willdenow judged to be a mere variety of this fpecies, with *leaves* half as long again.

5. T. *nucifera*. Acorn-bearing Yew. Linn. Sp. Pl. 1472. Willd. n. 5. Ait. n. 3. Thunb. Jap. 275. Kæmpf. Am. Exot. 814. t. 815.—Leaves two-ranked, diftant, lanceolate, pointed, but half the length of the fruit.—Frequent, according to Kæmpfer, in the northern provinces of Japan, flowering in fpring, and ripening fruit late in autumn. Thunberg obferved it here and there near Nagafaki, and in the ifland of Nipon. Mr. Aiton fays it was cultivated in the greenhoufe of Capt. Thomas Cornwall, in 1764. We have never examined this fpecies. Kæmpfer defcribes it as a lofty *tree*, with many oppofite fcaly *branches*; the wood light. *Leaves* hardly an inch long, one-third of an inch afunder, nearly feffile, tipped with a fhort point; dark fhining green above; glaucous beneath. Female *flowers* axillary, folitary, difperfed, fomewhat quadrangular, their thick flefhy fcales becoming a fort of permanent cup at the bafe of the *feed*, or *nut*, which is coated, oval, pointed, above an inch long. The oil of the kernel is efteemed for culinary purpofes. The kernel itfelf is too aftringent to be eaten in general.

6. T. *macrophylla*. Long-leaved Japan Yew. Thunb. Jap. 276. Willd. n. 6. Ait. n. 4. Banks Ic. Kæmpf. t. 24. (*Sin*, vulgò Máki, feu *Fon Máki*, id eft *Maki* legitima; Kæmpf. Am. Exot. 780.)—Leaves fcattered, lanceolate, pointlefs, fpreading every way. Fruit ftalked.—Common in Japan, flowering in June. *Thunberg*. Mr. William Kerr brought it from China to Kew in 1804. A greenhoufe plant, flowering in July and Auguft. *Aiton*. Kæmpfer defcribes this as a large and ftout *tree*, whofe wood is valued for cabinet work, being not liable to the attacks of infects, or other caufes of decay. The *leaves* are a finger's length, fpreading equally in all directions; paler beneath. Male *flowers* cylindrical. *Fruit* axillary, ftalked, with a pair of awl-fhaped revolute fcales at the top of the ftalk. The *feed* is oval, the fize of a pea, and feems by Kæmpfer's figure to be elevated on a partial ftalk above the flefhy *calyx*. Thunberg, however, fpeaks of the "ovate fmooth green *berry*, turning black in drying, filled by an ovate white *feed*." Perhaps this may be a coated nut, as in *T. nucifera*.

7. T. *fpinulofa*. Spinous-leaved Yew.—Leaves partly oppofite or whorled, lanceolate, fpinous-pointed, fpreading every way. Fruit ftalked.—For a fpecimen of this, faid to have been brought by governor Philip from Port Jackfon, New South Wales, we are indebted to A. B. Lambert, efq. It very much refembles Kæmpfer's plate of the laft, in general habit, but the *leaves* are hardly an inch and quarter long, and have each a fpinous point. The ftalks of the *fruit* are axillary, each crowned with a pair of lanceolate, revolute, permanent fcales. *Fruit* oval, elevated on a ftalk, which is equal in length to the *calyx*, compofed of feveral flefhy fcales, that envelopes it. The fize and whole appearance of this *fruit* and its accompaniments are fo precifely like Kæmpfer's figure of the laft, which indeed they help us to underftand, that thefe two plants muft be of the fame genus, and are more truly perhaps akin to *T. nucifera*, than to *T. baccata*. On this fubject we may expect information hereafter from Mr. Brown; if at leaft our prefent plant be really a native of New South Wales.

8. T. *latifolia*. Broad-leaved Cape Yew. Thunb. Prodr. 117. Willd. n. 7.—"Leaves folitary, lanceolate, pointed, fmooth."—Found by Thunberg at the Cape of Good Hope.

9. T. *falcata*. Sickle-leaved Cape Yew. Thunb. Prodr. 117. Willd. n. 8.—"Leaves folitary, lanceolate, falcate, fmooth."—From the fame country. One of our wild fpecimens of *T. elongata* anfwers to this definition.

10. T. *tomentofa*. Downy Cape Yew. Thunb. Prodr. 117. Willd. n. 9.—"Leaves oppofite, lanceolate, downy beneath."—Gathered at the Cape by Thunberg, whofe fpecific characters of thefe fpecies, except of the laft, are not fufficient to diftinguifh them from the reft. We have feen no fpecimens.

11. T. *verticillata*. Whorled Japan Yew. Thunb. Jap. 276. Willd. n. 10. (*Kcu fin*, item *Sen baku*, vulgò *Inu Máki*, id eft *Máki* fpuria; Kæmpf. Am. Exot. 780.)—Leaves whorled, linear, falcate.—Native of Japan. A *tree* with denfe branches, gradually fhorter upward, fo as to affume a conical figure, like a Cyprefs, three fathoms high. *Fruit* oblong, in two divifions; the lower part refembling moufe-dung; the upper a grain of pepper, in which is loofely enclofed a flefhy, foft, fweetifh kernel. Such is Kæmpfer's defcription, by which it is eafy to perceive the clofe refemblance of this fruit to our *T. macrophylla* and *fpinulofa*. A fpecimen from Thunberg, without fructification, in the Linnæan herbarium, anfwers well to his own defcription,

tion, having round, ſmooth, greyiſh *branches*. Whorls from one to two inches aſunder, each of about eight ſeſſile, linear, falcate, entire, ſmooth, ſingle-ribbed *leaves*, a finger's length, or more; two lines broad; obtuſe, or ſlightly emarginate, at the end; of a dark ſhining green above; paler beneath.

TAXUS, in *Gardening*, furniſhes a plant of the hardy evergreen kind, of which the ſpecies moſtly cultivated is the common yew-tree (T. baccata.) This is a tree which has ſeveral varieties, as thoſe with very ſhort leaves, with broad ſhining leaves, and with ſtriped or variegated leaves.

Method of Culture.—In this tree, the increaſe may be effected in ſeveral ways, as by ſeeds, and ſometimes by layers and cuttings. In the firſt mode, after having procured a quantity of the yew berries, and diveſted them of the pulp or mucilage, they ſhould be ſown in beds of light earth, either in ſhallow drills, or ſcattered over the ſurface in the autumn or ſpring ſeaſon; but the former is the beſt method, as the plants riſe in the following ſpring; and be covered near an inch deep with light mould, out of the alleys, &c. They require no further care, only to keep the beds clean from weeds before and after the plants come up, and to give occaſional waterings in dry weather, in ſpring and ſummer, to forward and ſtrengthen the plants in their growth. They ſhould have two years' growth in the ſeed-bed; then in the autumn or ſpring be planted out upon four-feet-wide beds, in nurſery rows, a foot aſunder, to remain two, three, or four years, when ſome may be planted out finally for hedges, where required; others in the nurſery quarters, in rows, two or three feet aſunder, to be trained in a ſuitable manner for the purpoſes they are intended.

And after growing in the nurſery till they obtain from half a yard to four or five feet ſtature, they may be finally planted out in autumn or ſpring, for their intended purpoſes; when they will riſe from the ground with a large ſpread of roots. They ſhould be planted in their places as ſoon after removal as poſſible, giving each plant a good watering at the time.

In the future culture, thoſe trained in hedges, &c. muſt be clipped or cut in annually, once or twice in the ſummer; and thoſe in the ſhrubberies and rural plantations have the lower branches pruned up occaſionally to a ſingle ſtem; but the head ſhould generally be permitted to ſpread agreeably to its natural mode of growth, except juſt reducing any conſiderable rambling branch, &c.

But the ſtriped or variegated yews, and other varieties, ſhould be increaſed by layers, ſlips or cuttings, as they are rarely permanent by ſeeds. The layers ſhould be made from the young ſhoots of not more than a year or two old, being laid down in ſpring, ſummer, or early in autumn, when many of them will take root, and in one or two years be fit for planting off into nurſery rows.

And the ſlips and cuttings ſhould be made by cutting or ſlipping off a quantity of the one-year's ſhoots, diveſting them of the lower leaves, and planting them in a ſhady border thick together, in ſmall trenches, in the early ſpring or autumn, giving water at planting, and afterwards occaſionally in dry hot weather. They will be well rooted in two years, and be fit for being planted out into wide nurſery rows, or in any other ſimilar manner.

All theſe plants may be employed as ornamental evergreens, and as foreſt-trees; and they were formerly much uſed in hedges and trained figures: they have a good effect in ſhrubberies among others of the evergreen tribe, being permitted to aſſume their natural growth, in common with other trees and ſhrubs; and alſo when planted as detached ſtandards, in extenſive diſtant opens of graſs-ground, in parks, and the ſides of hills, &c.; likewiſe when introduced as foreſt-trees in timber plantations of the evergreen kind. See PLANTATION.

The different ſorts of hedges and figure-works which were formerly in ſo high repute in gardens and pleaſure-grounds, are now almoſt wholly in diſuſe, theſe being at preſent laid out in a more open and rural manner, ſo as to have a greater imitation of nature, and a more full diſplay of their ſeveral quarters and parts, as the lawn, walks, and other places, together with the various plants belonging to them.

Single yews are now even hardly ever admitted in modern deſigns by way of ornament, but theſe trees, in their natural growths, are deſirable for introducing into large plantations of the durative kind, for the ſake of increaſing the variety; and though ſome perſons reject them in conſequence of their poiſonous nature, and gloomy mournful aſpect, others admire them for ſuch ſolemn appearances, and think they afford a remarkably fine contraſt with the other more lively evergreens. There can be no doubt that the leaves, eſpecially when withered, or dried a little, are of a poiſonous quality; beſides, the tree has had the title of the *deadly yew* given to it by ſome, and been looked upon as an emblem of mortality, and on that account planted in church-yards, to remind people of their latter end. That accidents have frequently ariſen to cattle, of both the horſe and cow kind, from eating the green leaves and tender ſhoots, but more particularly when in the above ſtates, is certain. Therefore, as the cuttings or clippings of this ſort are often liable to be eaten with greedineſs by ſome cattle, particularly cows, even when they have lain in the ſun for a day or two, and are become half dried, it is proper and neceſſary that they ſhould be either carefully deſtroyed by fire, or put quite out of the way of all ſorts of animals, and not, as is too frequently the practice, be careleſsly thrown over the walls or hedges, into the roads, lanes, or on the rubbiſh heaps, where cattle frequent.

The beſt ſizes of yew plants are probably from two or three, to five or ſix feet in height; but thoſe of ſeven or eight may be removed with balls of earth about their roots, and be uſed for particular purpoſes and occaſions. Watering at the time of planting them is conſtantly requiſite.

TAXUS, in *Zoology*, the URSUS *Mæles*, or common *Badger*; which ſee.—Alſo, a name given by Kæmpfer to the hyæna of the ancients. See CANIS *Hyæna*, and HYÆNA.

TAY, in *Geography*, is a river in Perthſhire, Scotland, conſidered as the greateſt of the Scottiſh rivers, has its ſource in the weſtern extremity of the county, in the diſtrict of Breadalbane, on the frontiers of Lorn, in Argyleſhire; but has not the appellation of Tay till it iſſues from the lake of that name. At its ſource it bears the name of Fillan; and deſcending in a circuitous courſe of eight or nine miles through a valley, to which it gives the name of Strathfillan, it falls into Loch Dochart. This lake, about three miles in length, has an ancient caſtle upon an iſland, overhung by a huge promontory; the whole embowered with wood, ſo as to have a moſt romantic appearance. Iſſuing from Loch Dochart, the river retains that name, and gives the appellation of Glen-Dochart to the vale through which it runs. At the eaſtern extremity of this valley, the water is again detained in its courſe; and being augmented by the river Lochay, the united ſtreams form one of the moſt beautiful of the Scottiſh lakes, called Loch Tay. Iſſuing hence, the river aſſumes the name of the lake, which name it retains till it mingles with the waters of the ocean. The valley through which it paſſes may be conſidered as the paradiſe of the Highlands. On Loch Tay, and the river for ſome fome miles below it, the banks are richly cultivated, or covered with beautiful plantations, the whole overlooked and fheltered by mountains towering to the clouds; among which rifes the lofty Benlawers, the third mountain in point of height in the ifland. Here, near the village of Kenmore, is the magnificent feat of the earl of Breadalbane, called Taymouth; and in this valley, although the parifhes are twenty, thirty, or forty miles in extent, feveral parifh-churches are fituated in a tract of a few miles; a circumftance which demonftrates the difcernment of the clergy in ancient times in felecting their place of refidence. After leaving the lake about two miles, the Tay acquires a great increafe from the waters of the Lyon; at Logierat it receives the united ftreams of the Garry and the Tummel, and becomes a river of uncommon fize and beauty. Near Dunkeld it is increafed by the waters of the Bran, and receiving in its courfe the Ifla, with its tributary ftreams from the eaft, and the Almond from the weft, proceeds by Perth between the hills of Kinnoul and Moncrieff, till it meets the Earn, after which it proceeds eaftward, forming the eftuary or Frith of Tay; which expands to the breadth of three miles, but contracts to two miles as it approaches Dundee, about eight miles below which, it pours its waters into the German ocean. The hills of Kinnoul and Moncrieff afford extenfive profpects; that from the latter is denominated by Pennant the "Glory of Scotland." The Tay is navigable as far as Newburgh, in Fife, for veffels of 500 tons; and veffels of confiderable fize can go up as far as Perth. The Frith of Tay is not fo commodious as that of the Forth; but from the Buttonnefs or Barray fands to Perth (an extent of nearly forty miles), the whole may be confidered as a harbour; having the county of Fife on one fide, and thofe of Angus and Perth on the other. There are fewer great falls of water on the Tay than in moft other rivers which rife in a highland diftrict; but it poffeffes feveral cafcades of confiderable height, particularly at the Linn of Campfie, near its junction with the Ifla, where the water is precipitated over a huge bafaltic dike into a pool of great depth.—Beauties of Scotland, vol. iv. Perthfhire, 1806. Gazetteer of Scotland, 1806.

Tay, *Loch*, a lake in Perthfhire, Scotland, extends about fifteen miles in length from the village of Killin, its weftern extremity, to its eaftern termination at the village of Kenmore; its breadth is only from one to two miles. Its depth varies in different parts, from fifteen to a hundred fathoms. The banks on both fides are fertile, and finely diverfified by the windings of the coafts and the varied appearances of the mountains. On a fmall promontory near the eaftern extremity, are the church and village of Kenmore, near which, on a fmall ifland covered with trees, ftand the ruins of a priory, which was dependent on the religious eftablifhment of Scone. It was founded, in 1122, by king Alexander I., who depofited there the remains of his queen Sybilla, the natural daughter of Henry I. of England. On the death of Alexander the priory was more liberally endowed, that the monks might perform maffes for the repofe of his foul, as well as for that of his queen. The loch abounds with falmon, pike, perch, eels, charr and trout. The falmon are peculiarly excellent; the fifhery for which commences in December, and ends on the 26th of Auguft. The earl of Breadalbane has the exclufive right of fifhing there at all feafons. This privilege was originally granted for the purpofe of fupplying fifh for the monks of the priory, and at the diffolution was, with the ifland, claimed by this noble family. The waters of this lake have at times fuffered violent and unaccountable agitation. An ample account of one of thefe phenomena, which occurred on Sunday, September 12, 1780, is publifhed in the firft volume of the Tranfactions of the Royal Society of Edinburgh. It was written by Mr. Fleming, late minifter of Kenmore. He ftates, that "about nine o'clock in the morning the water was obferved to retire about five yards within the ordinary boundary, and in four or five minutes to flow out again. In this manner it ebbed and flowed fucceffively three or four times within the fpace of a quarter of an hour, when all at once the water rufhed from the eaft and weft in oppofite currents, and rofe in the form of a great wave to the height of five feet above the ordinary level, leaving the bottom of the bay dry to the diftance of between ninety and an hundred yards from its natural boundary. When the oppofite currents met, they made a clafhing noife and foamed; and the ftronger impulfe being from the eaft, the wave, after rifing to its greateft height, rolled weftward, but flowly diminifhing as it went, for the fpace of five minutes, when it wholly difappeared. As the wave fubfided, the water flew back with fome force, and exceeded its original boundary four or five yards; then it ebbed again about ten yards, and again returned, and continued to ebb and flow in this manner for the fpace of two hours, the ebbings fucceeding each other at the diftance of about feven minutes, and gradually leffening, till the water fettled into its ordinary level. During the whole time that this phenomenon was obferved, the weather was calm. It could fcarcely be perceived that the direction of the clouds was from north-eaft." On the 13th of July, 1794, the loch experienced agitations fimilar to thofe defcribed by Mr. Fleming, but they were neither fo violent nor fo long continued.—Beauties of Scotland, vol. iv. Perthfhire.

Tay, a river of Ireland, in the county of Waterford, which runs into the fea, 7 miles W.N.W. from Dungarvan bay.

TAYA, a river of Auftria, which rifes near Schweigers, paffes by Drofendorf, and enters Moravia, paffes by Znaym, Laab, &c. and joins the Marfch, 4 miles N.N.E. of Hockenau.—Alfo, a fmall ifland in the Indian fea, near the weft coaft of Siam. N. lat. 7° 38′. E. long. 98° 30′.

TAYABO, a town on the eaft coaft of the ifland of Celebes, in Gunong-Tellu bay. S. lat. 1° 10′. E. long. 121° 30′.

TAYASAN, a town on the eaft coaft of the ifland of Negros. N. lat. 10° 18′. E. long. 123° 3′.

TAYBA, a ruined town in the deferts of Syria, which fhews in its prefent ftate, evident marks of its former magnificence.

TAYECUA, a town of South America, in the province of Darien; 30 miles W. of St. Marie de Darien.

TAYGETA, in *Ancient Geography*, a river of the Peloponnefus, in Laconia.

TAYGETUS, a mountain of Laconia, S.W. of Bryfées, being a portion of a fmall chain of mountains on the promontory of Tenarus, on the frontiers of Arcadia. It was famous for the abundance of its game. On this mountain was a place confecrated to the fun, called by Paufanias "Talet." Here they facrificed, among other victims, horfes.

TAYKYATT, a long and ftraggling town of the Birman empire, on the W. fide of the Irawaddy; 5 miles W.N.W. of Yeoungbenzah.

TAYL, in *Heraldry*. See Tail.

TAYLOR, Brook, LL.D. and F.R.S., in *Biography*, an eminent mathematician, was born of a good family, at Edmonton, near London, in the year 1685. In early life he devoted himfelf to mufic, drawing, and painting, in which he was reckoned to excel. At the fame time he purfued his classical studies and mathematics under a private tutor; and in 1701, at the age of 15, he was entered a fellow-commoner at St. John's college, in the university of Cambridge. Such was his assiduity in the prosecution of mathematics, that in 1708 he composed his treatise "On the Centre of Oscillation," which was published in the Phil. Transf. In the next year he took his degree of bachelor of laws, and in 1712 he was elected fellow of the Royal Society. By a letter addressed to Mr. Machin, dated in this year, it appears that he had then given a solution of Kepler's famous problem, pointing out its importance and use. He also at the same period presented to the Society three papers, *viz.* "On the Ascent of Water between two Glass Planes;" "On the Centre of Oscillation;" and "On the Motion of a stretched String." In consideration of his services to the Society, and distinguished qualifications for the office, he was elected their secretary in 1714, taking in the same year his degree of doctor of laws at Cambridge. In 1715, he published his "Methodus Incrementorun;" a curious essay, preserved in the Phil. Transf. entitled, "An Account of an Experiment for the Discovery of the Laws of Magnetic Attraction;" and also a treatise, of high value and reputation, "On the Principles of Linear Perspective." His correspondence this year with count de Montmort on the tenets of Malebranche was ably conducted, and gained for him an eulogy from the French academy; and in 1716, on his visit to Paris, he was treated with great personal respect. Upon his return to London, in 1717, he composed three treatises, published in the 30th volume of the Phil. Transf.; the titles of which are, "An Attempt towards an Improvement of the Method of approximating in the Extraction of Roots of Equations in Numbers;" "A Solution of Demoivre's 15th Problem, with the Assistance of Combinations and infinite Series;" and "A Solution of the Problem of G. G. Leibnitz proposed to the English." His health being impaired by intense application, he was obliged to seek relief at Aix-la-Chapelle. Upon his return, in 1719, he directed his attention to studies very different from those to which he had been accustomed; and the fruits of these studies have been found among his papers by his grandson sir William Young, in detached fragments of a treatise on the Jewish sacrifices, and a dissertation on the lawfulness of eating blood. His leisure hours were still devoted to the application of mathematics in the improvement of the arts; and with this view he revised his treatise on Linear Perspective, which appeared in a new and enlarged form. Drawing was also a favourite amusement. His treatise on Linear Perspective, which has been held among mathematicians in the highest estimation, produced at this time a controversy, which terminated in a very serious misunderstanding, between him and J. Bernouilli. This treatise, abstruse to those who consult it for mere practical purposes, was rendered more plain and perspicuous by Mr. Kirby, in an edition, entitled "Brook Taylor's Perspective made easy." Our author's answer to Bernouilli is preserved in the 30th volume of the Phil. Transf. Soon after his return to England in 1721, he published the last paper that appears with his name in the Phil. Transf. entitled "An Experiment made to ascertain the Proportion of Expansion of Liquor in the Thermometer, with regard to the Degree of Heat."

Dr. Taylor was twice married: his second wife was a daughter of John Sawbridge, esq. of Olantigh in Kent. On the death of his father, in 1729, he succeeded to the family estate of Bifrons in Kent, and in the following year his wife died in child-bed. About this time he probably wrote the essay, entitled "Contemplatio Philosophica," published by sir W. Young in 1793. But though his mind might have thus obtained temporary relief, he survived his wife little more than a year, and died of a decline in the 46th year of his age, December 1731. "I am spared," says his descendant, "the necessity of closing this biographical sketch with a prolix detail of his character, in the best acceptation of duties, relative to each situation of life in which he was engaged; his own writings, and the writings of those who best knew him, prove him to have been the finished Christian, gentleman, and scholar." Life by his grandson, sir William Young, prefixed to his Posthumous Works.

Taylor, Jeremy, an eminent divine and prelate of the established church in Ireland, was the son of a barber at Cambridge, where he was born in the early part of the 17th century. At the age of 13 he was admitted at Gonville and Caius college in the university of that place, where he remained till he took the degree of M.A. Having taken orders, he occasionally preached in London, and obtained by the interest of archbishop Laud, in 1636, a fellowship of All Souls' college, Oxford. Here he resisted attempts that were made to proselyte him to popery, and became more established in Protestant principles. Laud appointed him one of his chaplains, and procured for him the rectory of Uppington, in which he settled about the year 1640, at which time he surrendered his fellowship and married. In 1642 he was chaplain in ordinary to Charles I., and served his cause by writing in defence of the church of England. When the parliament became victorious, his living was sequestered, and he retired into Wales, where he was kindly received by the earl of Carbery, of Golden Grove, near Llandilo, in Carmarthenshire; under whose protection he exercised his ministry, and kept a school for the support of his family. In this state of retirement, he composed those discourses, which caused him to be held in high estimation, as one of the first writers in the English language, "with respect to fertility of conception, eloquence of expression, and comprehensiveness of thought." At this period the death of three hopeful sons disturbed his tranquillity, and rendered it necessary for him to change the scene and to remove to London, where he exposed himself to considerable danger by officiating in a private congregation of loyalists. Invited by Edward lord Conway to his seat at Portmore in the county of Antrim, he remained in Ireland until the Restoration. On that event he came over to England, and in January 1660-1, his services were recompensed by the promotion to the sees of Down and Connor. He was also made privy-counsellor of Ireland, and appointed to the administration of the bishopric of Dromore, and honoured with the office of vice-chancellor to the university of Dublin. In these high and responsible stations he paid sedulous attention to his official duties, exhibited an example of piety, humility, and charity; and employed so great a part of his income in doing good, both privately and publicly, that when he died at Lisburne in 1667, he left only moderate portions to his three daughters. His person was comely, his manners were polite, his voice was melodious, and his conversation was agreeable. Of his works, which were numerous, consisting chiefly of sermons and devotional pieces, and printed in four, and also in six volumes, folio, the most remarkable is entitled, "Theologia Eclectica, or a Discourse on the Liberty of Prophesying; shewing the unreasonableness of prescribing to other men's faith, and the iniquity of persecuting different opinions," 4to. first published in 1647. The author, when this book was written, belonged to a vanquished and persecuted party; and he strongly and boldly pleads for liberty of conscience, and the rights of individuals to judge for themselves in matters of religion.

religion. This work, confidering the time in which it was written, and the connections of the author, indicates a very enlightened mind with regard to the fubjects of difcuffion; and it is perufed with no fmall degree of intereft in the prefent period of greater knowledge and liberality. With refpect to toleration, however, we obferve, that he limits it to fuch doctrines as are not inconfiftent with fociety or the public good;—a limitation which is capable of being much mifconftrued and mifapplied. Having afferted, as a firft principle, that "the duty of faith is completed in believing the articles of the Apoftles' creed," he could not confiftently approve the impofition of ftricter creeds. Of the Athanafian creed he thus fpeaks: "If I fhould be queftioned concerning the fymbol of Athanafius, I confeffe I cannot fee that moderate fentence and gentleneffe of charity in his preface and conclufion, as there was in the Nicene creed. Nothing there but damnation and perifhing everlaftingly, unleffe the article of the Trinity be believed, as it is there with curiofity and minute particularities explained. Befides, if it were confidered concerning Athanafius's creed, how many people underftand it not, how contrary to natural reafon it feems, how little the fcripture fayes of thofe curiofities of explication, and how tradition was not clear on his fide for the article itfelfe, much leffe for thofe forms and minutes,—and after all this, that the Nicene creed itfelfe went not fo farre, neither in article, nor anathema, nor explication, it had not been amiffe if the final judgment had been left to Jefus Chrift."

This celebrated work did not efcape invidious criticifm and fevere animadverfion. Among others we may mention Anthony Wood, who, with cenfurable illiberality, fuggefted, that Taylor in this book, and Hales in his tract on Schifm, employed their arguments as a ftratagem by way of raifing factions among the Prefbyterians, and diffolving their union. The moft popular of Taylor's other writings, have been his "Golden Grove, or Manual of daily Prayers;" his treatife on "Holy Living and Dying;" and his "Ductor Dubitantium, or Rule of Confcience." Dr. Dodwell long fince obferved, and not unjuftly, that "Dr. Taylor, in his voluminous writings, faid many lively things, which will not bear a ftrict examination." Biog. Brit. Gen. Biog.

Taylor, John, D.D. a learned and highly refpectable divine among Proteftant Diffenters, was born in the year 1694, at or near Lancafter. After having received his education at Whitehaven under Dr. Dixon and others, he was nominated by one of the Difney family to the chapel of Kirkftead, in Lincolnfhire, exempt from ecclefiaftical jurifdiction, and which had been occupied from the latter end of the preceding century by diffenting minifters. Here he lived, on a fmall falary aided by a fchool, for 18 years; and laid a foundation for the theological celebrity, which he afterwards acquired by a diligent ftudy of the fcriptures in their original languages. In this obfcure and retired fituation he did not efcape notice; and in the year 1733, he complied with an invitation from the Prefbyterian congregation at Norwich. To his congregation, which had been before his fettlement ferved by Calviniftic minifters, he recommended the perufal of Dr. Clarke's Scripture-Doctrine of the Trinity. His firft publication was "A Prefatory Difcourfe to Mr. Jofeph Rawfon's Cafe," who, in 1736, had been excluded from communion with the congregational church at Nottingham, for refufing his affent to a declaration required of him concerning the Trinity; in which he ably defended the right of Chriftians to deduce their faith from the fcriptures, without the intervention of creeds and fubfcriptions. His firft avowed attack upon Calviniftic theology, was the publication of his "Scripture-Doctrine of Original Sin," which firft appeared in 1740. This excited alarm and animadverfion. (For an account of this controverfy, fee the article *Original* Sin.) Dr. Taylor's fupplement was publifhed in 1741. This was fucceeded, in 1745, by "A Paraphrafe on the Epiftle to the Romans, with a Key to the Apoftolic Writings." This "Key" was well received, and has been highly commended. The late learned Dr. Watfon, bifhop of Llandaff, has given it a place in his "Theological Tracts;" and archdeacon Paley recommends a careful perufal of the Paraphrafe on the Romans to candidates for priefts' orders. The labours of his fubfequent years produced feveral fmall tracts, and particularly his "Scripture-Doctrine of Atonement;" but his opus majus, as we may juftly denominate it, was his "Hebrew Concordance," in folio, the firft volume of which appeared in 1754, and the fecond in 1757. This work, which does immortal honour to the critical fkill and indefatigable affiduity of the author, was encouraged by a great number of fubfcribers, among whom we may enumerate twenty-two Englifh, and fifteen Irifh bifhops. Soon after the publication of this performance, the author was prefented by the univerfity of Glafgow with the degree of D.D. In 1754 he publifhed a pamphlet, entitled "The Lord's Supper explained upon Scripture Principles," and in 1757 appeared a defence of infant baptifm, entitled "The Covenant of Grace." Dr. Taylor was happily fituated at Norwich, and received every teftimony of refpect to which his learning and character entitled him; but a fcene of more public and general ufefulnefs was opened to him in the year 1757, when he was invited to fupply the place of divinity-tutor at the newly-founded academy of Warrington, in Lancafhire. But here his fituation was rendered unpleafant to him; and fome events occurred which affected his health and fpirits. Although he performed his official duties for fome time amidft the difquiets which he experienced, he was at length carried off, by an unperceived death, during the night of March 5, 1761, at the age of 66 years. At Warrington he publifhed two pamphlets, *viz.* "An Examination of the Scheme of Morality advanced by Dr. Hutchefon, late Profeffor of Morality in the Univerfity of Glafgow," and "A Sketch of Moral Philofophy," for the ufe of his clafs. He alfo prepared for the prefs "The Scripture Account of Prayer, in an Addrefs to the Diffenters in Lancafhire," in confequence of the introduction of a liturgy at Liverpool, an innovation in the accuftomed mode of worfhip among Diffenters which he difapproved. His pofthumous work, entitled "A Scheme of Scripture Divinity," was publifhed by Mr. Richard Taylor of Norwich, his eldeft furviving fon; and it was held in fuch eftimation by the late bifhop of Llandaff, as to form a part of his Collection of Tracts. As a preacher, Dr. Taylor was plain and fimple in his language, but dignified and impreffive; and he excelled in a critical explanation of difficult paffages of fcripture. He had the merit of introducing into the congregation at Norwich a fpirit of liberal enquiry, which, we are informed, ftill continues. Memoir on the Life of Dr. John Taylor of Norwich.

Taylor, John, LL.D., the fon of a barber at Shrewfbury, was born about the year 1703, and diftinguifhed himfelf as a fcholar and critic. After a courfe of preparatory education in his native town, he was entered at St. John's college in Cambridge, and became a fellow of it in the year 1730, in which year he publifhed two Latin academical orations. In 1732 appeared propofals for an edition of Lyfias. He was firft librarian and afterwards regiftrar of the univerfity. His "Lyfias," Gr. and Lat., with the conjectures of Markland, was publifhed from the prefs of

Bowyer,

Bowyer, in 1739; and a new edition, with Taylor's verfion and notes, was printed at Cambridge in the following year. Upon taking his degree of LL.D. he delivered and publifhed a differtation under the title of "Commentarius ad legem decemviralem de inope debitore in partes diffecando." In 1743, he publifhed "Orationes duæ; una Demofthenis contra Meidiam; altera Lycurgi contra Leocratem," Gr. and Lat. with notes and emendations; and in the following year, "Marmor Sandvicenfe, cum Commentario et Notis," being a differtation on an Athenian marble brought to England by lord Sandwich, bearing the oldeft infcription of known date.

In 1741, Dr. Taylor had been admitted an advocate in Doctors' Commons, and in 1744 he was made chancellor of Lincoln. He afterwards took orders, and printed a fermon preached at Bifhop-Stortford in 1749. He was prefented to the archdeaconry of Buckingham, to the rectory of Lawford, Effex; and in 1757 to a refidentiaryfhip of St. Paul's. In 1755, ftill profecuting his legal ftudies, he publifhed "Elements of the Civil Law," 4to. reprinted in 1769. An abridgment of this learned work, entitled "A Summary of the Roman Law," was publifhed in 1773.

Dr. Taylor held alfo the offices of commiffary of Lincoln and of Stowe: he was a member of the Royal and Antiquarian Societies; and of the latter he was one of the vice-prefidents. At the time of his death, his long-promifed edition of Demofthenes was juft finifhed, in two vols. 8vo. at the univerfity prefs, Cambridge; and the notes were afterwards added, together with part of an appendix to Suidas. The character of Dr. Taylor was that of an amiable and difinterefted man; and the world was deprived of his learned labours in April 1766. To the works already mentioned, we may add fome remarks inferted in Fofter's "Effay on Accent and Quantity," and various pieces of poetry, printed in the Gentleman's Magazine, and in Nichols's "Select Collection of Poems." Anecd. of Bowyer. Month. Rev. Gen. Biog.

Taylor, Henry, A.M. a very refpectable clergyman of the eftablifhed church, was the fon of William Taylor, merchant of London, and born at Southweald, in Effex, in May 1711. The rudiments of his education he received at Mr. Newcome's fchool, in the parifh of Hackney, and there he formed an early friendfhip with Mr. John Hoadly, fon of Dr. Benjamin Hoadly, bifhop of Winchefter. From Hackney he removed to Queen's college, in the univerfity of Cambridge, and having completed his education with a view to the church, he took orders, and commenced the exercife of his minifterial duties as a preacher with fingular acceptance. His talents and acquirements, as well as his voice and manner of delivery, which were peculiarly pleafing, recommended him to public notice, and he ranked high in the eftimation of thofe friends with whom he intimately affociated. His firft preferment was the rectory of Whitfield, in Oxfordfhire, which he held for a minor. In 1755 he was prefented by bifhop Hoadly to the rectory of Crawley, in Hampfhire, which he afterwards held in connection with the vicarage of Portfmouth, in exchange for a living in Hampfhire, which he had held with Whitfield. He married Mifs Chriftian Fox, daughter of the Rev. Francis Fox, rector of St. Mary's, Rotherhithe, who died in the year 1769; and by her he had four fons and two daughters. His courfe of literary and clerical labour terminated in April, 1785, and he was interred at Crawley.

Having recited the few particulars which we could collect concerning the private life of Mr. Taylor, we fhall now fubjoin a lift of his publications, fome having his name and others being anonymous. In 1760 he publifhed "An Effay on the Beauty of the Divine Economy; being the Subftance of a Sermon (with many and large Additions) preached at the Vifitation of the Lord Bifhop of Winchefter, held by the Worfhipful and Reverend Dr. John Hoadly, Chancellor of the Diocefe, on Tuefday September 18, 1759, at the cathedral Church of Winchefter, and publifhed at the Defire of Mr. Chancellor and the Clergy."—"A full Anfwer to a late View of the internal Evidence of the Chriftian Religion, in a Difcourfe between a rational Chriftian and his Friend," 1771.—"A Tract againft Warburton," 1772.—"Confufion worfe confounded, Rout on Rout; or the Bifhop of G——ter's Commentary upon Rice or Arife Evans's Echo from Heaven, examined and expofed by *Indignatio*," London, 1772. Anonymous. "Two Letters; *viz.* 1. A Letter to the Earl of Abingdon, in which His Grace of York's Notions of Civil Liberty are examined by *Liberalis*, publifhed in the London Evening Poft, November 6, 1777. 2. *Vera Icon;* or a Vindication of His Grace of York's Sermon, preached on February 21ft, 1777; proving it to contain a fevere Satire againft the Miniftry, and a Defence of civil and religious Liberty, upon the well-known Principles of Whiggifm; in anfwer to a Letter from *Liberalis* to the Earl of Abingdon, by *Myftagogus Candidus.*"—"The Apology of Benjamin Ben Mordecai to his Friends, for embracing Chriftianity; in feven Letters to Elifha Levi, Merchant of Amfterdam; with Notes and Illuftrations, by the Author and the Editor." Lond. 1771. 1773, 1774, 4to. The firft of thefe letters contains an account and examination of the various opinions among Chriftians, concerning the nature and perfon of Chrift. In the fecond, third, and fourth letters, it is propofed to fhew from fcripture, that the Logos was the angel of the covenant, and to prove the fame from the moft approved commentators on fcripture, both ancient and modern, both Jewifh and Chriftian; and to demonftrate that Jefus was the Meffiah. The fifth, fixth, and feventh letters contain preparatory principles to the Chriftian fcheme of redemption; giving the fcheme of Chriftianity itfelf, and fhewing it to be one, plain, regular, and confiftent fyftem of divine economy, from the beginning of the world to the end; and containing proofs, illuftrations, anfwers to objections, and an examination of Mr. Hume's notion of miracles.—"Thoughts on the Nature of the Grand Apoftacy, with Reflections and Obfervations on the Fifteenth Chapter of Mr. Gibbon's Hiftory of the Decline and Fall of the Roman Empire; to which are added three differtations: 1. On the Paroufia of Chrift; 2. On the Millennium; 3. On the late Rev. Mr. Richard Wood, on Prophecy," 1781.—"Farther Thoughts on the Nature of the Grand Apoftacy of the Chriftian Churches, foretold by the Apoftles; with Obfervations on the Laws againft Herefy, the Subfcription to Articles of Human Compofition, and other Subjects of the utmoft Importance to the Religion of Proteftants, and to Chriftianity in general," 1783.—"Confiderations on Ancient and Modern Creeds compared; the Supremacy of the Father; the perfonal Exiftence of the Holy Spirit; the Pre-exiftence of Chrift and his Divinity, &c." publifhed after the author's death by his fon, the Rev. Henry Taylor, rector of Spridlington, Lincolnfhire, 1788.

Mr. Taylor, who was of a fprightly, cheerful difpofition, occafionally amufed himfelf in writing verfes; fome of which, particularly his "Paradife Regained," are publifhed in Dodfley's Collection.

On Mr. Taylor's principles and character it is needlefs to enlarge. His conduct in private and focial life correfponded to his clerical profeffion: to the fentiments of bifhop Hoadley, in church and ftate, he was invariably attached; he joined the

petitioning

petitioning clergy in their application for an enlargement of the terms of conformity; and he avowed himſelf on all occaſions, without diſguiſe, the friend and advocate of civil and religious liberty. In his theological opinions, he conſidered himſelf as coinciding more nearly with Apollinaris, than with any other.

TAY-MING, in *Geography*, a city of China, of the firſt rank, in Pe-tche-li; 232 miles S.S.W. of Peking. N. lat. 36° 20′. E. long. 114° 49′.

TAYNG, a town of Corea; 25 miles S.E. of Haimen.

TAYWAN, or TAI-OUAN, the capital of *Formoſa;* which ſee.

TAZ, a river of Ruſſia, which riſes from two lakes, Ku and Din, and runs into the Tazovſkaia gulf, N. lat. 67° 35′. E. long 80° 14′.

TAZABUCO, a town of Peru; 46 miles E.N.E. of La Plata.

TAZATA, in *Ancient Geography*, an iſland of the Caſpian ſea, near the coaſt of Hyrcania. Pliny. It is called Talca by Ptolemy, and Talga by Mela.

TAZEE, in *Geography*, a town of Candahar; 70 miles E. of Candahar.

TAZEWELL, a poſt-town of Tenneſſee; 517 miles W.S.W. of Waſhington.

TAZINA, in *Ancient Geography*, a town of Aſia, in Media.

TAZLA, or SALATO, in *Geography*, a lake of Aſiatic Turkey, 36 miles long, and 2 broad; 30 miles N. of Cogni.

TAZLA, a town of Aſiatic Turkey, in Caramania; 28 miles N. of Cogni.

TAZOVSKAIA, a gulf or bay in the Obſkaia gulf, formed by the waters of ſeveral rivers of Siberia, and joined to the Obſkaia gulf, about 140 miles in length, and 3 in breadth. N. lat. 67° 40′ to 69°. E. long. 76° to 80°.

TAZREE, a town of Perſia, in the province of Lariſtan; 15 miles N.E. of Tarem.

TAZUS, TACHELY, in *Ancient Geography*, a town in the interior of the Tauric Cherſoneſus, E. of Portacra, mentioned by Ptolemy.—Alſo, a town of Aſiatic Sarmatia, upon the northern coaſt of the Euxine ſea.

TAZZETTA, in *Botany*, the ſpecific name choſen by Linnæus, who ſpells it incorrectly, for the Polyanthus Narciſſus. (See NARCISSUS.) The word is Italian for a ſmall cup, and De Theis ſuppoſes it was firſt applied in Italy to this flower, which is much cultivated there, and uſually imported from thence, in its higheſt perfection, by our floriſts. Still we do not ſee how Linnæus came to adopt this name, nor, indeed, how it fell in his way.

TCHA. See TEA.

TCHA, or *Cangua*, in *Geography*,. See CANGA.

TCHABA, a town of Aſiatic Turkey, in Natolia; 18 miles E. of Boli.

TCHABAR, a river of Chineſe Tartary, which runs north into the Songarie.

TCHABISCHI, a town of Ruſſia, in the government of Irkutſk, on the Amur; 40 miles N.N.E. of Stretenſk.

TCHACAHAMAR, a town of Thibet; 10 miles W. of Orto.

TCHACAOSO, a town of Thibet; 25 miles S. of Chatcheou.

TCHACA-TCHOUTCHI, a town of Thibet; 30 miles N.W. of Tchontori.

TCHACA-TOHOI, a town of Chineſe Tartary, in the country of Hami; 15 miles N.W. of Quatcheou.

TCHADOBSKO, a town of Ruſſia, in the government of Tobolſk, on the Tunguſka; 212 miles E. of Eniſeiſk.

TCHAGANSKOI, a fortreſs of Ruſſia, on the Ural; 16 miles S. of Uralſk.

TCHAGODO, a town of Ruſſia, in the government of Novgorod, on the lake Voz; 240 miles N.E. of Novgorod. N. lat. 60° 30′. E. long. 38° 44′.—Alſo, a river of Ruſſia, which riſes near Suchotzkoi, in the government of Novgorod, and runs into the Mologa, 16 miles N. of Uſtiuzna.

TCHAHAN HOTUN, a town of Chineſe Tartary; 260 miles N. of Peking. N. lat. 43° 58′. E. long. 117° 29′.

TCHAHAN *Hamer*, a town of Chineſe Tartary; 38 miles S.W. of Coucou.

TCHAHAN *Soubarkan Hotun*, a town of Chineſe Tartary; 163 miles N.N.E. of Peking. N. lat. 41° 38′. E. long. 118° 44′.

TCHAHASOU HOTUN, a town of Chineſe Tartary; 683 miles N.N.E. of Peking. N. lat. 49° 34′. E. long. 127° 42′.

TCHAHI, a town of Perſia, in the province of Choraſan, or Khoraſſan; 258 miles N. of Herat.

TCHAIA, a river of Ruſſia, which runs into the Lena, near Tchamſka, in the government of Irkutſk. N. lat. 58° 5′. E. long. 109° 34′.

TCHAICAN, a town of Corea; 28 miles W. of Outchuen.

TCHAI-YAM, a river of China, which joins the Lo, 15 miles W.S.W. of Pao-king.

TCHAKAN-TOTOHO KIAMEN, a poſt of Chineſe Tartary, in the country of the Monguls; 18 miles S.E. of Kara-Hotun.

TCHAKET, a town of Aſiatic Turkey, in Aladulia; 15 miles N. of Adana.

TCHAKTELA, a town of Aſiatic Turkey, in Caramania; 27 miles N. of Akſhehr.

TCHAL, a town of Kurdiſtan, or Curdiſtan; 28 miles E. of Amadieh.

TCHALBISCHEVO, a town of Ruſſia, in the government of Tobolſk; 20 miles S. of Eniſeiſk.

TCHALMOZA, a town of Ruſſia, in the government of Olonetz, on the north-eaſt coaſt of lake Onezſkoe; 32 miles S.E. of Povenetz.

TCHAM, a town of Corea; 420 miles E. of Peking.

TCHAMDSOU-TIGAC, a lake of Thibet, about 36 miles in circumference. N. lat. 31° 30′. E. long. 81° 26′.

TCHAMNAGOM-DOU, a lake of Thibet, about 36 miles in circumference. N. lat. 30° 50′. E. long. 93° 54′.

TCHAMSKA, a town of Ruſſia, in the government of Irkutſk; 64 miles E.N.E. of Kirenſk.

TCHAM-TCHIM HOTUN, a town of Corea; 415 miles E. of Peking. N. lat. 40° 9′. E. long. 124° 46′.

TCHAM-TIEN, a town of Chineſe Tartary; 43 miles N.W. of Siao-ku-leou.

TCHAMTOU, a town of Thibet; 54 miles S.W. of Contchoudſong.

TCHANG, a lake of China, about 20 miles in circumference; 40 miles N.E. of Tcin-tcheou.

TCHANG-CHAN, or CHAN-SAN, a ſmall iſland in the Chineſe ſea, and moſt ſoutherly of thoſe called Mi-a-tou; 18 miles N.W. of Teng-tcheou.

TCHANG-FONG, a town of Corea; 63 miles E.S.E. of King-ki-tao.

TCHANG-HOA, a town of China, of the third rank, in the iſle of Hainan; 42 miles S.W. of Tchen-tcheou.

TCHANG-ING, a town of Corea; 40 miles S. of Kang.

TCHANG-KIA-KEOU, a gate on the great wall, which separates China from Tartary, in the northern part of Pe-tche-li, the principal passage by which the Tartars enter China; 90 miles N.N.W. of Peking.

TCHANG-PING, a town of Corea; 15 miles E. of Koang-tcheou.—Also, a city of China, of the second rank, in Pe-tche-li; 20 miles N.N.W. of Peking. N. lat. 40° 14'. E. long. 115° 37'.

TCHANG-SING, a town of Corea; 35 miles S. of Koang-tcheou.

TCHANG-SONG, a town of Corea; 33 miles N.W. of Kang-tcheou.

TCHANG-TCHA, a city of China, of the first rank, in Hou-quang, on the Heng river. The inhabitants of this city have given occasion to a great festival, which is celebrated in the fifth month throughout the empire. The mandarin who governed this city, and was much esteemed and beloved by the people for his probity and virtue, happening to be drowned in the river, they instituted a festival to his honour, which is celebrated by sports, and feasts, and fights upon the waters, as if they intended to search for the mandarin, the object of their love and grief. This festival, which was at first peculiar to this city, came afterwards to be observed throughout the empire; 742 miles S. of Peking. N. lat. 28° 11'. E. long. 112° 25'.

TCHANG-TCHEOU, a city of China, of the first rank, in Fo-kien; 950 miles S. of Peking. N. lat. 24° 32'. E. long. 117° 34'.—Also, a city of China, of the first rank, in Kiang-nan; 525 miles S.S.E. of Peking. N. lat. 31° 50'. E. long. 119° 29'.

TCHANG-TE, a city of China, of the first rank, in Hou-quang; 717 miles S.S.W. of Peking. N. lat. 29° 2'. E. long. 111° 2'.

TCHANG-YUEN, a town of Corea; 60 miles W.S.W. of Ho-ang-tcheou.—Also, a town of Corea; 30 miles S.E. of Kang-tcheou.

TCHANI, a lake of Russia, in the government of Kolivan, upwards of 200 miles in circumference; 100 miles W.N.W. of Kolivan.

TCHANKOUR, a town of Thibet; 105 miles S.E. of Sourman.

TCHAN-TE, a city of China, of the first rank, in Ho-nan. This is one of the most northern cities of the province. Two things are here remarkable: the first is a fish resembling a crocodile, the fat of which is of such a singular nature, that when once kindled it cannot be extinguished; the second is a mountain in the neighbourhood, so steep and inaccessible, that in time of war, it affords a place of refuge to the inhabitants, and a safe asylum from the insults and violence of the soldiery. Tchan-te contains in its district one city of the second class, and six of the third; 255 miles S.S.W. of Peking. N. lat. 36° 6'. E. long. 114°.

TCHAO-KING, a city of China, of the first rank, in Quang-tong, on the river Si; 1062 miles S.S.W. of Peking. N. lat. 23° 3'. E. long. 111° 44'.

TCHAO-NAIMAN-SOUMI-HOTUN, a town of Chinese Tartary; 198 miles N. of Peking. N. lat. 42° 28'. E. long. 115° 44'.

TCHAO-TCHEOU, a city of China, of the first rank, in Quang-tong, on the Pe-kiang; 1007 miles S. of Peking. N. lat. 23° 37'. E. long. 116° 21'.

TCHAOUTCHE-AGHISI, a town of Asiatic Turkey, in Natolia, on the Black sea; 12 miles N.W. of Erekli.

TCHAPIE-DSAKE-TOMPSOU, a lake of Thibet, about 54 miles in circumference. N. lat. 32° 12'. E. long. 84° 34'.

TCHARKAZ. See ZARCHAS.

TCHARONDA, a town of Russia, in the government of Novgorod, on the Sula; 188 miles E.N.E. of Novgorod. N. lat. 59° 40'. E. long. 37° 34'.

TCHASIRCONG, a town of Thibet, near the Ganges; 24 miles E. of Latac.

TCHASTIJA, an island of Russia, in the government of Irkutsk, on the Lena; 112 miles N.E. of Kirensk.

TCHAT, a mountain of Thibet, on the frontiers of Yarkan. N. lat. 33° 10'. E. long. 78° 44'.

TCHATELI, a town of Chinese Tartary, in the country of Hami; 38 miles N.W. of Hami-Hotun.

TCHAUNSKAIA, a gulf on the northern coast of Russia, in the Frozen sea. N. lat. 71° to 72°. E. long. 166° to 169°.

TCHAUSI, a town of Russia, in the government of Mogilev, on the Soz; 40 miles S.E. of Mogilev. N. lat. 53° 36'. E. long. 31° 14'.

TCHAZMIUNSKOI, a cape on the east coast of Kamtschatka; 52 miles S. of Verchnei Kamtschatskoi. N. lat. 55° 48'. E. long. 160° 15'.

TCHEBAKSAR, a town of Russia, in the government of Kazan, on the Volga; 64 miles W.N.W. of Kazan. N. lat. 56° 24'. E. long. 46° 30'.

TCHEBARKULSKAIA, a fortress of Russia, in the government of Upha; 132 miles E. of Upha.

TCHECHUI, a river of Russia, which runs into the Lena, nearly opposite Ilinska.

TCHECO, a town of Thibet; 93 miles E.S.E. of Lassa.

TCHEFTKAN, a town of Asiatic Turkey, in Aladulia; 45 miles N.N.W. of Adana.

TCHEGEN, an island in the Caspian sea; 144 miles S. of Astrachan.

TCHEGOTCHINA, a river of Russia, which runs into the Kolima, N. lat. 68°. E. long. 150° 14'.

TCHEGUEDE HOTUN, a town of Chinese Tartary, on the east bank of the Amur, opposite Teldom; 673 miles N.N.E. of Peking. N. lat. 49° 26'. E. long. 127° 37'.

TCHEHARSHEBEH, a town of Asiatic Turkey, in Natolia; 30 miles S.E. of Alah Shehr.

TCHEKENAGUR, a town of Asiatic Turkey, in Caramania; 21 miles S. of Kirshehr.

TCHE-KIANG, a province of China, bounded on the north and north-west by Kiang-nan, on the east by the sea, on the south by Fo-kien, and on the south-west by Kiang-si; about 200 miles in length from north to south, and from 120 to 180 broad. This province, which was formerly the residence of some of the emperors, is one of the most considerable in the empire, on account of its maritime situation, extent, riches, and the number of its inhabitants. The air is pure and healthful; the plains are watered by a number of rivers and canals, kept in good order; and the springs and lakes, with which it abounds, contribute greatly to its fertility. The natives are mild and lively, and very polite to strangers; but they are said to be extremely superstitious. A prodigious quantity of silk-worms is bred in this province; whole plains may be seen covered with dwarf mulberry-trees, which are purposely checked in their growth: they are planted and pruned almost in the same manner as vines. Long experience has taught the Chinese, that the leaves of the smallest trees procure the best silks. The principal branch, therefore, of the trade of this province, consists in silk-stuffs; those in which gold and silver are intermixed are the most beautiful, and most esteemed in the empire. With regard to their common pieces, an immense quantity is sent to every part of China, to Japan, the Philippines, and to

Europe ; and, notwithſtanding this exportation, ſo much is left, that a complete ſuit of ſilk may be bought here as cheap as one of the coarſeſt woollen-cloth in France. Excellent hams are brought from this province, and thoſe ſmall gold fiſh with which ponds are commonly ſtocked. The tallow-tree grows here, and a ſpecies of muſhrooms, which are tranſported to every province of the empire. In Tche-kiang there are reckoned to be 11 cities of the firſt claſs, 72 of the third, and 18 fortreſſes, which in Europe would be accounted large cities. (Groſier's China, vol. i. p. 64.) According to ſir George Staunton, the number of inhabitants amounts to 21 millions, and the province includes 39,150 ſquare miles, or 25,056,000 acres. See CHINA.

TCHELAO, a town of Perſia, in the province of Chorafan, or Khoraſſan : near it is a narrow defile in a mountain, called, by the orientaliſts, Hell, from the difficulty of the paſſage.

TCHELBOSCH, a river of Ruſſia, which joins the Biſuga, and runs with it into the ſea of Azof ; 40 miles S.W. of Eiſkoi.

TCHELEH-DAGHI, a mountain of Natolia, N.E. of Boli.

TCHELGA, a town of Abyſſinia ; 20 miles N.W. of Gondar. N. lat. 12° 44′. E. long. 37° 18′.

TCHELIABINSK, a town of Ruſſia, in the government of Upha ; 188 miles E. of Upha. N. lat. 54° 50′. E. long. 62° 4′.

TCHELMINAR, or TCHILMINAR. See CHILMINAR.

TCHEMURTAESKOI, in *Geography*, a fortreſs of Ruſſia, in the government of Irkutſk ; 60 miles S.W. of Selenginſk.

TCHEN, a town of Corea ; 13 miles N.N.E. of Ping-hai.—Alſo, a city of China, of the ſecond rank, in Ho-nan ; 416 miles S.S.W. of Peking. N. lat. 34° 46′. E. long. 110° 36′.—Alſo, a city of China, of the ſecond rank, in the iſland of Hai-nan ; 57 miles S.W. of Kiong-tcheou. N. lat. 19° 32′. E. long. 108° 49′.

TCHEN-AN, a town of Corea ; 35 miles S.S.E. of Hetſin.

TCHENBAR, a town of Ruſſia, in the government of Penza ; 80 miles W.S.W. of Penza. N. lat 52° 52′. E. long. 43° 30′.

TCHENDEI, a river of Ruſſia, which runs into the Yana, near its mouth.

TCHENE, a town of Egypt, on the right bank of the Nile ; 18 miles N. of Enſeneh.

TCHENG-TCHANG, a town of Corea ; 30 miles S.S.E. of Haimen.

TCHENG-TE, an iſland in the Eaſtern ſea, near the ſouth coaſt of Corea ; about 10 miles long, and 6 broad. N. lat. 34° 20′. E. long. 128° 37′.

TCHEN-HAI, a town of Corea ; 30 miles S. of Tſin-tcheou.

TCHENJEE. See HÆMUS.

TCHEOU-CHAN, or CHU-SAN, an iſland in the Chineſe ſea, near the weſt coaſt of China, belonging to the province of Tche-kiang, about 24 miles long, and from 4 to 10 broad.

TCHEPAGIRSKOI, a town of Ruſſia, on the Pod-kamonſkaia Tunguſka. N. lat. 61° 20′. E. long. 96° 44′.

TCHEPETKINA, a river of Ruſſia, which runs into the Kolima, 88 miles N. of Verchnei Kovimſkoi. N. lat. 67° 35′. E. long. 148° 14′.

TCHER, a river of Ruſſia, which runs into the Don, near Tcherkovſkaia, in the country of the Coſſacks.

TCHERDAKLI, a town of Ruſſia, in the government of Ekaterinoſlav ; 32 miles N. of Mariupol.

TCHEREDOVA, a town of Ruſſia, in the government of Tobolſk, on the Irtiſch ; 16 miles N. of Tara.

TCHEREMISSES and TCHEUWASSES, tribes of people occupying the vicinity of the Volga, in the government of Regen. Theſe people uſe the horſe in their facrifices, and chiefly white ones, eſpecially in their great annual ſolemnities in autumn, of which none can partake, unleſs he has firſt bathed and put on a clean ſhirt.

TCHEREMSCHAN, a river of Ruſſia, which runs into the Volga, near Singiliev, in the government of Simbirſk.

TCHEREPOVETZ, a town of Ruſſia, in the government of Novgorod, on the Sula ; 188 miles E.N.E. of Novgorod. N. lat. 59° 40′. E. long. 37° 34′.

TCHERGONA, *Valley of*, a ſequeſtered beautiful valley of the Crimea, inhabited by the richeſt Tartars, who, from their vicinity to Aktiar, find a ready market for the produce of their lands ; carrying thither honey, wax, fruit, and corn. This valley is deſcribed as the retreat of health and joy ; the pipe and tabor ſounding merrily among mountains, thick ſet with groves, which cloſe them on every ſide. The performers conſiſt of parties of Tzigankies, or gipſies, who, as mendicant artificers, muſicians, and aſtrologers, are very common all over the ſouth of Ruſſia. They have alſo a wind-inſtrument reſembling a haut-boy, made of the wood of cherry-tree, and they carry with them the large Tartar drum, characteriſtic of the Cimbri in the time of Strabo. Theſe gipſies are much encouraged by the Tartars, who allow them to encamp among their villages and to exerciſe their various occupations. Many of them are rich, poſſeſſing fine horſes and plenty of other cattle ; but rich or poor, their mode of life is the ſame.

TCHERIKOV, a town of Ruſſia, in the government of Mogilev, on the Soz ; 80 miles S. of Mogilev. N. lat. 52° 36′. E. long. 30° 54′.

TCHERKASK, a town of Ruſſia, in the country of the Coſſacks, on the Don. The appearance of the town, viewed from the river, affords a moſt novel ſpectacle. Although not ſo grand as Venice, it ſomewhat reſembles that city. The entrance to it is by broad canals, interſecting it in all parts. On each ſide, wooden houſes, built on piles, appear to float upon the water : to theſe the inhabitants paſs in boats, or by narrow bridges only two planks wide, with poſts and rails, forming a cauſeway to every quarter of the town.

The town of Tcherkaſk is divided into eleven ſtanitzas, and contains 15,000 inhabitants, occupying about 3000 houſes, and allowing, upon an average, five perſons to each houſe. Here are ſeven churches, four built of ſtone and three of wood. One of theſe churches is appropriated to the Mahometan worſhip of the Tartars. The firſt erected in this place was founded by Peter the Great, and in this they keep what they call their regalia, applying the term to republican, rather than to regal, enſigns of diſtinction. Another church is built in the Grecian taſte, with fourteen Corinthian columns, covered entirely with burniſhed gold. Almoſt all the other public edifices are conſtructed of wood. Here are ſix priſons, four for males and two for females ; and the priſoners are allowed to go about begging in their chains. The ſhops are very numerous, kept chiefly by Greeks, and containing the produce of Turkey, as pearls, cloth, ſhawls, tobacco, fruit, &c. Here are two public baths, and each ſtanitza has its reſpective tavern. The inhabitants, according to Dr. Clarke in his Travels (vol. i.), are cleanly in their appearance, poliſhed in their manners, well inſtructed, hoſpitable, generous, and diſintereſted, humane to the poor, good huſbands, good brothers, good wives, good mothers, virtuous daughters, valiant and dutiful sons. "A Cossack," he says, "placed by the side of a Russian, what a contrast!" 32 miles E.N.E. of Azof.

TCHERKASSES, or TSCHERKASSIANS, a tribe of people, who inhabit that part of Caucasus which is called the Great and Little Kabardia, the islands of the lower Kuban, and the southern bank of that river. (See CIRCASSIA.) These people are famous for their horses, which are about the size of the Kalmuck horse, ill-made, without elegance or proportion, and for the most part ewe-necked, but of such strong and hardy natures, as to be able to run five or six hundred English miles in three days.

TCHERKESH, a town of Asiatic Turkey, in Natolia; 45 miles W.S.W. of Castamena.

TCHERKIN, a town of Abyssinia; 36 miles N. of Gondar. N. lat. 13° 15′. E. long. 37° 40′.

TCHERMAEVSKOI, a town of Russia, in the government of Tobolsk; 32 miles E.N.E. of Turinsk.

TCHERNAIA, a river of Russia, which runs into the Anadir, 100 miles below Anadirskoi.

TCHERNAIAGRIADA, a fortress of Russia, on the Volga; 32 miles N.N.W. of Astrachan.

TCHERNIGOV, a town of Russia, and capital of a government, on the Desna; 344 miles S.S.W. of Moscow. N. lat. 51° 24′. E. long. 31° 14′.

TCHERNIGOVSKOE, a government of Russia, bounded on the N. by Mogilevskoe, on the N.W. by Novgorod Sieverskoe, on the E. by Charkovskoe, on the S. by Kievskoe, and on the W. by Poland: about 180 miles long and 40 broad. N. lat. 49° 50′ to 51° 5′. E. long. 31° to 35°.

TCHERNIKEH, a town of Asiatic Turkey, in the government of Sivas, at the union of the Tosanlu and Jekil-Ermak; anciently a city of Pontus, and called Eupatoria, from Mithridates, surnamed Eupator; 24 miles N. of Amasia. N. lat. 40° 26′. E. long. 36° 38′.

TCHERNITZ. See CZERNITZ.

TCHERNOIYAR, a town of Russia, in the government of Saratov, defended by a ditch and chevaux-de-frieze, with some cannon; 200 miles N.W. of Astrachan. N. lat. 47° 54′. E. long. 46° 4′.

TCHERNOLUTZKAIA, a town of Russia, in the government of Tobolsk; 20 miles W. of Omsk.

TCHERNOMORSKI, or *Cossacks of the Black Sea*, a tribe of Cossacks, whose territory is separated by the river *Ae* or *Yea*, from that of the Grecian or Malo-Russian inhabitants, whose number does not exceed 700 persons, and the boundary of whose district is formed by the river Ae towards the S. and by the sea of Azof to the N. The Tchernomorski are a brave but rude and warlike people, and hospitable to strangers. Their original appellation was Zaporogztzsi or Zaporagians, denoting their former situation "beyond the cataracts" of the Dnieper. From the banks of this river they were removed by the late empress Catharine to those of the Kuban, in order to repel the incursions of the Circassians and Tartars from the Turkish frontier. In consequence of the service they rendered to Russia in Catharine's last war with Turkey, the empress, by an ukase of the 2d of June, 1792, ceded to them the peninsula of Taman, and all the countries between the Kuban and the sea of Azof, as far as the rivers Ae and Laba; an extent of territory comprehending upwards of 1000 square miles. They had also a constitution allotted to them in all respects similar to that of the Don Cossacks, and received the appellation of "Cossacks of the Black sea." They were also allowed the privilege of choosing an Ataman; but their numbers have been considerably diminished. They could once bring into the field an army of 40,000 effective cavalry: but at present, their number of troops does not exceed 15,000. They now occupy the whole country from the Ae to the Kuban, and from the Black sea to the frontier of the Don Cossacks. (See COSSACKS.) The Tchernomorski do not resemble the Cossacks of the Don in habits, disposition, or any other characteristic quality. The latter wear the true uniform; the former wear any habit according to their caprice. The Don Cossack is mild, affable, and polite; the Black-sea Cossack is blunt and even rude, from the boldness and martial hardihood of his manners. If he is poor, he appears clad like a primeval shepherd, or the wildest mountaineer; at the same time having his head bald, except one long braided lock from the crown, placed behind the right ear. This lock distinguishes the Tchernomorski Cossack from the Cossack of the Don, as well as from every other tribe of Cossacks in the Russian empire. If the Euxine Cossack is rich, he is very lavish in the costliness of his dress, which consists of embroidered velvet, and the richest silks and cloths of every variety of colour. The Tchernomorski are more cheerful and noisy than the Don Cossacks; turbulent in their mirth; vehement in conversation; somewhat querulous; and if not engaged in dispute, they are generally laughing or singing. Both these Cossacks hold one another in low estimation. The metropolis of the Tchernomorski Cossacks is "Ekaterinedara," or "Catherine's Gift." It has no resemblance to a town; but is rather a grove, or forest of oaks, in which a number of straggling cottages, widely separated, are concealed, not only from general observation, but from the view of each other. The country is covered with tumuli, which are very ancient, and appear by their remains to have been sepulchres. The government is wholly exercised by the Ataman and his officers, who wear theatrical and splendid habits. Their breasts are covered with chains of gold and gold-lace; their sabre is Turkish; their boots of red or yellow-coloured leather; their cap of black velvet, ornamented with lace and silver chains, or fine black Tartarian wool, taken from lambs in an embryo state. They bind their waist with silken sashes, sustaining pistols of the most costly workmanship. A small whip, with a short leathern thong, is attached to their little finger. The lower extremity of their lance is supported by the right foot; and from the powder-flask, pendent in front, are suspended silver coins, and other trinkets. The Circassians and Tchernomorski carry on trade by a peculiar kind of barter. The exchange of corn, honey, mats, wood, and arms, for the salt of the Cossacks, is transacted without contract; the wares of the Circassians being placed on the ground where they find the salt ready stationed for barter. The Tchernomorski who are employed in guarding their cattle in the steppes, amounting to many thousands, from the depredations of the Circassians, pass the night upon the bare ground; and in order to protect themselves from the mosquitoes, which are both numerous and troublesome, creep into a kind of sack, sufficient only for the covering of a single person; beneath this they lie upon the thistles and other wild plants of the steppes. In order to avoid the excessive irritation and painful swelling occasioned by the stings of these ferocious insects, they light a number of fires to drive them from the cattle during the night; but their thirst of blood is so insatiate, that swarms will attack a person attempting to shelter himself even in the midst of smoke. See Clarke's Travels, vol. ii. 8vo.

TCHERNORIEGENSKAIA, a fortress of Russia, in the government of Upha, on the Ural; 12 miles W. of Orenburg.—Also, a fortress of Russia, in the government of Simbirsk, on the river Sak; 80 miles S.E. of Simbirsk.

TCHERPLINSKOI, a fortrefs of Ruffia, in the government of Upha, on the Ural; 124 miles E. of Orenburg.

TCHERTCHI, a town of Thibet; 20 miles S.W. of Harachar.

TCHERTOVSKA, a town of Ruffia, in the government of Irkutfk; 32 miles S.W. of Kirenfk.

TCHERVLENA, a fortrefs of Ruffia, in the government of Caucafus, on the Malka; 64 miles E. of Ekaterinograd.

TCHESKAIA, a gulf or bay in the Frozen ocean, on the N. coaft of Ruffia. N. lat. 66° 50′ to 77° 40′. E. long. 45° to 47°.

TCHESUCHINSKOI, a fortrefs of Ruffia, on the borders of China; 104 miles S.W. of Nertchinfk.

TCHE-TAN, a river of China, which runs into the Tom, 12 miles W. of Yeou.

TCHE-TCHEOU Hotun, a town of Chinefe Tartary, in the country of Hami; 983 miles E. of Peking. N. lat. 40° 29′. E. long. 94° 21′.

TCHETIRDAGH, a mountain of the Crimea, the *Trapezius* of Strabo, the height of which Pallas ftates to be about 1200 feet, and Dr. Clarke fays, that it does not exceed 1300 feet; though the rapidity of its rife from the coaft about Alufta makes its elevation appear to be much greater. Almoft the whole of the Crimea may be feen from its fummit in clear weather. The higher parts of this mountain exhibit a mafs of lime-ftone, very compact and of a grey colour. Its ancient name, *Trapezius*, was probably derived from the table-form of its fummit. The lower diftrict is covered by groves impenetrable to the rays of the fun.

TCHEUISKOI, a town of Ruffia, in the government of Tobolfk, on the Oby; 48 miles N.N.E. of Kolivan.

TCHEVTZA, a river of Ruffia, which runs into the Viatka, near Slobodfkoi, in the government of Viatka.

TCHIATAM, a town of Thibet; 510 miles E. of Laffa. N. lat. 28° 3′. E. long. 99° 20′.

TCHICOU, a town of Corea; 18 miles S.S.E. of Long Kouang.

TCHICSE, a town of Thibet; 12 miles E. of Latac.

TCHICTAMA, a town of Thibet; 15 miles N.E. of Pi-tchan.

TCHIEIN, a town of Ruffia, near the ftraits which feparate the continent of Afia from America. N. lat. 65° 40′. E. long. 188° 24′.

TCHIGLING, a river of North America, which runs into the Frozen fea, oppofite to the ifland of Chichitfi.

TCHIKIRI, a river of Chinefe Tartary, which runs into the Amur, 15 miles N. of Saghalien Oula Hotun.

TCHILINSKOI, a town of Ruffia, in the government of Irkutfk, on the Ingoda; 60 miles E. of Doroninfk.

TCHILLDIR Mountains, a name which is given to a very high ridge, formed by fome branches of mount Caucafus, which taking an oppofite direction of thofe known by the name of the "Mountains of Ceraunii," pafs towards the S. and S.W., crofs Ahgaz and Mingrelia, and encircle the Euxine to the E. and S.E. Thefe unite in the abovenamed high ridge on the northern frontier of Immeretia, and again open into the Turkifh province of Akifha. Here they affume the appellation of Tchilldir, and would appear to feparate into three branches, the moft northern of which follows in a S.E. line the banks of the Cyrus, and ultimately produces an immenfe range, which running parallel with the Cafpian, feparates Irak from Ghilan and Mazanderan, and to the N. of Mefhed is loft in the deferts of Khoraffan. In the neighbourhood of Sultanea and Cazween this range receives the name of Khai Caucafan, and in the vicinity of Tehraun it is called Elbourz. The middle ridge of the Tchilldir mountains, under the denomination of the Moffian hills, traverfes the province of Georgia, and bounds on the N. the delightful plain of Erivan. It then enters the Ruffian diftricts of the Karabaug and Karadaug, and gradually finks into the plains of Mogan. The laft and moft fouthern branch of the Tchilldir mountains, bending to the S. and E., paffes the town of Kars, and forms a junction with mount Taurus. Kinneir's Mem. of the Perfian Empire.

TCHINDAT Turukuevskoi, a fort of Ruffia, in the government of Irkutfk; 72 miles S. of Nertchinfk.

Tchindat *Turukuevfka*, a fortrefs of Ruffia, in the government of Irkutfk; 80 miles S.W. of Nertchinfk.

TCHINEH, a town of Afiatic Turkey, in Natolia; 15 miles W.N.W. of Moglah.

TCHING, a city of China, of the fecond rank, in Honan; 382 miles S. of Peking. N. lat. 33° 49′. E. long. 114° 38′.—Alfo, a city of China, of the fecond rank, in Ho-nan; 340 miles S.S.W. of Peking. N. lat. 34° 50′. E. long. 113° 29′.

TCHI-NGAM, a city of China, of the fecond rank, in Se-tchuen; 780 miles S.W. of Peking. N. lat. 28° 32′. E. long. 107° 4′.

TCHING-CANG, a city of China, of the fecond rank, in Yun-nan; 1302 miles S.W of Peking. N. lat. 24° 12′. E. long. 99° 16′.

TCHING-CHAN, a town of Corea; 30 miles S.S.E. of Ou-tchuen.

TCHING-HE, a town of Corea; 30 miles N.N.E. of Kang-tcheou.

TCHING-HIANG, a city of China, of the firft rank, in Se-tchuen; 910 miles S.W. of Peking. N. lat. 27° 18′. E. long. 104° 26′.

TCHING-KIANG, a city of China, of the firft rank, in Kiang-nan, on the fouth fide of the river Yang-tfe. This is not one of the largeft cities of the province, for it is not above a league in circumference, and has authority over only three cities of the third clafs, but it is one of the moft confiderable for its fituation and commerce; it is the key of the empire towards the fea, and is alfo a fortrefs, where there is alfo a ftrong garrifon; the walls are above 30 feet in height in feveral places. The ftreets of the city and fuburbs are paved with marble; 470 miles S.S.E. of Peking. N. lat. 32° 14′. E. long. 118° 55′.—Alfo, a city of China, of the firft rank, in Yun-nan; 1082 miles S.S.W. of Peking. N. lat. 24° 44′. E. long. 102° 40′.

TCHING-NING, a city of China, of the fecond rank, in Koei-tcheou; 1017 miles S.S.W. of Peking. N. lat. 26° 3′. E. long. 105° 23′.

TCHING-TCHEOU, a city of China, of the firft rank, in Hou-quang. This city is fituated on an angle made by two rivers; the country is watered by a great number of brooks, which make the vallies exceeding fruitful; it is very full of mountains, which yield plenty of quick-filver, lapis lazuli, and green-ftones for painting. There are alfo mines of filver and gold. The people who inhabit the mountains are not fo polite as the reft of the Chinefe; on the contrary, their rude and favage manners make them to be looked upon as barbarians. The diftrict of this city contains one of the fecond order, and nine of the third; 765 miles S.S.W. of Peking. N. lat. 28° 23′. E. long. 109° 40′.—Alfo, a city of the province of Kiang-nan, fituated near the canal through which all barks going from Sou-

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Sou-tcheou to Kiang muſt paſs. It is celebrated on account of its trade, and water which gives tea a pleaſant taſte: dependent on it are five cities of the third claſs, in which a particular kind of earthen-ware is manufactured, highly valued by the Chineſe, and preferred to the moſt elegant porcelain.

TCHING-TEOU, a town of Corea; 30 miles S.S.W. of Kang-tcheou.

TCHING-TING, a city of China, of the firſt rank, in Pe-tche-li. Tching-ting is a large city, about four miles in circumference. Its juriſdiction is very extenſive, and comprehends 32 towns; five of which are of the ſecond, and 27 of the third claſs. Northward from it lie ſeveral mountains, where the Chineſe ſay many ſimples and curious plants are to be found; on theſe mountains there are alſo ſeveral monuments or temples, erected in honour of deceaſed heroes; among which is one conſecrated to the memory of the firſt emperor of the dynaſty of Han; 137 miles S.S.W. of Peking. N. lat. 39° 9′. E. long. 114° 20′.

TCHING-TOU, a city of China, of the firſt rank, in Se-tchuen. This was formerly the reſidence of the emperors, and one of the largeſt and moſt beautiful cities in China; but in 1646, it was almoſt entirely deſtroyed, during the civil wars which preceded the laſt invaſion by the Tartars. Its temples, bridges, and the ruins of ancient palaces, are objects of admiration to ſtrangers; neither its commerce, nor the manners of its inhabitants, have any thing to diſtinguiſh it from other cities, nor its ſituation, which is, however, exceedingly pleaſant. It has under its juriſdiction ſix cities of the ſecond claſs and 25 of the third; 810 miles S.W. of Peking. N. lat. 30° 40′. E. long. 103° 44′.

TCHIN-HOA, a town of Corea; 50 miles E.N.E. of King-ki-tao.

TCHINKITANY Bay, a bay on the W. coaſt of North America, called by the Spaniards Baya de Guadaloupe.

TCHIN-NAN, a city of China, of the ſecond rank, in Yun-nan; 1187 miles S.W. of Peking. N. lat. 25° 16′. E. long. 101° 4′.

TCHIN-NGAN, a city of China, of the firſt rank, in Quang-ſi; 1150 miles S.S.W. of Peking. N. lat. 23° 21′. E. long. 106°.

TCHIN-YUEN, a city of China, of the ſecond rank, in Quang-ſi; 1145 miles S.S.W. of Peking. N. lat. 23° 14′. E. long. 106° 49′.

TCHIRAKI, a town of Chineſe Tartary, in the country of the Kalkas. N. lat. 48° 36′. E. long. 115° 16′.

TCHIRINKOUTAN, one of the ſmall Kurile iſlands. N. lat. 49° 20′. E. long. 153° 4′.

TCHIRNOOI, one of the ſmall Kurile iſlands. N. lat. 47° 8′. E. long. 151° 50′.

TCHIRON. See Shiron.

TCHISEGI Daghi, a mountain of Aſiatic Turkey, in the government of Sivas, near Divriki.

TCHISTAY, a town of Bohemia, in the circle of Boleſlau; 4 miles N.W. of Jung Buntzel.

TCHISTIAKOVA, a town of Ruſſia, in the government of Perm; 36 miles N. of Perm.

TCHISTOKOLSK, a town of Ruſſia, in the government of Kazan; 36 miles S.E. of Kazan. N. lat. 50° 16′. E. long. 49° 54′.

TCHI-TCHEOU, a city of China, of the firſt rank, in Kiang-nan; 570 miles S. of Peking. N. lat. 30° 45′. E. long. 117°.

TCHI-TCHOUAN, a town of Thibet; 20 miles N. of Chao-ma-ing Hotun.

TCHIUNA, a river of Ruſſia, which riſes ſix miles from Bratſkoi, in the government of Kolivan, lat. 56° long. 101°, and runs into the Tunguſka, 56 miles S.E. of Eniſeiſk. N. lat. 57° 54′. E. long. 93° 34′.

TCHIURAC, a river of Natolia, which runs into the Meinder near Tcheharſhebeh.

TCHI-YUEN, a town of Corea; 15 miles S.E. of Tſin-tcheou.—Alſo, a city of China, of the firſt rank, in Koei-tcheou; 1000 miles S.S.W. of Peking. N. lat. 27° 1′. E. long. 107° 51′.

TCHO, a city of China, of the ſecond rank, in Chan-ſi, on the river Fuen; 298 miles S.W. of Peking. N. lat. 36° 36′. E. long. 111° 23′.

TCHOCOU, a town of Thibet; 18 miles E. of Harachar Hotun.

TCHOHA Kiamen, a poſt of Chineſe Tartary; 45 miles S.W. of Kara.

TCHOI. See Palcati *Nor*.

TCHOKA. See Saghalien.

TCHOL, a river of Chineſe Tartary, which riſes in lat. 48° 20′, long. 120° 34′, and runs into the Noupi, N. lat. 46° 28′. E. long. 123° 31′.

Tchol *Hotun*, a town of Chineſe Tartary, on a river of the ſame name; 500 miles N.N.E. of Peking. N. lat. 46° 41′. E. long. 123° 35′.

TCHOL-ABADI, a town of Aſiatic Turkey, in Caramania; 32 miles S.W. of Aſkſhehr.

TCHOM-COU-CHO, a town of Chineſe Tartary; 25 miles S.W. of Ning-yuen.

TCHOM-YUEN, a town of Chineſe Tartary; 15 miles N. of Geho.

TCHONG, a town of Corea; 68 miles from Kin-naitchan.—Alſo, a city of China, of the ſecond rank, in Quang-ſi; 1175 miles W. of Peking. N. lat 22° 26′. E. long. 107° 4′.

TCHONG-HOTOC, a town of Thibet; 90 miles S.S.W. of Horatoubé.

TCHONG-KIANG-CHE, a town on the W. coaſt of Formoſa. N. lat. 24° 40′. E. long. 138° 2′.

TCHONG-KING, a city of China, of the firſt rank, in Se-tchuen. This is one of the moſt commercial cities of the province. It is in a great meaſure indebted for its trade to its ſituation at the confluence of two remarkable rivers; one of which, called *Hin-cha-kiang*, or *Golden-ſand*, receives in its courſe all the ſtreams from the mountains, which riſe on the neighbouring confines of Tartary. The other is Ta-kiang, which has its ſource beyond the boundaries of China, and is commonly called *Yang-tſe-kiang*. Tchong-king is built upon a mountain, and riſes in the form of an amphitheatre: the air round it is wholeſome and temperate. This city is celebrated for its fiſh, and a particular kind of trunks, made with canes, interwoven in the manner of baſket-work. It has in its diſtrict three cities of the ſecond claſs, and eleven of the third; 750 miles S.W. of Peking. N. lat. 29° 42′. E. long. 106° 19′.

TCHONG-KOUE, or the *Middle Kingdom*, the name which the Chineſe give to this empire; the weſtern Moguls call it Catay; the Mantchew Tartars, Nican-courou; the Japaneſe, Thau: and the people of Cochinchina and Siam, Cin, from which laſt appellation that of China is probably derived.

TCHONTORI, a town of Thibet; 175 miles S.E. of Hami. N. lat. 40° 24′. E. long. 96° 34′.

TCHORRO-TOHON-KIAMEN, a poſt of Chineſe Tartary; 23 miles N. of Odoli.

TCHORS, a town of Perfia, in the province of Adirbeitzan, inhabited by Curds, fubject to Perfia; 78 miles W.N.W. of Tauris.

TCHOSCHO, a fmall river of Ruffia, which runs into the Tchefkaia galf, 40 miles N.N.E. of Mezen.

TCHOUĆDOU, a town of Chinefe Tartary; 20 miles N.N.W. of Petouné-Hotun.

TCHOUCHAN, a town of Corea; 38 miles S. of King-ki-tao.

TCHOUCHLOMA, a town of Ruffia, in the government of Koftrom; 76 miles N.E. of Koftrom. N. lat. 58° 35′. E. long. 42° 40′.

TCHOUCTEY-KIAMEN, a poft of Chinefe Tartary; 10 miles N.E. of Tchol.

TCHOUDSONG, a town of Thibet, on the borders of China; 340 miles S.E. of Laffa. N. lat. 27° 22′. E. long. 96° 50′.

TCHOUKIA-POURAN, a town of Thibet; 69 miles S.S.E. of Laffa.

TCHOU-KIONG, or YUNG, a city of China, of the firft rank, in Yun-nan; 1187 miles S.W. of Peking. N. lat. 25° 6′. E. long. 101° 20′

TCHOULGUE-HOTUN, a town of Chinefe Tartary; 745 miles E.N.E. of Peking. N. lat. 44° 1′. E. long. 131° 47′.—Alfo, a town of Chinefe Tartary; 840 miles E.N.E. of Peking. N. lat. 44° 48′. E. long. 133° 49′.

TCHOUMOU, a town of Thibet; 63 miles E.S.E. of Laffa.

TCHOUMOURTI, a town of Thibet, near the Ganges; 225 miles E.S.E. of Latac.

TCHOURHATAI, a town of Chinefe Tartary. N. lat. 43° 4′. E. long. 119° 45′.

TCHOUSOR, a town of Thibet; 36 miles S.W. of Laffa.

TCHOU-TAN, a river of China, which runs into the Yuen, near Hong-kiang-fe.

TCHOU-TCHAN-TCHE, a town of the ifland of Formofa. N. lat. 24° 48′. E. long. 120° 21′.

TCHUDSKOI, a lake of Ruffia, between the governments of Peterfburg and Riga; about 64 miles in length, and from 8 to 24 in breadth. N. lat. 58° to 59° 10′. E. long. 27° to 27° 28′. See PEIPUS.

TCHUGUEV, a town of Ruffia, in the government of Charkov; 12 miles E. of Charkov. N. lat. 49° 58′. E. long. 36° 14′.

TCHUKOTCH, a river of Ruffia, which runs into the Icy fea, N. lat. 71° 30′. E. long. 155° 14′.

TCHUKOTSKIJA, the moft eaftern province of Ruffia, in the government of Irkutfk, extending from N.W. to S.E., about 740 miles in length, and nearly 520 from N. to S. N. lat. 63° to 73° 20′. E. long. 157° to 159°.

TCHUKOTSKOI, a cape of the N.E. extremity of Siberia, at the entrance of the ftraits which divide the Pacific ocean from the Frozen fea, and the continent of America from Afia. N. lat. 66° 15′. E. long. 199° 14′.

TCHULIM, a river of Ruffia, formed by the union of feveral rivers, which runs into the Oby, near Moltchanovka.

TCHUMARA-STANITZ, a town of Ruffia, in the government of Irkutfk, on the Lena. N. lat. 61° 12′. E. long. 125° 14′.

TCHUMISCH, a river of Ruffia, which runs into the Oby, 6 miles S.S.E. of Kolivan.

TCHURKINO, a lake of Ruffia, 320 miles N.N.W. of Zafhiverfk. N. lat. 72° 30′. E. long. 134° 4′.

TCHUSOVAIA, a town of Ruffia, in the government of Perm; 28 miles N. of Perm.—Alfo, a town of Ruffia, in the government of Perm, at the union of the Tchufovaia and the Kama; 16 miles N. of Perm.—Alfo, a river of Ruffia, which joins the Silva, and runs into the Kama, about 12 miles above Perm.

TCHUSOVOI, a town of Ruffia, in the government of Perm; 40 miles N.E. of Perm.

TCHU-TCHEOU, a city of China, of the firft rank, in Tche-kiang; 730 miles S.S.E. of Peking. N. lat. 28° 36′. E. long. 139° 33′.

TCI-NAN, or TSI-NAN, a city of China, of the firft rank, in the province of Chan-tong, fituated fouth of the river Tfing-ho, or Tfi: this city is large and populous, and is much refpected by the Chinefe, on account of its having been formerly the refidence of a long feries of kings, whofe tombs, rifing on the neighbouring mountains, afford a beautiful profpect. Tci-nan has under its jurifdiction four cities of the fecond clafs, and 26 of the third; 235 miles S. of Peking. N. lat. 36° 46′. E. long. 116° 46′.

TCIN-CHOUI, a lake of China, about 37 miles in circumference; 25 miles N.N.E. of Tfin-tcheou.

TCING, a city of China, of the fecond rank, in Pe-tche-li; 130 miles S.S.W. of Peking. N. lat. 38° 8′. E. long. 114° 6′.

TCI-NGIN, a city of China, of the fecond rank, in Chang-tong; 275 miles S. of Peking. N. lat. 35° 34′. E. long. 116° 24′.

TCIN-TCHEOU, or TSIN-TCHEOU, a city of China, of the firft rank, in Chang-tong. The principal branch of its commerce is fifh, which are caught in fuch abundance, that, we are affured, the profit arifing from their fkins only is very confiderable. It has in its diftrict one city of the fecond clafs, and 13 of the third; 230 miles S.S.E. of Peking. N. lat. 36° 46′. E. long. 118° 20′.

TCITCICAR-HOTUN, a town of Chinefe Tartary. This is the ufual refidence of a Tartarian general, and capital of a diftrict. This city was built to guard the frontiers of the Chinefe empire from the Ruffians. The city is fortified by clofe palifades, and a wall conftructed of earth. The fpace inclofed by the former contains the tribunals and the houfe of the Tartar general; that which is between the palifades and the earthen wall is occupied by the foldiers of the Tartar garrifon, merchants, and tradefmen, moft of whom are Chinefe invited hither by hopes of gain, or condemned to exile, and whofe houfes are only of earth, forming pretty large ftreets. The jurifdiction of the general who commands here extends over the new cities of Merguen and Saghalien-oula (city of the Black river): the latter being, on account of its fituation, the moft populous, the richeft, and the moft important. It is fituated on the fouthern bank of the river Saghalien, commands a plain in which feveral villages have been built, and fecures to the Mantchew Tartars the poffeffion of extenfive deferts covered with woods, in which a great number of fables are found.

The diftrict to which this city belongs is the moft northerly of the three departments of Eaftern Chinefe Tartary. It is occupied by different Tartar tribes, the principal of which are the Mantchews, Solons, and the Tagouris, the ancient inhabitants of the country. The two latter tribes fubmitted to the Mantchews, and implored their affiftance againft the Ruffians or Mufcovites, who, with armed barks, paffing from the Saghalien-oula into the Songari-oula, infefted all the rivers which flow into them, and made themfelves formidable to the Tartar nations who inhabited their banks. The Ruffians would foon have become mafters of the valuable forefts in which the fables are found, if the fort of Yafca, which they built on the river Saghalien, had been fuffered to remain; but, by the treaty of peace concluded in 1689,

 between

between the Ruffians and Chinefe, it was agreed that it fhould be demolifhed, that no caufe of umbrage or complaint might be left to the Tartar hunters.

The Tagouris, who appear to be the oldeft inhabitants of the country, are tall, ftrong of body, and accuftomed to labour; they build themfelves houfes, fow corn, and cultivate their lands, although they have always been furrounded by Tartars who live under tents, and are entirely ignorant of agriculture.

The Solon Tartars are ftill more robuft, braver, and of greater ingenuity; they are almoft all hunters; their women mount on horfeback, handle the bow and the javelin, and follow in the chace ftags and other wild animals. It is generally about the beginning of October that thefe Tartars depart to hunt fables, clad in a fhort clofe garment of wolf's fkin: they cover their heads with a cap made of the fame, and carry their bows fufpended at their backs.

They take along with them feveral horfes loaded with facks of millet, and their long cloaks made of foxes' or tygers' fkins, which they wrap round them to defend themfelves from the cold, efpecially during the night. Their dogs are trained to this kind of hunting; they are accuftomed to climb the fteepeft rocks, and know all the ftratagems of the fables.

The fables' fkins of this country are highly valued. Some of the rivers that run into the Saghalien-oula furnifh pearls; 335 miles N.E. of Peking. N. lat. 47° 25'. E. long. 123° 30'.

TE, a city of China, of the fecond rank, in Chan-tong, on the grand canal; 150 miles S. of Peking. N. lat. 37° 35'. E. long. 115° 50'.

TEA-*Tree*, in *Botany*. See THEA.

TEA, in *common language*, denotes the leaves of the tea-tree, as they are imported into this country, and the infufion of them in boiling water. The term is more extenfively applied to any other infufion of ordinary roots or herbs.

Dr. Lettfom, in his botanical defcription of the tea-plant, thinks it moft probable, that there is only one fpecies, and that the difference between the green and bohea teas depends on the nature of the foil, culture, age, and the manner of drying the leaves. He adds, that it has even been obferved, that a green tea-tree, planted in the bohea tea country, will produce bohea, and on the contrary; and that on his examining feveral hundred flowers, brought both from the bohea and green tea countries, their botanical characters have always appeared uniform. We are principally indebted to Kæmpfer, Le Compte, and Du Halde, for an authentic hiftory of the culture of this exotic fhrub, and the manner of preparing or curing its leaves.

The particulars of greateft importance that have been recited, have lately been judicioufly collected, and the fubject further illuftrated by additional obfervations by Dr. Lettfom.

The tea-tree loves to grow in vallies, at the foot of mountains, and upon the banks of rivers, where it enjoys a fouthern expofure to the fun; though it endures confiderable variations of heat and cold, as it flourifhes in the northern clime of Peking, as well as about Canton; and it is obferved that the degree of cold at Peking is as fevere in winter as in fome of the northern parts of Europe. However, the beft tea grows in a mild temperate climate, the country about Nanking producing better tea than either Peking or Canton, betwixt which places it is fituated.

The root refembles that of the peach-tree; the leaves are green, longifh at the point, and pretty narrow, an inch and half long, and jagged all round. The flower is much like that of the wild rofe, but fmaller. The fruit is of different forms, fometimes round, fometimes long, fometimes triangular, and of the ordinary fize of a bean, containing two or three feeds, of a moufe-colour, including each a kernel. Thefe are the feeds by which the plant is propagated: a number from fix to twelve or fifteen being promifcuoufly put into one hole, four or five inches deep, at certain diftances from each other. The feeds vegetate without any other care, though the more induftrious annually remove the weeds, and manure the land. The leaves which fucceed are not fit to be plucked before the third year's growth, at which period they are plentiful, and in their prime.

In about feven years the fhrub rifes to a man's height, and as it then bears few leaves, and grows flowly, it is cut down to the ftem, which occafions an exuberance of frefh fhoots and leaves the fucceeding fummer; fome, indeed, defer cutting them till they are of ten years' growth. In Japan, the tea-tree is cultivated round the borders of the fields, without regard to the foil; but as the Chinefe export confiderable quantities of tea, they plant whole fields with it. The leaves are not collected from the cultivated plant till it is three years old; and after growing feven or ten years, it is cut down, in order that the numerous young fhoots may afford a greater fupply of leaves.

The beft time to gather the leaves of tea is while they are yet fmall, young, and juicy; and the different periods in which they are gathered are particularly defcribed by Kæmpfer. The firft gathering of the tea-leaves, according to this author, commences about the latter end of February, when the leaves are young and unexpanded. The fecond collection is made about the beginning of April, and the third in June. The firft collection, which confifts only of the fine tender leaves, is moft efteemed, and is called Imperial tea. The fecond is called Tootsjaa, or Chinefe tea, becaufe it is infufed and drunk after the Chinefe manner. The laft, which is the coarfeft and cheapeft, is chiefly confumed by the lower clafs of people. Befides the three kinds of tea here noticed, it may be obferved, that by garbling or forting thefe, the varieties of tea become ftill further multiplied. The leaves are plucked carefully one by one, and notwithftanding the feeming tedioufnefs of this operation, the labourers are able to gather from four to ten or fifteen pounds each in one day. The tea-trees that yield often the fineft leaves, grow on the fteep declivities of hills, where it is dangerous, and in fome cafes impracticable to collect them. The Chinefe are faid to vanquifh this difficulty by a fingular contrivance. The large monkies which inhabit thefe cliffs are irritated, and in revenge they break off the branches, and throw them down, fo that the leaves are thus obtained. The leaves fhould be dried as foon as poffible after they are gathered.

The buildings, or drying-houfes, that are erected for curing of tea, contain from five to ten or twenty fmall furnaces, about three feet high, each having at the top a large flat iron pan. There is alfo a long low table covered with mats, on which the leaves are laid, and rolled by workmen, who fit round it: the iron pan being heated to a certain degree by a little fire made in the furnace underneath, a few pounds of the frefh-gathered leaves are put upon the pan; the frefh and juicy leaves crack when they touch the pan, and it is the bufinefs of the operator to fhift them as quick as poffible with his bare hands, till they become too hot to be eafily endured. At this inftant he takes off the leaves with a kind of fhovel refembling a fan, and pours them on the mats before the rollers, who, taking fmall quantities at a time, roll them in the palm of their hands in one direction, while others are fanning them, that they may cool the more fpeedily, and retain their curl the longer. This procefs is repeated two or three

three times, or oftener, before the tea is put into the ſtores, in order that all the moiſture of the leaves may be thoroughly diſſipated, and their curl more completely preſerved. On every repetition the pan is leſs heated, and the operation performed more ſlowly and cautiouſly. The tea is then ſeparated into the different kinds, and depoſited in the ſtore for domeſtic uſe or exportation.

The Chineſe know nothing of *imperial tea*, *flower of tea*, and many other names, which in Europe ſerve to diſtinguiſh the goodneſs and the price of this faſhionable commodity; but, beſide the common tea, they diſtinguiſh two other kinds, *viz.* the *voui* and *ſoumlo*, which are reſerved for people of the firſt quality, and thoſe who are ſick. We have two principal kinds of tea in Europe; *viz.*

Tea, *Green*, which is the common tea of the Chineſe, &c. F. le Compte calls it *bing* tea, and ſays it is gathered from the plant in April. It is held very digeſtive, and a little aſtringent; it gives a paliſh-green tincture to water, and its leaves are much twiſted.

Tea, *Bohea*, which is the *voui* tea, or *bou tcha* of the Chineſe. F. le Compte makes this only differ from the green tea, by its being gathered a month before it, *viz.* in March, while in the bud; and hence the ſmallneſs of the leaves, as well as the depth of the tincture it gives to water. Others take it for the tea of ſome particular province; the ſoil being found to make an alteration in the properties of the tea, as much as the ſeaſon of gathering it. It is all bought at Nankin, and thence brought into Europe, where it is now much in vogue.

As to the differences in colour and flavour peculiar to theſe two kinds, and to their varieties, Dr. Lettſom thinks that there is reaſon to ſuſpect that they are, in ſome meaſure, adventitious, or produced by art. He has been informed by intelligent perſons, who have reſided ſome time at Canton, that the tea about that city affords very little ſmell while growing. The ſame is obſerved of the tea-plants now in England, and alſo of the dried ſpecimens from China. We are not, however, as he obſerves, to conclude from hence, that art alone conveys to tea, when cured, the ſmell peculiar to each kind; for our vegetable graſſes, for inſtance, have little or no ſmell till they are dried and made into hay.

As to the opinion, that the green tea owes its verdure to an effloreſcence acquired from the plates of copper on which it is ſuppoſed to be cured or dried, he ſhews that there is no foundation for this ſuſpicion. The infuſions of the fineſt imperial and bloom teas undergo no change on the affuſion of a volatile alkali, which would detect the minuteſt portion of copper contained in them, by turning the liquors blue.

The fine green colour of theſe teas, with as little reaſon, hath been attributed to green copperas; as this metallic ſalt would, on its being diſſolved in water, immediately act on the aſtringent matter of the leaves, and convert the infuſion into ink, as happens when a chalybeate water has been employed in the making of tea.

On the whole, Dr. Lettſom thinks it not improbable, that ſome green dye prepared from vegetable ſubſtances, is employed in the colouring of the leaves of the green teas. And Neumann ſuſpects, that the brown colour and the flavour of the bohea ſorts are introduced by art. Both the grean and bohea teas have an agreeable ſmell, and a lightly bitteriſh ſubaſtringent taſte: with ſolution of chalybeate vitriol, they ſtrike an inky blackneſs. They give out their ſmell and taſte both to watery and ſpirituous menſtrua; to water, the green ſorts communicate their own green tincture, and the bohea, their brown; but to rectified ſpirit, they both impart a fine deep green. The extracts, obtained by gently drawing off the menſtrua from the filtered tinctures, are very conſiderably aſtringent, and not a little ungrateful; but the ſpirituous moſt ſo.

Savary alſo ſpeaks of a ſort of *red* tea, or *Tartar* tea, called *Honan tcha*, which tinges the water of a pale red, and which is ſaid to be extremely digeſtive: by means of it the Tartars are ſaid to be able to feed on raw fleſh. Its taſte is earthy, and much the leaſt agreeable of them all: but this is ſcarcely known in England.

Tea is to be choſen of the briſkeſt ſmell, and as whole as poſſible: and the greateſt care is to be taken that it have not been expoſed to the air to pall and evaporate.

The drink, tea, is made in China, and throughout the greateſt part of the Eaſt, after the ſame manner as in Europe; *viz.* by infuſing the leaves in boiling water, and drinking the infuſion hot. Indeed, among us, it is uſual to temper its bitterneſs with ſugar, but the Orientals uſe it without the addition of ſugar or milk.

However, the Japaneſe are ſaid to prepare their liquor in a ſomewhat different way, *viz.* by pulverizing the leaves, ſtirring the powder in hot water, and drinking it as we do coffee.

From the account given by Du Halde, this method is not peculiar to the Japaneſe, but is alſo uſed in ſome provinces of China.

The common people, who have a coarſer tea, boil it for ſome time in water, and make uſe of the liquor for common drink. Early in the morning, the kettle, filled with water, is regularly hung over the fire for this purpoſe, and the tea is either put into the kettle encloſed in a bag, or by means of a baſket of proper ſize preſſed to the bottom of the veſſel, that there may be no hindrance in drawing off the water.

The Bantsjaa tea only is uſed in this manner, whoſe virtues, being more fixed, would not be ſo fully extracted by infuſion.

The Chineſe are always taking tea, eſpecially at meals: it is the chief treat with which they regale their friends. The moſt moderate take it at leaſt thrice a day; others ten times, or more; and yet it is computed, the conſumption of tea among the Engliſh and Dutch is as great, in proportion, as among the Orientals.

With regard to the commercial hiſtory of tea, we may obſerve that it was firſt introduced into Europe by the Dutch Eaſt India Company, very early in the 17th century, and that a quantity of it was brought over from Holland by lord Arlington and lord Oſſory, about the year 1666, at which time it was ſold for 60*s.* a pound. But it appears, that before this time, drinking of tea, even in public coffee-houſes in this country, was not uncommon; for in 1660, a duty of 8*d. per* gallon was laid on the liquor made and ſold in all coffee-houſes.

The preſent conſumption of it is immenſe, both among the rich and poor. Dr. Lettſom tells us, that he has been informed, that at leaſt three millions of pounds are allowed for the annual home conſumption, not including the incredible quantity ſmuggled into the kingdom; and that the Eaſt India Company have generally in their warehouſes a ſupply for three years.

In the appendix to ſir George Staunton's Account of Lord Macartney's Embaſſy to China, we have ſeveral ſtatements relating to the tea-trade with China. The average of teas exported from China to Europe in foreign ſhips, for nine years, *viz.* from March 1772 to 1780, the average of the number of ſhips being twelve, was 13,198,201 lbs.; in Engliſh ſhips, at the average of nine, 5,639,939 lbs.: the total average of ſhips is twenty-one, and of exported tea 18,838,140 lbs

18,838,140 lbs. The annual confumption of tea by foreigners in Europe is eftimated at 5,500,000 lbs.; and the confumption of Great Britain and her dependencies is at leaft 13,338,140 lbs., which, at 700,000 lbs. *per* fhip, would employ thirty-eight large fhips conftantly in the China trade, inftead of eighteen fhips, as above, moft of which were fmall, one fleet going out when another is coming home.

The above is exclufive of private trade teas, brought legally and illegally into Europe. It is faid, upon the authority of confidential information, that the Englifh fhips have often fmuggled from 1000 to 3000 chefts of tea each; and alfo that the foreign captains bring a large quantity of tea, which they either fmuggle at fea, or throw into the fea, the punifhment being fevere. The lofs to the public on 1000 chefts of hyfon tea fmuggled, is above 20,000*l.*

The average quantities for one year of each fort of tea fold by the Eaft India Company in ten years, from March fale 1773 to September fale 1782 inclufive, exclufive of private trade, which was trifling, are as follow:

Bohea - - -	3,075,307 lbs.
Congou - -	523,272
Souchong and Pekoe	92,572
Singlo - - -	1,832,474
Hyfon - -	218,839
	5,742,464

See COMMUTATION *Aa.*

As to the properties of tea, they are ftrangely controverted: the Eaftern nations are at leaft as much poffeffed with an idea of their extraordinary virtues as the Europeans; but it is, perhaps, becaufe imagination bears as great a fway there as here. The reafon why the gout and ftone are unknown in China, is afcribed to the ufe of this plant.

Tea is extolled as the greateft of all medicines: moderately and properly taken, it acts as a gentle aftringent and corroborative: it ftrengthens the ftomach and bowels, and is good againft naufeas, indigeftions, and diarrhœas. It acts alfo as a diuretic and diaphoretic. The immoderate ufe of it, however, has been very prejudicial to many, who have been thereby thrown into the diabetes.

And alfo in Europe, infufions of tea-leaves have been extravagantly condemned by fome, and commended by others. From the contradictory opinions, even of medical writers, on this fubject, the natural inference feems to be, that they poffefs neither noxious nor beneficial powers, in any very confiderable degree. They feem, when moderately ufed, to be for the moft part innocent; in fome cafes they feem to be falutary; in fome they are apparently prejudicial. They dilute thick juices, and quench thirft more apparently, and pafs off by the natural emunctories more freely, than more watery fluids: they refrefh the fpirits in heavinefs and fleepinefs, and feem to counteract the operation of inebriating liquors.

From their manifeft aftringency, they have been fuppofed to ftrengthen and brace up the folids, but this effect experience does not countenance; as it is in diforders, and in conftitutions in which corroborants are more ferviceable, that the immoderate ufe of tea is peculiarly hurtful; in cold indolent habits, cachexies, chlorofis, dropfies, and debilities of the nervous fyftem. Lewis's Mat. Med.

Dr. Lettfom has particularly inquired into the medical qualities and effects of tea; and having obferved that infufions of bohea and green tea contribute to preferve fweet fome fmall pieces of beef immerfed in them, he infers that they poffefs an antifeptic power, when applied to the dead animal fibre, and from their ftriking a purple colour with falt of iron, he deduces their aftringent quality.

From other experiments he concludes, that the activity of tea chiefly refides in its fragrant and volatile parts; and that if the ufe of it be beneficial or injurious to any particular conftitution, it becomes fo principally by means of this odorous fragrant principle. He apprehends that it is the fafeft courfe to ufe the infufion of the more ordinary kinds of this plant, which abound lefs with this fragrant principle. Or the tea may be boiled a few minutes, in order to diffipate this volatile part, which ftands charged as the caufe of thofe nervous affections that are faid to be produced, or aggravated, by the ufe of this liquor. By this procefs may likewife be extracted more copioufly the more fixed, bitter, and ftomachic parts of this vegetable.

Dr. Lettfom, who feems to be thoroughly perfuaded of the occafionally noxious effects of this volatile principle, in the finer teas efpecially, recommends this laft mentioned mode of making tea, or the fubftitution of the extract inftead of the leaves; by the ufe of which the nervous relaxing effects, which follow the drinking of tea in the ufual manner, would be in great meafure avoided. This extract has been imported hither from China, in the form of fmall cakes, not exceeding a quarter of an ounce each in weight, ten grains of which might fuffice one perfon for breakfaft; but it might eafily be made here by fimple decoction and evaporation, by thofe who experience the noxious qualities of the volatile principles of this plant.

It may be farther obferved, that the effect of drinking large quantities of any warm aqueous liquor would be to enter fpeedily into the courfe of circulation, and pafs off as fpeedily by urine or perfpiration, or the increafe of fome of the fecretions.

Its effects on the folid parts of the conftitution would be relaxing, and thereby enfeebling.

If this warm aqueous fluid were taken in confiderable quantities, its effects would be proportionable, and ftill greater if it were fubftituted inftead of nutriment. The infufion of tea, however, has thefe two peculiarities. It is not only poffeffed of a fedative quality, but alfo of a confiderable aftringency; by which the relaxing power, afcribed to a mere aqueous fluid, is in fome meafure corrected on this account. It is, perhaps, lefs injurious than many other infufions of herbs, which, befides a very flight aromatic flavour, have very little, if any, ftypticity, to prevent their relaxing debilitating effects.

So far, therefore, tea, if not too fine, if not drank too hot, nor in too great quantities, is perhaps preferable to any other known vegetable infufion. And if we take into confideration, likewife, its known enlivening energy, our attachment to it will appear to be owing to its fuperiority in tafte and effects to moft other vegetables. See Dr. Lettfom's Natural Hiftory of the Tea-tree, with Obfervations on the Medical Qualities of Tea, and Effects of Tea-drinking, 4to. 1772.

Tea may be confidered as a very powerful aphrodifiac; and accordingly, a phyfician of confiderable eminence in his profeffion, imputes the amazing population of China, amongft other caufes, to the general ufe of it. Percival's Eff. p. 63.

We fhall clofe this part of the article with a tranfcript of its medicinal powers, as they are ftated by Dr. Cullen (Mat. Med. vol. ii.) "With refpect to its qualities as a medicine, that is, its power of changing the ftate of the human body, we might fuppofe it afcertained by the experience of its daily ufe; but from the univerfality of this ufe in very different conditions of the plant, and in every poffible condition of the

the perfons employing it, the conclufions drawn from its effects muft be very precarious and ambiguous, and we muft attempt by other means to afcertain its qualities with more certainty.

"To this purpofe it appears, from the accurate Dr. Smith's experiments 'De Actione Mufculari,' No. 36, that an infufion of green tea has the effect of deftroying the fenfibility of the nerves, and the irritability of the mufcles; and from the experiments of Dr. Lettfom, it appears that green tea gives out in diftillation an odorous water, which is powerfully narcotic.

That the recent plant contains fuch an odorous narcotic power, we might prefume from the neceffity which the Chinefe find of drying it with much heat before it can be brought into ufe; and that, even after fuch preparation, they muft abftain from the ufe of it for a year or more, that is, till its volatile parts are ftill farther diffipated: and it is faid, that unlefs they ufe this precaution, the tea in a more recent ftate manifeftly fhews ftrong narcotic powers. Even in this country, the more odorous teas often fhew their fedative powers in weakening the nerves of the ftomach, and indeed of the whole fyftem.

"From thefe confiderations we conclude very firmly, that tea is to be confidered as a narcotic and fedative fubftance; and that it is efpecially fuch in its moft odorous ftate, and therefore lefs in the bohea than in the green tea, and the moft fo in the more odorous, or what are called the finer kinds of the latter.

"Its effects, however, feem to be very different in different perfons; and hence the different, and even contradictory accounts that are reported of thefe effects. But if we confider the difference of conftitution, which occafions fome difference of the operation of the fame medicine in different perfons, and of which we have a remarkable proof in the operation of opium, we fhall not be furprifed at the different operations of tea.

"If to this we add the fallacy arifing from the condition of the tea employed, which is often fo inert as to have no effects at all; and if we ftill add to this the power of habit, which can deftroy the powers of the moft powerful fubftances, we fhall not allow the various and even contradictory reports of is effects to alter our judgment, with refpect to its ordinary and more general qualities in affecting the human body.

"From the experiments above-mentioned, and from the obfervations which I have made in the courfe of fifty years, in all forts of perfons, I am convinced that the qualities of tea are narcotic and fedative.

"It has been often alleged, that fome of the bad effects imputed to tea are truly owing to the large quantity of warm water which commonly accompanies it, and it is poffible that fome bad effects may arife from this caufe: but from attentive obfervation I can affert, that wherever any confiderable effects appear, they are in nine of every ten perfons entirely from the qualities of the tea; and that any like effects of warm water do not appear in one of a hundred who take in this very largely.

"But while we thus endeavour to eftablifh the poifonous nature of tea, we do not at the fame time deny that it may fometimes fhew ufeful qualities. It is very poffible, that in certain perfons, taken in moderate quantity, it may, like other narcotics in a moderate dofe, prove exhilarating, or, like thefe, have fome effect in taking off irritability, or in quieting fome irregularities of the nervous fyftem.

"As its bad effects have been often imputed to the warm water that accompanies it, fo we have no doubt that fome of its good effects may alfo be afcribed to the fame caufe, and particularly its being fo often grateful after a full meal."

By 9 Geo. II. c. 35, if a veffel, coming from foreign parts, and having 6 lbs. or more of tea on board, fhall be found at anchor, or within two leagues of the fhore, &c. all fuch tea, with cheft and package, fhall be forfeited. The importer of any coffee, tea, or cocoa-nuts, fhall within thirty days enter the faid tea, &c. and warehoufe it. (10 Geo. c. 10. 5 Geo. III. c. 43.) That which is landed without entry and warehoufing fhall be forfeited. But this fhall not extend to any coffee or tea imported by the Eaft India Company. The coffee and tea intended for home confumption fhall be entered and the duty paid. (10 G. c. 10.) A permit fhall be given for the removal of tea from any warehoufe, whether it be bohea, congou, fouchong, or pekoe tea; and fuch tea fhall in the permit be fpecified under the denomination of *black* tea; and if the tea be neither bohea, congou, fouchong, nor pekoe tea, then fuch tea fhall be fpecified under the denomination of *green* tea. 43 Geo. III. c. 129.

By 13 Geo. III. c. 44. no licence fhall be granted to the Eaft India Company to export tea, unlefs there remain in the warehoufes a quantity not lefs than ten millions of pounds weight.

No tea is allowed to be imported, except from the place of its growth, on pain of forfeiture. (11 Geo. c. 30.) And by 24 Geo. III. c. 38. all the duties upon tea imported, fold, or ufed in this kingdom, fhall ceafe from September 15, 1784; at which period the Eaft India Company is difcharged from the payment of duties on tea in their warehoufes; and afterwards there fhall be paid a duty of 12*l.* 10*s.* *per cent.* computed upon the grofs prices for all tea delivered by the Company to the purchafers, which duty fhall be drawn back on exportation to any place where the drawback is already allowed. The Company is required to make four fales in the year, and to fell fuch quantity as fhall be fufficient to fupply the demand, provided an advance of 1*d.* *per* lb. be bid upon the prices at which the teas fhall be put up; and at the four firft fales after paffing the act, thefe prices fhall not exceed the following rates; *viz.* for bohea tea, 1*s.* 7*d.* *per* lb.; congou tea, 2*s.* 5*d.* *per* lb.; for fouchong tea, 3*s.* 3*d* *per* lb.; for finglo tea, 3*s.* 4*d.* *per* lb.; and for hyfon tea, 4*s.* 11*d.* *per* lb.: and afterwards the whole price at which the teas are put up, fhall not exceed the prime coft, with the freight and charges of importation, lawful intereft from the time of the arrival of fuch tea in Great Britain, and the common premium of infurance. In lieu of the duties on tea, this act fubftitutes an additional duty on windows. See Commutation *Act.*

By this fame act, the inland duty upon cocoa-nuts and coffee fhall ceafe from September 15, 1784, and the following additional duties be paid; *viz.* for every pound of cocoa-nuts, the produce of Britifh America, 6*d.* and the produce of any other place, 1*s.* 6*d.*; and for every pound of coffee, the produce of Britifh America, 6*d.* and the produce of any other place, 2*s.* 6*d.*; and thefe duties are fubject to an additional impoft of 5 *per cent.* and 5 *per cent* thereon impofed by 19 Geo III. c. 25. and 22 Geo. III. c. 66.

If coffee or tea are intended to be taken out for exportation, they fhall be delivered out on fecurity that they fhall be exported, and not relanded. 13 Geo. c. 10.

No drawback fhall be allowed on tea exported, except to Ireland, &c. where the whole duty on exportation fhall be allowed. 18 Geo. II. c. 26. 17 Geo. III. c. 27. 43 Geo. III. c. 69.

Every perfon having in his cuftody more than fix pounds weight of tea, is a dealer; and felling without a licence, to be be had for 12*d.*, shall forfeit 5*l.* a month. (11 Geo. c. 30.) If any person offer any tea to sale without a permit, or a pedlar with one, the person to whom it is offered may seize the same, &c. 9 Geo. II. c. 35. See COFFEE.

Every person dealing in tea, &c. shall cause to be painted or written over the door of his shop, the words *dealer in coffee, tea, cocoa-nuts*, or *chocolate*, on pain of 200*l.* (19 Geo. III. c. 69.) And any dealer buying of any person who has not this inscription, incurs forfeiture of 100*l.*, and any other person 10*l.* By 20 Geo. III. c. 35. no person shall trade in coffee, tea, or chocolate, without a licence, at the price (by 43 Geo. III. c. 69.) of 5*s.* 6*d.*, under penalty of 20*l.* The adulteration of tea is subject to a penalty of 100*l.* besides the forfeiture of the same, and for every pound of dyed leaves of tea, 5*l.* 11 Geo. c. 30. 17 Geo. III. c. 29.

At the East India Company's sale of teas, an account shall be taken of the buyers and prices, and the best bidder shall within three days deposit with the Company, or their clerks, 40*s.* for every tub or chest of tea, on pain of six times the value, and such sale shall be void, and the same shall in 14 days after be put up again. (18 Geo. II. c. 26.) And by 13 Geo. III. c. 44. the deposit for every tub and chest of bohea tea shall be 4*l.* By 13 Geo. III. c. 44. tea may be exported. No tea shall be received, with or without a permit, within the limits of the bills of mortality; and no tea, exceeding 20lbs. weight, shall at one time be received, with or without a permit, out of the said limits, on pain of forfeiture. (21 Geo. III. c. 55. 22 Geo. III. c. 68. 23 Geo. III. c. 70.) All tea seized and condemned shall be sold to the best bidder. (24 Geo. III. sess. 2. c. 47.) Tea carried in the night, with or without a permit, except in certain circumstances, shall be forfeited, and may be seized by any officer for the inland duties as tea. 21 Geo. III. c. 55.

TEA, *Buckthorn.* See RHAMNUS.

TEA, *German.* See SPEEDWELL.

TEA, *Mexico, Chenopodium ambrosioides* of Linnæus, is a species of chenopodium, which, as well as the Jerusalem oak, or chenopodium botrys, are natives of the southern parts of Europe, and sown annually with us in gardens. Infusions of the leaves and flowery heads of both these plants, which are not unpalatable, drank as tea, are said to be of service in humoral asthmas and coughs, and other disorders of the breast; they are supposed to be antispasmodic and antihysteric. Lewis's Mat. Med.

TEA, *New Jersey.* See CEANOTHUS.

TEA, *New Zealand.* See PHILADELPHUS.

TEA, *Oswego.* See MONARDA.

TEA, *Paraguay*, or *South Sea.* See PARAGUAY.

TEA, *West Indian.* See SIDA.

TEA *Soup*, in *Rural Economy*, that which is prepared from the tea, liquid, or infusion of some sort of vegetable substance or other, such as hay, cut straw, or haulm, &c. by thickening it a little with some sort of mealy material, or mashed potatoes, or other such roots, after being boiled or steamed.

TEA, in *Geography*, a river of England, in the county of Buckingham, which runs into the Ouse near Stony Stratford.

TEAHOWRAY. See PORTLAND *Island.*

TEAK, or TEEK, a species of timber that occurs frequently in various parts of the East Indies, and which is applied to a variety of domestic and nautical purposes. Extensive forests of these trees border on the banks of the Godavery within the mountains, and supply abundance of ship-timber for the adjacent ports. The teak forests, from which the marine yard at Bombay is furnished with that excellent species of ship-timber, lie along the western side of the Gaut mountains, and other contiguous ridges of hills, as the N. and N.E. of Basseen; the numerous rivulets that descend from them affording water-carriage for the timber. Major Rennell reproaches the unpardonable negligence with which Europeans are chargeable for delaying to build ships of war for the service of the Indian seas. They might be freighted home, without the ceremony of regular equipment, as to masts, sails, and furniture; which might be calculated to answer the purpose of the home-passage at the best season; and crews could be provided in India. Teak ships of 40 years old and upwards are not uncommon in the Indian seas, while an European ship is ruined there in five years. The teak is called the Indian oak. See TECTONA.

TEAKI, in *Geography*, an island in the Mediterranean; twenty miles long, and four broad. This island was anciently called "Ithaca," and is memorable in Grecian history for being the kingdom of Ulysses; some Europeans call it "Val de Compare." N. lat. 38° 47′. E. long. 21° 40′.

TEAL, QUERQUEDULA, in *Ornithology*, the *Anas crecca* of Linnæus, the smallest of all the duck kind. Its beak is black, and its head, and upper part of its neck, of a reddish-brown; but there runs on each side of the head a green streak from behind the eyes quite to the back part, and between these is a black spot under the eyes; there is a white line which separates the reddish colour from the green. The lower part of the neck, the shoulders, and the sides, are very beautifully variegated with black and white streaks; the breast and belly are of a dusky greyish-white; the first beautifully spotted with black; the vent black; the tail sharp-pointed and dusky; the coverts of the wings brown; the greater quill-feathers dusky; the exterior webs of the lesser marked with a glossy green spot, above which is another of black, and the tips white; the irides whitish, and the legs dusky. The female is of a brownish ash colour, spotted with black, and has a green spot on the wing, like the male. Ray and Pennant. See DUCK.

TEAL, *Crested, Querquedula cristata*, a name given by Belonius and some others to a species of duck, remarkable for a tuft of feathers an inch and half long, hanging down from the back part of the head, and thence called the *tufted* duck; but more known among authors by the name of *capo negro.* See DUCK.

TEAL, *Summer, Anas circia* of Linnæus, is apprehended by Mr. Pennant to be no other than the female of our teal, though Linnæus has described it as a distinct species. See DUCK.

Summer teal is also a name given in some places to the garganey.

TEAM, THEAM, or *Thame*, in our *Ancient Customs*, signifies a royalty granted by the king's charter to a lord of a manor, for the having, restraining, and judging bondmen, neifs, and villeins, with their children, goods, and chattels, in his court.

TEAM, in *Agriculture*, the number of horses, oxen, or other animals which are drawing together at once in the same plough, cart, waggon, or other carriage. There is a great variety of different sorts of teams employed in field, road, and other sorts of labour, which is carried on by means of domestic animals; and it is of very great importance to ascertain which of them is of the greatest advantage, and the cheapest in the different uses and intentions.

In all sorts of farming work, in the field as well as on the road, the heavier kinds of strong horses, and those of the close, short, compact, punch breeds, have hitherto, for the most part, been employed for the purpose of team labour; and for

for the dray, and every fort of fimilar heavy work, where a flow, fteady, ftrong draught is required, they are alfo unqueftionably the moft proper and fuitable, as long experience has fully proved. But a confiderable alteration has lately taken place in the kinds which are made ufe of as teams for carrying on the lighter forts of road-work, whether by means of carriages or other vehicles.

It has been found that the ftouter fort of horfes, poffeffing a little blood, are by much the beft adapted to this kind of labour of any, being much more active and expeditious, as well as more durable, and lefs liable to fatigue and to become tired out on the road. On this account they form the teams for moft forts of coach and other carriage labour, and in many inftances for various heavier defcriptions of it: and it is not improbable but that, in fome cafes, they might be fubftituted as teams for farming work with great propriety and advantage, in confequence of their quicker pace, and having what is commonly called more bottom.

Among farmers it has long been a difputed point, whether horfes or oxen form the moft economical and advantageous team for the purpofe of the cultivator in performing his work, and it remains ftill undecided, though many intelligent agriculturalifts now incline to the fide of horfe-teams, except in particular circumftances and fituations. And a late writer has remarked, that the circumftances in which the latter have been chiefly fuppofed to be more advantageous than the former, are in their being kept at lefs expence, and their not declining in value. But that thefe, when examined, are perhaps not fo decifive of their fuperiority, as they may at firft fight appear; for where the work of the farm is done by the younger fort of horfes, which is perhaps the beft method, the decline in value cannot be of any material confequence, while the fuperiority in point of the difpatch of work is very great. And in regard to the keep, as oxen cannot perform their labour well in continuance without oats, or fome other fuftenance of a fimilar kind, it would feem not improbable but that young horfes may pay nearly as well as oxen, and be kept with little difference in the expence. Indeed the common opinion, that oxen are fuperior to horfes in the tillage of heavy lands, does not at all appear to be well founded, efpecially when drawn in *yokes* and *bows*, as the poaching muft be greater than by horfes working at length. But when in harnefs, they may, from their greater fteadinefs, be preferable; of courfe, under different management, they are capable of being employed in both ways. But in all fuch cafes, as where quick motion is of more importance than the fteady drawing of heavy weights, the horfe is much fuperior to the ox, as well as in carting, where great fpeed is required in the unloaded ftate, and wherever the roads or lands are rough, fharp, and ftony, as oxen cannot be fhod fo well as horfes to ftand fuch roads. And in harrowing with light harrows, where a jumping irregular motion is neceffary, it has been fhewn in the Annals of Agriculture, that horfes are the moft proper, and to be conftantly preferred. In fhort, that teams of the ox-kind may be made ufe of with benefit in many cafes in bufineffes about the farm, but they are incompatible with all forts of diftant work, and efpecially on the road, and in ftony fituations.

It has been remarked, in a late Calendar of hufbandry, that there are two cafes in which oxen are certainly more beneficial than horfes: firft, when a farmer lives in a diftrict where there is a breed of cattle well adapted to work; and, fecondly, when his farm is fo large, that he can buy in a lot of cattle annually, at a fmall expence *per* head, and feel no inconvenience in turning out fuch beafts from the teams to fatten as do not work well. In both thefe cafes, the writer has little doubt of the fuperiority of oxen to horfes. But in countries that do not poffefs a breed of cattle well adapted for work in the ftate of oxen; and on fmall farms, whence fairs muft be attended at the diftance of a hundred miles to purchafe a few, and confequently at a great expence *per* head, and poffibly without land for fattening any, the benefit will be very queftionable.

It has been fuggefted by the writers of the Agricultural Survey of the Weft Riding of Yorkfhire, that from the circumftances of ox-teams being almoft univerfally given up in thofe places where they were formerly in repute, a fufpicion arifes, that working them is not attended with profit.

In regard to the national advantages to be derived from a change from horfes to oxen, there does not appear to be any great benefit, as it has been fhewn by Mr. Pitt in an excellent paper in the fifth volume of Communications to the Board of Agriculture, that as thofe ufed in agriculture are in a great meafure a nurfery for thofe wanted for other purpofes; the extent of fuch change can take place no farther than about the work of 100,000 horfes.

To afcertain what general effect fuch a change might produce in increafing food for mankind, as what he calls the higher kept farm-horfes are generally, or at leaft a part of them in preparation for fale, for the road, or harnefs; he muft fuppofe the deduction made, from what he has called moderately kept farm-horfes; now fupported at four acres and a half *per* head; then the deduction of

	Acres.
100,000 of thofe would fave the landed produce of - - - - -	450,000
And the deduction of young ftock, in the fame proportion, one-ninth of the whole, would fave one-ninth of 250,000 acres, to preferve even numbers, fuppofe -	30,000
In all faved - - - - - - -	480,000

The idea in all the midland counties is, it is obferved, that two oxen will be required to do the work of each horfe; 200,000 working oxen will therefore be wanted inftead of the horfes thus deducted. To give the oxen a fair chance in this calculation, he will fuppofe them fit to work at three years old, and the workers to be of the ages of three, four, five, and fix refpectively, 50,000 of each; the fame number coming one, two, and three years old, will be wanted for fucceffion ftock; and 50,000 annually fatted off; the land neceffary for their fupport may be nearly as follows:

	Acres.
Keep of 50,000 fteers, of the ages of coming one, two, and three years old refpectively, 150,000 acres in all, at one acre each *per* head *per annum* - - -	150,000
200,000 working oxen, of full three, four, five, and fix years old, 50,000 of each, at two and a half acres *per* head *per annum* - - - - -	500,000
Lefs land cannot, it is believed, be poffibly allowed to keep them in working condition; they muft have hay and fometimes corn when clofely worked, 50,000 fatting, at three acres *per* head - -	150,000
Land neceffary for the oxen - - - -	800,000
Deduct for the horfes - - - -	480,000
Difference - - - - - - - -	320,000

These 320,000 acres of land will produce 50,000 fat oxen, or 32 acres will produce five fat oxen; suppose them 270lbs. *per* quarter each, or 5400lbs. of beef from 32 acres; this is 168¾lbs. of beef *per* acre *per annum*: but a dairy will, it is said, produce more, and a flock of sheep well managed quite as much human food *per* acre. Little advantage, therefore, would, it is said, be derived from this change of substituting oxen for horses in agriculture, unless the use of horses on the road, and for purposes of pleasure, luxury, pomp, amusement, trade, mining, manufactures, commerce, and war, could be abolished or lessened.

Accordingly, Mr. Malthus thinks the advantages of luxury, when it falls short of actual vice, are certainly great: it cannot be denied, but it contributes to the comforts, enjoyments, and consequent happiness of a nation; but if carried too far, it will completely defeat its own purpose; the surest way is to stop short of the mark.

In the clear, full, and excellent account of the state of agriculture in the county of Middlesex, the very able and experienced author has brought together into one point of view a great number and variety of the different objections and reasons, which either operate against or wholly prevent the use of oxen for the purpose of performing team-labour; and which the inquirer, who wishes for more full information on so important a subject, may do well to consult, as they place the question with much clearness and decision greatly in favour, and on the side, of the horse.

In fact, the writer thinks it very clear, that those persons who prefer horses to oxen, for the purpose of labour, display superior knowledge in agriculture. This opinion, he says, is sanctioned by the practice of nine-tenths of the best husbandmen in the nation. In proportion as Britons become enlightened, they lay aside ox-teams; and experience has now so completely established the superiority of horses, as to render their employment almost universal. And under this system, the science and practice of agriculture have improved more rapidly than at any former period of time. "The number of horses used in husbandry are nearly," says the writer, "1,200,000. If half this number were to be superseded by oxen, in the proportion of two oxen to one horse, it would require 1,200,000 such cattle to do the same quantity of labour as is now done by 600,000 horses. The difference of these two numbers would be an increase to that extent of our labouring cattle. The other 600,000, in the place of so many horses, as well as the increased number, feed in the same manner as cows, and on a similar herbage; consequently the whole 1,200,000 would deprive us of the means of supporting so many cows. So unwise a measure would reduce the number of our cows to one-fourth of their present number. The veal, milk, butter, and cheese, would be diminished in that proportion; and in consequence of this scanty produce of the dairy, the price would be so exorbitant, that none but the most wealthy could afford to eat of these things.

"After what has been said, need I add, that every ox used in husbandry at this time deprives the nation of a cow, and of all the comforts which that animal is calculated to bestow. The introduction of oxen, to do one half the labour now done by horses, would deprive the labourers of the greater part of their diet: a dearth would be the inevitable consequence, until the numbers of our people were reduced to equal the scantiness of their food, or until the oxen could be fattened and slaughtered, to make way for the return of the more valuable cow. Hereafter I shall expect the farmers in theory only, who are advocates for ox-teams, to change their notes, and write in favour of a team to be drawn by cows."

Upon the whole, the writer is of opinion, that the very few advantages which oxen possess are not by any means of such consideration, as to compensate for the damage which their being used would do upon some kinds of land; nor are they so proper for the general purposes of a farm as horses, and the general substitution of labouring oxen in lieu of horses would be vastly injurious to the nation.

It is allowed that those who have argued in favour of the superior advantage of oxen may be correct in all their reasonings, so far as they are deduced from their own experience; but that the experience of others may furnish arguments as strong on the other side. Circumstances vary in every district, and render the good or the bad of any practice altogether relative. In the county of Chester, for instance, the farmer has not only to fallow his corn land, and lead manure to his meadows, but he has often to send his team to distances of ten or fifteen miles, to take his corn to market, to fetch lime or coal, and for various other purposes, on hard turnpike roads; and the time in which such services are performed is to him of essential consequence. Would oxen be as well able to accomplish such journies as horses? Are oxen used in any county where circumstances are precisely similar? Do not oxen require more rest than horses? Will they stand hard work as well? Are they as ready for every different kind of work on a farm as horses? Unless these questions can be answered in the affirmative, we have to place in opposition to the saving of expence in keeping them, convenience and time, which are as valuable as corn and money. It is also further argued, that the diminution in the use of corn, from employing oxen, is an object of great national importance; all that the horse consumes being so much loss as the food of man; and the loss of animal food, occasioned by the preference given to horses, is likewise urged. But if, in the same portion of time, horses will do more work than oxen, the earth will be enabled to yield a greater produce, and the additional portion of food gained may more than counterbalance what is lost. The consumption of food, however, is not an argument which should be brought forward against the farmer, who, by every proper artificial means, should be induced to raise the greatest quantity possible from his ground. On what principle is it that the legislature, by bounties, endeavour to encourage exportation, when the prices of corn sink below a certain sum? Is it not that more may be produced, in the ordinary course of seasons, than the nation can consume, in order to secure a sufficiency when the harvests are below their average? The more horses are kept, the greater the consumption of corn, and the greater the demand; and is it not better to have it increased by such means, than by exportation? The horses, in the year of scarcity, may be fed entirely on hay or grass; and, at all times, their existence is so much real national wealth. May it not be doubted too, whether, if farmers could dispense with the use of horses, a sufficient number would, as hinted at above, be reared for the mere purposes of pleasure or luxury, to answer the demand of government, in cases of emergency? Numbers of them, of all descriptions, whether for the increase of cavalry, or the draught of artillery, are surely desirable in every country that must trust its defence exclusively to its own exertions. Even now the breeding of them is attended with so much hazard, that very many are fearful of encountering the risk: what then would be the consequence, if the demand was considerably lessened?

In respect to the feeding of teams, whether of horses or oxen, it is a point that requires much thought, care, and attention; as where a want of economy prevails, it may lessen the profits of the farmer in a very high degree,

gree, as is obvious from the vaſt conſumption of expenſive food that muſt take place. The yearly expence of keeping a labouring horſe and an ox, previous to the late riſe in the different articles that are made uſe of as food, has been ſtated, in the ſixteenth volume of the Annals of Agriculture, to be in the general amount as follows: *viz.* that of a working horſe, 17*l.* 10*s.* 6*d.*; and that of a working ox, 13*l.* 1*s.* 10*d.*: ſo that the difference of expence in favour of the ox is 4*l.* 8*s.* 8*d.*

The difference in the expences of food, ſince the above period, may have probably demanded the addition of rather more than one-third to theſe accounts; though they are at preſent much lowered.

The training or breaking in the oxen for team-labour is commonly performed by firſt confining them by means of a halter or rope, while the yoke or harneſs is put on, and then placing them between a pair of old ſteady oxen both before and behind, ſo that they can neither puſh forward nor backward in an improper manner; and another, perhaps better, way is to yoke them ſingly with an old team-ox, which is not a free worker, as they are leſs liable to be hurt in hot weather in this way. They may alſo be firſt broken in, by being employed in other ſorts of labour before they are put to the plough.

Oxen are more apt to tread, poach, and injure the land, eſpecially where it is of a heavy, clayey, moiſt nature, when worked in yokes, than when in harneſs; yet ſome diſtricts prefer the ſyſtem of yokes and bows, either ſingle or double, to the harneſs method, which is a later practice. And there is a wide difference of opinion among practical farmers about the ſuperiority of the one or the other method. Some very ſenſible men, who have tried both ways, contend that three in harneſs are equal to as much work as four in the other mode, and that they are more quick in their motions, and work with more eaſe: while others, equally well experienced, are decidedly of opinion that the old eſtabliſhed method is ſuperior to the new, and that any number in yokes are equal to the ſame number in collars. The queſtion is, of courſe, not yet well decided: however, it is agreed, that it is unfavourable to work them too hard in any method.

The neceſſary proportion of horſes to the extent of the farm, is alſo a circumſtance that is of much intereſt to the farmer; but which muſt of neceſſity vary greatly, according to the nature, ſituation, and ſtate of the land, as well as the mode of huſbandry under which it is conducted.

In deciding the neceſſary proportion of team, the farmer muſt likewiſe well conſider the extent which the ſward or graſs-land bears to that which is in the ſtate of tillage; as where the proportion of the former is conſiderable, there will be much leſs team-work to be executed, of courſe a much leſs ſtrength may be ſufficient. Where the farm is under the hay ſyſtem, as there is ſeldom much team-work, except in conveying the produce and carting manure, a ſmaller extent of team is moſtly ſufficient, in proportion to the quantity of land, than in other caſes. And in the dairy management, the ſame is the caſe; but as in this caſe it becomes neceſſary to raiſe green crops as cattle food, a ſomewhat ſtronger team may be required than in the former caſe.

In perfectly tillage farms, whether conducted under the naked fallow ſyſtem, or the more improved management under the convertible huſbandry, a much greater force of team will be required, in proportion to the extent of land that is to be cultivated. Some reduction of team-labour may, however, be effected in both caſes, by having recourſe to green ſmothering crops in the place of the fallowings, which ſhould always be done as much as poſſible.

There can be no doubt but that there are ſome other ſorts of animals, beſides thoſe of the horſe and ox kind, that may be occaſionally employed in team-labour. The mule is an animal well calculated for this purpoſe, from its being more hardy, and enduring work a greater length of time, or to a more advanced age, than the horſe. In ſome caſes, the ſmaller ſorts of mules have been recommended, as more hardy and uſeful; but in Worceſterſhire, large mules have been found more beneficial for team purpoſes.

The aſs may likewiſe be employed for team-labour with advantage, in ſmall concerns, from its hardy nature, and being capable of living on more ſcanty fare than the horſe; and it is very uſeful for numerous purpoſes about the farm-houſe.

Whatever ſort of teams may be made uſe of upon farms, they ſhould always be well attended to, and no neglect of any kind ſuffered in regard to them; and when attacked by diſeaſe, recourſe be had as quickly as poſſible to proper remedies.

TEAN, in *Geography*, a river of England, which runs into the Dove, 2 miles N.E. of Uttoxeter.

TEANO, a town of Naples, in Lavora; 14 miles N.W. of Capua.

TEANUM, Tiano, in *Ancient Geography*, a town of Italy, in Campania, towards the ſouth-eaſt. It was a Roman colony, and a conſiderable town.—Alſo, a town Italy, ſurnamed Apulum by Strabo, and Apulen Pliny.

TEAP, in *Rural Economy*, provincially a tup c . See Ram.

TEARNE, in *Geography*, a river of England, w runs into the Severn, near Shrewſbury.

TEARPOUR, a town of Hindooſtan, in the circar of Sumbul; 13 miles N.N.E. of Sumbul.

TEARS, in *Phyſiology*, the peculiar limpid fluid ſecreted by the lacrymal gland. This fluid is deſtined to preſerve the tranſparency of the cornea, by keeping it moiſt, and removing from it foreign ſubſtances. In man a preternatural flow of tears is excited by different paſſions of the mind, eſpecially grief; but it is doubtful if this takes place in any inferior animal. See Eye, Man, and Passion.

The fluid of tears has been examined *chemically* by Fourcroy and Vauquelin, but their account of its properties is not ſo complete as could be wiſhed. It is colourleſs and tranſparent, without any ſmell, but of a perceptibly ſaline taſte. Its ſpecific gravity is ſomewhat greater than that of water. It tinges vegetable blues green. It unites with water, both cold and hot, in every proportion. The mineral acids produce no change upon it. When evaporated to dryneſs, a number of cubic cryſtals of muriate of ſoda are obtained; and there are alſo diſtinct traces of a free alkali, which is ſoda. One hundred parts, when evaporated, leave only four of ſolid matter, of which about one is ſaline matter, and the reſt a peculiar animal ſubſtance, which theſe chemiſts conſidered as a ſpecies of *mucus*, and which is ſeparated likewiſe from tears in their fluid ſtate, in the form of flakes, when alcohol is poured upon them. This peculiar animal matter, on expoſure to the air, is ſtated to poſſeſs the property of gradually abſorbing oxygen, which renders it thick and viſcid, and of a yellow colour. In this ſtate it is inſoluble in water, and remains long ſuſpended in it without alteration. Hence, ſays Berzelius, if theſe obſervations are to be depended upon, this ſubſtance bears a conſiderable affinity to the mucus of the noſe, which probably, like that

 of

of tears, is fecreted in a fluid ftate, and afterwards converted, by the action of the air during refpiration, into the ftate we ufually fee it. The folid matter of tears obtained by evaporation, when burnt, leaves fome traces of the phofphates of lime and foda. Journ. de Phyfique, t. xxxix. p. 256.

TEASARRAH, in *Geography*, a town of Bengal; 72 miles W. of Midnapour.

TEASEL, or Teazel, in *Botany*. See Dipsacus.

Befide the common wild fpecies of this plant, there is a large kind of it, the heads of which are of fingular ufe in raifing the nap upon woollen cloth, for which it is propagated in great quantities in many parts of the weft of England.

The foils moft adapted to the growth of this plant are thofe of the more ftrong and deep kinds, but which are not too rich; as loamy clays, and fuch as have ftrong marly bottoms, and are fit for the growth of wheat crops.

The moft favourable fituations are thofe that are rather elevated, open, and incline a little to the fouth; and the higher grounds, particularly where the country is inclofed, are the moft advantageous.

For the preparation of the ground, where it is a lea, it fhould be ploughed up deeply in the early part of the year, as in the beginning of February; and where it is inclined to moifture, it fhould be executed in narrow ridges of not more than three bouts each, the furrow flices being laid over in as even and regular a manner as poffible, the fine mould from the furrows being raifed by the plough or fpade fo as to cover the furface. But in lands that are fufficiently dry, and which are broken up from ftubble, the ploughing may be deferred to a later period, and be laid in ridges of much greater breadths, and in a more flat form.

Mr. Billingfley, in his Agricultural Report of Somerfetfhire, has remarked, that in the providing feed, it fhould conftantly be taken from fuch plants as are the moft perfect of their kind, and the moft productive in heads; as there is much difference in the quantity that is afforded by different plants, fome producing nearly a hundred, while others do not afford more than three or four. It fhould be fuffered to remain till it becomes perfectly ripened, and be ufed while frefh.

With refpect to the proportion of feed, that which is moftly employed on the acre is from about one to two packs, according to the above writer; but fome make ufe of a larger quantity, as two pecks, or more.

It may be noticed, in regard to the feafon of putting in crops of this fort, that it is commonly about the middle of March or beginning of April. The common method of putting this fort of crop into the ground is the broad-caft, it being fown evenly over the furface, in the manner that is practifed for turnips, fown in this way. But before this is done, the land fhould be well harrowed down, in order to afford a fine ftate of mould as a bed for the feed. It is then to be covered in by a flight harrowing with a light fhort-tined harrow, fuch as is ufed for grafs-feeds. Some, however, prefer a light bufh-harrow for this purpofe.

However, this fort of crop may be fown in rows in the drill method, at the diftance of eight, twelve, or more inches from each other, in the fame way as that of the drilled turnip. But this method is not, we believe, yet much employed by thofe who are in the practice of raifing crops of this nature.

In the after-culture of crops of this kind, much depends on the land between the plants being kept perfectly clean and free from weeds; in having them fet out to proper and fufficient diftances, as about twelve inches; and in having them well earthed up. Some cultivators perform frequent diggings, that the ground may be rendered cleaner and more mellow, confequently the growth of the plants be the more effectually promoted. This bufinefs has ufually the name of fpaddling, or fpittling, and is executed with great difpatch by labourers that are accuftomed to perform it. When thefe diggings have been finifhed, nothing further is neceffary till the period of cutting, which is generally about the end of the month of July in the fecond year, which is known by fome of the uppermoft heads beginning to blow; as when the bloffoms fall, they are ripe, and in a ftate to be cut and fecured.

This cutting is moftly executed at three different times, at the diftances of about ten days or a fortnight from each other. It is performed by means of a knife, contrived for the purpofe, with a fhort blade, and a ftring attached to the haft. This laft is done, in order that it may be hung over the hand or wrift, when the leaves are to be ftripped from the ftem parts. A pair of ftrong gloves is likewife neceffary. Thus prepared, the labourer cuts off the ripe heads along the rows or lines, or otherwife, with about nine inches of ftem, and ties them up in handfuls with the ftem of one that is more perfectly ripened, or otherwife. And on the evening of the day on which they are cut, they fhould be put into a dry fhed; and when the weather is fine, and the air clear, they fhould be taken out and expofed to the fun daily, till they become perfectly dry. As foon as they are completely dried, they fhould be laid up in a dry room, in a clofe manner, till they become tough and of a bright colour, and ready for ufe. They fhould then be forted or feparated into three different kinds, by opening each of the fmall bundles. Thefe are diftinguifhed into *kings*, *middlings*, and *fcrubs*, according to their different qualities. They are afterwards, the author of the above report fays, made into packs, which, of the firft fort, contain nine thoufand heads; but when of the fecond, twenty thoufand; the third is a fort of very inferior value. By fome, before forming them into packs, they are done up into what are termed ftaves, by means of fplit fticks, when they are ready for fale.

The produce in crops of this nature muft be very uncertain, there being fometimes fifteen, or fixteen, or more packs on the acre; and at other times fcarcely any. The produce is difpofed of to the cloth manufacturers in Somerfetfhire, Wiltfhire, and Yorkfhire.

It has been ftated, that formerly an acre of land, if well grown, and what is deemed a full crop, often produced nine packs of *kings*, nineteen of *middlings*, and two of *fcrubs*.

In the county of Effex, they have a fingular practice of cultivating and growing teafel crops with feeds, fuch as coriander and carraway, producing thereby a fort of treble crop. It is ftated, that the feeds of thefe feveral plants are fown together, very early in the fpring, upon a ftrong old lay, once ploughed; and generally yield very confiderable returns.

It is noticed, that the head of the teafel is of a conical form, two or three inches in length, and one or one and a half in diameter at the bottom, or largeft end; armed on every part with fmall ftrong points, turned a little downwards; and are bought by the woollen manufacturers, who fix them upon frames, calculated to cover a cylinder, which is made to turn round, and flightly catch their fays, bays, and other fuch articles, which another part of the weaver's machine draws againft them; by which means the knap is raifed to almoft any length the manufacturer wifhes.

The largeft burs, and thofe moft pointed, are efteemed the

the beſt, and are now called *male* teaſels; they are moſtly uſed in the dreſſing and preparing of ſtockings and coverlets; the ſmaller kind, properly called the *fullers'* or *drapers'* teaſels, and ſometimes the *female* teaſel, are uſed in the preparation of the finer ſtuffs, as cloths, rateens, &c. The ſmaller kind ſometimes, called *linnots heads*, are uſed to draw out the knap from the coarſer ſtuffs, as bays, &c.

The leaves of the common wild teaſel dried, and given in powder or infuſion, have been commended by ſome as a powerful remedy againſt flatuſes or crudities in the ſtomach.

TEATE, Chieti, in *Ancient Geography*, a town of Italy, in Samnium, ſeated on a mountain, at a ſmall diſtance from the Adriatic gulf. It was the capital of the people called Marrucini. Ptol. In the Itinerary of Antonine, this town is marked on the route from Rome to Hadria, by the Valerian way.

TEATHE, in *Agriculture*, a term applied to the dung of cattle in feeding off green crops; or which, in a more particular ſenſe, ſignifies the ſoil or improvement left upon the paſture lands in feeding them with live-ſtock, or the fertilizing effects which are produced on them, in conſequence of ſuch cattle or other live-ſtock being foddered upon them with any ſort of food, whether ſuch improvements be cauſed by their dung, urine, treading, breath, perſpiration, warmth of their bodies, or other ſimilar cauſes. It is a term much made uſe of in the huſbandry of Norfolk.

TEATHING, the practice of eating turnips, or other ſuch matters, off, upon young wheat crops, or in other ways, in the early ſpring months, by live-ſtock, as ſheep and bullocks. It is often written *tathing* by farmers.

It is a ſingular huſbandry, which the writer of the Norfolk Agricultural Report met with on entering the diſtrict of Fleg, in coming from Yarmouth. It conſiſts in carting turnips on to wheat in February and March; they call it *pull and throw* on wheat, eating them on that crop by ſheep and bullocks, if ſheep are kept; if not, by bullocks alone.

The outfield graſs-land in ſome of the ſheep diſtricts in the northern parts of the iſland, which are incloſed in a temporary manner, and intended to be broken up for tillage, are ſometimes teathed, by confining black cattle and ſheep upon them in ſomething of the fold manner.

TEATINOS, in *Geography*, a ſmall iſland in the Pacific ocean, between the iſland of Chiloe and the coaſt of Chili. S. lat. 43° 35′.

TEATS, Sore, in *Neat Cattle*, an affection in thoſe of the cow-kind, to which ſome are much more ſubject than others; eſpecially ſuch as have newly or lately calved. When the teats of theſe animals are affected during the ſummer months, they often become ulcerated, and by the teazing of the flies, the cattle are rendered difficult to be milked: they alſo become a very great nuiſance at the periods of milking, as the diſcharges from them are apt, without much attention, to paſs between the fingers of the operator into the milk-pail, and ſpoil the milk.

The affection is cauſed by inflammation, irritation, and too much diſtention of the parts by the milk.

In order to the removal of it, the milk ſhould be firſt frequently drawn, and the parts well waſhed with ſoft ſoap and warm water; after which, a ſubſtance compoſed of elder ointment and wax melted together, to which is then added a little alum and ſugar of lead, in fine powder, may be uſed to the parts after milking at night and in the morning; or a weak ſolution of white vitriol and a little ſugar of lead, in ſoft water, may be made uſe of in the ſame way, in ſome caſes, with more advantage. The addition of a little aſſafœtida, and ſuch like ſubſtances, in powder, is, it is ſaid, beneficial in the ſummer ſeaſon in driving away the flies.

Great care is to be taken to keep the teats as clean as poſſible during the time of cure.

TEBALA, in *Geography*, a town of Arabia, in the province of Hedsjas; 128 miles S.S.E. of Mecca.

TEBALDEO, Antonio, in *Biography*, an Italian poet, was born at Ferrara in 1463. Although brought up to the medical profeſſion, he chiefly devoted himſelf to poetry, and it was his cuſtom to accompany his verſes with his lute. Of theſe, which were much admired, a collection was publiſhed by his couſin Jacopo, in 1499, and often reprinted. In Latin verſe he ſucceeded better than in thoſe of his native language; and it is ſaid, that pope Leo X. gave him 500 gold ducats for a ſingle epigram. After the death of Leo, whoſe favour he enjoyed, he was reduced to the neceſſity of begging 30 florins of cardinal Bembo. He died at Rome in the year 1537. Specimens of his compoſitions in both languages are given in Mr. Roſcoe's Life of Leo X. Gen. Biog.

TEBECRIT, in *Geography*, a town of Algiers, near the Mediterranean; 2 miles from Ned Roma.

TEBELBELT, a town of Africa, in the country of Tafilet; 100 miles S. of Sugulmeſſa.

TEBENDA, in *Ancient Geography*, a town of Aſia, in the interior of Pontus Galaticus. Ptolemy.

TEBESTA, in *Geography*, a town of Africa, in the kingdom of Tunis, on the borders of Algiers, where are found ſeveral beautiful ruins. It was anciently very ſtrong; but, in the year 1057, was laid waſte by Muley Mahomet. Tebeſta is well ſupplied with water, and the environs abound in almonds and nuts; 130 miles S.S.W. of Tunis.

TEBET, or Thevet, the fourth month of the civil year of the Hebrews, and the tenth of their eccleſiaſtical year. It anſwered to part of our December and January, and has but twenty-nine days. The ſecond day of this month is the laſt of the octave of the dedication of the temple, after it was purified by Judas Maccabæus. See 1 Macc. iv. 59. John, x. 22.

The tenth day of this month is obſerved by the Jews as a faſt, in memory of the ſiege of Jeruſalem by Nebuchadnezzar, in the ninth year of Zedekiah.

TEBIQUARI, in *Geography*, a river of South America, which riſes in S. lat. 27°, and joins the Iquay, to form the Rio Grande, in S. lat. 30° 55′.—Alſo, a river of South America, which runs into the Paraguay, 8 miles below Aſſumption.

TEBOOA. See Hood's *Iſland*.

TEBSEN, a town of Egypt, on the Nile; 16 miles N. of Cairo.

TEBUÇ. See Tahuk.

TEBUHASAN, a town of Africa; 15 miles S.E. of Sugulmeſſa.

TECALA, a town of European Turkey, in Theſſaly; 30 miles W. of Lariſſa.

TECALETH, a town of Morocco; 121 miles W.N.W. of Morocco.

TECALIA, in *Ancient Geography*, a town in the northern part of Germany. Ptolemy.

TECEUT, or Techeit, in *Geography*, a town of Africa, in the country of Sus, ſituated in a fertile ſoil, abounding with grain, dates, figs, grapes, and ſugar-canes. Here is a manufacture of Morocco leather; 150 miles S.W. of Morocco.

TECH, a river of France, which riſes in the Pyrenées, and runs into the Mediterranean, near Elne.

TECHE, a river of Louiſiana, which connects with the Vermillion; and theſe are the principal rivers of the Attakapas. Their general courſes are nearly the ſame to the lake

lake Taffe; their channels are deep, and they are connected by ftreams from the lake Taffe. The Teche is much larger and longer than the other, being upwards of 200 miles in length. The Taffe is a beautiful lake of clear water, about 10 miles in circumference. The principal fettlements of the Attakapas are on each fide of the Teche, moftly weftern, and on the Vermillion. Befides the culture of cotton, maize, &c. they have the advantage of extenfive natural meadows to fupport their herds, which, on account of the natural mildnefs of the climate, are kept without much trouble. The inhabitants of the Attakapas are generally wealthy, and live as luxuriantly as the planters of the Miffifippi. Upon the whole, this part of Louifiana feems deftined to become one of its richeft diftricts.

TECHIA, a town of the Arabian Irac; 160 miles N. of Bagdad.

TECHNICAL, Technicus, formed of τεχνικος, *artificial*, of τεχνη, *art*, fomething that relates to art.

In this fenfe we fay, *technical words*, *technical verfes*, &c. And in this fenfe Dr. Harris entitles his dictionary of arts and fciences, Lexicon Technicum.

Technical is more particularly applied to a kind of verfes, in which are contained the rules or precepts of any art, thus digefted to help the memory to retain them. See *Artificial* Memory.

Technical verfes are ufed in chronology, &c. Such, *e. gr.* are thofe expreffing the order and meafure of the calends, nones, &c. thofe expreffing the feafons, and thofe expreffing the order, &c. of the figns.

F. Labbé has compofed a fet of technical Latin verfes, including all the epochas in chronology; and F. Buffier, after his example, has put both chronology and hiftory into French verfe, and even geography alfo.

Technical verfes are commonly compofed in Latin; they are generally wretched ones, and often barbarous; but utility is all that is aimed at in them: to give fome idea of which we will here add a few inftances. The cafuifts include all the circumftances which make us partakers with another in a theft, or other crime, in thefe two technical verfes.

"Juffio, confilium, confenfus, palpo, recurfus,
Participans, mutus, non obftans, non manifeftans."

The firft of F. Buffier's technical verfes of the hiftory of France, are thefe:

"Ses lois en quatre cents Pharamond introduit,
Clodion Chevelu, qu' Aetius vanquit.
Merovée; avec lui combatit Attila;
Childeric fut chaffé, mais on le repella."

Technical *Words*, are what we otherwife call *terms of art*.

TECHUKS, in *Geography*, the moft remote people of Afiatic Ruffia, who fcarcely exceed 1000 families, are generally found in fmall camps, pitched by the fides of rivers. Their rude tents are fquare, confifting of four poles, fupporting fkins of rein-deer, which alfo form the covering: before every tent are fpears, and arrows, fixed in the fnow againft any fudden attacks of the Koriaks, who, though of the fame face, are a more malicious and enterprifing people. In the midft is a ftove, and the bed confifts of fmall branches of trees fpread on the fnow, and covered with deer-fkins. Their habitations and food are dirty and difgufting; and the drefs of the women confifts only of a fingle deer-fkin faftened on the neck, fo that on loofening one knot the body remains naked. The features are coarfe, but they have not the flat nofes, nor little hollow eyes of the Kamtchadales; and Leffeps pronounces their countenances to have nothing of the Afiatic form, in which affertion he had been preceded by Pallas and Tooke. The Koriaks are fuppofed not to exceed 2000 families.

TECKLENBURG, a town of Weftphalia, and capital of a county to which it gives name; 7 miles S.W. of Ofnabruck. N. lat. 52° 15'. E. long. 7° 35'.—Alfo, a county and principality, bounded on the north and eaft by the bifhopric of Ofnabruck, and on the fouth and weft by the bifhopric of Munfter; about 20 miles in length, and 10 in breadth. This county was formerly more extenfive, including the county of Lingen, and part of the bifhopric of Munfter. The foil is fertile, and yields good corn, and paftures for cattle: the river abounds in fifh, and in feveral places are quarries of ftone: the chief manufactures are linen cloth. It is now annexed to Weftphalia.

TECLITIUM, or Teglitium, in *Ancient Geography*, a town of Lower Mœfia, upon the route from Vininatium to Nicomedia, along the Danube. Anton. Itin.

TECOANTAPEQUE, in *Geography*, a fea-port town of Mexico, in the province of Guaxaca, fituated at the foot of a volcanic mountain, near the Pacific ocean; 160 miles S.E. of Acapulco. N. lat. 16° 2'. W. long. 99° 10'.

TECOLATA, or Tetolata, in *Ancient Geography*, a town of Gallia Narbonnenfis, upon the Valerian way, between Ad Turrem and Aquæ Sextiæ. Anton. Itin.

TECOLITHOS, in *Natural Hiftory*, the name of a gem, otherwife called *Syriacus lapis*, and *Judaicus lapis*, good for diffolving the human calculus. See Syriacus and Judaicus.

It has this name from τηκω, *I diffolve*, and λιθος, *a ftone*; becaufe it diffolves ftones.

TECOMA, in *Botany*, fo called by Juffieu, from the Mexican appellation *Tecomaxochitl*, under which one of the fpecies appears in Hernandez.—Juff. 139. Brown Prodr. Nov. Holl. v. 1. 471. (Tecomaxochitl alia; Hernand. Mex. 409.)—Clafs and order, *Didynamia Angiofpermia*. Nat. Ord. *Perfonatæ*, Linn. *Bignoniæ*, Juff. *Bignoniaceæ*, Brown.

This genus is feparated from *Bignonia* by Juffieu, folely becaufe the partition of the capfule or pod is contrary, not parallel, to the valves; and he enumerates as fpecies the *B. ftans*, *radicans*, and *pentaphylla* of Linnæus, befides the above plant of Hernandez from Mexico. Mr. Brown adds to thefe the *B. pandorana*, Andr. Repof. t. 86; which is *B. Pandoræ*, Curt. Mag. t. 865; *B. pandorea*, Venten. Malmaif. t. 43; though the laft-mentioned author fays he found the partition of the capfule parallel to the valves, and therefore this fpecies is a *Bignonia* according to Juffieu. So indeed it remains in Mr. Aiton's Hort. Kew. v. 4. 34, with the fpecific name of *auftralis*, by the fubftitution of which Mr. Brown has happily got rid of the above *pandorean* confufion; and there we fhall readily leave it, only remarking that it is, according to Mr. Brown, a native of Port Jackfon, and of the tropical part of New Holland, not of Norfolk ifland. The *ftem* is twining. *Leaves* pinnate, with an odd leaflet, fmooth. *Flowers* panicled, white, with a purple throat. For the other fpecies above named, fee Bignonia, n. 11, 14 and 15. We doubt whether the tribe in queftion is fufficiently well known at prefent for botanifts to undertake its generic reformation. Nor can we permit the above name of our diftinguifhed friend Juffieu to pafs without animadverfion, as nothing can be more contrary to found principles of nomenclature, nor to his own declaration againft barbarous names in his preface. The prefent is peculiarly ill applied, as the original *Tecomaxochitl* of Hernandez appears to be *Solandra grandiflora*, or very like it, having fimple leaves.

TECONA,

TECONA, in *Geography*, a town of Hindooſtan, in Dowlatabad; 21 miles W. of Poonah.

TECONIC FALLS, a cataract in the river Kennebeck, about 65 miles from its mouth.

TECORIPA, a town of New Mexico, in the province of Sonora; 70 miles E. of Pitquin.

TECRIT, a town of Aſiatic Turkey, in the government of Moſul, ſituated on a rock near the weſt ſide of the Tigris, on the borders of the Arabian Irak. Tecrit is thought to be the Birtha or Vitra of the ancients, deſcribed as a very ſtrong fortreſs, and ſaid to have been conſtructed by Alexander the Great. It was choſen in the ſeventh century for the abode of a Jacobite primate, and increaſed to a conſiderable town. In 1393, it was taken by Timur Bec, who put all the ſoldiers that defended it to death. The ruins are extenſive, and the number of houſes amount to about five or ſix hundred, with a caravanſera and two coffee-houſes; 120 miles S. of Moſul. N. lat. 34° 37′. E. long. 42° 37′.

TECTONA, in *Botany*, a name altered by Linnæus from the Eaſt Indian name of this valuable timber-tree, *Tek*, *Tekka*, *Theka*, or *Teak*, and made claſſical, according to a method which he ſometimes uſed, from τεκτων, *a carpenter*, or τεκτονια, *a piece-work in timber, or iron*, both derived from τευχω, *to build*; alluding to the uſe of the wood in building houſes as well as ſhips.—Linn. Suppl. 20. Schreb. 141. Willd. Sp. Pl. v. 1. 1088. Mart. Mill. Dict. v. 4. Thunb. Nov. Gen. diſſ. 4. 71. Ait. Hort. Kew. v. 2. 11. Gærtn. t. 57. (Theka; Juſſ. 108. Lamarck Illuſtr. t. 136.)—Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Perſonatæ*, Linn. *Vitices*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-ſhaped, its margin in five, occaſionally ſix, ovate blunt ſegments, permanent. *Cor.* of one petal, funnel-ſhaped; tube ſhorter than the calyx; limb in five, occaſionally ſix, deep, obovate, crenate ſegments, incurved at the point, twice as long as the tube. Nectary a glandular ring, at the baſe of the germen. *Stam.* Filaments as many as the ſegments of the corolla, inſerted, alternately therewith, into the tube, decurrent, thread-ſhaped, erect, rather longer than the limb; anthers heart-ſhaped; two-lobed, erect. *Piſt.* Germen ſuperior, nearly globular, downy; ſtyle thread-ſhaped, downy, ſlightly curved, the length of the corolla; ſtigmas two, revolute, obtuſe. *Peric.* Drupa nearly globoſe, depreſſed, dry, ſpongy, hairy, concealed in the enlarged, inflated, membranous calyx. *Seed.* Nut bony, the ſhape of the drupa, with a terminal knob, of four cells, with ſolitary kernels.

Eſſ. Ch. Corolla five-cleft. Stigma divided. Drupa dry, ſpongy, within the inflated calyx. Nut of four cells.

Obſ. The terminal flowers are often ſix-cleft.

1. T. *grandis*. Teak-wood, or Indian Oak. Linn. Suppl. 151. Willd. n. 1. Ait. n. 1. Roxb. Coromand. v. 1. 10. t. 6. (Theka; Rheede Hort. Malab. v. 4. 57. t. 27. Jatus; Rumph. Amboin. v. 3. 34. t. 18.)—Native of the mountainous parts of the Malabar and Coromandel coaſts, as well as of Java, Ceylon, and other countries of the Eaſt Indies, flowering during the hot ſeaſon; but not till the tree is arrived at a conſiderable age and magnitude, ſo that there is little chance of ſeeing it bloſſom in our ſtoves, where young plants are ſometimes introduced. The *trunk* in its native country grows erect, to a vaſt height, with copious ſpreading oppoſite *branches*, croſſing each other, quadrangular when young. *Leaves* ſpreading, oppoſite, ſtalked, elliptic-oblong, acute, entire, ſlightly waved, with one rib and many tranſverſe veins, whoſe ſubdiviſions are finely reticulated; their upper ſide rough like a file; lower finely downy: their length is generally about a ſpan, but the leaves on young branches ſometimes meaſure eighteen inches or two feet, and are nearly half as much in breadth. *Panicles* terminal, hoary, very large and ſpreading, repeatedly ſubdivided in an oppoſite manner, with lanceolate *bracteas*. *Flowers* very numerous, comparatively ſmall, being ſcarcely half an inch long; externally hoary; internally yellow, dotted with red. *Anthers* yellow. *Fruit* the ſize of a ſmall cherry, rough, brown, in a large membranous, brown, bladdery *calyx*, reſembling the *Phyſalis Alkegengi* in general ſhape, but hardly ſo large.

The wood of this tree is, as Dr. Roxburgh remarks, by far the moſt uſeful timber in Aſia; it is light, eaſily worked, and though porous, both ſtrong and durable. For ſhip-building it is peculiarly excellent for its lightneſs, and its durability either in or out of the water. Pegu affords the largeſt quantity of this timber, which is eaſily brought down the rivers of that country, and ſold cheap. The ſame author mentions that the banks of the Godavery, in Hindooſtan, afford a teak which is beautifully veined, much cloſer in the grain, and heavier, than uſual. This ſort is peculiarly fitted for furniture, and gun-carriages.—Teak-wood, according to Thunberg, fetches a conſiderable price at the Cape of Good Hope, on account of its great utility, in a country where large timber-trees are rare.

TECTOSAGES, or *Volcæ Tectoſages*, in *Ancient Geography*, a people included amongſt thoſe who inhabited the ſouthern part of Gaul, belonging more particularly to Languedoc.

TECTRICES, in *Ornithology*, are the leſſer coverts of the wings of birds, or the feathers which lie on the bones of the wings.

TECUCZI, or TECUTSCH, in *Geography*, a town of European Turkey, in Moldavia, on the Birlat; 70 miles W.N.W. of Galatz.

TECULET, a town of Africa, in the empire of Morocco, ſituated near the coaſt of the Atlantic, on the edge of a mountain. In the year 1514, this town was ſacked by the Portugueſe, and a great number of inhabitants carried away for ſlaves. It has been ſince re-peopled; 15 miles E. of Mogodor.

TECUM DUCES. See DUCES.

TED, in *Agriculture*, a term made uſe of to ſignify the ſpreading abroad new-mown graſs, which is the firſt thing done in order to its being dried, and made into hay. Much in the proceſs of hay-making depends upon good and complete tedding of the graſſy hay in the beginning of the work.

TEDANIUM, TEDONIUS, or *Tidanus*, in *Ancient Geography*, a river of Illyria, which ſerved as a boundary between this province and Japygia. Pliny.

TEDBURY, in *Geography*. See TETBURY.

TEDDER, TEDDOR, or *Tether*, in *Agriculture*, a rope or chain by which an animal is tied, and confined in the fields, that it may not paſture on too wide a range. This is very ſeldom a good practice, or one that ſhould be much followed.

TEDELER, or TEDLIS, in *Geography*. See DELLYS.

TEDESCHI, or TUDESCHI, NICCOLO, in *Biography*, an eminent canoniſt, ſometimes called "the abbot," and ſometimes "Panormitanus," from the city of Palermo, the city in which, as ſome ſay, he was born, in 1386, though others make Catania his native place. At the age of fourteen he took the habit of St. Benedict in Catania, and afterwards purſued his ſtudies at Bologna. We ſhall not follow him through all the ſtages of his advancement from one degree of reputation, and from one ſtation of honour and truſt to another; but obferve, that he accepted a cardinal's hat from pope Felix V., favoured by Alphonfo, king of Sicily, and openly embraced his party during the contefts about the papal throne. In 1442 he was pope's legate to Frederic, king of the Romans; but when Alphonfo took part with pope Eugenius, Tedefchi retired to his church at Palermo, of which he was archbifhop. He would not diveft himfelf of the purple, though received from an anti-pope, but died poffeffed of it in 1445. Of the erudition of this ecclefiaftic, however fluctuating and temporifing he was in his politics, we have ample evidence in his works, an edition of which was publifhed at Venice, in 9 vols. fol., in 1617.

TEDESCHINI, Christiani, a buffo tenor finger in the comic opera, who came hither from Berlin at the fame time as the Paganini, 1760. He appeared firft in an under character in "Il Mondo nella Luna," compofed by Galuppi. Nor was his figure (which was *gobbo*) or voice fit for a more important part. He was, we believe, by birth a German, whence he had his name; but he had been in Italy, and his language on the ftage, and manner of finging, were perfectly Italian.

He fung on our opera ftage but one year, and afterwards devoted his time totally to fcholars, and became a very fafhionable and ufeful finging-mafter. Among his numerous pupils he made many good fingers, the Mifs Fitzpatricks, Mifs Sloper, &c. &c.; and was of ufe to many of our ftage-fingers. After accumulating a confiderable fum of money by diligence and hard labour, he returned to the continent to end his days.

TE DEUM, a kind of hymn, or fong of thankfgiving, ufed in the church, beginning with the words *Te Deum laudamus, We praife thee, O God.*—It is ufually fuppofed to be the compofition of St. Auguftine and St. Ambrofe.

It is cuftomarily fung in the Romifh church with extraordinary pomp and folemnity upon the gaining of a battle, or other happy event: and fometimes even to conceal a defeat.

This hymn was likewife fung in Proteftant churches on days of thankfgiving for a victory, peace, or other national event. Purcell compofed his Te Deum for the opening of the cathedral of St. Paul's, but did not live till that ftructure was finifhed.

In Boyer's Annals of Queen Anne, vol. iv., 1704, it is faid that the hymn Te Deum, with other anthems, were admirably performed at St. Paul's, when her majefty went thither in great ftate on the day of thankfgiving for the victory at Blenheim. We are not informed by whom the mufic was compofed; it is only faid that it was performed with great folemnity by the three choirs of her majefty's chapel, Weftminfter Abbey, and St. Paul's. There was no inftrumental band on this occafion, or any other accompaniment to the voices than the organ, which feems to have been the cafe in all former times, when any of our fovereigns went in ftate to St. Paul's.

But in 1706 we are told in the fame Annals, vol. v. p. 333, that at a public thankfgiving for the battle of Ramillies, her majefty went in great ceremony to St. Paul's, accompanied by both houfes of parliament, and all the great officers of ftate; when Te Deum was performed "with vocal and *inftrumental* mufic, after the compofition of the famous Mr. Henry Purcell." And this feems the firft time that an inftrumental band was allowed to accompany the voices in our metropolitan church of St. Paul.

In 1708, Te Deum was fung to excellent mufic at St. Paul's, compofed by Dr. Crofts for the victory at Audenarde, whither her majefty went in great folemnity.

We were extremely curious to learn when and where Handel's grand Te Deum for the peace of Utrecht was firft performed. It was natural to imagine that it was firft heard at St. Paul's, and that queen Anne went thither in ftate on the occafion, which fir John Hawkins pofitively afferts, telling us that, "in 1713, the treaty of peace at Utrecht being finifhed, a public thankfgiving was ordered for the occafion, and Mr. Handel received from the queen a command to compofe a Te Deum and Jubilate, which were performed at St. Paul's cathedral, her majefty herfelf attending the fervice." Hift. Muf. vol. v. p. 269.

But though in a paragraph of the Poft Boy, July 2, 1713, it is announced that "her majefty goes the 7th to St. Paul's, being the day appointed for the thankfgiving, accompanied by the houfes of the lords and commons;" yet in the fame newfpaper, from Saturday July 4, to Tuefday July 7, 1713, the public was informed that "her majefty does not go to St. Paul's July 7, as fhe defigned, but comes to St. James's (from Windfor) to return thanks to God for the bleffings of peace."

If Handel's elaborate compofition had been executed at St. Paul's, a ftyle of mufic fo new, forcible, and mafterly, muft have had a great effect on an Englifh congregation, who had never heard ecclefiaftical mufic fo accompanied. Purcell's voice parts, always pleafing, well accented, and expreffive, had little affiftance from an inftrumental band. Inftrumental mufic, except organ playing, was but little cultivated in our country during his time. But Handel, befides his experience in Germany, had heard operas and maffes performed by great bands in Italy, with fuch precifion and effects, as were unknown in our country till he came hither to teach us.

Handel's Te Deum for the battle of Dettingen, 1743, and Graun's for the king of Pruffia's victory at Colin, in 1757, are the moft celebrated compofitions to that facred hymn of the laft century, and the moft likely to furvive the prefent.

TEDIASTUM, in *Ancient Geography*, a town placed by Ptolemy in the interior of Liburnia, near Aruciæ.

TEDJEN, or Tedyen, in *Geography*. See Tedzen.

TEDIF, a town of Syria, in the pachalic of Aleppo. Here is a Jewifh fynagogue; and the inhabitants have a tradition that one of the minor prophets refided here. On a hill near this town are fome fepulchres and aqueducts cut in the rock; 21 miles E. of Aleppo.

TEDINGHAUSEN, a town of the duchy of Bremen; 9 miles S. of Otterfberg.

TEDIUM, in *Ancient Geography*, a town of Arabia Deferta, near Mefopotamia. Ptol.

TEDLA, or Tedila, in *Geography*, a province of the empire of Morocco, in the kingdom of Fez, which extends along the eaftern fide of Mount Atlas, and has to the weft the province of Shavoya, and to the S. Morocco. This is a rich province, abounding in fheep, whofe wool is fo fine, that no filk is fofter: it is ufed in the manufacture of caps worn by the opulent, and is fold at Fez at a very high price: its exportation being prohibited, it is confumed by the inhabitants. The province contains 450,000 inhabitants.

TEDNEST, or Tedoest, a town of Africa, in the empire of Morocco. This town was deftroyed by the Portuguefe in the year 1514, and in part rebuilt by the Jews; 40 miles N.E. of Mogador.

TEDONG. See Tirun.

TEDSI, a town of Africa, in the country of Sus, fituated to the eaft of Tarudant; 90 miles S.W. of Morocco.

TEDZEN, a town of Perfia, in Khoraffan, on a river of the fame name; 32 miles E. of Mefghid.—Alfo, a river of Perfia, in the province of Khoraffan, fuppofed to be the ancient Ochus, and next in fize to the Oxus. It has its fource near Saraks; and after receiving many ftreams, and in the number Mefhed river, falls into the Cafpian fea, in N. lat. 38° 41′.

TEE, in the *Manege*. See BREAST-*Plate*.

TEE-*Square*. See SQUARE.

TEEBAKAN, in *Geography*, a fmall ifland in the Eaft Indian fea, near the N. coaft of Borneo. N. lat. 7° 52′. E. long. 117° 39.

TEECHA, a town of Bengal; 45 miles E. of Calcutta.

TEEDIA, in *Botany*, fo named by Perfoon, we know not with what meaning.—"Perf. Syn. v. 2. 166." Brown in Ait. Hort. Kew. v. 4. 47. See CAPRARIA, fp. 3, *lucida*, on which alone this genus is founded, being diftinguifhed by having a *berry* inftead of a *capfule*, as is remarked in the place indicated. We have not had an opportunity of examining whether this be really the cafe, or whether it be a capfule with or without a pulpy coat; nor do we know how far Willdenow's fuggeftion, that all the Cape fpecies poffibly have a fimilar feed-veffel, is well founded.

TEEFEE, in *Geography*, a town of Africa, in Kaffon; 30 miles N.W. of Kooniakary.

TEEHEENGAN, a fmall ifland in the Eaft Indian fea, N. of Borneo. N. lat. 7° 49′. E. long. 117° 30′.

TEEKOOL, a fmall ifland in the Sooloo Archipelago. N. lat. 6° 6′. E. long. 120° 25′.

TEELNA, a town of Bengal; 10 miles W. of Conchong.

TEEMBIE, a town of Africa, in the country of Foota. N. lat. 10° 28′. W. long. 10° 48′.

TEEMBOO, a town of Africa, in the country of Foota. N. lat. 9° 59′. W. long. 10° 18′.

TEEN-TALLOW, a town of Hindooftan, in Guzerat; 20 miles S.E. of Brodera.

TEERAH, a province of Candahar, W. of Paifhawar.

TEERANDAZEE, a town of Candahar; 8 miles E. of Suffa.

TEERRAWHITTE, the fouth-weft point of the northernmoft ifland of New Zealand, in the South Pacific ocean, and the N. fide of Cook's Straits.

TEERWISCH, a town of Pruffia, in the province of Oberland; 8 miles N.N.W. of Ortelfburg.

TEES, a river of England, which rifes on the borders of Cumberland, and runs into the German ocean, about ten miles below Stockton, N. lat. 54° 42′. The whole courfe forms a boundary between the counties of York and Durham.

TEESDALIA, in *Botany*, received that name from Mr. R. Brown, in memory of the late Mr. Robert Teefdale, F.L.S., who died on Chriftmas-day, 1804. This accurate Englifh botanift was, for many years, a feedfman in the Strand, but retired from bufinefs fome time before his death, refiding firft at Ranelagh, near Chelfea, and afterwards at Turnham-Green. He was the author of "*Plantæ Eboracenfes*; or a Catalogue of the more rare Plants, which grow wild in the neighbourhood of Caftle Howard, in the North Riding of Yorkfhire, difpofed according to the Linnæan Syftem;" publifhed in the Tranfactions of the Linnæan Society, v. 2. 103. The author compofed this catalogue whilft he was gardener to the earl of Carlifle.—Brown in Ait. Hort. Kew. v. 4. 83. Sm. Tr. of Linn. Soc. v. 11. 283. Compend. Fl. Brit. ed. 2. 98.—Clafs and order, *Tetradynamia Siliculofa*. Nat. Ord. *Siliquofæ*, Linn. *Cruciferæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of four elliptical, concave, fmall, fpreading, equal, deciduous leaves. *Cor.* Petals four, obovate-oblong, obtufe, fpreading, with fhort broad claws. *Stam.* Filaments fix, flightly club-fhaped, afcending, each with a dilated ovate fcale attached to its inner fide, a little above the bafe, the two lateral ones fhorteft and moft diftant, in one fpecies wanting; anthers vertical, of two round lobes, diftant at their bafe. *Pift.* Germen fuperior, feffile, roundifh, emarginate, tumid at one fide, flat at the other; ftyle fcarcely any; ftigma capitate. *Peric.* Pouch erect, inverfely heart-fhaped, tumid, with a longitudinal furrow in front; concave, with an elevated ridge, at the back, two-celled; partition lanceolate; valves boat-fhaped, oblique, keeled. *Seeds* two in each cell, ovate.

Eff. Ch. Pouch emarginate, inverfely heart-fhaped. Seeds two in each cell. Filaments with a fcale on their inner fide, near the bafe.

1. T. *nudicaulis*. Naked-ftalked Teefdalia. Ait. n. 1. Sm. Tr. of L. Soc. v. 11. 286. (Iberis nudicaulis; Linn. Sp. Pl. 907. It. Oeland. 139. Sm. Fl. Brit. 692. Engl. Bot. t. 327. Curt. Lond. fafc. 6. t. 42. Fl. Dan. t. 323? Burfa paftoria minima; Ger. Em. 276. Shepherd's Crefs; Petiv. Herb. Brit. t. 50. f. 2.)—Petals unequal.—Native of dry gravelly fituations in the northern parts of Europe, flowering in April or May. It occurs about London, Norwich, and Bury, but is not a general Englifh plant. The *root* is fmall, tapering, annual. *Herb* varying much in luxuriance and number of ftalks. *Leaves* feveral, almoft entirely radical, pinnatifid in a lyrate manner, ftalked, roughifh principally at the edges. *Stalks* unbranched; the central one always erect and naked; the reft afcending, fpreading or decumbent, often bearing a leaf or two. *Flowers* white, very fmall, corymbofe. *Calyx* fmooth, often purplifh. Two inner or upper *petals* as long as the calyx; outer ones full twice as long; all entire. The remarkable fcales on the *ftamens* were firft particularly noticed in *Englifh Botany*. On thefe Mr. Brown founds his principal generic character, omitting the irregularity of the petals, in which this plant agrees with IBERIS, though very little in its habit, which is rather that of a LEPIDIUM. (See thofe articles.) The writer of the prefent article has, in the Tranfactions of the Linnæan Society above quoted, critically inveftigated the hiftory of this fpecies and the following, and has firft brought them together under one genus.

2. T. *regularis*. Regular-flowered Teefdalia. Sm. as above, 286. (Lepidium nudicaule; Linn. Sp. Pl. ed. 1. 643. ed. 2. 898. Loefl. It. Hifp. 155. Nafturtium minimum vernum, foliis tantùm circa radicem; Magnol. Bot. Monfp. 187. t. 186. N. foliis pinnatifidis, caule nudo floribus tetrandris; Gerard Gallopr. 347, excluding the *Iberis* of Linnæus.)—Petals equal. Stamens but four.—Native of dry elevated gravelly places in the fouth of France, and above the convent of St. Bernard at Madrid, flowering in the early fpring. The *root* is annual. Whole *herb* fo precifely refembling the foregoing, except in being ufually rather lefs luxuriant, that it is fcarcely poffible to diftinguifh them, except by the *flowers*. The *petals* of the prefent are all of equal fize, fpreading, longer than the *calyx*. *Stamens* only four, two at each broad fide of the germen, each bearing a white expanded fcale, as in the *T. nudicaulis*; the two fhorter, or more fpreading *ftamens* entirely wanting. It is much to be wifhed that feeds of this fpecies could be procured from Montpellier, that we might compare both in a living ftate. Linnæus was always perfuaded of their being diftinct.

TEESEE, in *Geography*, a town of Africa, in Kajaaga. N. lat. 14° 50′. W. long. 9° 27′.

TEESHOO LOOMBOO, or LUBRONG, a town and large monaftery of Thibet, confifting of three or four hundred habitations of the Gylongs, befides temples, maufolea, and the palace of the fovereign pontiffs, all built of ftone; 2 miles S.W. of Sgigatchee.

TEESTA, or YO SANPOO, a river of Afia, which rifes in Thibet, and runs into the Ganges by two ftreams, one 25 miles N., the other 80 E.S.E. of Moorfhedabad.

TEETBADDY, a town of Bengal; 27 miles N.E. of Dacca.

TEETH, *Difeafes of the.* The difeafes which affect the teeth and the parts connected with them, are ufually divided into two kinds; namely, into fuch as are termed *common*, becaufe they are alfo met with in other parts; and into thofe which are called *proper*, being obferved only in the teeth. Hence, as the celebrated Plenck has remarked, the fubject may be conveniently treated of under the following heads. Doctrinâ de Morb. Dentium, &c. Lovanii, 1796.

Of Natural Dentition.—The procefs by which the teeth make their way through the gums, is named *dentition*, (fee DENTITION,) which may be divided into the *firft* and *fecond*.

1. *Of the Firft Dentition.*—In the fixth or feventh month after birth, the *firft* or *milk* teeth make their appearance through the gums. The two middle incifores of the lower jaw are thofe which moft frequently firft come out, and, in the courfe of a few weeks, they are generally followed by the two middle incifor teeth of the upper jaw. At length, after fome months more, the lateral incifors and the canine teeth fhew themfelves. The anterior molares, or front grinders, do not commonly pafs through the gums until the child is a twelvemonth old.

The third and fourth grinders are cut about the tenth or twelfth year, and the dentes fapientiæ at the age of twenty, or even at a more advanced period of life.

The *firft* dentition, therefore, lafts from the fixth month to the fecond or third year. The *fecond* from the ninth to the thirteenth year.

But it is to be obferved, that the interval betwixt the periods when the teeth are actually cut, is fubject to very great variety, both with refpect to different teeth and different children. Sometimes a month, fometimes half a year, and, on other occafions, a whole twelvemonth will elapfe between the firft appearance of one tooth and that of another.

The cutting of each tooth has two diftinct ftages; the firft of which has been called the *periodus ingreffus*; the fecond, the *periodus egreffus.*

The firft ftage is ufually obferved in the fourth month, or about fix weeks before the tooth paffes through the gums. It happens when the tooth, in confequence of its augmented fize, begins to prefs againft the bony laminæ of the focket, fo as to make them recede. At this period the child feels a degree of itching in the gums, and hence it is that he now frequently puts into his mouth his fingers, or other hard bodies, and compreffes them by ftrongly biting them between the gums. The fecretion of the faliva is increafed. The gums become red, and fwell in the fituation of the tooth which is about to be cut. When the child fucks, he irritates and bites the nipple; he is alfo commonly troubled with a purging and a cough; he is watchful, cries frequently, and becomes feverifh.

Sometimes, however, dentition takes place fo eafily, that none of the preceding fymptoms are remarked.

After a few days, the above complaints generally ceafe, but not unfrequently come on again in about a fortnight or a month, that is to fay, about the commencement of the fecond ftage, or that in which the tooth makes its egrefs. Then the gum grows white, or exhibits whitifh points in the fituation of the tooth which is about to be cut. Thefe are caufed by the tooth itfelf, and difappear as foon as it has paffed through the gum.

2. *Of the Second Dentition.*—In the feventh or eighth year, the milk-teeth, amounting in number to twenty, become loofe, and gradually fall out, generally in the fame order in which they were cut. Soon afterwards, the fecond or permanent teeth rife out of the gums. It hardly ever happens, that the fecond dentition produces any dangerous fymptoms, the paffage through the alveolary procefs and gum being now fufficiently capacious.

After the milk-teeth have fpontaneoufly fallen out, or been extracted, they are almoft always found to be deftitute of fangs. This is a circumftance which has puzzled many eminent writers, and has even given birth to the erroneous doctrine, that the milk-teeth are never furnifhed with fangs. Suffice it here to fay, that in the opinion of the beft informed modern furgeons, the difappearance of the fangs is the effect of abforption.

Sometimes children, but more frequently adults, cut their teeth a third time. It is faid that dentition has been obferved to happen thrice in an infant five years of age; and Plenck was acquainted with a man, who was born with two of the grinding teeth, which were afterwards changed twice. (Doctrinâ de Morbis Dentium, p. 10.) Even a fourth dentition has been noticed by fome very experienced men. Halleri, tom. viii. l. 30. p. 22.

Of Difficult Dentition.—The advance of the teeth out of the fockets or gums may be attended with the moft alarming fymptoms. But experience proves, that in numerous children, the whole femicircle of each jaw becomes furnifhed with teeth, without the flighteft mark of indifpofition either before, or during the progrefs of the teeth through the gums. In other inftances the worft fymptoms prevail, both while the teeth are making their way out of the fockets, and through the gums; fuch as an inflammatory fwelling of the gums, tonfils, and parotid glands; rednefs of the eyes and cheeks; vomiting, griping pains, tenefmus, profufe diarrhœa with green evacuations, and fometimes obftinate coftivenefs and retention of urine. Fever, accompanied with cough and other catarrhal affections, hiccough, univerfal or partial tetanus, convulfions, &c. are the fymptoms by which, according to the eftimate of feveral writers, nearly a third of children are deftroyed in difficult dentition.

Thefe are the *common* fymptoms of difficult dentition; but occafionally *peculiar* ones arife, which not unfrequently fubfide as foon as the tooth is cut; as, for inftance, gutta rofacea (Lorry, Tract de Morb. Cutaneis, 1777, p. 411.); deafnefs; amaurotic blindnefs; enlargement of the knees; paralyfis; and lamenefs of one or both legs. (Pafch, Abhandlung aus der. Wundarzney von. den Zahnen, S. 25. 36.) Aphthæ of the mouth; an inflamed tubercle over the tooth which is about to be cut; fuppuration, ulceration, and even floughing of the gums. Rachitis is alfo alleged to have its origin fometimes from difficult dentition.

Thefe effects are particularly met with in very plethoric and irritable children; or in infants whofe bowels are overcharged with irritating excrementitious matter. Too much laxity, or too great hardnefs of the gums, is hardly ever the fole caufe of fuch fymptoms.

With regard to the prognofis, it may be remarked, that favourable dentition is a fign of future health. Ricketty children almoft invariably cut their teeth with difficulty. The

The more numerous the teeth are which are making their way out together, the more fevere are generally the fymptoms, and the greater is the danger.

Bloated, coftive, heavy children are extremely liable to be carried off by dentition.

The incifors and grinders ufually come out with more eafe than the canine teeth. Thin children, who are affected with acute fever, and whofe bowels are open, are in lefs danger from dentition. Infants who have a cough during this procefs, are often a long while in cutting their teeth. The foregoing prognofis accords with what was pronounced upon the fubject by Hippocrates, whofe accuracy remains unimpeached.

As the fymptoms of dentition are partly *inflammatory*, being accompanied with a ftrong determination of blood towards the head and brain; and partly *fpafmodic*, in confequence of the fympathy of the teeth with other parts, the treatment requires that antiphlogiftic and antifpafmodic means be employed. It is neceffary, therefore,

1. That the bowels be kept open with emollient clyfters.

2. That leeches be applied behind the ears.

3. That the fyrup of poppies, with nitre and one or two drops of laudanum be internally adminiftered.

4. That the red part of the gum over the tooth which is about to be cut, be rubbed with a mixture of lemon-juice and honey, or cream.

5. That in the event of there being a tendency to convulfions, in addition to the other fymptoms, a divifion of the gum be made over the tooth. By the majority of practitioners, indeed, the laft is confidered as by far the moft ufeful and efficient means of relief.

This incifion is to be made through the gum with the common inftrument, well known by the name of the gum-lancet, which is far better for the purpofe than an ordinary lancet, which is apt to cut the tongue and lips, efpecially when the child moves about much. The grinding teeth require a crucial incifion: all the others a fimple tranfverfe cut completely through the gum. The wound is then to be examined with the finger, in order to afcertain that no tenfe fibre over the tooth continues undivided. In this country, practitioners feldom apply any thing to the incifion; but abroad, it is not uncommon to put to it a mixture of lemon-juice and honey.

Internally, antifpafmodics may be exhibited, particularly the fyrup of poppies, with the fpiritus ammoniæ fuccinatus.

In order to promote dentition, and render its effects on the conftitution as mild as poffible, the celebrated Plenck recommends, that as foon as the infant is five months old, its gums be rubbed feveral times a day with a mixture of lemon-juice and honey, firft over the middle incifors of the lower jaw, and when thefe have come out, over thofe of the upper jaw.

Emollient remedies are faid to relax the gums too much, the confequence of which is, that the loofe gum is flowly and difficultly perforated by the tooth, as inftead of ulcerating, it is only raifed and rendered tenfe.

The ufe of hard applications, as biting the root of marfhmallows, fmooth corals, boars' tufks, &c. render the gums callous; but more good might, perhaps, be derived, if fubftances with rough furfaces were employed.

A premature incifion of the gum foon clofes again, and therefore does little fervice; but we do not believe that the cicatrix, thus produced, can be any impediment afterwards to dentition, as many have imagined; for it is an eftablifhed fact, that cicatrices in general are more difpofed to ulcerate and be abforbed, than the original parts of the body. We would never fuffer any idle apprehenfions of the above fort to deter us from dividing the gum, were there any chance of benefit from the proceeding. At the fame time, we do not recommend this as a prophylactic meafure, but as being proper only when illnefs, fufpected to arife from dentition, actually exifts.

Premature Dentition.—This is ftated to happen, when the milk-teeth come out before the infant is fix months old. Sometimes children are even born with their teeth already cut. Rzafcynky, Rhodius, l'Eclufe, and Stoerck, mention a boy, who had the molares at the time of birth. Alfo in an abortion of fix months, and another of feven, teeth have been obferved. (Halleri Elementa Phyfiol. t. vi. p. 19.) Van Swieten met with two incifors in an abortion of five months. (Comm. t. iv. p. 742.) In a very weak male child, born at eight months, Arnold faw two perfect teeth rife out of the lower jaw on the feventh day after birth, and grow with extraordinary quicknefs; but they fell out in the eighth week from their firft appearance. Obf. Phyfico-Med. p. 70.

In general it is to be concluded, that early dentition indicates great conftitutional vigour and ftrength.

Of Backward Dentition.—Backward dentition is when the milk-teeth are not cut, though the child is a twelvemonth old, or even older. The proximate caufe of this delay is generally referred by medical writers to languor and weaknefs of the conftitution. But late dentition is of feveral kinds.

1. Backward dentition from an unknown caufe fometimes happens, the teeth not making their appearance for a year after birth, notwithftanding the children have not any appearance of debility. Van Swieten met with a moft healthy female child, who was nineteen months old when fhe cut the firft tooth. Comm. t. iv. p. 742.

2. Backward dentition from the rickets. It is univerfally known, that in ricketty children the cutting of the teeth is a long while delayed. In thefe fubjects the gums are always much relaxed, and we have already ftated, that this circumftance is by no means favourable to dentition. It is probable, alfo, that in ricketty infants the teeth themfelves are a long while before they are perfectly formed, it being well afcertained, that in fuch conftitutions the depofition of the phofphate of lime takes place with extraordinary flownefs and difficulty.

3. Backward dentition of the dentes fapientiæ. The wife teeth are feldom cut before the twentieth year, and fometimes they firft come out in perfons confiderably advanced in years. Halleri Element. Phyfiol. t. vi. p. 28.

4. Late dentition in adults. Sometimes this takes place a third time, chiefly with refpect to the incifores; and inftances are actually recorded, in which thefe teeth were cut in adults, or even in old perfons. Haller quotes examples, in which they were cut at the ages of 90, 95, 100, 118, 120, and later. Halleri, l. c. t. viii. l. 30.

Wrong Situation of the Teeth.—This happens when the teeth make their appearance in the palate, or in any place not comprifed in the alveolary arches. The proximate caufe of this unpleafant occurrence is the preternatural formation of the young tooth in an erroneous fituation.

The cafes may be of different kinds, in regard to the place which the tooth occupies.

1. When a tooth grows out of the palate, it obftructs maftication, and by rubbing againft the tongue, often makes it ulcerate. The inconvenience can only be remedied by extracting the difplaced tooth.

2. The tooth may come out under the tongue. This cafe produces the fame grievances as the preceding, and requires the fame mode of relief.

3. The

3. The next curious circumftance which we have to notice, is the growth of teeth in the ovaries. It is now believed, that the teeth fometimes found in thefe organs, are not always the relics of a previous embryo, but may be formed there as a lufus naturæ. An inftance, in which a tooth was formed in an encyfted fwelling in the orbit, has been lately recorded by Mr. Barnes of Exeter. See Medico-Chir. Tranf.

4. Albinus records an example, in which a tooth grew out of the maxillary procefs below the orbit. It was concealed until it made its way out in this extraordinary fituation. Annot. Acad. t. i. p. 54.

5. The teeth have fometimes been obferved inverted, their bodies being fituated towards the jaw. Poilich, Increm. Offium, p. 25. Albin. c. 9. Palfin, c. 9.

Extraordinary Diftance of the Teeth from each other.—Sometimes the teeth are placed too diftant apart, fo that between their crowns large interfpaces are left.

1. In children three years of age, the crowns of the milk-teeth are fo clofe to each other, that they are laterally as it were in contact; but in children feven years old, there are wide interfpaces between them. The reafon of this is owing to the jaw increafing in fize, while the dimenfions of the teeth undergo no alteration. The fecond or permanent teeth, on the other hand, (at leaft the firft twenty of them,) have larger bodies than the milk-fet.

2. Frequently the tartar infinuates itfelf between the crowns of the teeth, and occafions a confiderable feparation of them. We need fcarcely obferve, that the cure requires that the tartar fhould be taken off, and the teeth reduced into their natural pofition.

3. The deformity of which we are now treating, is occafionally afcribable in adult fubjects to the preternatural breadth of the jaw, in which circumftance it is abfolutely incurable.

Extraordinary Clofenefs of the Teeth.—The teeth may be too crowded together, fo that their crowns are laterally in contact. This defect may extend to fome or all the teeth. The frequent confequence is, that the lateral margins of thefe parts become carious.

There are two fpecies of the diforder.

1. The firft arifes from the great width of the crowns of the teeth, and it may be afcertained by ocular examination. In fome inftances, all the bodies of the teeth are preternaturally wide; in others, only a certain number of them.

The mode of cure confifts in filing off a little of the lateral edges of the teeth affected.

2. The fecond fpecies is caufed by the uncommon fhortnefs of the jaw. It may be known by obferving that the crowns of the teeth are not too large, and that the alveolary arches are ftrikingly diminutive.

Here the mode of relief is the fame as in the foregoing cafe.

Extraordinary Number of Teeth.—Sometimes the number of the teeth exceeds what is the ufual fhare of the human fpecies in general; and this particularly occurs whenever the number amounts to more than thirty-two. Columbus has feen thirty-three (p. 34.); Fauchart, thirty-three and thirty-four (edit. 2. tom. i. p. 3.); Bourdet, thirty-fix (p. 25.); and Ingraffias, thirty-fix, including twenty-four grinders. Text 2.

1. With refpect to the redundant number of each clafs, it is when there are fix incifores, or four canine teeth, or more than ten molares in one jaw. The cafe is incurable.

2. In fome inftances, the exceffive number is owing to there being a double row of teeth. This malformation may happen to both jaws, or be confined to one. It has been noticed in both jaws by Munick, p. 144; Plinius, c. xi. p. 623; C. Bartholinus, p. 464, &c.

Arnold met with a boy, fourteen years old, who had altogether feventy-two teeth in his mouth. There was a double fet of the incifores, canine teeth, and three pofterior grinders; but the anterior grinders were triple: confequently there were counted in each jaw eight incifores, two canine on each fide, and twelve molares. The incifores were not arranged in an even double row, but each row feemed irregular, and its order as it were promifcuous. The arrangement of the canine and grinding teeth was more regular. None of thefe teeth were affected with caries. Obf. Phyf. Med. p. 69.

3. There may be a larger number of teeth than common, in confequence of the prefence of one of the milk-teeth; for when the latter does not fall out at the ufual period, the corrづfponding permanent teeth come out in the vicinity of it.

Here the cure confifts in drawing the fuperfluous milk-tooth.

Deficient Number of Teeth.—Sometimes the number of the teeth falls fhort of what is ufual; and this happens whenever they are fewer in the adult fubject than thirty-two.

1. The defective number may be owing to a preternatural fhortnefs of the jaw. Sometimes one or more teeth remain concealed during life. Thus, the dentes fapientiæ are never cut in perfons who have the upper or lower alveolary arch not fufficiently long.

2. The fex alfo makes a difference; women, generally fpeaking, having fewer teeth, than belong to men. Riolan, p. 38, and 39.

3. The deficiency in the number may proceed from a tooth having been drawn, or dropped out. This is evidently a cafe which can only be remedied by the infertion of an artificial tooth.

4. Laftly, the limitation of the number may be owing to infancy; for, in children under feven years of age, the natural number of the teeth does not exceed twenty.

Obliquity of the Teeth.—The pofition of fome or all the teeth may be oblique; an inconvenience which may be caufed by the milk-teeth not being fhed, by tartar infinuating itfelf into the interfpaces of the teeth, by loofenefs of the alveoli, and, laftly, by a forcible luxation of the teeth affected. The milk-teeth feldom grow obliquely; the permanent ones do fo much more frequently. The molares hardly ever rife in a wrong direction; and, in general, they are only the incifores and canine teeth which deviate from the right pofition.

With regard to the effects of fuch obliquity, we have to obferve, that the teeth affected impede maftication, interfere with the articulation of words, ferioufly disfigure the countenance, and, unlefs drawn, or replaced in their natural pofition, may occafion incurable ulcers on the tongue, lips, or cheeks.

The differences of the obliquity make thefe cafes divifible into feveral kinds.

1. The obliquity forward is when the tooth projects anteriorly, fo as to hurt the cheek or lips. Such a tooth may caufe ulceration of thefe parts, as already mentioned. The parotid duct has been known to be perforated, and a falivary fiftula brought on, by an oblique tooth in the upper jaw. Pafch, l. c. p. 71.

2. The obliquity backward is when the pofition of the tooth inclines towards the centre or pofterior part of the mouth, fo as to be capable of hurting the tongue. Teeth, fo circumftanced, have fometimes been the caufe of ulcers on the tongue, which in point of obftinacy and malignancy have truly vied with cancer. Plenck informs us, that by drawing

ing the left eye-tooth, he once cured an ulcer, which had exiſted half a year on the left edge of the tongue. P. 20.

3. The converging obliquity is when the crowns of the teeth converge in their ſituation, or even croſs each other.

4. The diverging obliquity is when they diverge.

5. The lateral obliquity is when the ſide of the body of the tooth is turned more or leſs forwards or backwards.

6. Obliquity of the fang. Sometimes the fangs of the teeth are curved ſo obliquely backwards or forwards, that the bottom of the ſockets either projects like a ſmall exoſtoſis, or is completely perforated.

Of the Reduction of an oblique Tooth.—With reſpect to one of the permanent teeth, which is rendered oblique by the preſence of one of the firſt ſet, the treatment conſiſts in immediately extracting the latter.

The milk-tooth may be known by its pearl colour, its more poliſhed ſurface, and its ſmaller ſize. The permanent tooth is longer, whiter, ſtronger, and of greater breadth. The crowns only of the ſecond ſet of grinders are ſhorter than thoſe of the milk-ſet. Albini, Annot. Acad. l. ii. p. 19.

But an oblique permanent tooth may be replaced in its right poſition, by the following means.

1. When the child is very young, and the tooth quite recent, it may be reduced into its proper ſituation, by frequently preſſing upon it with the finger in the courſe of the day.

2. Or the reduction may be effected with a double ſilk-thread, ſmeared with wax and maſtich. A nooſe is to be made at each end of the thread, and faſtened to the adjacent teeth. The thread, being then divided into two, is to be made to croſs two or three times firmly over the oblique tooth.

3. By a metallic plate. The length of the plate ſhould exceed the meaſure of the two neighbouring teeth, together with the oblique one. Its width ſhould be leſs than the height of the teeth. It is to be applied to the inſide of ſuch teeth as incline inwards, and to the outſides of thoſe which incline outwards. At the ends of the plate are two holes, through which the ſilk-threads, ſmeared with wax, are to be paſſed, and, after croſſing each other, are to be tied over the oblique tooth.

4. By Bruner's machine. When the tooth does not admit of reduction by the preceding means, Bruner's machine may be tried. See A Bruneri Einleitung zur Wiſſenſchaft eines Zahnarztes, p. 83.

When ſeveral of the teeth are oblique, the cure is to be attempted by the ſame operations; but when the ſide of a tooth inclines forward, it is neceſſary to uſe the forceps to bring the part into its right poſition.

Looſeneſs of the Teeth.—Sometimes the teeth become looſe and moveable in their ſockets. The proximate cauſe of this affection may depend upon the loſs of the elaſticity of the alveoli and gums, upon the too great or too ſmall ſize of the ſockets, or upon the abſorption or waſting of the fangs. Looſe teeth are very inconvenient in maſtication, and eaſily drop out.

Of this complaint there are ſeveral ſpecies, the differences of which are referrible to the cauſes.

1. Looſeneſs of the teeth from ſecond dentition. After the ſeventh year, the twenty milk-teeth begin to grow looſe, and fall out, nearly in the ſame order in which they were cut.

2. Looſeneſs of the teeth from age. In old perſons the ſockets become contracted, and the canal in the fangs being obliterated, theſe parts alſo diminiſh. Hence we ſee the reaſon why the teeth frequently become looſe in ſubjects advanced in life.

3. Looſeneſs of the teeth from violent concuſſions. A forcible concuſſion, ſuch as happens in falls againſt the teeth, diminiſhes the elaſticity of the gums and ſockets, and of courſe may be a cauſe of the preſent diſorder.

The cure requires corroborant waſhes: the tinctura laccæ, aſtringent decoctions, red wine, ſpirit of wine, or the terra catechu or ſanguis draconis, diſſolved in camphorated ſpirit.

4. Looſeneſs of the teeth from relaxation of the gums. There are people whoſe gums are pale and relaxed, at the ſame time that there is no appearance of ſcurvy.

Here the cure is to be accompliſhed by the means recommended for the preceding caſe.

5. Looſeneſs of the teeth either from caries of the ſocket or fang. This caſe may be known by the emiſſion of pus from the ſocket of the looſe tooth. Sometimes a cure may be effected by gargles; but, in general, if the tooth is alſo painful, it ought to be extracted.

6. Looſeneſs of the teeth from ſcurvy of the gums. In ſubjects with ſcurvy, the gums become looſe and fungous, and the ſockets filled with a fetid purulent matter: hence the teeth are looſened.

The cure requires the internal exhibition of antiſcorbutic medicines, and the uſe of antiſcorbutic waſhes.

7. Looſeneſs of the teeth from mercury. Mercury acts ſpecifically upon the gums, deſtroying their tone, and promoting the ſecretion of ſaliva. Hence, perſons uſing mercury, either outwardly or inwardly, are liable to have their teeth rendered looſe.

The cure demands purgative medicines, the expulſion of the mercury from the ſyſtem, and the uſe of tonic gargles.

Defect of Teeth.—When the teeth are entirely wanting, ſeveral very unpleaſant effects are neceſſarily the conſequence. The proper maſtication of the food being then abſolutely impoſſible, cardialgia, and other complaints connected with difficult digeſtion, are produced. The deficiency of the grinding teeth occaſions a collapſe of the cheeks, and of courſe an unſightly emaciation of the countenance; while the want of the inciſores ſpoils the voice.

1. It is natural for all young infants to be without teeth, until they are ſeven or eight months old; but when the teeth do not begin to come through the gums after a child is a twelvemonth old, then the backwardneſs of dentition may be conſidered as morbid.

2. In old perſons, the teeth naturally fall out, and the alveoli contract into a kind of ſharp edge, covered with the callous membrane of the gums, by which the ſofter ſpecies of food may yet be chewed.

3. Want of teeth from rickets. When the rudiments of the permanent teeth are deſtroyed with the milk-teeth, then of courſe no ſecondary teeth ever make their appearance.

4. Loſs of teeth from violent cauſes. Under this head we comprehend the defect of one or ſeveral teeth, drawn, or beaten out.

5. Loſs of teeth from necroſis. Every form of this diſorder makes the teeth fall out in little pieces.

6. Loſs of teeth from ſcurvy. In ſituations where the ſcurvy is prevalent, it is common to meet with numerous perſons who have loſt their teeth in the very prime of life.

Every kind of deficiency of teeth, except that which belongs to infancy, cannot be remedied in any other way but by the inſertion either of artificial or natural teeth.

Of the Inſertion of Teeth.—There are various ſpecies of this operation, but all of which may be included under the following heads.

1. The inſertion of a healthy proper tooth. When a tooth that has been extracted, or beaten out, appears to be entirely ſound, it is to be immediately replaced in the ſocket, and tied with thread to the adjacent teeth. Sometimes it ſpon-

ſpontaneouſly becomes fixed again, if care be taken to uſe an aſtringent gargle with a view of making the gum contract.

2. The inſertion of a proper tooth that has a carious fang. When the tooth, which has been removed from the alveoli, is merely carious in the fang, it may be replaced again, after the carious part has been filed away.

3. The inſertion of a proper tooth, which has a caries of its body or crown. When a very ſmall portion of the crown is carious, it may be removed with a file, and the tooth can then be put into its ſocket again. But if the whole body be diſeaſed, it may be cut off tranſverſely from the root; a ſmall hole may be drilled acroſs the latter part, and, with the help of a golden wire, an artificial crown or body, having alſo a tranſverſe hole for the paſſage of the wire, may be faſtened to the root. In this ſtate, the tooth may be replaced.

4. The inſertion of a tooth taken from the mouth of another living ſubject, or from a dead ſubject. The perſon, to whom the tooth is to be transferred, ſhould not be above the age of forty; but the ſubject, from whom it is to be taken, ought not to be more than four-and-twenty. The tranſplanted tooth ſhould belong to the ſame jaw and ſide of the face, and be of the ſame ſhape and ſize, as the tooth that is extracted.

The canal of the tooth, which is to be inſerted, muſt be cloſed with gold; and the tooth muſt be every where rendered free from inequalities, ſo that it may be the more likely to adhere.

5. The inſertion of an artificial tooth. The form and ſize which ſhould be given to the artificial tooth muſt be determined by a model of ſoft red wax, which has been preſſed into the gap made by the loſt tooth. In order that the white colour of the artificial tooth may correſpond to the light yellowiſh colour of the reſt of the teeth, the new tooth ſhould be macerated in ſtrong coffee, or in the lees of red wine.

Artificial teeth ought to be made of ivory, or of the tooth of the hippopotamus. Each of them ſhould be grooved on both ſides, and perforated tranſverſely, ſo as to admit of being tied to the neighbouring teeth. The nooſes of two threads are to be faſtened on the neighbouring teeth, and the ends having been drawn tranſverſely through the hole of the artificial tooth, and there made to decuſſate, they are to be tied in a ſurgeon's knot. The tooth having been placed in the ſocket, the threads betwixt the artificial and old teeth muſt be tightened and made faſt. Laſtly, an aſtringent gargle muſt be uſed for a few days.

6. The inſertion of ſeveral artificial teeth. When two, three, or a larger number of contiguous teeth are wanting, an equal number muſt be formed of one piece of ivory, or other ſubſtance, and faſtened at once to the neighbouring teeth.

7. The inſertion of a whole ſet of artificial teeth. When all the teeth of the upper and lower jaws are loſt, a complete ſet may be fixed on the margins of the alveolary arches. Should any of the natural teeth remain, they may often be of great aſſiſtance, in rendering the lodgment of the artificial ones more firm and ſecure. When the whole, or the greater part, of the teeth of either jaw is loſt, an artificial ſet may alſo be inſerted.

The cuſtom of wearing ivory teeth, and of binding them in with a gold wire, is very ancient: Lucian and Martial ſpeak of it as practiſed among the Romans. But ligatures of wire have been found to hurt the natural teeth, with which the artificial are connected; whereas ſilken twiſt cannot affect them to any conſiderable degree for ſeveral years.

Guilleman gives us the compoſition of a paſte for making artificial teeth, which will never grow yellow: the compoſition is white wax granulated, and melted with a little gum elemi, adding powder of white maſtich, coral, and pearl.

Thus whole ſets may be made for one or both jaws, ſo well fitted to admit of the neceſſary motions, and ſo conveniently retained in their proper ſituation, by means of ſprings, that they will anſwer every purpoſe of natural teeth, and may be taken out, cleaned, and replaced by the patient himſelf with great eaſe.

Wearing out of the Enamel.—(See CRANIUM.) The bodies of the grinding teeth being wide, exceſſively hard, and expoſed to perpetual friction, they become worn much ſooner than the reſt of the teeth, and flat in conſequence of the deſtruction of their points. Halleri Element. Phyſiol. t. vi. p. 29.

With reſpect to the effects of the loſs of the enamel, it is to be obſerved, that the teeth which are deprived of it become ſo ſenſible, that painful ſenſations are produced in them by heat and cold, and by ſolid as well as liquid aliment. In the end, alſo, they readily become carious.

The ſpecies of this affection depend upon the cauſes.

1. Loſs of the enamel from age. After the age of thirty, almoſt all the teeth in the human ſubject have been ſomewhat worn by long maſtication. Some writers aſſert, that in youth, the waſte of the enamel may be repaired by nature; but if the teeth be deſtitute of vaſcularity, the evil muſt be always irreparable. See CRANIUM.

2. Loſs of the enamel from gnaſhing of the teeth. Perſons who in the night are in the habit of gnaſhing their teeth deſtroy the enamel. For the purpoſe of preventing the ill conſequences of this practice, it has even been recommended to cover the teeth in the night-time with a thin gold plate.

3. Deſtruction of the enamel by the uſe of tobacco-pipes. Plenck informs us, that in the inciſor teeth of men, who had for many years been accuſtomed to ſmoke pipes, he has ſeen the diſtinct impreſſion of a black ſemicircle.

4. Loſs of the enamel from long and violent bruſhing of the teeth. They who daily rub and bruſh their teeth forcibly with a rough hard tooth-powder, or too ſtiff a bruſh, inevitably deſtroy, in the courſe of a few years, all the enamel on the front ſurface of the teeth. Here the cure obviouſly depends upon the avoidance of the cauſe.

5. Loſs of the enamel from applying the file to the teeth. Whenever this operation is carried to too conſiderable a depth, the enamel is removed by mechanical violence.

6. Loſs of the enamel from biting a very hard body. This ſort of violence ſometimes ſplits the enamel, which immediately falls off in pieces, at the very time of making the bite.

7. Loſs of the enamel from its being preternaturally brittle. When the enamel is thus affected, it is apt to break in chewing and biting ſubſtances without the exertion of any particular degree of force.

8. Loſs of the enamel from the projection of an oppoſite tooth. A tooth which juts out conſiderably, ſo wears the correſponding tooth in the oppoſite jaw, as to make a deep impreſſion in it. The treatment conſiſts in ſhortening the tooth, which is injurious on account of its length, with a file.

Concretion of ſeveral of the Teeth into one Maſs.—A true anchyloſis of the teeth cannot happen from any proceſs like oſſification, becauſe they poſſeſs no vaſcularity; and ſome of the caſes, referred to by writers, were probably original malformation.

There are ſeveral varieties ſpecified.

1. The

1. The true concretion of the teeth, which happens when the teeth are connected together by a ſubſtance reſembling bone.

2. The ſpurious concretion, or that ariſing from the exceſſive cloſeneſs of the teeth to each other, in which ſtate they ſeem as if they had actually grown together.

3. The concretion from tartar. Sometimes the interſpaces of the teeth are ſo filled up with tartar, that the teeth cohere in ſuch a degree, as to cauſe an appearance reſembling what may be ſuppoſed to proceed from an actual bony concretion of thoſe bodies. The mode of treating this caſe will be conſidered in ſpeaking of the tartar of the teeth.

4. The cloſe contact of the fang of the tooth with the ſocket. In this circumſtance, the tooth either cannot be extracted, or, in the event of great force being uſed, the tooth is broken away from the jaw.

Elongation of the Teeth.—Sometimes one or more of the teeth appear to become longer.

1. Elongation of a tooth from the deficiency of the oppoſite one. Thus, when one of the molares of the upper jaw is drawn out, the correſponding tooth of the lower jaw ſeems lengthened; becauſe after a time the neighbouring teeth are worn down by the friction which they continually exerciſe againſt each other.

2. Elongation from preternatural ſoftneſs of the tooth. Plenck informs us, that he has ſeen in a female child eight years old, the right canine tooth of the lower jaw elongated, and which, after being extracted, was found ſo ſoft, that the crown and fang could be compreſſed with the finger.

3. Elongation of a tooth from exceſſive growth is mentioned by writers; but this caſe cannot be poſſible, as the teeth are known not to be vaſcular.

4. Imaginary elongation. Perſons whoſe teeth are affected with ſtupor, are apt to fancy that their teeth are longer than natural; but without real cauſe. The cure conſiſts in removing the ſtupor.

Foulneſs of the Teeth.—The teeth are often ſeen covered with a ſordid, fetid, yellowiſh, or dark-brown mucus.

The proximate cauſe is the adheſion of the mucus of the mouth and fauces to the ſurface of the teeth.

1. Morning foulneſs. In almoſt all men, the teeth become coated in the night during ſleep with a dirty mucus, and appear foul in the morning. The reaſon is, becauſe during ſleep the ſaliva is more ſlowly ſecreted in the mouth; and, on account of the motionleſs ſtate of the tongue and jaws, it is not waſhed off the teeth.

This ſpecies of foulneſs is eaſily removed by waſhing the mouth every day with cold water, and the teeth with a bit of rag, the finger, or a wet ſponge.

2. Foulneſs of the teeth from neglect to clean them. They who are not in the daily habit of waſhing their mouths and teeth with cold water, by degrees have the interſtices and fangs of their teeth incruſted with mucus in the morning, and with the remaining particles of the food.

With reſpect to the treatment, merely waſhing the mouth in this inſtance is not enough; it is alſo requiſite to clean the teeth occaſionally with tooth-powder.

3. Foulneſs of the teeth from fever. This is remarkably ſeen in caſes of putrid fever, in which, owing to the ſtate of the ſaliva, the teeth become covered with a yellow or dark-brown coat.

Here the teeth ſhould be frequently waſhed and cleaned with vinegar.

4. Foulneſs from ptyaliſm, eſpecially that produced by mercury. In the beginning of a ſalivation, the teeth become coated with mucus. The beſt treatment is to waſh and clean them frequently with a honey gargle.

5. Scorbutic foulneſs. In perſons labouring under ſcurvy, the teeth are invariably covered with a purulent kind of mucus, iſſuing from the ſockets of the looſened fangs.

The cure demands the internal and external employment of anti-ſcorbutic remedies.

6. Foulneſs of the teeth from tartar. In the early ſtate of the formation of tartar, the ſurface of the teeth becomes covered with a mixture of earth and gluten.

The treatment conſiſts in removing the tartar with a thick tooth-powder.

Of cleaning the Teeth.—In perſons whoſe teeth are perfectly ſound, it is only neceſſary to waſh their mouths every morning with water that has had the chill taken off it, and that contains a few drops of the ſpirit of lavender; the mucus being wiped from the teeth with a bit of rag, or ſponge. The ſame ſhould alſo be done after meals, and the fragments of meat lodged between the teeth muſt be removed with a tooth-pick, which inſtrument ſome recommend to be made of juniper wood.

But in perſons in whom a depoſition of tartar readily takes place, the tartar ought to be removed with a tooth-ſcraper, and the teeth well cleaned every week with tooth-powder.

Charcoal, or carbon, is uſed for cleaning the teeth, and the beſt is made from the ſhell of the cocoa-nut. We are informed by hiſtorians that the ladies among the ancient Britons uſed the charcoal made with the wood of the common hazel-nut for this purpoſe. See DENTIFRICE.

The abſorbent earths are uſed for dentifrices; they mechanically cleanſe the teeth from the thick mucus and tartar, and at the ſame time preſerve the tone of the gums. Therefore,

1. The baſis of dentifrice powders may be prepared ſhells, red corals, mother-of-pearl, powdered crabs' claws, bone of the cuttle-fiſh, lapis hæmatites, &c.

2. For communicating an agreeable colour to the powder, carmine or cochineal may be added.

3. For giving an agreeable odour, ambergris, cinnamon, or cloves may be uſed.

4. For ſtrengthening the gums, armenian bole, ſanguis draconis, or terra catechu, is the beſt ingredient.

Rough tooth-powders, like that containing pumice-ſtone, gradually wear away the enamel, eſpecially when they are employed every day.

Acid applications, particularly the mineral ones, do indeed whiten the teeth; but when long uſed, render them brittle.

Hence crude and burnt alum ought to be rejected from every kind of dentifrice. The nitric, muriatic, and ſulphuric acids in tinctures are ſtill more hurtful.

Of the Tartar of the Teeth.—This ſubſtance is an earthy cruſt, which adheres to the teeth. As it fills up the interſpaces of ſeveral of the teeth, and occupies their external ſurfaces, it is ſeldom obſerved upon their inſides. By the Greeks it was called *odontolithos*, from ὀδοὺς, *a tooth*, and λίθος, *a ſtone*. By others it has been termed *tophus*, vel *calculus* dentium.

With regard to the effects of the tartar, it diſplaces the teeth, and renders them looſe and painful; it alſo ſeparates the gums from the fangs, producing caries in the latter, and a bad ſmell in the breath.

In reſpect to colour, the tartar of the teeth is of three kinds, namely, dark-brown, yellow, and black.

Since many perſons who never clean their teeth at all are not diſfigured with theſe depoſitions of tartar, it appears that a peculiar diſpoſing cauſe is neceſſary for the occurrence of the complaint. The ſpecies are:

1. Tartar

1. Tartar from neglect to wafh the mouth. It originates from the gluten of the faliva, which, in uncleanly fcorbutic fubjects, and great wine-drinkers, adheres to the teeth, becomes putrid with the heat, and in putrefying depofits a fort of earthy matter upon the teeth. People who drink chiefly water are feldom troubled with earthy incruftations on their teeth.

The cure requires the removal of the tartar. Small portions of tartar may be taken off by means of a brufh and a thickifh tooth-powder.

But when the tartar is abundant, thick, and grown, as it were, to the teeth, it muft be cut with a fuitable inftrument placed obliquely, beginning from the neck, and carrying the inftrument towards the upper part of the tooth. The tartar having been cut, is then to be removed piecemeal.

Any remaining particles of tartar may afterwards be gradually got rid of by the ufe of a brufh and tooth-powder.

2. Spontaneous tartar. There are certain perfons, whofe teeth are conftantly incrufted with tartar, notwithftanding they are in the continual habit of wafhing their teeth and mouths.

This peculiar diathefis feems to confift in an extraordinary quantity of earthy matter in the faliva.

Berdmore relates a furprifing example of this fort of tartar. A man, thirty-two years of age, had the teeth of each jaw coated with folid tartar, half an inch in thicknefs, both on the outfide and infide of the teeth, and on the furface of the gums, fo that the interftices of the teeth were altogether invifible. The gums were every where pufhed off the teeth, and painful. The incruftations upon the incifor teeth were fo thick, that the lower lip was rendered more prominent. During a fortnight, Berdmore removed every day fome of the tartar from the teeth with an inftrument, and at length employed a dentifrice and brufh. The retracted gums were fcarified, and thus made to adhere to the necks of the teeth. The patient was obliged to brufh his gums and teeth three times a day, partly with a view of preventing the new formation of tartar, and partly in order that the regeneration of the gums might be ftill more promoted. But although the patient ftrictly followed this plan, his teeth and gums, in the courfe of half a year, became again covered with an extremely thick coat of tartar. Berdmore was therefore under the neceffity of recommending the ufe of a ftiffer brufh, and a dentifrice made of fhells, for the purpofe of removing the tartar. P. 56.

With refpect to the treatment of tartareous incruftations of the teeth in general, it is effential to remove the tartar and clean the teeth well every day.

The internal and external remedies alfo, which are ufually advifed for diffolving ftones in the bladder, may be employed, as lime-water, pure potaffa, &c.

Sometimes peppermint-water, with a few drops of nitrous acid, is ufed with advantage.

3. Tartar from the porofity of the furface of the teeth. Perfons who are in the habit of ufing acrid tinctures or powders which diffolve the enamel, and make it porous, are frequently troubled with tartareous incruftations.

The caufe being avoided, the mode of treatment is the fame as in the preceding cafes.

Of Blacknefs or Necrofis of the Teeth.—This is a very peculiar affection of all the teeth, making them appear black, rough, and eroded.

Sometimes only the upper part of the crown exhibits a dark-coloured erofion; while, in other inftances, the whole fubftance of the tooth is eroded.

The proximate caufe of this difeafe is imputed by Plenck to injury of the nutrient veffels of the pulp by difeafe, before the growth of the tooth is thoroughly completed; and, therefore, it is a totally different diforder from necrofis of the bones, which is attended with phenomena, connected with the vafcularity of the parts themfelves.

Hence it is only in infants that feveral of the teeth are ufually thus diftempered.

Necrofis of the milk-teeth is indeed much more frequent than of the permanent fet.

The following varieties of the complaint, depending on the difference of the caufe, have been diftinguifhed.

1. Blacknefs of the teeth from rachitis. In ricketty infants, the milk-teeth come out of the jaw more tardily, and they foon afterwards turn black and friable, and fall out piecemeal. The fecondary teeth alfo, when rachitis is not cured between the firft and fecond dentition, are affected with the fame deftructive change, fo that fubjects of this defcription are either deftitute of teeth during the whole of their lives, or only have in their mouths teeth which have a black eroded appearance.

As for the cure of rachitis, we do not intend to confider it in the prefent place, and fhall merely ftate that the pure milk of a healthy nurfe, falubrious air, a great deal of exercife, good food, abforbent medicines, white alkaline falts, bark, fteel, fea-bathing, &c. are the remedies principally recommended.

2. Scorbutic blacknefs of the teeth. When the fcurvy attacks children before the offification of the teeth is completed, the milk-teeth, as foon as cut, either appear to be already eroded, or in a fhort time afterwards become fo, and put on a black colour.

The cure demands the immediate exhibition of anti-fcorbutic medicines, with the affiftance of which the fecond teeth are fometimes perfectly healthy.

3. Blacknefs of the teeth from the fmall-pox. In children who are feized with malignant fmall-pox during the firft or fecond dentition, a black erofion of the teeth is frequently obferved.

The cure requires the repeated adminiftration of purgatives, and then the Peruvian bark.

4. Blacknefs of the teeth from meafles. The fame black erofion of the teeth has been remarked after fevere cafes of meafles.

The cure is the fame as in the foregoing inftance.

All the preceding fpecies of necrofis, when they affect the milk-teeth, are to be ftopped by their proper fpecific remedies, in order that the fecond fet of teeth may not be affected; but when thefe are difordered, the cafe is irremediable.

5. Blacknefs of the teeth from tartar. The tartar itfelf fometimes turns black, and even after its removal, the teeth often remain of a blackifh colour, which cannot be effaced.

6. Blacknefs of the teeth from the application of mineral acids. Nitrous acid diluted with water, in a fhort time, whitens the teeth; but foon afterwards renders them black and friable. Plenck has feen the lateral edges of the teeth turned black and corroded by the employment of mercurial cofmetics.

7. Blacknefs of the teeth from cancer. Plenck has twice noticed in men, who were afflicted with ulcerated cancers of the lower lip, the teeth disfigured with a deep black colour. But it is to be remarked, that the affection was confined to the enamel, and did not extend to the bony fubftance of the fangs.

Preternatural Colour of the Teeth.—This is a change of the natural colour of the teeth to a yellow or afh-colour.

1. Difcolouration from neglect to clean the teeth. The fordes,

fordes, which collect upon the teeth, diminifh their glofs and whitenefs, and render them yellow or afh-coloured.

The cure confifts in removing the fordes.

2. Difcolouration from age. The whitenefs and polifh of the teeth, peculiar to youth, change in the advanced period of life into a dull yellow, which is totally irremediable.

3. Difcolouration from the ufe of mercury. The teeth are difcoloured not only by the internal, but alfo by the external ufe of mercury. Hence gilders, and other artizans who make ufe of mercury, have their teeth ftained of a leaden colour. Plenck has feen the fame fort of disfigurement occafioned by cofmetics containing quickfilver.

The cure requires that the mercury be got out of the fyftem as expeditioufly as poffible.

4. Difcolouration from fcurvy, &c. Scorbutic perfons are efpecially noticed as having the colour of the teeth fpoiled. Venereal and ricketty fubjects are alfo frequently affected in the fame way.

To this head muft likewife be referred the difcolouration of the teeth obfervable in mariners.

5. Difcolouration of the teeth from pregnancy. In pregnant and fuckling women, the luftre of the teeth is often remarked to leffen, and thefe parts to be difcoloured. Lorry, Tract. de Morb. Cutaneis, p. 61.

It is fuppofed that this change of the teeth is frequently connected with the bad ftate of the milk, the evacuation and correction of which are the means of cure advifed by feveral authors.

6. Difcolouration from taking hot food. Perfons who make a practice of drinking very hot liquids, or of chewing fubftances which are too warm, have the luftre and whitenefs of their teeth deftroyed. It is queftionable, whether the beautiful white colour of the teeth of animals in general may not be owing to their abftaining from hot aliments?

7. Difcolouration from dentifrice powders and tinctures containing mineral acids. Thus, burnt alum and fpirit of nitre for a fhort time whiten the teeth; but a little while afterwards, the enamel turns pale and falls off in bits.

8. Difcolouration from the fmoke of tobacco. The oil of this plant is well known to have the effect of turning the colour of the teeth to a dark brown or black.

9. Difcolouration from thinnefs of the enamel. When the vitreous fubftance is in a certain degree worn away, the bony fubftance, which is yellow, can be feen through it. The defect is incurable.

10. Difcolouration from an internal caries of the tooth. Such a tooth lofes its luftre and whitenefs, and becomes pale, afh-coloured, dark-brown, and at length black.

Here the only mode of cure is to extract the difeafed tooth.

11. Difcolouration from the ufe of madder. It is remarked, that only the bony part of the tooth is ftained red by this root, but not the enamel. The rednefs alfo does not extend itfelf to the portion of the tooth already formed; but only to the part formed while the animal is fed with madder. This colour likewife never difappears: circumftances much againft the doctrine of the teeth being vafcular.

12. Golden difcolouration of the teeth. This fpecies is brought on by art.

Fragility of the Teeth.—In this affection, the cohefion of the fubftance of the teeth is fo flight, that a very inconfiderable force makes it break.

The proximate caufe of this fragility of the teeth is probably connected, in many examples, with fome imperfections in their original growth.

The varieties defcribed by writers are as follow:

1. The fcorbutic fragility. In people afflicted with the fcurvy, the bodies of the teeth by degrees become fo fragile that they drop out piecemeal.

2. Fragility from rickets. In children thus affected, the milk-teeth, foon after they have been cut, become dark-coloured, are eafily broken, and ufually fall out in pieces.

3. Fragility from old age. In old age the teeth are apt to be broken in biting with force, and to fall out piecemeal.

4. Fragility from the application of mineral acids or burning oils. The abufe of fuch medicines, too long continued, brings on a fpecies of fragility, which admits of no mode of cure.

5. Fragility from caries. Teeth, which are excavated by caries, and rendered thin, are readily broken in maftication, and drop out in pieces.

All the different fpecies of fragility are incurable.

Mollities, or Preternatural Softnefs of the Teeth.—This difeafe is fo remarkable a foftnefs of the fubftance of the teeth, that it can almoft be compreffed together by the fingers.

The proximate caufe is faid to be either too great a quantity of the gluten, which connects the earthy particles together, or elfe a deficiency of the earth.

The fpecies are:

1. Softnefs of a milk-tooth. Plenck extracted from a girl feven years of age, a canine milk-tooth of the lower jaw, which was livid and foft, like cartilage, and was compreffible by the fingers, efpecially at the fang. De Morb. Dentium, p. 39.

2. Softnefs of the teeth from farcoftofis of the fang. Sometimes the fang of a tooth is abforbed, and a fungous fubftance fills up its place. This cafe has been abfurdly inftanced as a fpecimen of mollities of the teeth.

3. Softnefs of the teeth from fcurvy. It is afferted, that in the fcurvy, the teeth have been fometimes foftened and enlarged. (Grainger Hift. Febris Anom. p. 6.) But fuch accounts muft be incorrect, fince they imply a vafcular organization of the teeth. It merits attention alfo, that in certain dead fubjects, whofe bones are all affected with mollities, the teeth are found perfectly hard.

Preternatural Angles, or Sharpnefs of the Teeth.—Sometimes the form of a tooth is fo acute, that it hurts the neighbouring parts by pricking them.

The effects of fuch a tooth are irritation of the tongue, or of the inner furface of the lips, or cheek. Hence inflammation of thefe parts, or an ill-conditioned ulcer oppofite the fharp portion of the tooth, curable by no means whatfoever, except the removal of the angle or fharpnefs.

The fpecies are afcribable to the particularity of the caufe.

1. Irritating angles, or fharpnefs from malformation of a tooth. In this cafe the tooth has a found appearance, and the crown is felt to be too pointed or fharp.

2. Irritating angles, or fharpnefs from an oblique fracture of a tooth; as fometimes happens from biting hard nuts and other fubftances. The cafe can be detected on ocular examination.

3. Irritating angles, or fharpnefs from the tooth being worn obliquely. This is the moft common cafe.

The cure requires that the pointed or fharp part of the tooth be removed either with a file or a pair of cutting forceps; but if this cannot be accomplifhed, the tooth fhould be pulled out.

Fractures of the Teeth.—A fracture of a tooth is a folution of it into two or more fragments.

The folution of continuity may be tranfverfe, oblique, or comminuted. The moft common kind of fracture is the feparation of a particle of the enamel from the reft.

The effects are, confiderable pain in the tooth, and fometimes convulfions; an unpleafant fenfation in the tongue upon its touching the fracture. An oblique fracture hurts the tongue, lips, or cheek, by its pointed form. The broken furface of a tooth not unfrequently becomes carious.

The fpecies are:

1. Fracture from violence; as occurs in a fall upon the teeth, a blow on them, or in biting the hard ftones of fruits, or in an imperfect extraction of a tooth.

2. Fracture from previous caries, or fragility of a tooth. When either of thefe caufes is prefent, a very inconfiderable force will break the tooth, and fplit it into feveral pieces. The furface of the fractured part ought to be kept covered for feveral days with maftich.

The fracture of a tooth is an incurable accident.

Fiffures of the Teeth.—A fiffure of a tooth means a folution of continuity, like a mere line, or a crack in the enamel.

For the moft part, the caufe originates from biting the ftones of fruit, or other hard fubftances.

The effects are pain and tendernefs of the tooth, and, in confequence of the entrance of fordes into the fiffure, caries is frequently produced.

The treatment confifts in filling up the fiffure, while recent, with gum maftich.

Luxations of the Teeth.—The luxation of a tooth means the difplacement of it from its natural pofition in the focket, occafioned by violence.

The caufes are biting hard or refifting bodies with extreme force; falls or blows upon the teeth; but, moft commonly, the accident is brought on by an imperfect and unfuccefsful attempt to draw a tooth.

The disfigurement, arifing from the wrong pofture of the tooth, is the chief effect. The tooth may be put into its right pofition again with the aid of a pair of forceps.

Stupor of the Teeth.—This is a very fingular fenfation in the teeth, which cannot be defcribed by words. It was called by the Greeks *hæmodia*, from αἱμωδιάω, *obftupefco:* the French term it *l'agacement des dents.*

The proximate caufe is a peculiar affection of the nerves of the teeth.

With regard to the effects, this annoying fenfation prevents maftication, and excites a preternatural fecretion of the faliva; while it is exafperated by the entrance of air into the cavity of the mouth. For the moft part, the complaint is only of a tranfient nature.

The fpecies are:

1. Stupor of the teeth from eating unripe fruit. Hence we find, the affection is often caufed by eating four cherries, currants, goofeberries, &c.

This cafe may be relieved by chewing fweet almonds, or applying fomentations to the teeth.

2. Stupor of the teeth from vomiting dark bilious matter from the ftomach. The fecretions thrown up from the ftomach are fometimes of an auftere acid kind, and therefore may give rife to this affection of the teeth. Plenck has many times noticed the occurrence in hypochondriacal fubjects. Doctrina de Morb. Dentium, p. 42.

The cure demands emetics and abforbents, or mild alkaline remedies.

3. Stupor of the teeth in ricketty fubjects. The teeth of perfons who labour under rachitis, are, on account of their greater fenfibility, particularly expofed to the attack of this complaint.

Befides the radical cure of rachitis, which is to be attempted by tonic and abforbent medicines, external palliative means are not to be omitted

4. Stupor of the teeth from harfh noifes. Thus the painful fenfation is brought on by the acute rough found made by filing various fubftances, fcraping flate, fawing ftone, &c. In a fright, the gnafhing of the teeth has been obferved to have a fimilar effect.

Odontalgia, or Tooth-ache.—This fignifies pain in one or more of the teeth; the etymology being ὀδοὺς, *dens*, and ἀλγέω, *doleo.*

The proximate caufe is an irritation of the nerves which are diftributed to the teeth and gums.

As for the effects, the pain in the teeth fometimes rifes to fuch a degree, that reftleffnefs, fever, delirium, fpafms, convulfions, faintings, &c. are produced, efpecially in perfons of irritable conftitutions.

The cheek of the painful fide very often fwells upon a little abatement of the complaint taking place; the patient drivels confiderably; and maftication cannot be performed without an increafe of fuffering.

The different fpecies of the complaint are as follows:

1. Odontalgia rheumatica, or the tooth-ache occafioned by the rheumatifm affecting the gums and teeth.

The fymptoms of this cafe are, pain in the teeth, without any thing ailing the gums, as far as can be detected by ocular examination.

The cure demands purgative medicines, and afterwards fudorifics.

Externally, wine and water; or vinegar, in which the radix pyrethri has been boiled; the fmoking of tobacco; finapifms to the cheek; or blifters upon the temples, or nape of the neck; are efteemed amongft the moft eligible means of relief.

2. Odontalgia catarrhalis. This cafe is moftly brought on by a cold damp atmofphere and the fuppreffion of perfpiration, or from fudden expofure to cold while the body is very much heated.

This fpecies may be known by the prefence of the ufual fymptoms of catarrh, the difcharge of mucus from the noftrils, cough, &c.

It admits of relief by the fame means which are proper for a catarrh, or the rheumatic fpecies of tooth-ache.

3. Odontalgia inflammatoria. The complaint is brought on by inflammation of the gums. Such inflammation oftentimes affects, at the fame time, all the neighbouring parts, as the cheeks, ears, eyes, and indeed fometimes the whole head.

Frequently the cafe brings on, in a flow manner, the formation of abfceffes between the gums and cheek, which abfceffes, after a great deal of violent pain, burft.

This tooth-ache is exafperated by every kind of warm medicine, whether given inwardly, or ufed as an external application.

The cure of the complaint in its early ftage demands venefection, purgatives, nitre, and other antiphlogiftic remedies.

Externally, there is no better application than the aqua plumbi fuperacetatis.

4. Odontalgia arthritica, or odontagra, arifes on the abatement of a gouty affection of the joints, but fubfides again as foon as the latter difeafe recommences.

5. Odontalgia venerea. Both the venereal difeafe itfelf, and the mercury which is adminiftered for its cure, not unfrequently give rife to fevere tooth-ache. In each of thefe cafes, purgatives are indicated, and afterwards an emulfion of gum arabic, the warm bath, and the compound decoction of farfaparilla.

Here drawing the teeth is faid to be extremely dangerous, as it is apt to bring on inflammation of the throat, and even fatal confequences.

6. Odontalgia fcorbutica. This cafe may be known by the

the exiftence of the ufual fymptoms of the fcurvy. In addition to an intolerable itching in the gums, very acute pain is alfo often experienced.

With refpect to the cure, topical remedies muft be employed, together with fuch external and internal medicines as are generally requifite for the fcurvy.

7. Odontalgia gaftrica is an acute pain in the teeth and gums, arifing from a wrong ftate of the primæ viæ.

It may be cured by emetics, purgatives, and other medicines calculated to put the bowels and ftomach into order again.

Odontalgia gaftrico-verminofa. People who have worms are frequently tormented with the tooth-ache. Authors attempt to explain the fact as follows: they ftate that worms in the inteftines irritate the great intercoftal nerve, which has a ftrong fympathetic connection with the nerves of the teeth.

The cure demands purgatives and anthelmintic remedies.

8. Odontalgia a ventriculi debilitate, feu irritabilitate. It fometimes happens that men and hyfterical women, whofe ftomachs are weak and irritable, are afflicted with excruciating tooth-aches, which yield to no remedies but antifpafmodics, ftomachics, and tonics.

9. Odontalgia gravidarum. In the tooth-ache originating from pregnancy, the pain often fhifts from one tooth to another, and comes on very repeatedly, although the teeth are frequently perfectly found. Sometimes the pain is merely fympathetic; but, in moft inftances, it is connected with that plethoric ftate of the female conftitution known to prevail during pregnancy. Venefection is, therefore, the chief means of relief, and then topical applications may be ufed.

It is a queftion, whether the operation of drawing a tooth fhould ever be performed on pregnant women. There are fome women who have fuch a dread of the inftruments for this purpofe, that the very fight of them brings on the danger of convulfions and a mifcarriage. But, on the other hand, the pain may be fo violent as to create a chance of the fame evils. Here much addrefs is requifite to perfuade the patient to undergo the operation, and at the fame time great prudence not to advife it, unlefs rendered abfolutely indifpenfable by the feverity and obftinacy of the pain.

10. Odontalgia nutricum. Women who fuckle are alfo particularly fubject to be afflicted with excruciating tooth-ache, whether the teeth be found or carious. When the pain refifts the ufual means, efpecially opium and venefection, the tooth muft be extracted. This cafe has been fuppofed to depend upon a certain fympathy between the mammæ and the teeth.

11. Odontalgia from cutting the dens fapientiæ. Sometimes great and long-continued pain, delirium, and other alarming fymptoms take place, until the tooth has made its way out, or the gums have been divided.

12. Odontalgia hyfterica. This fpecies of tooth-ache often affects hyfterical women a long while, notwithftanding the teeth may be perfectly healthy; nor does it always yield to opium, nor even to the operation of extracting feveral of the painful teeth.

The treatment requires the warm bath, emollient fomentations to the cheeks, and gargles of the fame quality to the mouth.

13. Odontalgia from the teeth being worn away. The bony fubftance of the teeth is fo fenfible, when deprived of the enamel, that on coming into contact with air, or food, at all too warm, or cold, the moft intolerable pain is excited.

14. Odontalgia from tartar on the teeth. The tartar feparates the gums from the neck and fang of the tooth, fo as to expofe the latter parts to the cold air, and the ftimulating quality of the food. Hence, it is obvious, pain muft be the confequence.

The radical cure can only be accomplifhed by removing the tartar. The complaint may be palliated by the common applications for the relief of tooth-ache.

15. Odontalgia from a fracture of the body of the tooth. In this cafe the nerves of the remaining portion of the tooth are expofed to the air, and fometimes become affected with extreme pain.

Writers recommend for the purpofe of relieving this complaint, either applying the cautery to the furface of the fractured tooth, or elfe covering it with wax, or gum maftich.

16. Odontalgia verminofa. Whether the tooth-ache can ever really arife from the prefence of worms in a carious tooth, is doubtful. Plenck conceives the occurrence poffible, and he propofes as a means of cure the employment of a gargle containing the muriates of ammonia and foda.

17. Odontalgia periodica fignifies that form of the tooth-ache, which comes on every other day, and refembles in its periods of attack an intermittent fever.

In the treatment, authors recommend the ufe of purgatives, emetics, and the Peruvian bark.

18. Odontalgia cariofa. It is not every fort of caries of the teeth which is accompanied with pain; but only the internal or external humid kind of caries. In the dry caries, and alfo in the humid, when all the nervous filaments of the bone of the tooth have been deftroyed by it, the carious tooth remains free from pain.

In the tooth-ache from caries, the following modes of relief are recommended:

1. Preffure upon the nerve which comes out of the infra-orbitary canal of the fuperior maxillary bone.

2. Preffure upon the nerve which paffes out of the canalis mentalis of the lower jaw-bone.

3. Sulphuric acid applied to the carious part of the tooth by means of a probe. Plenck has fometimes found this plan ufeful.

4. Vinum pyrethri, vel rutæ, or ftrong vinegar.

5. Sinapifms to the cheek.

6. Blifters to the nape of the neck, and behind the ears.

7. The application of a magnet to the painful tooth.

8. Oil of cloves introduced into the carious tooth.

9. Camphorated milk retained for a time in the mouth.

10. Burning the nerve with a heated probe.

11. Opium applied to the carious tooth, or adminiftered internally.

12. Luxating the painful tooth is another mode of relief which has been propofed. With the aid of a fuitable inftrument the tooth is to be turned a little round in its focket, and then turned back again into its natural pofition. Thus, the fmall nerve, which enters the hole in the fang, is either broken or rendered paralytic.

Caries of the Teeth.—This fignifies an erofion of the fubftance of the teeth.

The dentes molares are more frequently than the reft of the teeth affected with caries, and the dentes fapientiæ oftener than any of the other grinders.

Caries of the teeth varies in refpect to its fituation, figure, nature, and caufe.

In regard to fituation, the caries may take place in one, in feveral, or in all the teeth. It may occur upon the external

ternal or internal furface of a tooth; upon the body or the fang of a tooth; or it may affect every part of it.

As to caufes, the caries may proceed from fuch as are properly called external, as a fiffure; a wearing away of the enamel; fordes adhering to the teeth; tartar; a detachment of the gums; a violent effort to bite, by which the apex of the fang, or the bottom of the focket, is contufed; the ufe of mercury; cofmetics; the application of acids, efpecially thofe which are termed mineral; dentifrice powders containing alum; cold damp air; fmoking, or chewing tobacco, &c.

Sugar has been imagined to be hurtful to the teeth; but probably without real foundation. General de Beaufort ate every day for forty years a pound of fugar, and lived to the age of feventy. After death, his vifcera were found free from difeafe, and his teeth found. (Anecdotes de Médécine, tom. ii. p. 35.) Plenck put a healthy tooth into fome fyrup diluted with water, and kept it there two months, at the end of which time it was taken out, and found to have undergone no change. Doctrinâ de Morb. Dentium, p. 52.

The internal caufes are fcurvy, rachitis, fcrofula, &c.

In relation to the particular nature of caries of the teeth, there are two fpecies; one termed humid, which quickly deftroys the tooth affected with it; the other is the dry caries, which advances flowly, lafts a long while, is altogether indolent, and cannot be palliated by any known remedy.

The effects of caries are fetor of the breath; repeated attacks of tooth-ache; infection of the neighbouring teeth; and not unfrequently the correfponding tooth on the oppofite fide of the mouth becomes alfo affected with caries, as feveral authors whimfically fuppofe, from nervous fympathy. In the fituation of the difeafed tooth, efpecially, over the carious fang, the gum is moft commonly attacked with a parulis, or epulis. Sometimes chronic ophthalmy originates from the irritation of the difeafed fang (Journ. de Méd. tom. xxxvi.); or elfe a fiftula of the gums or cheek, or an ozæna of the antrum Highmorianum. Even a locked-jaw has been known to arife from carious teeth. Truka Com. de Tetano, p. 151.

In refpect to figure or form, the following fpecies of caries may be eftablifhed.

1. Caries foraminofa, or a carious canal, which runs from the external furface of the crown, and penetrates the fubftance of the tooth.

In the treatment, it is proper to clean out the carious canal with a needle, and by injecting a fluid into it. Then it is to be burnt with a heated needle; and, laftly, clofed with wax, maftich, gold, or lead.

2. Caries of the whole crown or body of a tooth. When the middle of the crown of a tooth is eroded in fuch a manner, that the caries is wider fuperficially than it is more deeply, then the gold, or lead, or whatever is ufed for filling it up, cannot be retained in its place.

In this circumftance it becomes neceffary to burn the carious furface with a fuitable inftrument; or to deftroy it with cauftic applications; or to apply antifeptics.

But when, notwithftanding all thefe means, the caries yet fpreads, the tooth ought to be extracted, in order to remove the pain, prevent the occurrence of other difeafes, and not incur the rifk of the tooth breaking in pieces in the attempt to take it out at a later period, when it may be excavated and rendered too thin.

3. Caries maculofa. If the fuperficial fpot only appear upon the external furface of the tooth, it may be removed with a file.

4. Caries ftriata. When the caries occurs in the form of a longitudinal black ftreak, it is either in the middle of the crown, or on the lateral margins of the tooth. This cafe may be occafioned by the teeth being placed too clofely together, and alfo by the ufe of cofmetics. It admits of being taken off with a file.

5. Caries of the fang of a tooth. The body of fuch a tooth is fometimes found. The tooth, however, is frequently painful, the cheek of the affected fide, and the gum near the painful tooth fwell, and an abfcefs is formed, which is lefs common in the other fpecies of caries.

The cure requires that the tooth fhould be drawn out as foon as the inflammation has fubfided. It is reckoned dangerous to perform the operation while the parts are much inflamed.

6. Internal caries of a tooth. In this complaint the tooth is painful, and exhibits a leaden colour, and if it be fhaken with an inftrument the pain is confiderably exafperated. Thus the difeafed tooth may be detected amongft many which are healthy, even when feveral of them are thought by the patient to be unfound.

The cure requires the tooth to be extracted.

7. Caries of all the teeth. This affliction is fometimes induced by the fcurvy, and rachitis. The radical cure is of courfe impoffible; but the progrefs of the caries can be checked by the internal ufe of antifcorbutic medicines, the remedies againft rachitis, and by giving affa-fœtida.

Externally, antifeptic wafhes may be ufeful.

Plumbatio dentis is the filling of the carious cavity with thin fheet-lead, tin, or gold. Gold is preferable to lead, which is apt to be acted upon and diffolved by acid food, and may therefore produce the faturnine colic; but, on the other hand, lead is more eafily introduced into the tooth, and it can be more firmly fixed there. Some dentifts give the preference to tin.

The operation is proper, if the carious tooth has a narrow entrance. It can only be performed on the incifors, canine teeth, and firft grinders, which are furnifhed with but one fang.

The operation is contraindicated, when the orifice of the caries is wider than its bottom, as the lead cannot then be retained. Alfo, when pain and inflammation are prefent, the introduction of the lead muft be deferred until thefe fymptoms have fubfided.

The inftruments for this operation are,

1. The introductor.
2. The perforator.
3. The planatorium.
4. The file.
5. The plates or leaves of gold, about three or four times as thick as thofe commonly met with.

As for the operation itfelf,

1. A thin plate of lead, tin, or gold, is to be put into the hollow of the tooth, by means of the inftrument called the introductor.

2. The lead or gold is to be gradually compreffed more and more clofely, fo that it may fill up well the fides of the cavity. This is to be done with the planatorium. Then fome holes are to be drilled in the metal with the perforator, and thefe are to be filled with lead. Laftly, the place is to be rendered even and fmooth with the file.

The lead, for fome days after the operation, proves rather difagreeable to the tongue; but, in a fhort time, the patient is habituated to it, and he experiences no longer any fuch inconvenience.

Sometimes pain and inflammation follow; in which cafe, the lead muft be taken out for a few days with a pointed inftrument.

There have been perfons who have had lead in their teeth feventy years, and upwards, without any annoyance from it.

Of drawing or extracting a Tooth.—We fhall conclude this article with a few obfervations upon the furgical operation of extracting a tooth from its focket.

The following cafes make the performance of it neceffary.

1. A carious tooth, producing a fevere degree of pain, which can be abated by no remedies.

2. A fharp tooth, which irritates and hurts the tongue, and does not admit of being amended with the file.

3. An ulcer, or abfcefs of the maxillary finus.

4. A tooth which renders the focket carious, or caufes abfceffes, or excrefcences of the gums, fiftulæ of the jaw, or fome other troublefome complaints.

5. A milk-tooth not being fhed at the ufual period, and its prefence forcing one of the permanent fet to grow in a wrong direction.

6. A tooth growing out of the palate, or in any other unnatural place.

On the other hand, the operation is contraindicated, when the gums are highly inflamed; or when a tooth-ache, excited by mercury, or the fcurvy, is prefent. Drawing a tooth, in thefe circumftances, might give rife to extenfive inflammation and angina in a dangerous degree.

The common inftruments are,

1. The odontagra.
2. The pelicanus.
3. The clavis, or key.

Thefe three inftruments are objectionable in one refpect: namely, they pull the tooth out of its focket obliquely; and hence they often break the alveolary procefs, or the tooth itfelf.

4. But the tooth-inftrument which Aitken has defcribed, draws the tooth out of the focket perpendicularly; and, on this account, has an advantage. See Effays on feveral important Subjects in Surgery, London, 1771, p. 196.

5. The tooth forceps.

6. The pes caprinus, or punch.

The molares, when they can be firmly taken hold of, may be extracted with either of the firft four inftruments.

The incifores, canini, and firft molares, may be drawn out with the forceps.

Stumps and fangs cannot be taken hold of with thefe inftruments; they muft, therefore, be pufhed out of the alveolary procefs with the pes caprinus, or punch, and then be removed with a pair of forceps.

The patient and furgeon are to place themfelves as follows.

1. If the tooth be in the upper jaw, and it is to be taken out with the odontagra, pelicanus, or punch; or if the tooth, which is to be drawn, is in the lower jaw, the patient muft be feated in a low chair, or on the ground, the furgeon ftanding behind him.

2. But if the tooth is to be taken out with the key, or from the upper jaw with the forceps, the patient is to fit in a common chair, and the furgeon is to ftand in front of him.

The following are the different methods of performing the operation.

1. Of extracting a tooth with the odontagra.

The inner gum of the tooth about to be drawn, is to be depreffed with the claw of the inftrument nearly down to the alveolary procefs. The other part of the inftrument is to be applied to the crown of the tooth.

While the thumb is employed in making firm preffure upon the claw, the handle is to be held with the fingers, and, under the direction of the palm, the tooth is to be raifed perpendicularly from its focket.

By means of the fcrew, which admits of being turned, the inftrument may readily be adapted to the larger teeth.

2. Of drawing a tooth with the key.

The key is applied to the tooth nearly in the fame way as the odontagra, except that the thumb of the other hand is placed upon the claw. At the commencement, the key is to be turned very gradually; and the tooth, when it yields, is to be cautioufly and flowly raifed, left it flip away, and remain adherent to the gum.

3. Of drawing a tooth with the pelicanus.

The claw of this inftrument is to be applied to the infide of the neck of the tooth, while the rotula is to be put upon the two neighbouring teeth. The thumb of the hand not holding the inftrument is to be applied to the infide of them, fo as to counteract the refiftance of the rotula.

4. Of the extraction of a tooth with the forceps.

The neck of the tooth being firmly grafped with the forceps, is to be gradually moved, until it is fufficiently loofened to admit of being taken out perpendicularly.

5. Of taking out a tooth with the pes caprinus, or punch.

The two points of the inftrument are to be firmly applied, under the gum, to the lower part of the neck of the remaining portion of the tooth. The thumb of the hand not thus employed is to be covered with fome linen, and applied internally. The fang is then to be pufhed out of the focket, and removed with a pair of forceps.

With regard to the fymptoms arifing after the operation: a flight hæmorrhage, and a fwelling of the gums and cheek, are the ufual confequences. Thefe, however, are free from danger, and, when the mouth is wafhed with a gargle of tepid vinegar, they are foon relieved.

The more ferious confequences, which fometimes occur after the extraction of a tooth, are,

1. A violent and dangerous degree of hæmorrhage.

2. Alarming inflammation of the gums and cheek.

3. Abfceffes of the gums; very apt to take place, when the gums have been confiderably bruifed by the inftrument, or when fplinters of bone are left behind.

4. A fracture of the alveolary procefs, or of the palate. This accident is moft liable to happen, when the fangs of the teeth diverge, or when the fang and focket have grown together by the procefs of offification. The exiftence of the laft cafe may be known by the neck of the tooth being curved. Here the tooth fhould always be drawn out towards its concave fide.

5. Diflocation of the jaw. This may occur, if the mouth be too much open, or the lower jaw be brought too much forward, in the operation. The luxation ought to be immediately reduced. See Luxation.

6. Fracture of the jaw. See Fracture.

7. Caries of the focket.

8. Laftly, fracture and luxation of the tooth may be the confequences of an unfuccefsful attempt to perform the operation.

In the preceding remarks, we have been chiefly affifted by Plenck's excellent compendium, entitled "Doctrina de Morbis Dentium," &c. Lovanii, 1796.

Some interefting obfervations on the difeafes of the teeth, particularly with a view to the queftion whether thefe parts are vafcular, will be found in the article Cranium.

For a defcription of the difeafes of the gums, we refer to Gums, *Difeafes of.*

A Danifh

A Daniſh phyſician, named Hagerup, maintains in certain theſes that one may hear with the teeth.

As to animals, there are ſome fiſhes which have teeth on their tongues, as trouts; others have them at the bottom of the gullet, as the cod-fiſh; ſome, as the great ſea-dog or ſhark, called *canis carcharias*, have three, four, or five rows of teeth on the ſame jaw; the crocodile three, and thoſe all inciſors; vipers have two large crooked canine teeth, which are moveable, and ordinarily lie flat, only being raiſed when they would bite; and the rana piſcatrix, ſea-frog, or ſea-devil, has whole rows of the like moveable teeth. The toad and cuttle-fiſh have no teeth, and yet they can bite. See *Anatomy of* FISH.

TEETH, *Chemical Analyſis of.* The teeth cloſely reſemble bone in their compoſition. The bodies conſiſt of a cartilaginous baſis, united with phoſphate of lime, and ſmall proportions of other earthy ſalts. The enamel differs ſo far only from the bodies, that it contains no cartilaginous matter, but conſiſts entirely of earthy ſubſtances. The teeth have been often examined, and with various reſults, according to the ſtate of chemical knowledge at the period of examination. We do not think it neceſſary to give an account of all that has been ſaid on the ſubject, but ſhall confine our attention principally to the lateſt and moſt perfect analyſes. We ſhall begin with the analyſis of Mr. Pepys: he found the enamel of teeth compoſed of

Phoſphate of lime - - -	78
Carbonate of lime - - -	6
Loſs and water - - -	16
	100

The bodies of the teeth, according to the ſame chemiſt, conſiſt of the following proportions.

	Roots of the Teeth.	Teeth of Adults.	Firſt Teeth of Children.
Phoſphate of lime -	58	64	62
Carbonate of lime -	4	6	6
Cartilage - -	28	20	20
Loſs - - -	10	10	12
	100	100	100

A much more complete analyſis, however, of the enamel of teeth has lately been made by Berzelius. He gives the following table of his reſults, compared with the compoſition of the bones of the ſame animals.

	Dried Human Bones.	Enamel of Human Teeth.	Bones of Oxen.	Enamel of Ox Teeth.
Cartilage - -	32.17	—	} 33.30	} 3.56
Blood-veſſels -	1.13	—		
Fluate of lime -	2.00	3.2	2.50	4.00
Phoſphate of lime -	51.04	85.3	55.85	81.00
Carbonate of lime -	11.30	8.0	3.85	7.10
Phoſphate of magneſia - -	1.16	1.5	2.05	3.00
Soda, muriate of ſoda, water, &c.	1.20	2.0	2.45	1.34
	100	100	100	100

Thus confirming a diſcovery made many years before by Morichini, an Italian chemiſt, namely, that the enamel of teeth contains fluoric acid; a circumſtance which had been called in queſtion by later inquirers.

Foſſile ivory and bone have been found by Fourcroy and Vauquelin to retain proportions of animal matter, varying from 45 to 15 *per cent.*; a curious fact, and highly illuſtrative of the powers of intimate mixture, or rather perhaps chemical union, in preventing the deſtruction of organic ſubſtances.

TEETH, *Artificial*, are thoſe ſet in lieu of natural ones, which are wanting. See TEETH, *Diſeaſes of.*

TEETH, *Mark of*, in the *Manege.* See MARK and EYE *of a Bean.* See alſo TEETH, *infra.*

TEETH *of Fiſh.* See *Anatomy of* FISH.

TEETH, in *Rural Economy*, little bones fixed in the jaws, which ſerve not only to reduce the food and nouriſhment, but ſhew the age in ſome animals. The horſe has forty teeth, including the tuſhes, which are thus diſtinguiſhed. Twenty-four are called *grinders*, being placed at the bottom of the mouth, beyond the bars, twelve on each ſide of the channel, *viz.* ſix above, and ſix on each ſide. Theſe teeth continue, and do not give place to new teeth in their room, ſo that they are of no uſe in diſtinguiſhing a horſe's age; and they are ſubject to wolves teeth. In regard to the other ſixteen, twelve of them are called in their infancy *milk* or *foal* teeth, and the remaining four go by the name of *tuſhes.* The twelve foal teeth are ſhort, ſmall, and white, and are ſeated on the fore-part of the mouth, ſix above, and ſix below: and theſe change and caſt, to give place to others; which, in proceſs of time, become long, large, and yellowiſh.

Theſe new teeth are diſtinguiſhed by different names given them, according to their putting forth; and it is the manner of their coming forth that gives the knowledge of the firſt years of a horſe's age.

Of theſe twelve, four are called *nippers*, four *middling* teeth, and four go by the name of *corner* teeth. The four nippers are ſeated on the fore-part of the mouth, two above, and two below. When a horſe has put forth theſe, he is concluded to be from two and a half to three years old.

The middling teeth are placed near the nippers or gatherers, one above, and one below, on each ſide of the jaws. They come out and appear between three and a half and four years.

The corner teeth are placed ſtill more forward in the mouth, one above, and one below, on each ſide of the jaws.

They begin to ſhoot between the fourth and the fifth year, and are got above the gum at five years; and when ſurmounting the gum at that age, they become hollow, and mark commonly till ſeven or eight years. By marking is meant, that in the hollow or cavity of the corner teeth a little black ſpeck is formed, which, from its reſemblance, is called the bud or eye of a bean, or the mark. But when the horſe paſſes ſix, the cavity begins to fill, and the black mark diſappears by degrees; yet this diminution of the cavity and the mark continues from ſix to ſeven and a half. However, at eight years, the cavity is filled up, and the black mark gone; and the tooth is then full, and even as if it had been ſhaved. It is then ſaid, that the horſe has *raized*, which happens a little before the eighth year; and after that, the horſe does not mark; ſo that the ſureſt knowledge of his age is then formed from his tuſhes.

The tuſhes are placed beyond the corner teeth, upon the bars, two on each ſide below, without being preceded by any foal teeth. The two under tuſhes cut ſometimes at three years, ſometimes at three and a half, ſometimes at four;

four; but the two upper tuſhes ſometimes at four, ſometimes at four and a half; ſometimes before and ſometimes after the corner teeth, without any certain rule; and till the age of ſix they are chamfered within. And at about ten years of age the two under tuſhes appear much worn, which ſerves for that age. After that they grow out in length, and become bare of fleſh, becauſe the gum ſhrinks and retires; and at laſt, about the fifteenth or ſixteenth year, the horſe *ſhells.*

It is ſometimes ſaid, that a horſe is not capable of any great fatigue till his tuſhes have cut the ſkin. See AGE, in *Horſemanſhip.*

The teeth in ſheep are divided into two kinds, the *inciſores* and the *molares*, or the cutting and dividing, and the rubbing and grinding teeth. Such ſheep as are full-mouthed have eight of the firſt ſort of teeth; throwing up two every year, conſequently loſe their ſucking teeth. The inciſores are found to wear down in proportion to the action which they have; but the molares, having more ſtrength, and a different form, do not ſuffer ſo much in this way.

It has been ſuggeſted by an experienced ſheep-farmer, that theſe ſorts of young animals moſtly renew their firſt two teeth at from about fourteen to ſixteen months of age; and after that, every year nearly at the ſame time, until they are turned three years old, or, in the technical language of the ſheep-maſter, three ſhear, when they become full-mouthed; for although they have eight teeth before in the under jaw, it is commonly believed that they only caſt and renew the ſix inſide ones. Shepherds, however, differ much on this point, ſome contending that they only ſhed the ſix fore-teeth, while others maintain that they caſt the whole eight fore-teeth. The matter is, therefore, not yet well aſcertained. Some properly remark, that ſheep are very uncertain in their throwing up their teeth; much depending upon their being early or late lambed, well or ill fed, and other ſimilar circumſtances. Tups have been known to have four broad or renewed teeth, when by the age, as ſhewn in the above manner, they ought to have had only two. Some ſheep are remarked to be more backward than others, by ſeveral months, in proportion to their ſtrength of conſtitution, and other matters.

In Romney Marſh the teeth of ſheep are found to decay much faſter, it is believed, than in any other part of the country. Cloſe feeding wears the teeth exceedingly; of courſe, the teeth of the ſheep of thoſe who ſtock the hardeſt commonly decay the ſooneſt. The ſheep graziers in this diſtrict are very particular in mouthing their ſheep, which are kept or rejected according as their mouths are found to be good or bad; as, where the latter is the caſe, they have great difficulty in maintaining themſelves during the winter ſeaſon.

It is noticed that ſheep, about the time of renewing their teeth, are very tender in their mouths, and do not thrive ſo well as they do at other ſeaſons. At one ſeaſon a teg, it is ſuppoſed, may ſtarve any ſheep by cloſe feeding; but on the renewal of its broad teeth, any ſheep may ſtarve it.

In the above diſtrict, the barrens or old breeding ewes are generally caſt off when they have had their third lamb; though ſometimes, if their mouths be good, and they are often better than thoſe that have had only one lamb, they are kept for the fourth lamb: nor is this ſuppoſed a bad practice, ſince by it ſome valuable ewes may be reſerved.

Sheep are ſeldom kept here to any great age: ſome favourites are, however, kept till ten years old, without a tooth in their heads. Some have heard of their living twenty years. In the county of Hereford they are ſaid to live to a great age: they live on long graſs in the ſummer ſeaſon, and peaſe-ſtraw and other ſimilar matters in the winter, which do not wear their teeth ſo much as when they labour hard on a cloſe ſhort-ſet turf. See SHEEP.

The teeth of the various other ſorts of domeſtic animals have hitherto been but little noticed or attended to by ſtore or ſtock maſters, though they are probably, in many caſes, as much changed, and ſerve to mark the ages and growths of the animals as much and as certainly, as in the inſtances and caſes which have been given above.

TEETH, *Mammoth's.* See MAMMOTH's *Teeth.*

TEETH, *Wolf's.* See WOLVES' *Teeth.*

TEETH *of a Wheel*, in *Mechanics.* See WHEEL.

TEETHING. See DENTITION, and *Diſeaſes of* TEETH, *ſupra.*

TEETMOW, in *Geography*, a town of Bengal: 40 miles S.S.E. of Curruckpour.

TEFEE, a town of Braſil, in the government of Para, on the river of the Amazons; 220 miles W. of Fort Rio Negro.

TEFELSDORF, a town of Tranſylvania; 7 miles N. of Scheſburg.

TEFEN, a town of Aſiatic Turkey, in Natolia; 28 miles S.W. of Amaſieh.

TEFESSAD, or TFESSAD, a town of Algiers, whoſe ruins extend along the coaſt of the Mediterranean near a league, ſuppoſed to have been the ancient Tipaſa; 32 miles S.S.W. of Algiers. N. lat. 36° 32′. E. long. 2° 54′.

TEFETHNE, or TEFTANE, a town of Morocco, on the coaſt; 60 miles W. of Morocco.—Alſo, a river of Morocco, which runs into the ſea near Mogodor.

TEFFEREG, a town of the archbiſhopric of Salzburg; 1 mile S. of Windiſch Matray.

TEFLIS, a town of Aſia, capital of the principality of Georgia, and ſee of a biſhop, founded, according to an old inſcription in the citadel, by a certain prince Sarang, A.D. 1063, is ſituated on the N.W. ſide of the great plain of Karajoes, at the foot of a hill, occupying both banks of the river Kur, over which is a bridge. This city is ſurrounded with ſtrong walls, except towards the river; and has a large fortreſs at the declivity of the mountain, which contains a garriſon, and is often made uſe of as a place of refuge for criminals and debtors. All the houſes are of ſtone, with flat roofs, which ſerve, according to the cuſtom of the Eaſt, as walks for the women. The buildings are neat and clean; but the ſtreets are exceedingly dirty and narrow. The town contains one Roman Catholic, thirteen Greek, and ſeven Armenian churches. Near it are ſome warm ſprings, and hence it is called Theleſtokar, or Warm town. In the year 1386, this town was taken by Tamerlane, and the king of Georgia made priſoner. In 1723 it was taken by the Turks; and in 1734 retaken by Kouli Khan. Before it was taken by Aga Mahomed Khan, in 1797, it contained 4000 houſes, and 22,000 inhabitants. Although moſt of the houſes, which are neatly built, are now ſtanding, the population does not exceed 15,000 ſouls. It was for many years the reſidence of prince Heraclius, and is at preſent that of the Ruſſian governor and commander-in-chief, who has at all times a large force ſtationed in the city, to the diſguſt of the inhabitants, who ſhudder at the thoughts of their wives and daughters being conſtantly expoſed to the view and importunities of ſtrangers. This circumſtance tends to render the Ruſſian name deteſted by the Georgians: 100 miles N.N.E. of Erivan. N. lat. 42° 45′. E. long. 45° 20′.

TEFTERDAR, the name of an officer of dignity in the Eaſtern nations. In Egypt he is lord high treaſurer of the tribute paid out of the lands to the grand ſignior. He is named for

for a year by the Porte, but is generally continued in his office many years. This office is sometimes given to one of the poorer beys, to help him to support his dignity; and frequently to a quiet one, who is not likely to enter into intrigues. For one party never cares that a stirring man of the opposite party should be invested with an office of this dignity. See Deftardar.

TEFUT, in *Geography*, a town of Africa, in the country of Darah, formerly the capital of the ancient kings of Darah, now gone to decay.

TEFZA, a town of Morocco, built by the Arabians on the side of a mountain: the surrounding walls are composed of blocks of marble; 70 miles N.E. of Morocco. N. lat. 31° 40'.

TEFZRA, a town of Algiers; 15 miles S. of Tremecen.

TEG, a term used in some parts of the kingdom by the farmers, to express a lamb of a year old. Among sportsmen it denotes a roe of two years old. When a flock of ewes and lambs are turned into a turnip-field, the young lambs of three weeks old will immediately fall to eating the turnips, and scoop them very prettily; but these tegs will not touch them for several days. They usually stay till almost starved to death before they begin, but when they have begun, they soon grow fat.

In the Romney Marsh system of management, both the ewe and the wether tegs are kept upon the upland grass farms during the winter season, by which advantages are gained in various ways. They are by this means enabled to keep more ewes and fattening sheep on their marsh-lands, and to have the tegs when the pastures require them. See Sheep.

TEGADOO Bay, in *Geography*, a bay on the east coast of the most northern islands of New Zealand, discovered by captain, then lieutenant Cook, in 1769. S. lat. 38° 10'. W. long. 181° 14'.

TEGÆA, Jimmel, in *Ancient Geography*, a town of Africa, mentioned by Hirtius, situated S.W. of Leptis.

TEGANAN, an island of the Mediterranean, in the vicinity of that of Rhodes.

TEGAPATAM, in *Geography*. See Fort *St. David*.

TEGAREE, a town of Bengal; 11 miles N. of Kishenagur.

TEGAZA, a town of Africa, capital of a district in Zenhaga; near it is a salt-mine, about 300 miles from the Atlantic, and 400 S. of Cape Non. N. lat. 22° 20'.

TEGE, in *Ancient Geography*, a town of Africa Propria, between the two Syrtes. Ptol.

TEGEA, a town in the S.E. part of Arcadia, at a small distance from the Argolide; and placed by M. D'Anville on the scite of the modern Moklia. In this place was a famous temple of Minerva Alea, in which was a statue of the goddess, which was removed to Rome by Augustus. This temple contained a number of other curiosities; and the priesthood in it was exercised by a young female under fifteen years of age. Near this temple was a stadium, in which were celebrated games in honour of Minerva, and others in memory of a victory gained over the Lacedæmonians. The public place was ornamented with statues, and particularly one of Mars Gynecothoene, (γυνηκοθοινε,) sculptured upon a column. The epithet served to maintain the remembrance of a victory obtained by the valour of the females of Tegea. At a small distance from the public place was a magnificent theatre, encompassed with bronze statues. This city suffered much in the wars which raged in Arcadia in the time of the Achæan league. Pausanias says that here was a temple of Venus Urania, near that which was dedicated to Ceres and Proserpine. The Tegeates were a valiant people. Herodotus (l. i. c. 61.) mentions them with commendation. The Lacedæmonians ravaged the territory of Tegea, and at length obtained a superiority over its inhabitants.

Tegea, a town of the isle of Crete, said to have been inhabited by Agamemnon.—Also, a town of Macedonia.

TEGEHET, or Tegegilt, in *Geography*, a town of Africa; 120 miles S.S.W. of Fez.

TEGEL, Eric, in *Biography*, a Swedish historian, and principal secretary to Eric XIV. His father, having incurred the just resentment of Eric, as the cause of the misfortunes that occurred during his reign, was apprehended by Charles, duke of Sudermania the brother of Eric, and put to death at Stockholm in 1568. Charles, however, took the son under his protection, and sent him to Germany for improvement; and when he had visited Spain and Poland, appointed him his secretary. In 1614 he was nominated by Gustavus Adolphus historiographer of the kingdom, and in 1617 a privy-counsellor. He died at Stockholm in 1636, and left several works, of which the following were printed in Swedish: *viz.* "The History of Gustavus I. in two Parts." Stockholm, 1622, fol. "The History of Eric XIV. with Stiernman's Remarks;" 16-1721, 4to.

TEGENUM, or Tegianum, in *Ancient Geography*, a town of Lucania.

TEGERHY, or Teigarea, in *Geography*, a town of Africa, in the country of Fezzan; 80 miles S.W. of Mourzouk. It is a small town, and collects from its lands little produce besides dates and Indian corn. N. lat. 26° 17'. E. long. 15° 5'.

TEGERN, a town of Bavaria, on a lake called the Tegern See, anciently Lacus Tigurinus. Here is a celebrated abbey, founded by Albert and Ockar, two Bavarian princes; 28 miles S.S.E. of Munich.

TEGESSUS, in *Ancient Geography*, a town of the island of Cyprus.

TEGEWSE, in *Geography*, a town of Africa, near the lake of Marks, anciently called Tichasa; 38 miles S.S.W. of Gafsa.

TEGHURI, a large river of Mingrelia, which rises between the Alani and Soanni hills, and disembogues into the Phasis, 10 versts above the Scharistkali.

TEGIANUM, in *Ancient Geography*, a town of Italy, in Campania, according to Cluvier; though others assign it to Lucania, and call it Tegenum

TEGIUM, a town of Asia Minor, in the Troade.

TEGLA, in *Geography*. See Tuggala.

TEGLIO, a town of Italy, in the Valteline, situated upon the top of a mountain, is a long straggling place, containing about 300 houses, about 9 miles from Tirano, and 12 from Sondrio. Close to the town are the ruins of a fortress, standing upon an insulated rock, and formerly esteemed of great strength. This elevated spot commands a rich and extensive prospect from Tirano to the lower part of the valley, beyond Sondrio, as far as Morbegno. The government of Teglio is said to contain the 12th part of the Valteline; it is the most populous district, and contains about 8000 souls. In a good season, it produces much more corn than is sufficient for the consumption of the inhabitants, and rivals Sondrio and Tirano in the goodness of its wine.

TEGNA, in *Ancient Geography*, a town of Gaul, on the banks of the Rhone, not far from Valentia, to the north; the modern Tein.

TEGOMA, in *Geography*, a town of Africa, in the country of Asoudan; 50 miles S. of Agades. N. lat. 19° 10'. E. long. 12° 20'.

TEGORARIN, a town of Africa, in Biledulgerid; 70 miles N.N.W. of Gardeiah.

TEGUCO, a town of New Mexico, in the province of Culiacan; 40 miles N. of Culiacan.

TEGUIXIN, in *Zoology*, a fpecies of *lizard;* which fee.

TEGULA, in *Ancient Geography*, a town of Sardinia, on the route from Sulci to Nora. Anton. Itin.

TEGULET, in *Geography*, a town of Abyffinia; 180 miles S. of Gondar. N. lat. 9° 54′. E. long. 38° 35′.

TEGUMENT. See INTEGUMENT,

TEGYRA, in *Ancient Geography*, a town of Greece, in Bœtica.

TEHAE′, in *Geography*, a town of Curdiftan; 30 miles E. of Amadieh.

TEHAMA, a fandy belt which encompaffes the peninfula of Arabia, beginning at Suez, and terminating at the mouth of the Euphrates. It is of various breadth; for the moft part about two days' journey from the fea-fhore to the rife of the hills; or at leaft this is the breadth of the plain adjacent to the Red fea. It bears every mark of having been anciently a part of the bed of the fea. Its bottom foil is a greyifh clay, with a large proportion of fand, and having marine exuviæ interfperfed to a great diftance from the fea-fhore. It contains large ftrata of falt, which in fome places rife up to hills. Its regular inclination towards the fea indicates that it has emerged gradually. The fmall eminences on the confines of this plain are compofed of calcareous ftones, with a blackifh appearance, as if they had been burnt by the fun. The adjoining hills contain fchiftus and bafaltes. The fea, it is thought, ftill continues to recede, and the Tehama on that fide is gradually extending its limits. Hiftory confirms thefe appearances of the gradual receffion of the waters; and mentions, as fea-ports, feveral places which are at prefent inland, without noticing the prefent maritime towns, which muft have been of later origin than the formation of the land on which they ftand. Thefe newly-formed lands, however, are barren and unfruitful.

TEHRAUN, one of the five large diftricts of the province of Irak, in the Perfian empire: the other four being Ifpahan, Naen, Mullayer, and Kermanfhaw. Tehraun is alfo the name of the prefent capital of Perfia, which is rendered interefting by the furrounding fcenery. To the S. are the extenfive ruins of the grand and once proud city of Rae; to the E. the mountains of Elburz (famed in the Perfian traditions as the abode of dæmons); to the N. the fnow-clad fummit of the lofty Dumavend; and to the W. a plain enriched with cultivation and villages, and forming a delightful contraft with the rugged and ftupendous rocks which fkirt it on the N. and S. Tehraun is about four miles in circumference, furrounded by a ftrong wall, flanked by innumerable towers, and a noble dry ditch, with a glacis between it and the wall. The only building of confequence within the city is the citadel, which contains the palace of the fovereign and his officers. It was founded by Kurim Khan, enlarged by the late king, and beautified by the prefent fovereign. The fortifications can be confidered as formidable only in a country where the military art is unknown. The population is variable, being in fummer about 10,000, and in winter not lefs than 60,000 people. The environs of Tehraun are not unpleafant; the plain, to the E. and W., being covered with villages, and abounding in grain. On the N. fide the king has completed a palace, which, from its fituation, and the fine gardens that furround it, is a moft delightful refidence. There are many reafons which have probably induced the late king to fix upon Tehraun as the capital of his dominions. Its centrical fituation, and the eafy defence which it affords to the Perfian empire; the fertility and productivenefs of the furrounding country; the number of wandering tribes that have fettled round it, and that may be eafily and foon affembled; and above all, perhaps, its propinquity to Aftrabad, the native city of Aga Mahomed Khan, and alfo to Mazanderan and Daheftan, countries poffeffed by the Kajer tribe, of which he was the chief, and on whofe power and affection to his perfon his authority was in a great meafure founded;—all thefe confiderations might have induced him to make this city the capital of the empire. N. lat. 35° 40′. E. long. 50° 52′.

TEHROOT, or ZEHEROOT, a town of Perfia, in the province of Kerman, furrounded by numerous gardens; 8 miles N.W. by W. from Subziftan, and about 52 miles from the ruins of Bumm.

TEHUACAN, or TEGUACAN, a pleafant town of New Spain, between Oaxaca and Orizava. It is fituated in a delightful vale, near a river of the fame name, called alfo Rio Grande, of a nitrous quality, and fo petrifying a nature, that the fhores refemble ruinous walls. It has four churches; and the ftreets, fquares, and houfes are neat and modern. The chief market is that of wheat, which is excellent, and the pomegranates are highly efteemed. Befides numerous families of Spaniards and Mulattoes, here are about 2080 Indians. In the vicinity of this town are two wheat-harvefts, one in May, the other in September.

TEHUELS, a large lake of South America, towards the S. of Chili.

TEHUKHA, a town of Thibet; 4 miles S. of Jhanfu Jeung.

TEICHOPŒUS, τειχοποιος, among the Athenians, an officer who had the care of the city walls; their number was the fame with that of the tribes, every tribe having the choice of one.

TEIGN, in *Geography*, a river of England, in the county of Devon, which runs into the Englifh Channel at Teignmouth.

TEIGNMOUTH, a market-town in the hundred of Exminfter, and county of Devon, England, is fituated, as its name imports, at the mouth of the river Teign, and is fheltered on the eaft and north-eaft by a chain of hills, near the foot of which it ftands. It is diftant from Exeter 12 miles S. by E., and from London 187 W.S.W. A fmall rivulet divides the town into two parts or parifhes, called Weft and Eaft Teignmouth. The town is recorded to have been burnt in the tenth century by the Danes, who, having landed here, and defeated the king's lieutenant, ravaged the country to a confiderable extent. It was alfo nearly confumed in the reign of queen Anne, when the French landed and fet fire to it: one of the new ftreets, erected with the money procured by a brief for the diftreffed inhabitants, was named French-ftreet, as a memorial of the calamity. Since that period the town has become of much greater importance, and is now one of the moft fafhionable watering-places in the weftern part of England. The principal refort of company is Eaft Teignmouth, where the public rooms and theatre are fituated: the former, a neat building, contains tea, coffee, affembly, and billiard-rooms; the theatre has been recently built on a fpot of ground given by lord Courtenay, and was firft opened in the fummer of 1802. A walk or promenade leads from the public rooms towards the fouth, over an extenfive flat called the Den, on which is a fmall fort erected for the defence of the town. The view hence, up the river, is extremely beautiful; the ground gradually rifing on each fide into verdant hills, well cultivated, and adorned with woods. The cliffs overhanging the fea have a fingular appearance, being, with the exception of a few broad patches of verdure, of a deep red colour, and mount in rude irregular ſhapes to the height of ſeventy or eighty feet. Near the centre of Weſt Teignmouth is the church, a very ancient ſtone fabric, built in the form of a croſs: the roof is ſupported in a ſingular manner by the ramifications of a wooden pillar, that was formed from the trunk of a ſingle tree. Eaſt Teignmouth church is a venerable pile near the beach, and, from the appearance of its architecture, was probably one of the earlieſt ſtructures erected after the coming of the Normans. The trade of Teignmouth conſiſts chiefly of commercial intercourſe with Newfoundland; the exportation of clay, and the importation of coal; and is carried on principally in craft built at the place, where are conveniences for launching veſſels of a hundred tons. The clay exported is brought from Bovey, for the moſt part by a canal; and dug on the eſtate of James Templar, eſq., who, with true patriotiſm, is employed indefatigably in promoting the ſolid intereſts of his country, by improving agriculture, and encouraging manufactures. Weſt Teignmouth had anciently a chartered market, held on Sundays; but this was diſcontinued by order of the ſheriff in the reign of Henry III. The market is now held on Saturdays. Salmon, trout, whiting, mackarel, and various other kinds of fiſh, are taken here; and by ſome excellent local regulations, the inhabitants have the privilege of ſupplying themſelves before any can be ſold to the dealers. The lord of the manor holds a court-baron, or court-leet, in the town once every year: at which court a jury is nominated, two conſtables deputed and ſworn, and a portreve choſen, who is inveſted with conſiderable authority. In the population return of the year 1811, Weſt Teignmouth was ſtated to contain 441 houſes; Eaſt Teignmouth, 188; the inhabitants of the former being 2080; of the latter 813: making an aggregate of 2893 perſons, occupying 629 houſes.

Nearly oppoſite Teignmouth, and almoſt under the promontory called the Neſs, is the hamlet of Shaldon, the property of lord Clifford, which has lately become a favourite ſummer reſidence for many families who viſit the watering places on this coaſt. The chapel, erected about the year 1670, ſtands in a beautiful ſituation, a little above the Teign, about three quarters of a mile from the hamlet, and is approached by a level walk ſhaded with luxuriant trees.—Beauties of England and Wales, vol. iv. Devonſhire. By J. Britton and E. W. Brayley, 1803. Warner's Walk through the Weſtern Counties, 1800.

TEIJEUT, a town of Morocco; 15 miles S.E. of Mogodor.

TEIL, a river of France, which runs into the Atlantic, N. lat. 47° 39′. W. long. 3° 8′.

Teil, *Le*, a town of France, in the department of the Ardeche, on the Rhone; 12 miles S. of Privas.—Alſo, a town of France, in the department of the Ille and Vilaine; 15 miles S.E. of Rennes.

TEILLEUL, Le, a town of France, in the department of the Channel; 6 miles S. of Mortain.

TEIN, a town of Bohemia, in the circle of Pilſen; 6 miles N.E. of Tachau.

Tein, or *Teyn*, a town of Bohemia, in the circle of Bechin; 4 miles S. of Bechin.

TEINITZ, a town of Bohemia, in the circle of Pilſen; 26 miles S.W. of Pilſen. N. lat. 49° 30′. E. long. 12° 57′.—Alſo, a town of Moravia, in the circle of Brunn; 27 miles S.S.E. of Brunn.

Teinitz *Jungfern*, a town of Bohemia, in the circle of Schlan; 8 miles W. of Schlan.

TEINTS, and *Semi-Teints*, in *Painting*, denote the ſeveral colours uſed in a picture, conſidered as more or leſs high, or bright, or deep, or thin, or weakened, and diminiſhed, &c. to give the proper relievo, or ſoftneſs, or diſtance, to the ſeveral objects. See Colouring.

The word is pure French, where it ſignifies the ſame.

TEIRCE, or Teirs. See Tierce.

TEISBACH, in *Geography*, a town of Bavaria, on the Iſer; 1 mile W. of Dingelfingen.

TEISENDORF, a town of the archbiſhopric of Salzburg; 12 miles W.N.W. of Salzburg.

TEISKO, a town of Sweden, in Tavaſtland; 45 miles N.N.W. of Tavaſthus.

TEISSIER, Anthony, in *Biography*, a voluminous French writer, was born at Montpellier in the year 1632. Having ſtudied Greek and philoſophy at Orange, and being deſtined for the miniſtry among the Calviniſts, he applied to Hebrew and theology at Niſmes; and after ſpending ſome time in the academy at Montauban, he removed to that of Saumur. From thence he went to Paris, where he cultivated an acquaintance with ſeveral learned men; but giving up his deſigns for the miniſtry, on account of a diſorder under which he laboured, he turned his thoughts to juriſprudence, and took the degree of LL.D. at Bruges. In 1683 he married; but upon the revocation of the edict of Nantes, he was obliged to quit France. He then retired with his wife to Switzerland, and was recommended by Turretin and Heidegger to the family of Eſcher, a burgomaſter of Zurich. Declining to accept advantageous offers if he returned to France, he engaged with the ſenators of Berne for two years in conducting a French gazette in that city. In 1691 he quitted Berne and went to Zurich; and from thence he proceeded to Brandenburgh, where refugees enjoyed common privileges with thoſe of the natives of the country. At Berlin, the elector appointed him hiſtoriographer, with an annual penſion of 300 crowns, which was ſucceſſively augmented. He was alſo honoured with the title of counſellor of legation, and ordered by the elector to tranſlate into French the life of his father, Frederic William, written in Latin by Puffendorf. For this ſervice he was liberally rewarded, though his tranſlation was never printed. He was afterwards employed in compoſing many works for the inſtruction of the prince royal; and though his conſtitution was delicate, he enjoyed good health till his death, which happened in 1715, in the eighty-fourth year of his age. It would exceed our limits to enumerate all his works; an ample account of them may be found in the General Biography.

TEI-TCHANG, in *Geography*, a town of Corea; 13 miles N.N.E. of Haimen.

TEITEI, in *Ornithology*, the name of a Braſilian bird, a ſpecies of tanagra, in the Linnæan ſyſtem, called alſo *guiranheemegeta*, and *guraundi*.

It is of the ſize of our red-breaſt, and beautifully coloured.

It ſings very ſweetly, and is kept in cages, five or ſix together in the ſame cage. Marcgrave's Hiſt. of Braſil.

TEITH, in *Geography*, a river of Scotland, formed by ſtreams from ſeveral lakes, in the county of Perth, which runs into the Forth, two miles above Stirling.

TEJUCO, the capital of the Diamond diſtrict in Braſil, ſituated in a ravine at the foot of a mountain. Tejuco is ſeparated by the ſmall rivulet of St. Franciſco from the oppoſite mountains. The greateſt of the diamond works, called Mandanga, is ſituated on the river Izgitanhanha, and employs about 1000 negroes, ſometimes double this number. This rich river, formed by the junction of ſeveral ſtreams, is as wide as the Thames at Windſor, and in general from three to to nine feet deep. The part now working is a curve or elbow, from which the current is diverted into a canal cut acrofs the tongue of land round which it winds; the river being ftopped below the head of the canal by an embankment formed of feveral thoufand bags of fand. The deeper parts of the channel of the river are laid dry by large caiffons, or chain-pumps, worked by a water-wheel. The mud is then carried off, and the cafcalhão is dug up and removed to a convenient place for wafhing by machinery adapted to this purpofe. The contrivance for obtaining th· diamonds from the cafcalhão is particularly defcribed by Mr. Mawe, ubi infra. Tejuco is fituated in a fterile diftrict, which produces nothing for the maintenance of its inhabitants, whofe number is about 6000; and therefore depends for a fupply of provifions, on farms fituated at the diftance of feveral leagues. Neverthelefs, Tejuco may be called flourifhing, on account of the circulation of property created by the diamond-works in its vicinity. The annual fum paid by government for the hire of negroes, falaries of officers, and various neceffaries, fuch as nitre and iron, does not amount to lefs than 35,000*l.* and this, added to the demands of the inhabitants of the town and its neighbourhood, occafions a confiderable trade. The fhops are ftocked with Englifh cottons, baizes, and cloths, and other manufactured goods; alfo hams, cheefe, butter, porter, and other articles of confumption, which are brought on mules from Bahia and Rio de Janeiro. Tejuco, from its fituation on the fide of a hill, is very irregularly built; its ftreets are uneven, but the houfes in general are well conftructed, and in good condition, compared with thofe of other towns in the interior. Its name, fignifying in the Portuguefe language a muddy place, is derived from places of that defcription near it, which are rendered paffable by being covered with large pieces of wood. The diamonds are locked in the treafury under three locks; and thofe found in the diftrict are depofited every month, as they are received from the works; they are carefully weighed, and fome of them felected and kept feparate. The average quantity obtained may be eftimated at from 20,000 to 25,000 carats annually, which are fent under a military efcort to Rio, and there lodged in the treafury. The diamonds are tied up in black filk bags, and depofited in elegant inner cabinets, all which are locked up in ftrong chefts, bound with iron. Tejuco affords fome good barley, but grafs for cattle is fcarce and dear. Moft parts of the country abound in oranges, pines, peaches, guavas, and a great variety of indigenous fruits: ginger and pepper grow fpontaneoufly, and many fpices might probably be cultivated with fuccefs. Mawe's Travels in the Interior of Brazil, 1812.

TEJUGUACU, in *Zoology*, the name of a fpecies of lizard, common in the Brazils, and called alfo *temapara*.

It much refembles the iguana in its general figure, but differs from it in that its whole body is black, only variegated with fome white fpots. It lives principally on the fucking of eggs, but it is capable of bearing hunger a long time; Marcgrave having kept one alive feven months without eating. This fpecies afforded alfo a certain teftimony to that author of the reproduction of the tail when cut off. Ray.

TEIUM, in *Ancient Geography*, a town of Afia Minor, fituated on the Euxine fea, on the frontiers of Paphlagonia, near the fmall river Billis, 370 ftadia from the town of Heraclea. It was a Greek Ionian colony, which derived its name and its origin from *Tios*, a Milefian prieft, according to Arrian and Mela. The worfhip of Jupiter named Patarus was practifed in this town, according to Demofthenes. On the E. the territory of this town was bounded by the river Parthenius. The town was much augmented when the empire of the Perfians was deftroyed.

TEIUNHANA, in *Zoology*, the name of a fmall American lizard. It is about the thicknefs of one's little finger, and has a fharp nofe. Its tail is very flender, fix fingers breadth long, and terminates in a point almoft as fharp as a needle. Its head is covered with fcales; and its back, fides, and legs, with a tender fkin, as foft as fatin to the touch; and its tail is covered with extremely minute fcales, of a fquare figure. Ray.

TEKAT, in *Geography*, a town of Afiatic Turkey, in Natolia; 10 miles N. of Kiangari.

TEKEBI, a town of Egypt; 22 miles W.S.W. of Damietta,

TEKEH, a town of Turkifh Armenia; 40 miles S.E. of Trebifond.

TEKEREE, a town of Hindooftan, in Candeifh; 14 miles E. of Barrawnay.

TEKIN, a town of Afiatic Turkey, in Caramania; 100 miles W. of Tocat.

TE-KING, a city of China, of the fecond rank, in Quang-tong, near the river Si; 1064 miles S.S.W. of Peking. N. lat. 23° 12′. E. long. 111°.—Alfo, a city of China, of the fecond rank, in Quang-tong; 1065 miles S. of Peking. N. lat. 23° 12′. E. long. 110° 50′.

TEKKIUR DAG, a mountain of European Turkey, in Romania; 32 miles S.S.E. of Adrianople.

TEKLA, a town of Bohemia, in the circle of Chrudim; 6 miles S.W. of Leutmifchl.

TEKMABAD, a town of Perfia, in the province of Segeftan; 70 miles E.N.E. of Boft.

TEKOA, a village, and anciently a city of Paleftine, built by Rehoboam, king of Judah, and confiderable ruins appear of its ancient grandeur. It was the native place of the prophet Amos; 9 miles S. of Bethlehem.

TEKOLY, a town of Hindooftan, in Bahar; 53 miles S.S.W. of Patna.

TEKUPHÆ, or THEKUPHÆ, in the *Jewifh Chronology*, are the times in which the fun proceeds from one cardinal point to the next.

The fame term is alfo applied to the moment in which the fun enters a cardinal point: thefe four terms, or tekuphæ, into which the Jews divided their folar year, are obferved among the Jews with a great deal of ceremony; the reafon, as we are informed by Munfter, is this:

That people have a notion, that in each tekupha the fun has a feparate angel appointed to guard and direct it; and that in the very point where the fun finifhes one tekupha, and enters upon another, before the one director has taken place of the other, the devils have a power to exercife all kinds of tyranny in the water.

And hence, they fancy, that if any body drinks the fmalleft quantity of water at that time, he will infallibly have a dropfy, or fome other grievous diftemper.

The tekupha of Tifri correfponded to the autumnal equinox, that of Tebeth to the winter folftice, that of Nifan to the vernal equinox, and that of Tamuz to the fummer folftice

TEKY SOUND, in *Geography*, a road on the coaft of Georgia, fouth of the Savannah river, where a large fleet may anchor in ten or fourteen fathoms, and have fafe entrance over the bar of the river; the flood tide generally feven feet.

TEL ARESIAS, a town of Afiatic Turkey, on the Euphrates; 5 miles W.N.W of Diarbekir.

TEL *Gizir*, a town of Afiatic Turkey, in the province of Diarbekir; 16 miles W. of Merdin.

TEL *Kiaran*, a town of Afiatic Turkey; 30 miles S.S.W. of Diarbekir.

Tel *Muſet*, a town of Aſiatic Turkey, in the government of Diarbekir; 33 miles N.W. of Moſul.

Tel *el Judieh*, a town of Egypt, where the Jews had formerly a temple, deſtroyed by Veſpaſian; 17 miles N.E. of Cairo.

TELA, in *Ancient Geography*, a town of Spain, on the route from Aſturica to Saragoſſa, between Intercatia and Pintia. Anton. Itin.

Tela, or *Conſtantia*, a place of Aſia, in Meſopotamia, near the mountains, about N. lat. 37° 25′.

Tela *Celluloſa*, in *Anatomy*, the Cellular *Subſtance*; which ſee. It is ſometimes alſo called tela mucoſa.

TELACH, in *Geography*, an iſland of Ruſſia, in the Penzinſkoi ſea. N. lat. 61° 35′. E. long. 159° 14′.

TELAMON, in *Ancient Geography*, a promontory of Italy, in Etruria, at the foot of which was a port, between the rivers Almina and Alma. (Anton. Itin.) Pliny calls this port Telamon.

TELAMONE, in *Geography*, a town of the Stato del Preſidii, on the coaſt; 10 miles N. of Orbitello. N. lat. 42° 38′. E. long. 11° 6′.

TELAMONES, a name given by the Romans to what the Greeks called *Atlantes*; *viz.* the figures of men ſupporting entablatures, and other projectures. See Atlas.

The word, according to ſome, is derived from the Greek τελαμων, from τελαω, or τλαω, *I bear*.

Among the Greeks they were called *atlantes*, ατλαντες, which comes from the ſame word, ταλαω, or τλαω, by the figure metatheſis.

Telamones is alſo uſed by ſurgical writers ſometimes for lint, and ſometimes for the fillets or bandages which they apply over their dreſſings.

TELANA, in *Ancient Geography*, a very ancient town of Aſia, in Aſſyria. Steph. Byz. ſays that the king made it the place of his reſidence before Nineveh was built.

TELANADING Islands, in *Geography*, three ſmall iſlands lying eaſt and weſt, near the N.W. coaſt of the iſland of Gilolo. N. lat. 2° 18′. E. long. 127° 30′.

TELANDRIA, in *Ancient Geography*, an iſland on the coaſt of Lycia, in Aſia Minor. Pliny.

TELANDRUS, a town of Aſia Minor, in Lycia. Pliny.

TELAPSAR, in *Geography*, a town of Aſiatic Turkey, in the province of Diarbekir; 20 miles W. of Moſul.

TELARUSE, a river of Aſia, which forms the north boundary of the kingdom of Queda, ſeparating it from Lower Siam, and runs into the Eaſt Indian ſea, N. lat. 6° 55′. E. long. 99° 42′.

TELAUGIA, in *Natural Hiſtory*, the name of a genus of ſcrupi, of a glittering appearance, uſually containing flakes of talc, and emulating the ſtructure of the granites. Hill.

Of this genus we have twelve ſpecies.

TELCHINES, in *Ancient Geography*, a people who derived their origin from the iſle of Crete. They eſtabliſhed themſelves in Cyprus, and in Rhodes, where it is ſaid they invented the uſe of iron and braſs.

TELCOOTE, in *Geography*, a town of Hindooſtan, in Oriſſa; 20 miles S.E. of Jaypour.

TELDOM Hotun, a town of Chineſe Tartary, on the weſt ſide of the river Saghalien; 745 miles N.E. of Peking. N. lat. 49° 56′. E. long. 127° 33′.

TELE, τελη, among the Athenians, thoſe revenues that were brought in by lands, mines, woods, and other public poſſeſſions, ſet apart for the uſe of the commonwealth; as alſo tributes paid by ſojourners and freed-ſervants, and the cuſtoms laid upon certain trades and goods.

TELEBA, in *Ancient Geography*, a town of Albania, between the mouth of Soana and that of Garrus. Ptol.

TELEBOAS, a river of Aſia, in the environs of the ſources of the Tigris; ſurrounded, as Xenophon ſays, by a great number of villages.

TELEGRAPH, a machine adapted for communicating intelligence at a conſiderable diſtance, by making various ſignals, which have been previouſly agreed upon between two parties, to repreſent letters, words, or ideas. The means of making ſignals that are uſed in naval and military operations, are not called telegraphs, although they effect in a great degree the ſame object. See Signal.

The word telegraph, which is derived from two Greek words, τηλε, *at a diſtance*, and γραφω, *to write*, was brought into uſe about 1793 or 1794, when the French directory eſtabliſhed machines of this kind for communicating intelligence between Paris and all the principal towns in France. The Britiſh government ſoon after adopted the ſame meaſure, and it has ſince become very general.

No machine for making ſignals can with propriety be called a telegraph, unleſs it is adapted to expreſs a ſufficient number of letters or words to form a complete language, and which can therefore be made to communicate any information which can be expreſſed by oral or written language. Leſs perfect ſyſtems of ſignals, which extend only ſo far as to communicate intelligence of events which have been foreſeen, and the appropriate ſignals previouſly arranged, are ſtill called ſignal flags, ſignal lanthorns, ſignal guns, or fires, &c.

When people wiſh to tranſmit intelligence to others at a diſtance, in a quicker manner than by letters ſent by meſſengers or carrier-pigeons, it can be done only by ſignals. Theſe may be employed in three different ways: either by ſingle ſignals, which, according to previous agreement, convey whole ideas; or by ſeveral ſucceſſive ſignals, which, by repreſenting letters and words, anſwer the ſame purpoſe; or otherwiſe, by employing ſignals which expreſs numbers, each perſon being provided with a dictionary in which every word has a number affixed to it.

The firſt kind of ſignals were employed in the earlieſt periods, and ſome of them were ſuited to the ear as well as to the eye. For the making of viſible ſignals, the ancients employed fire and ſmoke, torches, flags, &c.; and in modern times, ſky-rockets have been uſed. For the audible ſignals, they employed drums and trumpets; and ſince the invention of gunpowder, the firing of cannon has been applied to the like uſe. But all theſe methods are incapable of expreſſing what could be communicated by ſpeech and writing; and the means of expreſſing all the poſſible variations and combinations of the letters of the alphabet, form, in a proper ſenſe, the true telegraphic art. Even the ſignals commonly uſed at ſea, as they extend only to particular circumſtances, are, when compared to ſignals by letters, only a kind of hieroglyphics.

The propoſed object of the telegraphic art is, therefore, to obtain a figurative language, the characters of which may be diſtinguiſhed at a diſtance. On the firſt reflection, we find that the practicable modes of ſuch diſtant communications muſt be confined to ſound and viſion; each of which is in a great degree ſubject to the ſtate of the atmoſphere: for independent of the wind's direction, it is known that the air is ſometimes ſo far deprived of its elaſticity, or ſome other quality that influences the conveyance of ſounds, that the heavieſt ordnance can ſcarcely be heard farther than the ſhot flies. It is alſo well known, that in thick hazy weather, the largeſt and

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moſt defined objects become totally obſcured at a ſhort diſtance. No inſtrument, therefore, deſigned for the purpoſe can be perfect. We can only endeavour to diminiſh theſe irremediable defects as much as may be.

The moſt barbarous nations employed ſignals, which could quickly inform them of the approach of enemies, as appears by the teſtimony of ſeveral ancient authors; and there is reaſon to believe that ſome ſort of telegraphic communication was in uſe among the Greeks. The deſtruction of Troy was certainly known in Greece very ſoon after it took place, and before any perſon could have returned from it. A Greek play begins with a ſcene, in which a watchman deſcends from the top of a tower in Greece, and gives information that Troy is taken. "I have been looking out theſe ten years (ſays he) to ſee when that would happen, and this night it has been done."

In addition to the Stenterophonic tube which was known and uſed by Alexander the Great, the Romans had a method, in their walled cities, either of forming a hollow in the maſonry, or of applying tubes to the walls, ſo as to confine or augment ſound, and convey information to any part of their works. In lofty houſes and warehouſes, it is now a common cuſtom to have a pipe, by way of ſpeaking trumpet, to give orders from the upper apartments to the lower. By this mode of confining its volume, ſound may be carried to a very conſiderable diſtance; but beyond a certain extent the ſound will loſe all articulation, and only convey alarm, without giving directions.

Every city of the ancients had its watch-towers; and the caſtra ſtativa of the Romans had always ſome ſpot, elevated either by nature or art, from whence ſignals were given to the troops cantoned or foraging in the neighbourhood: but it appears that they had not arrived to any greater refinements in the telegraphic art, than that on ſeeing a certain ſignal they were immediately to repair to their appointed ſtations. Flags or enſigns, with their various devices, are of the earlieſt invention, eſpecially at ſea, where, from the firſt idea, which was moſt probably that of a vane, to ſhew the direction of the wind, they have been long adopted as the diſtinguiſhing marks of nations, and are now ſo perfected into a ſyſtem of ſignals, that every requiſite order and queſtion is received and anſwered by the moſt diſtant ſhips of a fleet.

The mode of ſignalling in uſe about half a century ago was very imperfect. It was a good deal amended and ſimplified by that lamented officer admiral Kempenfelt; and his ſyſtem, as it was called, continued in uſe till within theſe twenty-five years. It was ſuperſeded in the navy by ſir Home Popham's, who firſt brought into practical utility a plan originally, it is believed, ſuggeſted by Mr. Richard Gower, of the Eaſt India Company's ſervice, in his "Practical Seamanſhip," publiſhed in 1794. This was the ſubſtitution of ten or twelve numbered flags, for a great number of flags. It is ſurpriſing that this eaſy ſcheme ſhould not ſooner have been diſcovered and adopted. Inſtead of the immenſe "colour cheſt" that we and our naval cotemporaries can recollect, and the difficulty of finding and hoiſting the variety of flags required, it is pleaſing to witneſs the facility with which communications can be now made, by means almoſt as eaſy of application as the pen.

The *ſyſtem* now in uſe, originating, as we have ſtated, with an officer of the Eaſt India Company's ſervice, has recently been greatly improved by another of theſe officers. It is not eaſy to deſcribe the nature of thoſe improvements; nor proper, perhaps, were it otherwiſe; for the directors of the Eaſt India Company have deemed it expedient to keep them ſecret. The author of them is captain Thomas Lynn. His work was printed in 1814, at the Company's expence, in a conſiderable quarto volume, under the title of "Lynn's Improved Syſtem of Telegraphic Communication." It is adopted throughout the extenſive ſervice of the Eaſt India Company; and we are glad to ſee it noticed in the preface to the volume, that the highly reſpectable court of directors moſt liberally patronized the work and its author. We do not find, notwithſtanding the manifeſt advantage of the "Improved Syſtem," that it has yet been introduced into the royal navy; although every officer in that as well as the Eaſt India Company's ſervice, who have had opportunities of trying it, are loud in its praiſe. It adapts itſelf to every deſcription of telegraphic machinery now in uſe; or, as far as we can ſee, that can be uſed: it requires fewer flags than were heretofore neceſſary; and its powers are vaſtly greater than the other codes or ſyſtems. This paragraph, and perhaps this whole page of our dictionary, can be thus communicated, word for word, or phraſe by phraſe, without difficulty, and with a rapidity unattainable by any ſcheme hitherto publiſhed. The numbers, and powers, and meaning of the ſignals, may be changed at pleaſure: ſo that if the work fall into improper hands, it merely communicates the principle on which the ſyſtem is founded.

In applying this or a ſimilar mode of communicating intelligence in land ſervice, ſeveral objections preſent themſelves: the variety of communications neceſſary to be made is ſo much greater, that the combination would become too complicated; and if the perſon for whom the information is intended, ſhould be in the direction of the wind, the flag would then preſent a ſtraight line only, and at a little diſtance would be ſcarcely viſible. The Romans were ſo well aware of this inconvenience of flags, that many of their ſtandards were ſolid, and the name manipulus denotes the rudeſt of their enſigns, which was a truſs of hay fixed on a pole.

A beacon or bonfire, made of the firſt inflammable materials that offered, being the moſt obvious, is perhaps the moſt ancient mode of general alarm. By being previouſly concerted, the number of points where the fires appeared may have particular intelligence affixed. The ſame obſervations may be referred to the more modern plan of throwing up rockets, whoſe number, or the places from whence they are thrown, may have affixed ſignifications. Many of our hills ſtill retain the name of beacon hills, from the ſignals which uſed to be made upon them, by means of fire and ſmoke, which were the chief things employed during the dark ages, and in the times of the feudal ſyſtem. The fire was uſed by night, and the ſmoke by day. Within a few years, ſignals made by theſe means were very common amongſt the ſmugglers on our coaſt.

The machine of Æneas, who wrote a treatiſe on the duties of a general in the time of Ariſtotle, is deſcribed by Polybius to have conſiſted of two earthen veſſels, made exactly ſimilar in all their dimenſions: they were to be filled with water, and each was to have a cock or ſpout, which could be opened or ſhut at pleaſure, and would, when open, diſcharge an equal quantity of water from both veſſels, ſo that each of the veſſels would take preciſely the ſame period of time to diſcharge the whole, or any given proportion, of its contents. A float of cork was to be provided for each veſſel to reſt upon the ſurface of the water, and ſupport a perpendicular ſtem or index, which could be divided, and have certain ſentences written to correſpond with each diviſion. The apertures of the ſpouts of the two veſſels were to be previouſly adjuſted, and the veſſels filled with water to the ſame height, ſo that their floats and indices would correſpond in pointing out the ſame ſentences: then, if both cocks were opened at the ſame inſtant, the water would run out from each veſſel, and the floats of both would ſubſide together, ſo that when either index

ſtood

ſtood at a particular ſentence, the other index would, at the ſame time, point out the ſame ſentence. Now this operation could be equally well performed when the two veſſels were moved to any diſtance aſunder, provided the obſervers were within ſight of each other, to be able to make the requiſite ſignals for opening and ſhutting the cocks of both veſſels at the ſame moment. The author thus deſcribes the uſe of this inſtrument: The two veſſels being prepared and adjuſted, they muſt be carried to the two places where the ſignals are to made and obſerved; water is poured into each, and the floats and indices are put into the veſſels. When any of the events which are written upon the indices ſhall happen, a torch or light is raiſed, which muſt be held aloft till ſuch time as another is raiſed by the party to whom it is directed. (This firſt ſignal is only to give notice that both parties are ready and attentive.) Then the torch or other light muſt be taken away, and the cocks ſet open inſtantly by both parties. When the interval or diviſion on that part of the index where the event, of which notice is to be given or written, ſhall be fallen to a level with the veſſels, then the man who gives the ſignals lifts up his torch, and on the other ſide, the correſpondent ſignal maker immediately ſhuts the cock of his veſſel, and looks at what is written on that part of the ſtick which touches the mouth of the veſſel; on which occaſion, if every thing has been executed exactly and equally on both ſides, both parties will read the ſame thing.

The proper telegraphic art was not wholly unknown to the ancients. The Greeks and the Romans made uſe of pots filled with lighted twigs and ſtraw for ſignals, over which they poured oil; and theſe being placed in certain rows, expreſſed certain letters, according to the order in which each row was lighted.

Polybius deſcribes a new method of communication, which was invented by Cleoxenus, or by Democlitus, and which Polybius himſelf very much improved. It poſſeſſes the principal advantage of the modern telegraph, *viz.* that, by means of ſignals, it communicates the letters of the alphabet, and can therefore be uſed to expreſs any thing which can be required. It is only inferior to the telegraph in the means of making the ſignals, which is by the light of torches, and rather complicated, ſo that it would be tedious to tranſmit any thing more than ſhort ſentences. Polybius deſcribes this method, which he calls Pyrſia, in the following manner: Take the letters of the Greek alphabet, and divide them into five parts, each of which will conſiſt of five letters, except the laſt diviſion, in which there will be only four. Let theſe be fixed on a board, in five columns. The man who is to give the ſignals is then to begin by holding up two torches, which he is to keep aloft till the other party has alſo ſhewn two: this is only to denote that both ſides are ready: theſe torches are then withdrawn. Both parties are provided with boards, on which the letters are diſpoſed as formerly deſcribed. Then the perſon who gives the ſignal is to hold up torches on the left hand, to point out to the other party, from what column he ſhall take the letters as they are pointed out to him: thus, if the letter is to be from the firſt column, he holds up one torch; if from the ſecond, two; and ſo on for the others. He is then to hold torches on the right hand, to denote the particular letter of the column that is to be taken. All this muſt have been agreed on beforehand. The man who gives the ſignals muſt have an inſtrument (διοπτρον, *perſpective*), conſiſting of two tubes, and ſo placed, that by looking through one of them he can ſee only the right ſide, and looking through the other, he can only ſee the left-hand ſide of him who is to anſwer. The board muſt be ſet up near this inſtrument; and the ſtations on the right and left muſt each be ſurrounded with a wall ten feet broad, and about the height of a man, that the torches raiſed above it may give a clear and ſtrong light, and that when taken down they may be completely concealed.

The ſteganographia trithemiana of a Benedictine monk, in the fifteenth century, ſeems to have been ſomething of the ſame kind; but the firſt recorded experiment, after the manner of the Greeks, is deſcribed by Kircher, in his "Ars magna Lucis et Umbræ," under the title of *Cryptogamia catoptrica;* it was however imperfect, and could be employed only at a certain diſtance. Schott, in his "Technica curioſa," propoſes, after an anonymous author, to erect poſts upon an eminence, ſo as to be diſtinguiſhed through a teleſcope, and on which proper ſignals could be elevated, as might be neceſſary.

The marquis of Worceſter, who is ſo juſtly celebrated for having firſt diſcovered that the force of ſteam could be applied to mechanical purpoſes, brought telegraphic communication to a conſiderable degree of perfection, if at leaſt we give him credit for having really effected every thing which he mentions in his Century of Inventions. This little tract was publiſhed in 1663, and contains the following articles.

"No. 6. How at a window, as far as eye can diſcover black from white, a man may hold diſcourſe with his correſpondent, without noiſe made, or notice taken, being according to occaſion given and means afforded, *ex re natâ*, and no need of proviſion before-hand, though much better if foreſeen, and means prepared for it, and a premeditated courſe taken by mutual conſent of parties.

"No. 7. A way to do it by night, as well as by day, though as dark as pitch is black."

The marquis gives us no idea of the means which he uſed for exhibiting his ſignals, by which we can judge of the practicability of his plan for communicating any detailed intelligence.

Keſler, in his Concealed Arts, adviſes characters to be cut out in the bottom of a caſk, ſo as to appear luminous when a light is placed withinſide, and the characters muſt be changed ſucceſſively to expreſs words and ſentences.

Dr. Hooke's Telegraph.—The firſt idea of a telegraph upon a ſimilar conſtruction to thoſe uſed at preſent, was ſuggeſted by Dr. Hooke towards the end of the laſt century, the ſiege of Vienna by the Turks having turned his attention to the buſineſs. He gave the firſt complete deſcription of ſuch a machine, as appears by the following extract, from a paper of his, read before the Royal Society on the 21ſt of May, 1684. "I propoſed (ſays he) ſome years ſince, a method of diſcourſing at a diſtance, not by ſound but by ſight: I ſay that it is poſſible to convey intelligence from any one high and eminent place, to any other that is in ſight of it, though thirty or forty miles diſtant, in as ſhort a time almoſt as a man can write what he would have ſent; and as ſuddenly to receive an anſwer, as he that receives it has a mind to return it, or can write it down on paper. Nay, by the help of three, four, or more eminent places viſible to each other, lying in a ſtraight line, 'tis poſſible to convey intelligence almoſt in a moment, to twice, or thrice, or more times that diſtance, with as great a certainty as by writing.

"For the performance of this, we muſt be beholden to a late invention, which we do not find any of the ancients knew; that is, the eye muſt be aſſiſted with teleſcopes, that whatever characters are expoſed at one ſtation, may be made plain and diſtinguiſhable at the other.

"Firſt: For the ſtations, if they be far diſtant, it will be neceſſary that they ſhould be high, and lie expoſed to the ſky; that there be no higher hill or part of the earth beyond them, that may hinder the diſtinctneſs of the charac-

ters,

ters, which are to appear dark againſt the ſky, beyond them appearing white, by which means alſo the vapours near the ground will be paſſed over and avoided. Next, in chooſing theſe ſtations, care muſt be taken, as near as may be, that there be no hill that interpoſes between them, that is almoſt high enough to touch the viſible ray, becauſe in ſuch caſes the refraction of the air of that hill will be very apt to diſturb the clear appearance of the object. The ſtations being found convenient, the next thing to be conſidered is, what teleſcopes will be neceſſary for each ſtation. One of theſe teleſcopes muſt be fixed at each extreme ſtation, and two of them in each intermediate ſtation; ſo that a man for each glaſs, ſitting and looking through them, may plainly diſcover what is done in the next adjoining ſtation, and with his pen write down on a paper the characters there expoſed, in their due order; ſo that there ought to be two perſons at each extreme ſtation, and three at each intermediate one, that intelligence may be conveyed backwards and forwards at the ſame time. Next there muſt be certain times agreed on, when the correſpondents are to expect it; or elſe there muſt be ſet at the top of a pole, in the morning, the hour appointed by either of the correſpondents for acting that day.

"Next there muſt be convenient apparatus of characters, conſiſting of at leaſt as many diſtinct characters as there are neceſſary letters in the alphabet, (to be made uſe of as is expreſſed in *Plate Telegraph*, *fig.* 1.) And theſe muſt be either day characters or night characters. If they are to be made uſe of in the day-time, they may all be made of deals, and of a ſize convenient for the ſeveral diſtances, any one of which characters may ſignify any one letter of the alphabet, and the whole alphabet may be varied 10,000 ways, ſo that none but the two extreme correſpondents ſhall be able to diſcover the information conveyed. If the characters are for the night, then they may be made with links, or lights diſpoſed in a certain order, which may be covered or uncovered, according to the method agreed on. There will be alſo requiſite ſeveral other characters, which may for expedition expreſs a whole ſentence, ſuch as 'I am ready to communicate;' 'I am ready to obſerve.' I could inſtance a hundred ways of facilitating the method of performing the deſign with the more dexterity and quickneſs, and with little change, but that I think will be needleſs at preſent, ſince, whenſoever ſuch a way of correſpondence ſhall be put in practice, thoſe and many more than I can think of at preſent will of themſelves occur, ſo that I do not in the leaſt doubt but that with a little practice all things may be made ſo convenient, that the ſame character may be ſeen at Paris, within a minute after it hath been expoſed in London; and that the characters may be expoſed ſo quick after one another, that a compoſer ſhall not much exceed the expoſer in ſwiftneſs, and this not only at the diſtance of one ſtation, but of an hundred; for ſuppoſing all things ready at all of thoſe ſeveral ſtations for obſerving and expoſing as faſt as the ſecond obſerver doth read the characters of the firſt expoſer, the ſecond expoſer will diſplay them to the obſerver of the third ſtation, whoſe expoſer will likewiſe diſplay them for the fourth obſerver, as faſt as his obſerver doth name them to him or write them down. There may be many objections brought againſt this way of communication, becauſe it has not yet been put in practice, but hardly any that may not be eaſily anſwered and obviated."

Dr. Hooke illuſtrates his invention thus: Let A B C (*fig.* 2.) repreſent three very long maſts or poles erected, E the top piece that joins them together, D a ſcreen, behind which all the deal-board characters hang upon certain rods or lines, and may, by the help of ſmall lines connected with each of them, be expoſed at F, or drawn back at D, as occaſion may require.

This propoſal of our ingenious countryman is very complete and well ſtudied; it would be leſs convenient and expeditious than the modern telegraphs, but would certainly have anſwered very uſeful purpoſes, with the advantage of being very free from the uncertainties and errors of more complete machines, which, at the ſame time that they admit of making a greater variety of ſigns than the letters of the alphabet, are for the ſame reaſon more liable to miſtakes in exhibiting as well as in reading or tranſlating them. The only obvious improvement on Dr. Hooke's telegraph is, that, inſtead of concealing the characters behind the ſcreen D, they ſhould be kept down below in the houſe on which the machine is to be erected, and be hoiſted up into the frame when they are to be exhibited.

M. Amontons, an ingenious French academician who ſtudied mechanics, was born at Paris in 1663, and died in 1705, at the age of forty-two. He propoſed the following method: Let there be people placed in ſeveral ſtations, and at ſuch a diſtance from each other, that by the help of a teleſcope, a man at one ſtation may ſee a ſignal made in the next before him: he muſt immediately repeat the ſame ſignal, that it may be ſeen by perſons in the ſtation next after him, who are to communicate it to thoſe in the following ſtation, and ſo on. Theſe ſignals may be as letters of the alphabet, or as a cipher, underſtood only by the two perſons who are in the diſtant places, and not by thoſe who make the ſignals. The perſon in the ſecond ſtation making the ſignal to the perſon in the third the very moment he ſees it in the firſt, the news may be carried to the greateſt diſtance in as little time as is neceſſary to make the ſignals in the firſt ſtation. The diſtance of the ſeveral ſtations, which muſt be as few as poſſible, is meaſured by the reach of a teleſcope. M. Amontons is ſaid to have tried this method on a ſmall tract of land, before ſeveral perſons of the higheſt rank at the court of France; but we are not acquainted with the kind of apparatus he employed; all that we know of his method is preciſely the ſame as Dr. Hooke's.

Guyat, a long time after Dr. Hooke, propoſed tables, with letters cut out in them: and Paulian, in his Dictionnaire de Phyſique, deſcribes a tranſparent figure, conſiſting of one perpendicular and three horizontal ſtripes, forming ten compartments, each of which can be rendered viſible or inviſible at pleaſure, by blinds or ſhutters moveable from behind.

Mr. Richard Lovell Edgeworth, in a memoir which he preſented to the Royal Society of Ireland (ſee their Tranſactions, vol. vi. p. 125.), adduces proof, that in 1767 he tried an experiment of the practicability of communicating intelligence by a ſwift and unſuſpected mode; and for this purpoſe he employed a common windmill, and arranged a ſyſtem of ſignals, which could be made by the different poſitions of the arms of its ſails, the canvas being removed from one or more arms, as was required. Theſe ſignals were made to denote numbers, and both parties were provided with vocabularies, in which all the words were numbered.

French Telegraph.—Although the telegraph was thus fully explained in 1684, it does not appear that this valuable invention was at all practiſed or applied to any uſeful purpoſe until 1793 or 1794, when the events of the French revolution had directed all the energies of that ingenious people to the improvement of the art of war. A report made by Barrere to the ſitting of the French Convention in Auguſt 1794, attributes the invention of the telegraph which they uſed to citizen Chappe.

"The new invented telegraphic language of ſignals is an artful

artful contrivance, to tranfmit thoughts in a peculiar language from one diftance to another, by means of machines, which are placed at different diftances of from twelve to fifteen miles afunder, fo that the expreffion reaches a very diftant place in the fpace of a few minutes. This is now brought to fuch a ftate of perfection, that a correfpondence may be conducted with Lifle, upon every fubject and every thing: even proper names can be expreffed; an anfwer may be received; and the correfpondence thus be renewed feveral times a day. The only thing which can interrupt their effect is the weather, when the air is fo very bad and turbid that the objects and fignals cannot be diftinguifhed. By this invention, remotenefs and diftance almoft difappear, and all the communications of correfpondence are effected with the rapidity of the twinkling of an eye. By its aid the operations of government can be very much facilitated, and the unity of the republic confolidated much more by the fpeedy communications with all its parts.

"The greateft advantage can be derived from this mode of correfpondence, becaufe, if thought proper, its objects need only be made known to certain individuals, or to one individual alone, or to the extremities of any diftance; fo that the Committee of Public Welfare may at prefent carry on a correfpondence with the reprefentative of the people at Lifle, without any other perfons being acquainted with their objects. If Lifle was even befieged, we fhould know every thing at Paris that might happen in that place, and could fend thither the decrees of the Convention without the enemy being apprifed of it, or able to prevent it."

M. Chappe's or the French telegraph is reprefented in *fig.* 4, which is made from fome fketches taken from the telegraph on the palace of the Louvre, at the time of its firft eftablifhment, and publifhed in the Monthly Magazine, and other publications.

A B is a beam or ftrong maft of wood, erected perpendicularly from the centre of a cabin or fmall houfe fituated on a rifing ground: it muft be about 15 or 16 feet high above the top of the houfe. C D is a balance-beam, jointed to the top of the maft, fo as to be moveable on its centre, like a fcale-beam. This balance-beam, which is called the long indicator, may be placed vertically or horizontally, or any how inclined, by means of ftrong cords, which are attached to the central wheel or pulley D, which has two grooves in the edge to receive the cords. The long indicator is about 11 or 12 feet long, and 9 inches in breadth; and at each extremity it carries fecondary indicators F, G, which likewife turn upon centres or joints, by means of four cords, which are conducted through a hollow in the centre pin or axis of motion of the long indicator, otherwife the motion of the long indicator to put it into different pofitions, would derange the cords, and alter the direction of the fecondary indicators, which are capable of being placed in any pofition with refpect to the long indicator, by thofe cords being conducted by pullies down into the cabin, and there attached to other mechanifm, by means of which the whole machine is moved, and can be made to affume any of the pofitions reprefented by the fmall figures in the plate, in which pofitions it forms a variety of different characters, to denote the letters of the alphabet or numerals.

That the indicators may be very light, and at the fame time oppofe the leaft refiftance to the wind, they are formed by frames, the interior parts of which are filled up by fmall oblique and feparate boards, which however, being feen in front, appear contiguous. The ends of the fmall indicators are carried beyond the centres, and carry counter-weights to balance the weight of the indicators: but thefe ends and balances are made fo as to be invifible at a diftance.

It is eafy to find the number of fignals poffible to be made with this telegraph: for if we confider the great indicator as being fixed, we fhall find that each of the fmaller ones may diftinctly take five different pofitions: two where it makes a right angle with the great indicator; two where it makes an angle of 45°; and one where it falls back upon the great one, in which cafe it will difappear. Three other diftinct pofitions might alfo be created; one where the fmall indicator would be horizontal with the great one, and two where it would make an angle of 135° with it.

The leffer indicators then, confidered as fingle movers, will furnifh five times five, or twenty-five fignals. As the great indicator is alfo a mover, there are twenty-five times as many fignals as this indicator has diftinct pofitions; and as it has but four diftinct pofitions, one horizontal, one vertical, and two inclined, there are in all four times twenty-five, or one hundred fignals.

The manner of ufing the telegraph was as follows: At the firft ftation, which was on the roof of the principal pavilion of the Louvre at Paris, M. Chappe, the inventor, received in writing, from the Committee of Public Welfare, the words to be fent to Lifle, near which the French army was at that time ftationed. Each of the telegraphs in the line employed three perfons to work it: one to move the machine, which was done by a fingle motion of a winch, and could therefore be effected in a moment. A fecond perfon was employed with a telefcope to obferve the telegraphs of the two adjacent ftations, to receive the communications, and to know by their fignals, if they had underftood the communication made to them, and alfo to receive the anfwers. The third perfon was employed to write down the obfervations made by the fecond perfon, and to give orders to the firft. The ftations were about three or four leagues diftant, and an obfervatory was fituated near the Committee of Public Safety at Belleville, to obferve the laft telegraph.

The grammarian will eafily conceive that fixteen figns may amply fupply all the letters of the alphabet; fince fome letters may be omitted, not only without detriment, but with advantage. Thefe figns, as they were arbitrary, could be changed every week: fo that the fign for B one day, might be the fign for M the next; and it was only neceffary that the perfons at the extremities fhould know the key. The intermediate operators were only inftructed generally in imitating and repeating thefe fixteen fignals, which were fo diftinct, and fo marked, as different the one from the other, that they were eafily remembered. The conftruction of the machinery within the houfe was fuch, that each fignal was uniformly given in precifely the fame manner at all times. It did not depend on the operators' manual fkill, becaufe the pofition of the arms could never for any one fignal be a degree higher or a degree lower than was intended, their movements being regulated mechanically. M. Chappe, having received at the Louvre the fentence to be conveyed, gave a known fignal to the fecond ftation, which was Montmartre, to prepare: at each ftation the obfervers with telefcopes were on watch, and each telegraph immediately gave the fignal of preparation which he had received; and this being communicated fucceffively through all the line, all the machines were brought into a ftate of readinefs. The perfons at Montmartre then received, letter by letter, the fentence from the Louvre, which they repeated with their own machine, and this was again repeated from the next height, with inconceivable rapidity, to the final ftation at Lifle, where the obfervations were written down, and tranflated according to the key which had been before arranged to be ufed, either by previous concert, or by fome particular fignal made with the telegraph, to denote that key which was ufed. The time

taken

taken up for each movement was about twenty feconds ; of which the motion alone took up four feconds ; and during the other fixteen, the telegraph was kept ftationary, that it might be diftinctly obferved and written down by the people at the next ftation. The figns were fometimes made for words, and fometimes for letters : when in words, a fmall flag was hoifted ; and as the alphabet could be changed at pleafure, it was only the correfponding perfons at each end of the line who knew the meaning of the figns. In general, news was given every day about eleven or twelve o'clock ; but the obfervers were conftantly on the watch, and as foon as a certain fignal was given and anfwered, they begun from one end to the other to move their machines. All the moveable parts were painted of a dark-brown colour, to be more diftinctly vifible when viewed againft the bright fky.

Another line of telegraphs, from Paris to Landau, was completed in 1796 : the firft of them was erected on a pavilion of the palace of the Tuilleries. The conftruction was more complicated than the firft. A fixed black bar, fifty feet long, was fupported horizontally by four uprights. This bar carried five indicators, fimilar to the fmaller indicators of the machines before defcribed. Two of the upright pofts which fupported the horizontal bar, carried each a fimilar indicator : in this way the centres of the indicators were all ftationary, inftead of having the long indicator with fmaller ones at the extremities. Thefe feven indicators were moved by pullies, in the ufual way ; and there was none of the difficulty of conveying the communicating cords through the hollow axis of the central pulley. Each of the indicators could take feven diftinct pofitions ; *viz.* for thofe which were fupported by the horizontal bar, two vertical, four inclined, and one horizontal ; and for thofe indicators which were fupported by the upright pofts, one vertical pofition, four inclined, and two horizontal ones. The number of combinations which fuch a conftruction can make, is $7 \times 7 \times 7 \times 7 \times 7 \times 7 \times 7$, which gives the aftonifhing number of 823,543 fignals. This number, which is eight thoufand times larger than that of the fignals of the firft telegraph, is doubtlefs more than fufficient : it, however, allowed them to abridge confiderably the telegraphic language, and to tranfmit whole phrafes at a time.

The Englifh Telegraph.—M. Chappe's machine was known in England not long after it was fet up, and two working models were made at Frankfort, and fent to England, by which the plan and alphabet became known ; and its advantages were fo obvious, that the Britifh government tried various experiments on telegraphic communication, and at length lines were eftablifhed from the Admiralty-office to Deal, Portfmouth, and other points of the fea-coaft. Thefe machines are upon the conftruction reprefented in *fig.* 3, not being made with indicators, like the French, to move upon centres into different pofitions, but with fix octagon boards, each poifed upon an horizontal axis, and fupported in a frame in fuch a manner, that each can be placed vertically, and will then appear of the full fize ; or if they are placed edgeways, as fhewn at d, the narrow edge alone will be prefented, and this at a fmall diftance will be invifible. The boards are turned by means of cranks, r, upon the end of the axles, and from thefe, lines defcend into the cabin below, where each has a handle, which is confpicuoufly marked with the letter or character which will be indicated when the handle is drawn down.

By the changes in the pofition of thefe fix boards, thirty-fix changes may be eafily exhibited, and the fignal to reprefent any letter may be made. By certain pofitions, a variety of other things may be fignified, according to the will of the two perfons employed at the two extreme pofts in making the fignals. Thus, one board being in a horizontal pofition, and the others fhut, or in a perpendicular fituation, may denote the letter a ; two boards only being in a horizontal pofition may give the letter b ; three in the fame manner, the letter c, and fo on. As there may be made as many changes with thefe boards as with the fame number of bells, the letters of the alphabet may be made with eafe, and a fufficient number of fignals may be formed for extraordinary purpofes.

This number of changes is fufficient ; for as this telegraph is intended to convey information by reprefenting the fucceffive letters of each word, a greater number of changes than would exprefs all the effential letters of the alphabet, the numerals, and three or four more fignals, to fignify attention, repeat, period, error, &c. would be only embarraffing, and liable to error. It is a good fyftem to fpell every word, rather than attempt to communicate entire words or fentences, as by keeping always to one fyftem, miftakes are avoided. The communication is in itfelf fo rapid, that it is more important to attain certainty in the operation, than to make any facrifice for the fake of difpatch.

This telegraph was judicioufly contrived to have a fufficient number of combinations, without having more than neceffary. Five boards would have been infufficient, and feven more than were neceffary. But there are feveral ferious objections to it : the form renders it too bulky to admit of being raifed to any great height above a building ; and after all, the boards are lefs evident to the eye at a diftance than the indicators of the French machine. The ftations muft, therefore, be nearer together, to render the bars of the frame vifible as well as the boards. Neither can this telegraph be made to change its direction, but it can only be feen from one particular point. It was found neceffary to have two telegraphs at the Admiralty, one for each line, and alfo at any point of the line where it branched off.

To enable the telegraph to be ufed at night, the firft French telegraph which was fet up was furnifhed with Argand lamps, but the Englifh was never ufed in that manner. It would have required a great number of lamps ; becaufe it would have been neceffary to have fixed lamps to indicate the points of the frame in which the boards work, as well as the boards themfelves.

Thefe two forms of telegraph, the French and the Englifh, continued in ufe for fome years. The French made frequent changes in the details of their fyftem, though for a long time they preferved M. Chappe's machine ; and when Buonaparte affumed the fupreme command in France, the original machines were taken down. A number of machines were fet up on various parts of the French coaft, and were ufed in fome of their campaigns : they were of a very temporary nature, and compofed of the fimpleft materials, of mafts and yards, with large balls at the end ; the yards were inclined by cords, fo as to effect the fignals on the fame principle as M. Chappe's original machine. About 1806 a new fet of telegraphs was eftablifhed on the whole extent of the coaft of the French empire, of which the following defcription is given by captain C. W. Pafley, in the Philofophical Magazine. See *figs.* 5 and 6.

Modern French Telegraph.—Every telegraph confifts of an upright poft, R, to which are attached three arms, A, B, and C, exactly fimilar to each other, and each moving upon its own diftinct fpindle or axis. The axis of one of thefe arms, A, is near the head of the poft R ; and the diftance between the centres of motion of either of the two uppermoft arms, and the centre of the one immediately below it, is rather lefs than double the length of one arm. The higheft of the three arms, A, can exhibit feven diftinct positions, as is shewn by the dotted lines A 1, A 2, A 3, &c.; but the other two arms, B and C, can only exhibit six positions each, because they are hidden by the post when in a vertical position. The total number of combinations, or of distinct signals, which can be made by this telegraph, will constantly be three hundred and ninety-one; but as the arm A, when in the vertical position A 4, may appear to be part of the post, R, it is not safe to employ that position, and this will reduce the number of signals to three hundred and forty-two. As only three bodies are employed in this telegraph, it appears very superior to the Admiralty telegraphs used in England, which, by the combination of double that number of bodies, can only make sixty-three distinct signals. Captain Pasley observes, that the mechanism of the French telegraphs just described, must be either imperfect, or the men employed in working them must have been very unskilful, for the signals were made and repeated in an awkward manner, with what seemed to him much unnecessary loss of time. But these defects, it will be evident, detract nothing from its merit as an invention. In regard to the mechanical construction, he could only observe that the arms, which were painted black, and appeared solid at a distance, were made in the fashion of a Venetian blind, in order, it may be presumed, to diminish the action of the wind in bad weather. Each arm had a counterpoise of thin materials painted white, which, unless the observer be very near the telegraph, becomes invisible.

Fig. 5. shews the telegraph in a state of rest, the dotted lines marking the several positions in which the arms can be exhibited. *Fig.* 6. is a specimen of the telegraph at work. *Fig.* 7. shews the construction of one of the arms on a larger scale, D E being the part which is fashioned like a Venetian blind, and E F the counterpoise.

Sir Home Popham's Telegraph at the Admiralty. — The original telegraphs at the Admiralty, with the six boards, have been lately taken down, and a new kind substituted. It is on the same principle with the French, being an upright mast with two indicators, which move upon centres one above the other, in the manner of the last described. The mast is made to turn round on its vertical axis, so as to present its arms successively to all quarters, when required. The mechanism, which is the invention of sir Home Popham, is the best which has ever been contrived, the movements being very simple, and effected by iron spindles and endless screws, so that the indices below are certain to accompany the indicators exactly in their movements, and place them precisely in their required positions, which cannot be done by the old machinery with cords, because they are liable to expand and contract by wet or dry weather. The machinery for this set of telegraphs was constructed in the most substantial manner by Mr. Maudslay in 1816. (See *figs.* 8, 9, and 10.) L M is a tall mast of an hexagonal form, framed up from six fir planks put together at the angles, and bound by iron hoops at different places, so as to be hollow within. The lower end, L, terminates in a pivot, and the mast is retained in a vertical position by a circular collar at O, which embraces it, and is supported in the roof of the building. The two arms, P M and Q R, are moveable upon centres, one at the top of the mast and the other half way down. When the arms are placed in a vertical position, they shut up within the hollow of the mast, so as to be entirely concealed; and for this purpose, two of the six sides are cut away at the upper part, so as to leave an opening through the mast of sufficient width to admit the two arms to work in it. To communicate motion to the arms, a small toothed wheel is fixed upon each arm at the centre of motion, and close to the side of the arm. The teeth of these wheels are actuated by endless screws or worms, formed on the upper ends of the long spindles *d e* and *f g*, which descend down to the bottom of the hollow mast, and have small bevelled wheels upon them, which are actuated by wheels of similar size, fixed on the ends of short horizontal spindles, which have handles, *p*, *q*, applied at the extremities. (See *fig.* 11.) By turning these handles, motion is given to the vertical spindles *d* and *f*; and by means of the endless screws upon the upper ends of them, the wheels at M and R, on the centres of the arms, are turned round, and the arms are put into any required position. But in order that the people below may at all times know exactly what positions the arms stand in, two dials, *m* and *r*, are formed on the lower part of the mast, the upper one, *m*, being for the upper arm M, and the other, *r*, for the lower arm R; and each dial has an index or hand, which turns round with a motion exactly corresponding to the motion of the arms. For producing this motion, the axle of each hand or index has a small toothed wheel, *s* or *t*, (*fig.* 11.) fixed upon it in the middle; and an endless screw is formed upon the upright spindle to work in the teeth of the wheel. The wheels upon the centre of the arms, and those upon the axes of the indices, have the same number of teeth; and as every turn of the spindles and screws will move the wheels round one tooth, the angular motion of the arms, P M and Q R, and the hands, *m* and *r*, will in all cases be the same.

The dials are each divided into eight, corresponding with the eight positions in which the arms are to be exhibited: *viz.* pointing vertically; 1st, upwards; and 2d, downwards: pointing horizontally; 3d, to the right; and 4th, to the left: pointing upwards at an inclination of 45 degrees; 5th, to the right; and 6th, to the left: pointing downwards at an inclination of 45 degrees; 7th, to the right; and 8th, to the left. But of these eight positions, only the four last are made use of to represent characters; because, in the two vertical positions, the pointers enter within the mast, and cannot therefore be seen whether they are pointing upwards or downwards: the horizontal positions of the arms are reserved for the necessary signals of preparation, &c. Each arm, then, has four positions, in which it will express different signals; and these positions are all made with the pointer, at an inclination of 45 degrees from the horizontal line.

These signals either express the letters of the alphabet, or the numeral characters, according to previous arrangement, which must be made known by exhibiting a preparatory signal, before the communication is begun. The signal to prepare for receiving letters is the lower arm extended horizontally to the right; and for the numerals, both arms are extended horizontally to the left.

The upper pointer, P M, used by itself, at an elevation of 45 degrees, denotes,

A, or 1, when pointing upwards to the left.
B, or 2, when pointing downwards to the left.
C, or 3, when pointing upwards to the right.
D, or 4, when pointing downwards to the right.

The lower pointer, Q R, used by itself, at an elevation of 45 degrees, denotes,

E, or 5, when pointing upwards to the left.
F, or 6, when pointing downwards to the left.
G, or 7, when pointing upwards to the right.
H, or 8, when pointing downwards to the right.

It is easy to conceive, that, by repeating all these positions with both arms exhibited together, instead of one singly, various combinations may be made, which are sufficient

ficient to exprefs all the remaining letters, and fome other neceffary fignals.

The dial for each arm is double; that is, a dial is fixed at each fide of the maft, and the axles of the indices or hands proceed quite through the maft, fo as to have a hand at each end. Thefe dials are not numbered exactly fimilar to each other, but are reverfed; and the two indices on the oppofite ends of the fame axle, though they point in one direction, do not indicate the fame numbers on the two dials; becaufe each dial is adapted to indicate the meaning which the different pofitions of the arms will have, when the telegraph is viewed on that fide to which the dial faces.

For when a fignal is made, that arm which projects from the right-hand fide, if the telegraph is examined on one fide, will project on the left hand, when the telegraph is viewed on the other fide.

It was before ftated, that the telegraph can be turned round, fo as to prefent its arms to any direction. This is done by the pivot, L, at the lower hand; but to hold it faft in the defired direction, a circular iron plate is placed on the floor, with holes in it; and a bolt, W, is fitted into two eyes, which are fixed to the axle of the maft. The point of this bolt drops into any of the holes in the plate, and thus holds the maft firm; but if the bolt is lifted up, to draw its point out of the holes, it can be turned round. The arms are made with boards, like Venetian blinds; and each has a piece of caft-iron at the oppofite end, to counterpoife the weight, and make the arm move freely into all pofitions.

Since the telegraph has been brought into actual ufe, its great utility has been obvious; and many ingenious perfons have ftudied the means of fimplifying the methods of reprefenting the fignals, with a view to obtain the greater facility and rapidity of communication. This would enable us to avoid the danger of miftakes, by being able to repeat the whole communication feveral times, which at prefent is tedious. Many of thefe contrivances difplay great ingenuity; but it appears to us, that the defect or difficulty of communicating detailed intelligence by means of telegraphs, arifes from the complicated conftruction of all the languages at prefent in ufe, rather than from any defects in the machines, which have been propofed to exhibit the fymbols; and that to perfect telegraphic communication, it would be neceffary to invent a new and more perfect language, which would be a moft valuable acquifition, to facilitate all other modes of communicating ideas.

All languages originated in a very rude ftate of fociety, and were at firft limited to the expreffion of very fimple ideas. As men advanced in civilization, they found the neceffity of increafing the number of their words; and to enable them to exprefs more complex ideas, compound words were occafionally introduced; but, in all cafes, knowledge muft have made a confiderable advance, before any arrangement or claffification of words was imagined: becaufe the neceffity of any grammar would not be difcovered, until the number of words were fo multiplied, as to render the ufe of them troublefome, and liable to confufion. Before a fyftem of grammar was eftablifhed, no improvements could be made in a language, except by the addition of new words; and every fuch addition muft have introduced new difficulties in the ufe of the language. Even when a fyftem of grammar is completely eftablifhed, as is now the cafe in all the languages of civilized nations, the number of words which were invented, or introduced without any fyftem, is fo confiderable, as to prevent that perfection of expreffion which might be obtained, if the language had been wholly conftructed in an advanced ftage of fociety. There is no doubt but a new language might be contrived, which, with a very fmall number of words, compared with any of the known languages, might exprefs all ideas in a much more expeditious and definite manner than they do. In oral communication, this defective conftruction of language, and the want of precifion, is little experienced, unlefs by thofe who begin to learn a foreign language; becaufe the extreme rapidity of expreffion enables us to amplify and enlarge upon any fubject, fo as to elucidate any words or phrafes which are not directly applicable to the expreffion of an idea to be communicated, or which are at all indefinite. In writing or reading, the deficiency of language is more obfervable, from the greater difficulty of expreffion and communication. But when we attempt to converfe by fignals, we experience in its full force the great complexity of language, and find that it becomes a tedious operation to reprefent a fentence clearly by fignals, which is fpoken or written in a moment; and this muft continue to be the cafe, even if the mechanical operation of exhibiting the fignals is reduced to the utmoft poffible fimplicity. As no fuch fcientific language as that which we hint at has been perfected, we muft content ourfelves to find the beft means of communicating our ideas by fignals, which fhall indicate the letters and words of our prefent languages: and this may be done in two ways; firft, by characters or fignals, which fhall either exprefs the letters of the alphabet, or words, or, in fome cafes, complete fentences. The other method is to exhibit fignals, which fhall indicate numbers; and thefe numbers can be tranflated into words, by means of a dictionary in which every word is numbered. The telegraphs which we have defcribed are of the former clafs, and we have explained the manner of ufing them; but the latter kind requires a greater variety of fignals, becaufe they muft be capable of making as many fignals as there are words in the language in which the communication is intended to be made. There is fome difficulty in making a telegraph fo univerfal as this requires, otherwife the numeral method has decided advantages, in the convenience with which it can be carried on by means of a common dictionary, alphabetically arranged, and in which every word is regularly numbered from one end to the other. In this any word can be inftantly found, by its place in the alphabet; and the number correfponding to it being exhibited by the telegraph, and obferved by the oppofite party, he can as quickly find out the fame word in the dictionary by means of its number.

The numeral method is perhaps the eafieft of all others, and may be exhibited by fire and fmoke in the fimpleft manner, without any telegraph or complicated apparatus being made for the purpofe.

The meaning of a fignal is afcertained by the continuance or difappearance of fire and fmoke at a different place. In the day-time, the fmoke on a particular hill may give notice to an obferver on the next hill, that a communication is to be made: he of courfe will anfwer it by fmoke, to fhew that he is upon his watch. The fmoke will then difappear on both hills, by a cover being placed over the fire; which, being taken off and put on again repeatedly, will fhew a fucceffion of clouds of fmoke rifing at proper intervals in the air. The obferver notes the number of times that the fmoke rifes without a confiderable interval, fuppofe three times; and he then writes down the number 3. After a more confiderable interval, determined on by the parties, the fmoke rifes again, we will fuppofe four times; he writes down the number 4. He has now the number 34 to communicate by fignals to the next poft. At night this is done by a fucceffive appearance and difappearance of fire.

As the number denoted by the fucceffive appearance of

 fmoke

ſmoke or fire, or firing of guns, may, if it is a large number, be liable to miſtake, a learned profeſſor in Germany propoſed to ſhorten the numbers employed, by uſing a quaternary inſtead of the decenary arithmetic. Thus, according to his ſyſtem, the units were to be placed as in common arithmetic; a figure in the next place, to the left hand, inſtead of denoting the number of tens, was a multiple of 4, denoted by the figure, that is, it denoted the number of fours to be expreſſed; in the third place, the figure denoted the number of ſixteens inſtead of hundreds; and the fourth place of figures would be ſixty-fours inſtead of thouſands; and ſo on. *E. gr.* To write down 95, he placed his figures thus: 1133; the 3 in the place of units denoted 3, the next 3 denoted 3×4, or 12; the third figure, 1, denoted 4×4, or 16; the next figure, 1, denoted $4 \times 4 \times 4$, or 64; conſequently 1133, in the quaternary arithmetic, was equivalent to $64 + 16 + 12 + 3 = 95$ in the common decimal numeration. The advantage propoſed by thus changing the figures was, that in making the ſignals 95, there muſt be fourteen firings, or appearances of ſmoke, which, in the other mode, is done by eight firings. In this arithmetic, a greater number than four never appears; and there is leſs danger in miſcounting ſo ſmall a number. Some of the numbers in the dictionary muſt be devoted to the ſingle letters of the alphabet, as it is by means of them alone that proper names can be made out.

Mr. Edgeworth, who, we believe, firſt introduced the numeral ſyſtem of communication, gives the following account of its advantages, in point of ſecrecy, over the alphabetical method, which is a great object in telegraphic communication. Although the alphabet may be varied at pleaſure, and any arbitrary ſigns employed, yet theſe are poſſible to be deciphered by rules which depend upon the uſual arrangements of letters: thus, for inſtance, a ſingle character being exhibited as a word, muſt, in the Engliſh language, be either A or I. The proportion which exiſts between the number of words of one, two, three, or any greater number of letters, can be claſſed in catalogues, and from theſe the monoſyllables of any cipher are eaſily obtained; and from the letters of theſe monoſyllables, the letters of longer words are diſcovered. By ſimilar rules, ſome of which are very ingenious, and depend upon the philoſophy of language, any alphabetical cipher may be eaſily unfolded. (See CIPHER.) But theſe rules, excepting a few of them, are uſeleſs, when ciphers are employed to denote entire words; and the moſt obvious mode of diſcovery may be avoided, by omitting thoſe common words which occur ſo frequently in every language, as *the*, *and*, *that*, *to*, &c.; and even ſuppoſing that, from its frequent recurrence, any word ſhould be diſcovered, no progreſs can be made from ſuch data, for the cipher of any word is an iſolated fact which leads to nothing farther.

Suppoſe the knowledge of any particular vocabulary ſhould fall into hands for which it was not intended, a ſlight change in the numeration, without any actual change of the figures, would prevent diſcovery: for inſtance, ſuppoſe it is ſettled between the parties, that 6, or any other number, is to be added or ſubtracted from the numbers which are exhibited before referring them to the vocabulary. The advocates of the numeral ſyſtem ſtate, that a letter can be communicated much quicker by ſignals which expreſs words, than by ſignals which expreſs only letters. Words may be forwarded as faſt as they can be looked out in a dictionary, and even faſter, whilſt only an equal number of letters could have been communicated by the alphabetical mode. Another alleged advantage reſulting from the uſe of words in the telegraphic correſpondence is, that the words of the ſame meaning in different languages having the ſame number attached to each, a correſpondence could be carried on from one language into another, which, though not grammatically correct, yet would be ſufficiently intelligible. Proper names muſt be ſpelt, which may eaſily be done, every letter having a correſponding number.

Mr. Richard Lovel Edgeworth, in the Tranſactions of the Royal Society of Ireland, vol. vi. p. 125, has deſcribed his telegraph, which is ſimple, and admits of very numerous combinations: it is intended to repreſent numbers to which words may be referred.

The machinery conſiſts of four indices or pointers, each capable of revolving on a centre or axis, ſo as to aſſume different poſitions. The ſhape of each pointer is that of an iſoſceles triangle, of which the baſe is rather leſs than half the perpendicular. The four pointers are placed in a row, as ſhewn by *fig.* 12, and, as in common numeration, the right hand repreſents units; the ſecond from the right, tens; the third, hundreds; and the fourth, thouſands. It is eaſy to diſtinguiſh whether a hand moving vertically, points perpendicularly downwards or upwards, horizontally to the right or left, or to any of the four intermediate ſituations: this produces eight poſitions, which can be made by each pointer; but of theſe eight poſitions, ſeven only are employed to denote figures; the upright poſition of the hand or pointer being reſerved to repreſent 0, or zero. The figures thus indicated refer to a vocabulary, in which all the words are numbered. Telegraphs of this kind, which are to be fixed at permanent ſtations, which may be ſeen clearly with tolerable glaſſes at twenty miles diſtance, are to be mounted on ſtone or wooden pillars, ſixteen or twenty feet high; four of which muſt be ſolidly erected in a row; and on the top of each a moveable circle or platform turns horizontally upon a centre, in the manner of a moveable windmill head. Acroſs the platform an axis lies horizontally, and carries the arm or pointer, fixed vertically at one extremity of the axis, whilſt, at the other end, are eight handles to turn the pointer round by. The handles are fixed in their different poſitions by a catch or alidad. By means of the platform, the pointer may be turned to any part of the compaſs; and as one ſide of it is painted black, and the other white, either ſide may be employed, as the colour of the clouds, or the ſituation of the place, may require.

In managing a correſpondence by theſe machines, it is neceſſary to have certain ſignals eſtabliſhed; nor are theſe ſignals merely arbitrary; it is abſolutely neceſſary that they ſhould be made by the two external pointers of the row, *viz.* units and thouſands; or by the two internal pointers, *viz.* tens and hundreds; elſe they could not be repeated by the intermediate ſtations without confuſion; becauſe, in the middle ſtations, that pointer which repreſents thouſands, when conveying a meſſage eaſtwards for inſtance, muſt, when an anſwer is returned to an oppoſite direction, repreſent units. The ſame change will take place between the pointer that denotes hundreds and tens.

When any communication is to be commenced, the pointers that denote thouſands and units are to be whirled round till the ſame is done at the correſponding ſtation. When this ſignal has been anſwered, the perſon who gave it proceeds to ſend his intelligence. As ſoon as he begins, the pointer of hundreds at the oppoſite ſtation is turned to 2, and kept in that poſition till the word is made out from the vocabulary; the pointer is then turned round to 0, or zero. The perſon who is ſpeaking, when he perceives by this ſignal that he is underſtood, turns all the machines to 0, which is always to be done at the end of every word.

When all his machines are in this poſition, his correſpondent again turns his pointer belonging to the place of hundreds to 2, to ſhew that he is ready to receive the intelligence, and it it is to remain there till he receives another word, and fo on, till all that is meant to be faid is finifhed: the pointers of *thoufands* and *units* are then to be vibrated backwards and forwards, with the points downwards, like pendulums, till the famé is done at the oppofite ftation.

If any interruption takes place on either fide from a cloud, or fhower, or any accident, it is to be indicated by vibrating *thoufands* and *units*, with their points upwards; which fignal muft be repeated from the oppofite ftation; and whoever has made the fignal of interruption, muft make the fignal of recommencement, when he is ready to proceed. This fignal is by vibrating *hundreds* and *tens*, with their points upwards, and when this is anfwered, (but not before,) the bufinefs may proceed. It fhould be obferved in general, that every fignal fhould be acknowledged by the party to whom it is addreffed.

The vocabulary correfponding with the numbers denoted by this machinery is compofed of a large book, *fig.* 13, with mahogany covers, framed, to prevent them from warping. Its fize, when opened, is 47 inches by 21; it confifts of 49 double pages, that is to fay, each fheet is folded in the middle, and when it is opened forms one page.

The book is divided into feven parts by thin flips of mahogany, which ferve to open it eafily at each of thefe divifions, every one of which contains feven pages, and each page forty-nine words. No more than forty-nine words are contained in each page, becaufe the numbers 8 and 9, and zero, are not admitted. This omiffion arifes from the ftructure of the machinery, which points only to feven numbers, referving 0 for a point of reft, at which point the hands indicate nothing. In every hundred, therefore, only forty-nine numbers are ufed; and in every thoufand, only feven hundreds are counted. Each divifion of the book, feparated by the mahogany rulers, contains all the efficient numbers in feven hundred. Each of thefe rulers projects beyond the fides of the pages, and is numbered in fucceffion from 1 to 7; and they are fo placed below one another, as to permit the numbers on all fides of them to be feen at once, as in the figure.

When any number of thoufands is pointed out, it can, by means of thefe rulers, be immediately felected: the feries of feven pages, which one of thefe rulers opens, is cut, like the alphabet of a ledger, at the edge in feven divifions. By thefe means, the page containing the hundred which is wanted is inftantly found. In the page thus obtained, the tens, from 10 to 70 inclufive, are divided from each other, fo as to be inftantly diftinguifhable, and the units under each divifion are in like manner eafily felected.

The following is a fpecimen of feven lines of the firft page, and though it is but one-tenth of the real fize, it is fufficiently diftinct. Its contents are divided into eight claffes, the words in each clafs being numbered downwards, from 1 to 77, omitting all cyphers, or zero, and all eights and nines. When once the clafs required is afcertained, any number in the page can be found immediately. As for inftance, the reader will eafily felect Clafs VII. N° 11, Clafs IV. N° 15, and fo of the reft. Nothing remains to be explained but the manner in which the clafs in each page is pointed out by the machinery. For this purpofe, before the pointers are turned to any fet of figures, the pointer that reprefents thoufands is turned to the clafs that is wanted, and as foon as the correfpondent anfwers this fignal, thoufands is returned to 0. Then all the pointers are moved to the places which denote the figures required for any word or fentence. When the clafs is thus afcertained, an index, which flides on the mahogany cover of the book, is fet to the column belonging to this clafs. When an obfervation is made, the number of thoufands can be opened by the ruler. As foon as it is read off by the telefcope, the number of hundreds is opened by the pages, where they are cut away, and the number of tens and units is feen on the page. As the pointers are moved in fucceffion from thoufands to units, the different divifions of the book can be opened as faft as the pointers are moved.

Specimen of the Vocabulary belonging to Mr. Edgeworth's Telegraph.

Common Words. Clafs 0.	Words lefs common. Clafs I.	Technical Terms. c, n, m. Clafs II.	Perfons. Clafs III.	Officers. Clafs IV.	Places. Clafs V.	Navy and Merchant Ships. Clafs VI.	Phrafes and Sentences. Clafs VII.
11. A.	11. Abafe.	11. Aback.	11. Abbot.	11. Academy of Infcript.	11. Abbeville.	11. Atlas.	11. Attend to day - at A. M
12. Ab.	12. Abate.	12. Abacus.	12. Ackland.	12. Acad. of B. L. Paris.	12. Aberdeen.	12. Ajax.	12. ——— ——— - at P. M.
13. Ac.	13. Abbey.	13. Abaft.	13. Acton.	13. Academy.	13. Abergavenny.	13. Albion.	13. ——— to-morrow - at A. M
14. Ad.	14. Abbefs.	14. Abatis.	14. Achefon	14 Account-Office.	14. Abington.	14. Africa.	14. ——— ——— - at P. M
15. Ae.	15. Abbot.	15. Abdomen.	15. Adams.	15. Admiralty.	15. Abydos.	15. Audacious.	15. ——— to night - at P. M.
16. Af.	16. Abdicate.	16. Abductor.	16. Adamfon.	16. Agent to the.	16. Abyffinia.	16. Agamemnon.	16. ——— to-morrow night at P. M.
17. Ag.	17. Abed, Abet.	17. Abeal.	17. Adair.	17. Admiral.	17. Acadia.	17. America.	17. ——— on Monday - at A. M.

The principal objection to Mr. Edgeworth's machine is, that it would be of a vaft fize, and each pointer would require a man to work it. He defcribes, at the end of his paper, a portable machine, which is made of fpars and poles jointed together, and braced by cords. We think the fecond kind of French telegraph, which was fet up between Landau and Paris, would anfwer the purpofe very well: it has five indicators, and the movements are made by machinery in the houfe below.

Major C. Le Hardy, in the Tranfactions of the Society of Arts for 1808, vol. xxvi. has defcribed a telegraph which is well adapted for exhibiting fignals which fhall indicate numbers. It has four indices or pointers, each confifting of a long arm, carrying a fquare index-board or pointer at the extremity. One of thefe pointers reprefents units; the fecond, tens; the third, hundreds; and the fourth, thoufands. All the four indices move on a common centre by the machinery; and to diftinguifh them one from another, each board is placed at a different diftance from the centre of motion, fo that in their motion they defcribe four circles of different radii. The pofition of the arm, with refpect to the horizon, is made to indicate the number which is to be expreffed by each index refpectively, and there are ten different pofitions for each, anfwering to the numeral characters.

To identify thefe ten pofitions, a large frame is fixed clofe behind the pointers, parallel to the plane of their motion; and

and this frame supports ten radial bars, which diverge from the common centre of motion. The radii are again interfected by other bars, forming four concentric arcs of circles, each correfponding in radius with the length of one of the four pointers or fignal-boards. By means of the radii, the pofitions of the pointers, and their correfponding numbers, are read off, whilft the arcs ferve to diftinguifh the different pointers of units, tens, hundreds, and thoufands, becaufe they always fhew the length of the arms from the centre. By this machinery, 10,000 can be exhibited; and for higher numbers, there are two fquare fignal-boards, which can be turned fo as to be invifible or vifible at pleafure; one reprefents 10,000, and the other 20,000, and both together 30,000, either of which numbers is to be added to the number fhewn by the arms, according as thefe fignal-boards are exhibited. By this addition, this telegraph can exhibit as high as 40,000.

The frame with radial bars is a good method of reading off the exact pofition of the arms; and it is fo much more certain than trufting to the eye alone, that by its aid the arms may be fhewn in a much greater number of pofitions; ftill, if each arm is diftinctly capable of exhibiting ten fignals, it will be fufficient for the numeral method. Mr. Edgeworth's pointers, as we have feen, were only capable of eight pofitions for each; and this obliged him to mutilate the fyftem of numbers, by taking away all the eights, nines, and zero.

The dial-plate of a clock has been propofed as a model, and would make a moft excellent telegraph, as it might exhibit 144 figns, fo as to be vifible at a great diftance. The dial fhould only be divided into fix divifions inftead of twelve; and this being raifed twenty or thirty feet above a building, and the indices and the dial being painted with very diftinct colours, would be clearly vifible. The dial, if fupported on one poft, might be always turned to the direction in which the information was to be conveyed.

In the Supplement to the Gentleman's Magazine for 1794, a telegraph is defcribed, which confifts of a femi-circle placed in a vertical pofition on a ftrong ftand. The circumference is divided into twenty-four divifions, which are rendered vifible by circular holes cut through the femi-circle. In the centre is an index, which can fucceffively be brought to point out any divifion, very much in the manner of the dial of a clock. In the night-time each divifion is to be furnifhed with a lamp, and the index is made fufficiently broad to eclipfe or hide any of the lamps at pleafure to which it is turned, and by this means the letters of the alphabet are to be defignated.

Mr. Garnet's Telegraph.—Of all the propofals for making a variety of fignals by the different pofitions of an index or pointer which moves on a centre, the following is the moft certain as to the identity of the pofitions, and hence it admits of the greateft number of fignals from each pointer. It has alfo a farther advantage, that there is no neceffity for any frame or dials, like the three laft defcribed machines, which, as their divifions are intended to be obferved at a diftance, muft be exceedingly large. The pointer or indicator of Mr. Garnet's machine is the fame as the foregoing, and its different pofitions reprefent different characters or letters: its length fhould be two and a half or three feet from the centre, for every mile of diftance. The diftant obferver can find out, and exactly read off thefe pofitions by a wire fixed acrofs the eye-piece of the telefcope with which he obferves, which eye-piece turns round on the end of the tube of the telefcope, fo as to bring the wire to be parallel to, or correfpond with the diftant pointer. This is as eafy to do as to look through the telefcope.

The index or pointer has a fmall circle fixed on its axis of motion, and turning round with it. This circle is divided into twenty-four divifions, or even more, and each divifion is lettered with a letter of the alphabet. A fixed index is alfo provided, to which any letter on the divided circle can be brought by turning the pointer round, and this determines the pofition of the pointer. Or, inftead of an index, the divided rim of the circle may be concealed in a box, with a hole at one fide juft fufficient to fee one letter or divifion at a time, and then there can be no miftake in fetting the pointer. The eye-piece of the telefcope is to be made to turn round upon the end of the tube, and is to have a circle fixed upon it fimilarly divided and lettered. A fine wire is alfo to be ftretched acrofs the centre of the eye-piece in the focus of its lenfes; and there muft be likewife an index or mark on the telefcope, to read the divifions of the circle on the eye-piece. If this circle be likewife enclofed in a box, having a hole to fee only one letter at a time, there will be lefs danger of miftake.

The inftrument being correctly adjufted, it is obvious that (the eye-piece of the telefcope being turned round till its wire covers or becomes parallel to the diftant pointer) the index on the telefcope will point out the fame letter on the divided circle of the eye-piece, as is indicated by the index and circle of the diftant pointer: hence the two parties have the fame letter or character prefented to them by their refpective inftruments.

The idea of reading the fignals by means of wires on the eye-piece of the telefcope is very valuable, and promifes many advantages. In intermediate ftations, there is always danger of confufion in making fignals to parties in both directions; becaufe an arm which inclines towards the right when the telegraph is viewed in one direction, in an oppofite direction will appear to incline to the left, and indicate a different thing: hence it is always neceffary for the parties to be informed, by a previous fignal, in what direction the communication is to be made, that the obfervers, when they fee a fignal made, may know whether it is intended for them, or for the next ftation beyond. Now when the telefcope is ufed, if the circle of each telefcope be figured to correfpond with the circle of the pointer which is to be obferved with it, all fignals will become intelligible to any party who obferves them.

The Rev. John Gamble fuggefted a form of telegraph, which confifted of four arms, each ten feet long, and furnifhed with a circular board at the end. All the four moved upon a common centre of motion, and independently of each other, fo that one, two, three, or four, could be exhibited at different degrees of elevation with refpect to the horizon, or with refpect to each other, fo as to afford a great number of fignals. One of thefe was erected in 1803 upon one of the towers of Weftminfter Abbey, but has long been removed. About the time when telegraphs were firft ufed, this gentleman publifhed a fmall pamphlet, entitled "Obfervations and Telegraphic Experiments," which contains fome good ideas.

Nocturnal Telegraphs.—In 1801, Mr. John Boaz of Glafgow obtained a patent for a telegraph, which effected the fignal by means of twenty-five Argand lamps. Thefe were arranged in five rows, with five in each row, fo as to form a fquare. Each lamp being provided with a blind, with which its light could be obfcured, the lamps could be made to exhibit letters and figures, the fame as Dr. Hooke's characters, by leaving fuch lamps only vifible as were neceffary to form the character. The machine is defcribed in the Repertory of Arts, Firft Series, vol. xvi. p. 223; and in the Philofophical Magazine, vol. xii. p. 84.

In

In the Philofophical Magazine, vol. xxix. Capt. Pafley has defcribed a telegraph, which is nearly the fame as Mr. Boaz's, but with fix lights only; alfo what is called a Polygramic telegraph.

The Chevalier Edelcrantz has defcribed a machine in the Tranfactions of the Society of Arts, which is for working the vanes of a telegraph with boards, like *fig.* 4, fo that by merely preffing keys, like an organ, and then turniug a haudle, the required fignals fhall be made. The telegraph was propofed with nine boards inftead of fix; but as we confider this form of telegraph decidedly inferior to thofe with arms moving on centres, we fhall not enter into any further defcription of it.

To conclude, we clafs the telegraphic art amongft thofe which are not carried to fuch a ftate of perfection as to be incapable of farther improvement: it is much to be wifhed that it could be fo fyftematized, that the communication of intelligence could be effected with the fame eafe and certainty as by writing. We are confident of the poffibility of this, from having obferved the abbé Sicard converfing with his deaf and dumb pupils by making figns of the fimpleft nature with the hands, in which manner he could communicate his ideas on any fubject with more rapidity than by writing.

TELEM, in *Ancient Geography*, a town of Paleftine, in the tribe of Judah, towards the extremity of this tribe, along the frontiers of Edom.

TELEMANN, Gio. Philip, in *Biography*, one of the greateft and moft voluminous mufical compofers during the firft fifty or fixty years of the laft century, in Germany. He was born at Magdeburg in 1681, and preceded Keifer as opera compofer at Hamburgh, for which city he produced thirty-five operas. His compofitions for the church and chamber are fuppofed to be more numerous than thofe of Aleffandro Scarlatti. In the year 1740, his overtures on Lulli's model amounted to fix hundred.

This compofer, like Raphael and fome other great painters, had a firft and fecond manner, which were extremely different from each other; in the firft he was hard, ftiff, dry, and inelegant; in the fecond, pleafing, graceful, and refined. Telemann, who lived to a great age, drew up a well-written narrative of his own life, in the early part of which he was an intimate acquaintance and fellow-ftudent with Handel.

The lift of Telemann's printed works, inferted in Walther's Mufical Lexicon in 1732, amounted to twenty-nine; and in Gerber's Continuation of Walther, fifteen or fixteen more are fpecified. But ftill double the number of thofe printed were long circulated in manufcript from the mufic-fhops at Leipfic and Hamburgh.

The beft account of Telemann's profeffional merit as a compofer, was publifhed at Hamburgh immediately after his deceafe at 85, in 1767, by profeffor Ebeling, an excellent mufical critic, a friend of Emanuel Bach, a man of a refined tafte, found judgment, and a perfect acquaintance with the merits and various ftyles of the great muficians of his country.

TELEMBO, in *Geography*, a river of South America, which joins the Patia, 8 miles N.W. of Baracoas.

TELENGUTES. See Teleutes.

TELENTO, a town of Perfia, in the province of Lariftan, on the fea-coaft; 10 miles S.W. of Congo.

TELEOLOGY, formed of τελος, *end*, and λογος, *difcourfe*, the fcience of the final caufes of things. This is an ample and curious field of inquiry, though pretty much neglected by philofophers.

TELEPHANES, in *Biography*, a celebrated performer on the flute in the time of Philip of Macedon. According to Paufanias he was a native of Samos, and had a tomb erected to him by Cleopatra, the fifter of Philip, in the road between Megara and Corinth, which was fubfifting in his time. The epitaph upon this mufician, which is preferved in the Anthologia, equals his talents to thofe of the greateft names in antiquity.

> "Orpheus, whom gods and men admire,
> Surpafs'd all mortals on the lyre:
> Neftor with eloquence could charm,
> And pride, and infolence difarm:
> Great Homer, with his heav'nly ftrain,
> Could foften rocks, and quiet pain:—
> Here lies Telephanes, whofe flute
> Had equal pow'r o'er man and brute."

Telephanes was clofely united in friendfhip with Demofthenes, who has made honourable mention of him in his harangue againft Midias, from whom he received a blow in public, during the celebration of the feaft of Bacchus. As this was a kind of mufical quarrel, we fhall relate the caufe of it.

Demofthenes had been appointed by his tribe to furnifh a chorus, to difpute the prize at this feftival; and as this chorus was to be inftructed by a mafter, Midias, in order to difgrace Demofthenes, bribed the mufic-mafter to neglect his function, that the chorus might be unable to perform their feveral parts properly before the public, for want of the neceffary teaching and rehearfals. But Telephanes, who had difcovered the defign of Midias, not only chaftifed and difmiffed the mufic-mafter, but undertook to inftruct the chorus himfelf.

TELEPHIASTRUM, in *Botany*, Dill. Elth. 375, fo called by Vaillant, from its refemblance to *Telephium*. See Talinum.

TELEPHIOIDES, Tourn. Cor. 50. t. 485. Dill. Elth. 377. t. 282. See Andrachne.

TELEPHIS, in *Ancient Geography*, a town of Afia, in Greater Armenia, fituated in the vicinity of the river Phafis.

TELEPHIUM, in *Botany*, a name adopted from Diofcorides, whofe τηλεφιον the plant we are about to defcribe was fuppofed, by Imperato, Clufius, and moft authors, to be. Dr. Sibthorp however fatisfied himfelf that the plant of Diofcorides was *Cerinthe minor*, and poffibly alfo the *afpera* of Willdenow. To this conclufion he was led, firft, by the authority of the famous old manufcript with drawings, at Vienna; and next, by obferving that *C. minor* is particularly common in Greece among vines in the fpring, as well as in other cultivated ground, as Diofcorides relates of his τηλεφιον. The yellow colour of the flowers alfo anfwers to his defcription, which our *Telephium*, in that point, does not, nor did Dr. Sibthorp obferve the latter in any part of Greece.—Linn. Gen. 149. Schreb. 201. Willd. Sp. Pl. v. 1. 1506. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 2. 173. Juff. 313. Tourn. t. 128. Lamarck Illuftr. t. 213. Gærtn. t. 129.—Clafs and order, *Pentandria Trigynia*. Nat. Ord. *Holeraceæ*, Linn. *Portulaceæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of five oblong, obtufe, concave, keeled leaves, the length of the corolla, permanent. *Cor.* Petals five, oblong, obtufe, erect, tapering downwards, inferted into the receptacle. *Stam.* Filaments five, awl-fhaped, fhorter than the corolla; anthers incumbent. *Pift.* Germen fuperior, triangular, acute; ftyle none; ftigmas three, acute, fpreading. *Peric.* Capfule fhort, triangular, of one cell with three valves, and a central unconnected receptacle, half as long as the capfule. *Seeds* numerous, roundifh-kidneyfhaped.

Eff.

Eff. Ch. Calyx of five leaves. Petals five, inserted into the receptacle. Capsule with one cell, three valves, and many seeds.

1. T. *Imperati.* Green Orpine. Linn. Sp. Pl. 388. Willd. n. 1. Ait. n. 1. (T. legitimum; Cluf. Hift. v. 2. 67. Ger. Em. 520. Telephio di Diofcoride; Imperat. Hift. Nat. 662.)—Leaves alternate.—Native of Switzerland, Italy, and the fouth of France. A hardy perennial, kept in our botanic gardens, flowering in fummer. Numerous decumbent, round, herbaceous, leafy *ftems*, a fpan long, but flightly branched, fpring from the crown of the root, fpreading in all directions. The *leaves* are fcattered, nearly feffile, obovate, entire, fmooth, glaucous, rather fucculent, an inch long, more or lefs. *Cymes* terminal, folitary, convex, of numerous fmooth *flowers*, with white, or pale flefh-coloured, *petals*.

2. T. *oppofitifolium.* Barbary Orpine. Linn. Sp. Pl. 388. Willd. n. 2. (T. myofotidis foliis, amplioribus, conjugatis; Shaw Afric. n. 572. f. 572.)—Leaves oppofite.—Found by Shaw in Barbary. Nothing is known of this fpecies but from his rude figure, and fhort defcription. The *leaves* are elliptic-oblong, above an inch in length; the lower ones ftalked. Tops of the flowering *branches* recurved, as in the *Heliotropium*. *Petals* fmall. *Capfules* of three valves, with many feeds; fo that there feems no doubt of the genus.

Telephium, in *Gardening*, furnifhes a plant of the fmall hardy perennial kind, of which the fpecies ufually cultivated for garden ufe is the true orpine (T. imperati).

Method of Culture.—This plant is increafed by fowing the feeds in the autumn or fpring, in dry light mould, either where the plants are to remain, or in beds to be afterwards planted out. They appear in the fpring, when they fhould be kept clear from weeds, and they will flower the following year.

It is alfo capable of being increafed fometimes by offsets, flips, or cuttings, planted out in the fpring feafon.

It likes a dry light foil, in which it grows beft and lafts longeft. The plants afford variety in the common borders and clumps when placed in the fronts of thofe parts.

Telephium, a malignant dangerous ulcer. The term is derived from Telephus, who was wounded by Achilles, and whofe wound, it is faid, became before he died a difeafe of the above kind.

TELEPHORUS, in *Entomology*, the Necydalis *Cærulefcens;* which fee.

TELESCOPE, from τηλε, *at a diftance*, and σκοπέω, *I fee*, is an optical inftrument that enlarges the vifual angle fubtended by a diftant object, and thereby is faid to *magnify* it, fo as to render it vifible to the eye of an obferver. This property of making diftant objects appear clofe to the eye, never fails to excite the furprife of every one who looks through a telefcope for the firft time; but few, comparatively fpeaking, have their curiofity fully gratified, as it regards the means by which this wonderful phenomenon is effected. They are told, that the tube through which they look, contains magnifying glaffes, or polifhed fpecula, which, by a peculiar arrangement, produce the furprifing effect they witnefs, and there the explanation ufually ends; but it is our province to give our readers a better account of this aftonifhing inftrument, which we propofe to do in a fyftematic manner, firft by giving a fhort *hiftory* of its invention and improvements; fecondly, by giving a popular explanation of the theory of the dioptric conftruction, including the doctrine of aberrations; thirdly, by explaining the theory of the cata-dioptric conftruction; fourthly, by defcribing the moft approved inftruments, with reference to the drawings that reprefent their figures on their refpective ftands; fifthly, by fhewing how their magnifying *powers* may be meafured by *dynameters*, and varied by different arrangements; and laftly, by exemplifying their *ufes* in meafuring fmall angles and their correfponding terreftrial diftances. But before we proceed further with this fubject, we muft requeft our readers to perufe the articles Aberration, Catoptrics, Dioptrics, Lens, Mirror, Reflection, Refraction, and Speculum, in the preceding volumes of our work, in order that we may not have occafion to repeat what would otherwife have been neceffary to be introduced in this place, to render our account fufficiently full, particularly in that part of it which relates to the theory of fingle lenfes.

1. *The Hiftory.*—The invention of the telefcope, which was one of the nobleft that modern ages can boaft of, has enabled man to raife his eyes far above the furface of the globe he inhabits, in fearch of worlds that were invifible to the unaffifted eye; and the more perfect his inftrument is made, the more celeftial bodies he difcovers fcattered through the infinitude of endlefs fpace. Whether this invention was cafual, or the offspring of ratiocination, cannot perhaps be pofitively affirmed from any exifting document; but the probability is, that it was in a certain degree cafual: lenfes of both the concave and convex formation were ufed feparately to affift the human eye, antecedently to the conftruction of any telefcope; and the general belief is, that fome accidental placing of two lenfes, one convex and the other concave, of different focal lengths, at fuch diftance from each other, that the rays tranfmitted through them formed a picture on the retina of the eye, led to the difcovery that they poffeffed the wonderful property of rendering a diftant body apparently more large, and confequently more near, than it will appear to the unaffifted eye, or to an eye ufing any fingle lens whatever: this difcovery, once made, would obvioufly lead to the conftruction of an inftrument, in which this fimple combination of two lenfes would be the bafis.

The honour of having conftructed the firft telefcope, which was no doubt of the dioptric or refracting fort, (from διοπτρον, *a perfpective inftrument*,) has been attributed to various inventors, feveral of whom may have been equally entitled to the claim of originality, though only one can be confidered as the *firft* inventor. We profefs not to be in poffeffion of better information on this fubject than our predeceffors were, and therefore fhall fatisfy ourfelves with the enumeration of thofe perfons who appear to us worthy of being put on the lift of competitors for the honour of this noble invention. Mr. W. Molyneux has afferted, in his "Dioptrica Nova," that our countryman Friar Bacon well underftood the nature of all forts of optical glaffes, and how to combine them fo as to form fome fuch inftrument as the telefcope; and Samuel Molyneux, the fon, has affirmed, that not only the invention but conftruction of a telefcope is fairly attributable to Bacon, as may be collected from various Latin phrafes in his Opus Majus; and Dr. Jebb, who edited this work, adduces a paffage from Bacon's manufcript, to prove that he actually applied telefcopes to aftronomical purpofes fo long ago as in the 13th century; the friar having died in the year 1294.

The paffages to which Mr. Molyneux refers, in fupport of Bacon's claims, occur in his Opus Majus, p. 348, and p. 357. Jebb's ed. 1733. The firft is as follows: "Si vero non fint corpora plana, per quæ vifus videt, fed fphærica, tunc eft magna diverfitas: nam vel concavitas corporis eft verfus oculum vel convexitas:" whence it is inferred, that he knew what a concave and convex glafs was. The fecond is comprifed in a whole chapter, where he fays, "De vifione visione fractâ majora sunt; nam de facili patet per canones supra-dictos, quod maxima possunt apparere minima, et e contra, et longe distantia videbuntur propinquissime, et e converso. Nam possumus sic figurare perspicua, et taliter ea ordinare respectu nostri visûs et rerum, quod frangentur radii, et flectentur quorsumcunque voluerimus, ut sub quocunque angulo voluerimus, videbimus rem prope vel longe, &c. Sic etiam faceremus solem et lunam et stellas descendere secundum apparentiam hic inferius, &c.:" *i. e.* greater things than these may be performed by refracted vision; for it is easy to understand by the canons above-mentioned, that the greatest things may appear exceeding small, and on the contrary: also that the most remote objects may appear just at hand, and on the contrary: for we can give such figures to transparent bodies, and dispose them in such order with respect to the eye and the objects, that the rays shall be refracted and bent towards any place we please; so that we shall see the object near at hand or at a distance, under any angle we please, &c. So that thus the sun, moon, and stars, may be made to descend hither in appearance &c. Mr. Molyneux has also cited another passage out of Bacon's Epistle ad Parisiensem, of the Secrets of Art and Nature, cap. 5. to this purpose: "Possunt etiam sic figurari perspicua, ut longissime posita appareant propinqua, et e contrario: ita quod ex incredibili distantia legeremus literas minutissimas, et numeraremus res quantumque parvas, et stellas faceremus apparere quo vellemus:" *i. e.* glasses or diaphanous bodies may be formed, that the most remote objects may appear just at hand, and contrarily; so that we may read the smallest letter at an incredible distance, and may number things though never so small, and may make the stars appear as near as we please.

Dr. Smith, however, who must be considered as having been a competent judge of this subject, was unwilling to allow the inference, that Bacon actually made a telescope, and conjectures that he only conceived in his mind how such an instrument might be constructed; which, by the bye, is still allowing the invention, though not the construction, to have been his. But be this as it may, we find no further notice taken of any such instrument as a telescope until about the year 1560, when John Baptista Porta, a Neapolitan, is said by Wolfius to have made a telescope; but the description he gave of his invention in his Magia Naturalis is so defective, that Kepler declared it unintelligible; neither does it appear that this telescope was used in any celestial observation. Soon after this time, *viz.* in the year 1579, according to the account of Thomas Digges, in his Stratiticos, his father, Leonard Digges, had learned from a manuscript book of the learned Bacon, how to discover objects at a distance, by perspective glasses set at due angles, when the sun shone upon them; but it is not evident whether the construction resembled that of a telescope or of a camera obscura, nor whether it was of the dioptric or catoptric kind.

According to Descartes, James Metius, while amusing himself with making mirrors and burning-glasses, happened to look through two lenses, one concave and the other convex, placed by accident at a proper distance from each other, and thus discovered the property that such a combination of glasses possesses of shewing objects at a distance; this discovery is said to have been near the end of the 16th century. The same discovery has been also attributed to John Lippersheim, a maker of spectacles at Middleburgh; but Borellus, in his book entitled "De vero Telescopii Inventore," makes Jansen, or Hansen, (Zacharias Joannides,) another maker of spectacles at the same place, the real inventor of the telescope in the year 1590; and there seems to remain little doubt but that Jansen was entitled to the honour. The account is, that after having arranged the glasses in a tube, this ingenious mechanic hastened to present it to prince Maurice, under a persuasion that it would benefit him in his wars; but the secret soon became public, and Lippersheim immediately copied the invention. This first telescope magnified about fifteen or sixteen times, and its inventor viewed with it the spots of the moon, the body of Jupiter, and even saw some small stars above and below his disc, which appeared to move round him, and which therefore must have been his satellites. From this source, it is supposed that Metius gained his information, as well as Cornelius Drebell, of Alcmaer in Holland, who afterwards made similar instruments. We may also mention Francis Fontana, an Italian, as one who claimed the honour of this invention in the year 1608; but from what we have already said, of Jansen particularly, he cannot be considered as the first inventor, though it is possible that the report of such an invention having taken place might incite him to devise the means of effecting a similar contrivance. This, it is generally understood, was the case with the famous Galileo, who, when professor of mathematics at Padua, heard it reported at Venice, in the year 1609, that a Dutchman had presented count Maurice of Nassau with an optical instrument, which had the property of making distant objects appear as though they were near; but notwithstanding about twenty years had elapsed since the invention, the means used for producing the wonderful effect were not known; and Galileo, on his return to Padua, in a very few days not only contrived but constructed a telescope, which he presented to the doge Leonardo Donati, and to the senate of Venice, together with an account of the construction and uses which the instrument might be applied to, both by sea and land; for which service it is well known that his stipend as professor was thenceforth tripled. Among other discoveries that were made with Galileo's telescope in the heavenly regions, the four satellites of Jupiter were found by him to revolve round this planet in their respective periods, and were called the *Medicean stars*, in honour of the house of Medici. This discovery took place early in the year 1610, and Galileo, pursuing his favourite study till March, published at Venice his "Nuncius Sidereus," containing an account of all his discoveries, and dedicated it to Cosmo, the grand duke of Tuscany, who, in a letter written by himself, invited the astronomer to quit Padua for an increased stipend, without the labour of a lectureship. The first telescope which Galileo constructed had only a power of three times; his second was six times more powerful; and his third magnified thirty-three times, which, at so early a date, was no contemptible instrument.

Hence Galileo, though evidently not the first maker of a telescope, has been considered as entitled to all the merit that is due to such a noble invention, seeing he had no model before him, nor instructions how to proceed in the accomplishment of his ingenious work. But though Galileo was successful in the construction and uses of his telescope, which was of the refracting sort, with a concave eye-glass, as we shall shew presently, yet it remained for that sagacious mathematician Kepler to explain, on philosophical principles, the *rationale* of that construction. It was he who first explained the nature and effects of both the converging and diverging rays of light, after passing through the respective lenses, and who demonstrated the principles by which new arrangements might be made in the glasses, that would produce a superior instrument. He shewed that in small obliquities of incidence, the angle of incidence exceeds the angle of refraction about three times.

He alfo firft proved, that in a plano-convex lens, parallel rays are made to converge to a point which is diftant from the lens juft the diameter of the fphere of convexity; and that, if both fides of the lens are equally convex, this point will be at the centre of the circle of convexity. It remained however for Cavallieri to difcover and to prove, in cafes where the radii of curvature of the two fides of a double-convex lens are unequal, that as the fum of both the diameters is to one of them, fo is the other to the diftance of the focus: and it may be proper to notice here, that the fame rules are applicable to concave lenfes, except that the focus is at the contrary fide of the glafs.

It is remarkable, however, that Defcartes, the pupil of Kepler, makes no mention of his tutor's improvements, in the art of conftructing a telefcope, having been carried into execution for feveral years after Galileo's was brought into ufe. It was not till the year 1630, that Scheiner defcribes, in his "Rofa Urfina," the plan of fubftituting a convex inftead of a concave eye-glafs, as fuggefted by Kepler, to be ufed for aftronomical purpofes, where the inverfion of the object is a matter of no importance, but where the increafed field of view is of material confequence. The fame mechanician foon after adds a fecond convex glafs to his eye-tube, by means of which the objects become erect, which addition was no improvement to the vifion, but rather a detriment; and after him, Rheita gave an erect pofition to objects, by ufing three fimilar lenfes in the eye-tube inftead of two, which greatly improved the vifion, without other detriment than the lofs of a little light: and becaufe Rheita's telefcope was adapted for viewing objects on the earth, as well as in the heavens, it was diftinguifhed by the name of the *terreftrial* telefcope, by way of diftinction from Scheiner's *aftronomical* one. In both thefe telefcopes, as well as in Galileo's with a concave eye-glafs, the power is eftimated from the focus of the object-glafs divided by the focus of the eye-glafs, as will be feen hereafter.

The ftudy of dioptrics now became general, and feveral improvements were offered by different individuals in the conftruction of the refracting telefcope; but among the real improvers muft be placed the very ingenious Huygens, who, being well acquainted with the aberration of the rays of light arifing from the fpherical figure of the glaffes, contrived a better arrangement of the eye-glaffes than had before been devifed. It was however very foon found, that the power of a telefcope of any of the preceding conftructions, could not be increafed by fhortening the focus of the eye-glafs alone, beyond certain limits, without introducing great indiftinctnefs, arifing from the fpherical aberrations; and that the beft mode of gaining power, without diminution of light and diftinctnefs, is an increafe of the focal length, without much increafe of aperture of the object-glafs; and a little experience fhewed, that it is neceffary to increafe this length in the duplicate ratio of the propofed increafe of power: *i. e.* in order to magnify *twice* as much, the focus of the object-glafs muft be made *four* times as long as that of another telefcope that has the fame light and diftinctnefs; and for any other power in a fimilar proportion. The confequence of this difcovery was, that different makers began to vie with each other, with refpect fimply to the length of their telefcopes: among thefe may be mentioned Euftachio Divini at Rome; Campani at Bologna; fir Paul Neille, Mr. Reive, and Mr. Cox, in England; and in France, Borelli and Auzout. The laft-mentioned mechanician fucceeded in grinding an object-glafs of the aftonifhing length of 600 feet; and it is faid, that Hartfocker made them even longer than this.

It will here occur to the reader, that tubes of this enormous length, if practicable, could not be manageable by an obferver; and hence we find, that thefe very long object-glaffes were fixed on the top of long poles, or to growing trees, and fo contrived as to be capable of adjuftment for the axis of vifion when turned to different altitudes, agreeably to the required pofition of the remote eye-glafs.

But while the length of the telefcope was thus inconveniently increafed, and the trouble of making good obfervations therewith proportionably augmented, it became a queftion to determine in what proportion the aperture might be enlarged with the increafe of focal length of the object-glafs. Auzout wrote a paper, and delivered it to the Royal Society in the year 1665, in which he affirmed, that the diameter of the object-glafs ought always to be in a fubduplicate ratio of its focal length, or nearly fo; and accordingly drew up a table of apertures fuitable for all focal lengths, from 4 inches to 400 feet: upon which Dr. Hooke very properly remarked, that the fame glafs may have its aperture advantageoufly enlarged or diminifhed, according to the quantity of light proceeding from the object viewed.

While powerful telefcopes were thus obliged to be unmanageably long, and obtained the name of *aerial* telefcopes, from the circumftance of their having no tubes to be inclofed in, the immortal Newton had his penetrating mind occupied with meditated improvements on the figure and arrangement of lenfes, and proceeding, as he always did, on rational principles, difcovered, from the elongated and coloured fpectrum formed by rays of light paffing through a triangular prifm, and from experiments calculated to inveftigate the caufe of fuch an oblong form and coloured appearance, that light is not homogeneous, and that different rays are differently refrangible, when tranfmitted through the fame medium. This grand difcovery prefented difficulties ftanding in the way of the improvement of the refracting or dioptric telefcope, apparently much greater than thofe which had previoufly been difcovered, as arifing only out of the fpherical figure of the glaffes; and all hope of fuccefs in making fhort telefcopes of great power, and yet with fufficient light and diftinctnefs, but without an admixture of coloured rays, was given up.

Yet to a mind like Newton's, it naturally occurred, that what could not be practically effected by refraction, might probably be accomplifhed by reflection of the rays of light into a focus, where, as there would be no feparation of the colorific rays by a refracting medium, there would be no colour nor elongation of the focal point, arifing from any other aberration, than what might be caufed by the figure of the reflecting furface; he therefore abandoned his propofed plan of grinding lenfes after the figure of fome of the conic fections, (for which fir Chriftopher Wren contrived a machine,) to avoid the effects of fpherical aberration in dioptric telefcopes, and turned his mind to the improvement of catoptric or rather cata-dioptric telefcopes, which had been previoufly propofed to Defcartes by Merfenne, and actually conftructed by James Gregory of Aberdeen. The compofition for the beft metal for reflection, and the mode of grinding and polifhing, as propofed and practifed by Newton, we have already detailed under our article SPECULUM; but as reflecting telefcopes have been conftructed differently, we will here introduce a fhort account of the refpective differences, before we refume the remaining narrative of the improvements in dioptric telefcopes. The firft conftruction of the reflecting telefcope was the Gregorian, and moft of the portable reflectors continue to be of this conftruction at the prefent day: its large fpeculum is concave, perforated at the centre, and placed at the interior end of the large tube; and the fmall reflector is alfo concave,

placed

placed oppofite the central hole of the large one, in fuch an adjuftable manner, that the rays, after a fecond reflection, *crofs* one another, and come to the eye-glafs in fuch a way, that an *erect* picture of the object, or rather of the image of the object, is formed on the retina of the eye. In this conftruction, it has been fuppofed that the figure of the large concave fpeculum ought to be truly parabolic, becaufe this is the figure recommended by Newton for his conftruction; but this conclufion is erroneous; for it is the joint effect of both the fpecula that muft be adverted to in their refpective figures, fo that the rays may come without aberration to the eye-glafs after *both reflections;* and in order to produce this joint effect, the curve of the large fpeculum muft be fomewhat *more* than parabolic, *viz.* approaching to hyperbolic, becaufe the fmall fpeculum is alfo concave, and has its feparate aberration.

In the Newtonian conftruction, the large fpeculum is, or ought to be, truly parabolic, and the fmall one *plane,* fet diagonally at an angle of 45°; fo that the rays, after the fecond reflection, come to the eye-tube on the *fide* of the large tube, and near its aperture: the rays do not crofs here, but come to a focus at the eye-glafs, where the object is reprefented inverted and well defined, as well as bright; for when the rays fall obliquely on the fmall reflector, they are almoft all reflected without difperfion, which is an advantage that this conftruction has over the Gregorian. When the Newtonian telefcope was propofed to Huygens, he had the candour to acknowledge, which proved to be the fact, that there would not be that limit to the aperture of a reflector, that is prefcribed by natural neceffity to that of a refractor, and that the power as well as light may be made far to exceed thofe of the latter.

The next conftruction of a reflecting telefcope was that of Caffegrain, defcribed in the Philofophical Tranfactions of the year 1672. This differs from the Gregorian only in this particular, that the fmall fpeculum is *convex,* and the focus of the large or concave one may be longer than is required in the other, for the fame length of tube; the rays do *not crofs* after the fecond reflection, and confequently the object is feen inverted, as in the Newtonian: but here the curve of the large fpeculum is lefs than parabolic, in order that the joint effect of both the reflections may be an exemption from aberration. This adjuftment of the figures of the metallic furfaces is beft underftood and accomplifhed by the firft-rate opticians, and is but little known to mere theorifts.

Of the Herfchelian telefcope we fhall only fay, in this place, that it differs from the Newtonian in no other refpect, except in its fize and powers, and that the fecond reflector is difpenfed with, the length of the tube being equal to the focal diftance of the large fpeculum, and the head of the obferver being confequently placed at the upper end or aperture of the tube; fo that, in this conftruction, as little light as poffible is loft from the fingle reflection, the principal lofs being that which is intercepted, on its entrance into the tube, by the head of the obferver. The parabolic curve for the face of the fpeculum is equally proper for the Herfchelian as for the Newtonian telefcope.

From thefe fhort hiftorical notices it will be feen, that Merfenne firft fuggefted the hint for conftructing a reflecting telefcope, which muft have been before the year 1651, when his Catoptrics were printed; or, according to Defcartes' third and twenty-ninth letters, written in 1639, though not publifhed till 1666, before thefe letters were written. Gregory, who might or might not have feen Merfenne's fuggeftion, publifhed an account of his conftruction in his "Optica Promota," in the year 1663; but as he was not a fkilful mechanic himfelf, it is underftood that his telefcope was but an indifferent one, and that the theory of his conftruction was not completely realized to his wifh. At this juncture, fir Ifaac Newton, who was a good mechanician, as well as mathematician and experimental philofopher, took the fubject into his confideration, and, by his fuccefsful labours, prevented the invention from falling into oblivion. His proceedings met with interruption from the occurrence of the plague; but about the end of the year 1668, he began his experiments on fpeculum metal, and, in the year 1672, produced two fmall reflecting telefcopes. In thefe, the large fpecula were ground into a fpherical concave furface, as being the eafieft to execute; but he was aware that the parabolic curve, recommended by Gregory, would be preferable, when it could be accomplifhed by mechanical contrivances, which he judged to be within the reach of human ingenuity. The refult of thefe labours was communicated to the Royal Society of London; and, through the medium of their fecretary, Mr. Oldenburgh, to the ingenious Huygens, who teftified his approval of this conftruction in an account which was publifhed in the Journal des Sçavans for the year 1672: and in this way, nearly the whole of Europe became acquainted with the Newtonian conftruction. In the mean time, Caffegrain, a Frenchman, who had varied Gregory's conftruction, by fubftituting a convex inftead of a concave fmall fpeculum, as we have already ftated, in the fame journal (des Sçavans, 1672), contefted the honour of having been the firft improver of the original Gregorian telefcope; which claim drew from Newton feveral objections to Caffegrain's conftruction, that will indeed apply equally to the Gregorian. We have, however, recently witneffed in captain Kater an advocate for Caffegrain's telefcope, in preference to that of Gregory, (fee Phil. Tranf. of London, 1813 and 1814,) principally with refpect to the brightnefs and diftinctnefs of objects refpectively feen by them; and his conclufion is, that much of the light is diffipated by the *croffing* of the rays in the *focal point,* which is a doctrine waiting for confirmation. In Caffegrain's telefcope, the picture of the object itfelf is viewed by the eye; but in Gregory's, the picture of the image reprefenting the object at the point of croffing is only viewed; which circumftance conftitutes the effential difference in the two conftructions: and it is very probable that the light proceeding from the image of an object may not be fo vivid as that proceeding from the object itfelf, of which the image may be confidered as a lefs enlightened reprefentation.

It is remarkable that no improvement was made on Newton's fmall telefcopes till about the year 1723, when Hadley prefented to the Royal Society a reflecting telefcope of Newton's conftruction, in which the focus of the fpeculum was 10 feet $5\frac{1}{4}$ inches. Though Newton's were only fix inches long each, they were compared to the fix-feet refractors, fuch as were made at that time; but what muft have been the public feeling, when Hadley produced his enlarged inftrument! This was found at leaft equal in power to the famous Huygenian refractor of 123 feet; at leaft, its power and diftinctnefs were equal, though the light was not quite fo bright.

Since Hadley's time, the reflecting telefcope has experienced confiderable improvements from the labours of Mr. Short, Mr. Mudge, the Rev. John Edwards, Dr. Herfchel (now fir William Herfchel), and others who are our own contemporaries.

But while reflecting telefcopes were undergoing their various improvements, and were fuperfeding the ufe of the long refractors, the idea of correcting both the fpherical and prifmatic

prifmatic aberrations was not abandoned. We have already afferted, under our article CIRCLE, that Chefter More Hall, efq. of More Hall in Effex, fo long ago as in the year 1729, conftructed telefcopes of different glaffes; fome of which have been preferved, and found, on examination, to be of the achromatic kind, though not known by this defignation. But as we are not in poffeffion of any record refpecting the invention and mode of conftructing fuch telefcope, we do not prefume to fay that this was the archetype of the modern achromatic inftrument; and, therefore, we do not confider it as detracting from the merit of the philofophic optician, who afterwards deduced the principles of the invention from accurate and ingenious experiments, and made known his fuccefsful application of them at a time when his claim to originality might have been difputed, if the prior invention had been then divulged.

It was not till about the year 1747 that Euler, not knowing what had been done by Hall, and profiting by a hint that had been fuggefted by fir Ifaac Newton, conceived the plan of conftructing an object-glafs of two fuch materials, of different refractive powers, as might counteract, by repeated refractions, the difperfion of the differently refrangible rays, and thus bring all the rays into one focal point, fo as to admit of a highly magnifying eye-piece. Accordingly two object-glaffes were fo inclofed in a box, as to include clear water between them, to be ufed inftead of a fingle lens; and though the experiment failed of fuccefs, the memoir, written by Euler on the occafion, attracted the attention of the late Mr. J. Dollond, mathematical-inftrument maker of London, who foon after fet about making experiments, as Newton had done, to afcertain if the refractive and difperfive powers of various tranfparent fubftances are in a conftant ratio, with the view of compounding, which he at length effected, an object-glafs that would bring the rays of light tranfmitted through it to a focal point, without the prifmatic aberration.

In the memoir which Euler had written, and which was publifhed in the Berlin Memoirs of 1747, he affumed that the indices of refraction might be expreffed by the powers of a certain invariable root, and that the exponents of thofe powers are proportional for the different rays of light paffing through different media. This paper coming to the hands of the ingenious Dollond, excited his attention; and in the year 1753 he addreffed a letter to James Short, "concerning a miftake in M. Euler's theorem for correcting the aberrations in the object-glaffes of refracting telefcopes;" which letter was publifhed in the Philofophical Tranfactions of the fame year; the object of which was to prove that Euler had affumed an hypothefis, as the bafis of his calculations, which was contrary to both reafon and experiment, or, as Short obferves in his accompanying letter, "contrary to the eftablifhed principles of optics." To this Euler replied, and maintained that his optical principle was a true law of nature; but the practical teft of its truth was wanting, the *ufe* that it was intended to be put to.

In 1754, the Swedifh geometer Klingenftierna took up the fubject, which now attracted the attention of various mathematicians, and attempted to prove that the Newtonian principle, oppofed to Euler's, is in fome extreme cafes irreconcileable with natural phenomena, and therefore ought not to be received as a law of nature. Dollond, therefore, thus oppofed, had recourfe to actual experiment, agreeably to Newton's plan of philofophizing; and, rejecting the propofal of putting water between two menifci, with a view of correcting the prifmatic aberrations by a number of refractions, proceeded to inftitute a regular feries of experiments, in order to determine what could be done by the oppofite refractions of different diaphanous media; and as thefe experiments were the foundation of all the improvements that have followed in the conftruction of colourlefs, or what Dr. Bevis denominated *achromatic*, object-glaffes of a refracting telefcope, we fhall here introduce a fummary account of them.

In the firft place, Dollond contrived to form a hollow inverted pyramid with two oppofite fides of glafs, as in *fig.* 1, *Plate* XXIV. *Aftronomical Inftruments*, and placed in an inverted pofition, within a triangular and equilateral prifm of glafs, to reft as reprefented in the figure. The veffel was then filled with clear water, and a ray of light made to pafs through both the water and glafs prifm: the angle at the junction of the glafs plates, clofing the veffel, was capable of enlargement or diminution; and the glafs fides were made to recede or approach, until an object feen through the water and glafs prifm was in its true place, *i. e.* until the refraction of the water balanced the oppofite refraction of the glafs. The refult of this experiment proved contrary to what had been expected from Newton's experiments, *viz.* an external object feen through this compound prifm was fringed with colours. But to be quite fure that there was no deception in the appearance, a glafs prifm, formed to an acute angle of only 9 degrees, was fubftituted, which was alfo more convenient for the experiment, and then the veffel was clofed, as in *fig.* 2, until the oppofite refractions balanced each other as before; but ftill the object viewed through the compound prifm was tinged with the prifmatic colours. The mean rays in thefe trials proceeded in a ftraight line, after quitting the fecond wedge of water; but the extreme rays were deflected, or turned refpectively out from exact parallelifm.

After having thus afcertained that equal and oppofite refractions of glafs and water will not deftroy the *colours*, the author varied the experiment, by altering the wedges of water, till he found that the refraction occafioned by the water muft be to that occafioned by the glafs as 5 : 4, before the colours will difappear. The next ftep was to purfue the proportions thus afcertained, in the conftruction of an object-glafs containing water; but after uniting a deep and double convex lens of pure water with a concave one of glafs, the object feen through the telefcope with this compound object-glafs was indeed free from colour, but by no means fo diftinct as was defired, and confequently the fpherical aberration yet remained. This telefcope was made in 1757, and ferved to prove that the feparation of the extreme rays, or what has fince been called the *difperfive power*, in the cafe of an union of glafs with water, is *not proportioned* to the *mean refraction;* as fir Ifaac Newton had afferted it to be, in the fame experiment (fee Newton's Optics, p. 112, 3d edit.): confequently the idea muft now have occurred of trying other diaphanous fubftances with different refractive powers, to fee what the *difperfion* would be in them. After an interval of fome time, during which different kinds of glafs were procured, the ingenious and perfevering artift found, for the firft time in the year 1757, that the *difperfive* power of the cryftal or white *flint*-glafs was *greater* than that of the Englifh *crown*-glafs, and alfo that the power of the latter was very fimilar to that of the Venice ftraw-coloured glafs. He determined, therefore, to try a wedge of flint-glafs, and another of crown-glafs, formed to different angles, as in *fig.* 3, until, when reverfed, their oppofite refractions were equal; which equality took place, when their angles were refpectively 25 degrees and 29 degrees; in which cafe, the fines of half the angles, or the indices of their refractions, were 216 : 250, or nearly as 19 : 22. But though the direction of the pencil of light was

was now unchanged, as was expected, the compound rays had not all the same divergence. The shape of the wedges was then modified, so that the colours disappeared by a due opposition of their respective dispersions; and when this was effected, the refractive powers of the two wedges were found nearly 2 : 3; and, consequently, the sines of half their angles, 19 : 33; which ratio is nearly 4 : 7. In this situation of the wedges, the rays which enter parallel emerge also parallel, while they are equally deflected from the points of emergence. These results may be obtained very strikingly by an union of four wedges, or pair of compound wedges, as represented in *fig*. 4, where the crown receives the rays first, and where the rays, at equal distances from the central line of union, meet always at the same point. This, therefore, pointed out the construction of a double object-glass, such as is represented in *fig*. 5, in which the convex curve of the crown-glass is to the concave curve of the flint of given qualities nearly as 7 : 4, or nearly in the ratio of their respective dispersive powers. But to avoid the too great effect of spherical aberration, arising from the quick curves, the single convex lens of crown-glass was made into a double convex, with double the radius of convexity; and also the single concave might be made double, with a similar increase in its radius of concavity, to answer the same purpose as the combination last described. But, in this case, the convexity of one glass would not fit the concavity of the other, so as to come nearly in contact throughout: it appeared necessary, therefore, that while the internal faces fitted each other, the external concavity of the flint-glass should be eight times less, or of longer radius than before proposed, in order to maintain the balance of opposite dispersions; or otherwise, as in *fig*. 6, if the double concave faces of flint-glass remain as above stated, the front convexity of the crown-glass must be five-sevenths of the due curvature, as proposed above; while the inner surface remains in perfect contact with the concavity of the other. In these combinations, the superior refraction of the convex lens, being diminished one-third part by the opposing refractive power of the concave lens, required this convex to be ground and polished to a focus three times shorter than would be required for the same lens used singly; and the option, that is afforded the artist, of varying the curves at pleasure, provided the combined effect of the compound lens shall produce a proper effect in banishing the colours, admits of a modification that will correct the spherical aberration also, in a great measure. Telescopes on this achromatic principle were first constructed in the year 1758, and when their merit was once acknowledged, the great number that the inventor and his successors have had occasion to make, both for sale among their customers, and for exportation, have afforded them the easy means of trying a variety of concave and convex glasses together in succession, before they were finally paired; so that their success not only originated in, but has been continued by, the aid of experiments, which no one but the Dollonds has had the power of executing to so great an extent. See DOLLOND.

Nor was J. Dollond's success confined to the manipulation of object-glasses alone; he had previously contrived and constructed the improved system of eye-glasses, in which object he was followed by his son-in-law, Ramsden.

This improvement consisted in extending the usual number of eye-glasses to five, so systematically arranged, that by dividing the errors of spherical aberration, they reduced their amount to an inconsiderable quantity.

The value of this arrangement will be best understood from his own words, which we will extract from his letter, published in the Philosophical Transactions of the year 1753. "If any one," says he, "would have the visual angle of a telescope to contain 20 degrees, the extreme pencils of the field must be bent or refracted in an angle of 10 degrees; which, if it be performed by one eye-glass, will cause an aberration from the figure in proportion to the cube of that angle; but if two glasses are so proportioned and situated, as that the refraction may be equally divided between them, they will each of them produce a refraction equal to half the required angle; and, therefore, the aberration being in proportion to the cube of half the angle taken twice over, will be but a fourth part of that, which is in proportion to the cube of the whole angle; because twice the cube of one, is but one-fourth the cube of two; so the aberration from the figure, where two eye-glasses are rightly proportioned, is but a fourth of what must unavoidably be, where the whole is performed by a single eye-glass. By the same way of reasoning, when the refraction is divided between three glasses, the aberration will be found to be but the ninth part of what would be produced from a single glass; because three times the cube of one, is but one-ninth the cube of three. Whence it appears, that by increasing the number of eye-glasses, the indistinctness which is observed near the borders of the field of a telescope, may be very much diminished, though not entirely taken away."

We have given this quotation at full length to shew, that in his adoption of several glasses in an eye-piece, the ingenious mechanic was not entirely indebted to his experiments, unassisted by reasoning and mathematical inferences, and accordingly the Royal Society rewarded his skilful labours with Copley's medal. John Dollond was succeeded in his business by his no less ingenious and industrious son, Peter Dollond, who improved the achromatic object-glass still further, by placing a double concave flint-glass between two convex ones of crown-glass, as in *fig*. 7. and by enlarging the aperture to 3⅗ inches in a 45-inch telescope; of these, a great number has been manufactured, and several of five-feet focal length. His calculations of the radii of convexity and of concavity were never publicly made known; and perhaps constituted a secret, on which the continuance of his celebrity depended, when the time of his father's patent had expired. The business is now successfully conducted by G. Dollond, the nephew, to whom we are indebted for much liberal information; but at no period had any of the Dollonds an agent in Paris, as is said in the new Supplement to the Encyc. Britannica. For several years from the time of the eldest Dollond's death, the foreign Transactions were crowded with dissertations and memoirs on the combinations of achromatic lenses mathematically determined, and the subject afforded ample scope for the geometrical and analytical researches of an Euler, a Clairaut, and a D'Alembert, as well as for Boscovich, Klingenstierna, Kæstner, and Hennert: but in this, as in some other speculative investigations, the labours of the profound mathematician have not much benefited the practical advancement of the art to which these labours have been directed; nay, they have tended to keep at a distance from each other the mathematician and the mechanic.

Boscovich's eye-piece, however, may be considered as constituting an exception to the preceding remark, and deserves here to be particularly noticed. According to one of his theorems, an eye-piece free from colours may be composed of two similar lenses of the same glass, provided they be placed from each other just one-half of the sum of their focal distances; which is very similar to the eye-glass now commonly adopted, in preference to a single lens, in the common astronomical refracting telescope, the only difference being, that in Boſcovich's the lenſes are of equal convexity; whereas, in the common improved aſtronomical eye-piece, the inner lens has a longer focus than the outer one, in the ratio of 3 : 1, and being both plano-convex, they both have their curved faces turned towards the object-glaſs.

From the preceding experiments of the Dollonds, have reſulted all the advantages that the achromatic refracting teleſcopes poſſeſs over the long teleſcopes with ſimple object-glaſſes, and which have put them in competition with the beſt reflectors in the eſſential qualities of power, light, and diſtinctneſs of viſion. There is, however, an imperfection, notwithſtanding Dollond's great ſkill and perſeverance, which remains yet to be overcome, if it is not invincible, which is, that while the colours occaſioned by the extreme rays are corrected with ſufficient accuracy by the compound object-glaſs, yet the intermediate rays are not perfectly corrected; and if any media can be ſo modified as to correct all the rays that fall on every point of the ſurface of the object-glaſs, ſo as to make them unite at the ſame point in the line of the axis; then, and not till then, will the object-glaſs be quite perfect. Peter, the ſon of John Dollond, who, we have ſaid, ſucceeded to his father's buſineſs, purſued this ſubject after his father's death; and in the year 1765, communicated to the Royal Society by letter the reſult of his experiments. He remarks, that when his father had made object-glaſſes of one convex lens of crown-glaſs, and of one concave of flint-glaſs, to be uſed with convex eye-glaſſes, it was found that the exceſs of aberration was in the convex portion of the compound object-glaſs, and that the equality of the counteracting aberrations could not be carried to any great diſtance from the centre of the glaſſes; he therefore attempted, about the year 1758, to make ſhort object-glaſſes of the ſame ſort, to be uſed with concave eye-glaſſes; but it was found, that, as the field of view, in uſing a concave eye-glaſs, depended on the aperture of the object-glaſs, the limits of the aperture were too confined with a double object-glaſs. This trial led the ſenior Dollond to a concluſion, which the ſon took up, and profited by; namely, that the exceſs of ſpherical aberration, occaſioned by one double convex lens of crown-glaſs, might be diminiſhed by ſubſtituting two plano-convex lenſes of ſimilar glaſs and curves, placed one at each ſide of the double concave of flint-glaſs. The ſenior Dollond had ſucceeded with this conſtruction when a concave eye-glaſs was uſed, and when the compound focus was ſhort; but it remained for the ſon to complete a long object-glaſs of this conſtruction, to be uſed with convex eye-glaſſes; which he ſucceeded in doing, firſt with a teleſcope of 5-feet focus, and $3\frac{3}{4}$ inches aperture, and afterwards with a $3\frac{1}{2}$-feet one of the ſame aperture, which he invited the Royal Society to ſee, and which was the prototype of the numerous achromatic teleſcopes of the ſame dimenſions, which have been ſince conſtructed and diſperſed by ſale through all the regions of the globe.

Among the firſt achromatic teleſcopes made by P. Dollond, was one purchaſed by the duc de Chaulnes, who examined very minutely the radii of the reſpective glaſſes, and publiſhed an account of them in French meaſures, which, converted into Engliſh inches, will ſtand thus; 32.4 and 40.8 for the outer convex of crown-glaſs; 22.2 and 30.6 for the double concave of flint; and 30.6 with 35.5 for the inner convex of crown-glaſs; but as the *qualities* of the reſpective glaſſes are not ſpecified, no uſeful inference can be drawn for the conſtruction of another teleſcope, in which the glaſs of each lens may be of another quality. This teleſcope, we learn from the preſent Mr. G. Dollond, had a focal length of 46 inches: and the five-feet teleſcopes ſubſequently made, have each an aperture of four inches: but the largeſt and beſt teleſcope of the achromatic kind ever made by P. Dollond, is that of ten-feet focus, and five inches aperture, lately converted into a ſuperb tranſit inſtrument by Mr. Troughton, and placed in Greenwich Obſervatory. See Transit *Inſtrument.*

Soon after Peter Dollond's teleſcopes began to be in repute, namely, in the year 1759, Benjamin Martin, at the ſame time a mathematician and a mechanic, who had long turned his attention to the conſtruction of teleſcopes, and deſcribed various conſtructions, publiſhed his "New Elements of Optics," a book now, like Edwards's Treatiſe, extremely ſcarce, in which he has entered more minutely into the doctrine of both kinds of aberrations, as they relate to practice, than any other author has done, either before or ſince. He not only followed the ſteps of J. Dollond in determining by glaſs wedges or priſms the relative refractive and diſperſive powers of different ſpecimens of glaſs, but ground ſingle object-glaſſes of ſeveral kinds of glaſs, with tools of the ſame radius, and then compared the geometrical foci of each with the refracted or real foci, by nice meaſurements: by this means he aſcertained the difference between the focus determined theoretically from the known radius, and the real or practical focus of the refracted rays in each glaſs by meaſurement, conſidering at the ſame time the diſtance of the radiant point: and thus he gained, as we ſhall have occaſion to ſhew more particularly hereafter, the ratio between the ſine of the angle of incidence and of the angle of refraction in each ſeparate ſpecimen, which ratio, in a ray paſſing from air into glaſs, had been aſſumed in all former optical theorems as 3 : 2 in all kinds of glaſs, and conſequently the focus for parallel rays had been put equal to radius in double convex lenſes, and alſo equal to the diameter in ſingle convex, without regard to the quality of the glaſs, with reſpect to its refractive power. The *rectification* of the old theorem, founded on the conſtant ratio 3 : 2, formed the baſis of the "New Elements of Optics," in which one half of the difference between the old theoretic and the refracted, or practical foci was called a, and then $\frac{R}{2a} = F$ with parallel rays became the baſis of the rectified theorems, which we propoſe to give preſently in their proper place. According to theſe new elements, and from a meaſurement of the angles of diſperſion, or of the coloured ſpectra contained between the extreme rays, as given by a priſm of flint, and another of crown-glaſs reſpectively, the ratio of which he determined to be as 5 : 3, he calculated that "the radii of the lenſes muſt have the ſame proportion as the differences of the ſines of incidence and refraction in red and violet rays, in priſms of equal refracting angles of white and crown glaſs;" and that, therefore, "the radii [or foci] of the lenſes muſt have the ſame proportion as the angles of diſſipation in refractions by ſuch priſms; and, of courſe, the ſame proportion as the lengths of the coloured ſpectra produced thereby." From theſe conſiderations the author concludes, that "*in all caſes* of a compound lens for producing viſion without colours, the ratio of the radii, r and R, of the concave and convex lenſes (when two only are uſed) muſt be that of 5 : 3; and that then the ratio of their focal diſtances for parallel rays will be that of 3 : 2 nearly. The ratio of the foci of two lenſes being thus determined that ſhall make the colours vaniſh, the longitudinal aberration ariſing from the reſpective curves was next conſidered; and in doing this, care was taken that the comparative foci of the two lenſes was not to be altered by an alteration in the curves now to be rectified. By Huygens's gens's general theorem, the aberration arifing from the curves of any lens may be determined and compared; and it being known from this theorem, that the longitudinal aberration is equal to $\frac{5}{3}$ds of the thicknefs of a double convex lens of equal radii, a double concave was determined from an equation of this aberration fuch, that its contrary aberration might counteract the aberration of the affumed convex lens of equal radii; and the numbers thus produced for the radii of the double convex of crown-glafs, and of the double concave of flint refpectively, were 8.36, 8.36, 10, and 23 inches, in which the focal diftances of the two lenfes are faid to be nearly as 2 : 3. In this combination, the compound focus is ftated to be 23.3 inches, and the radius $r = 23$ is contiguous to the convex glafs. Other calculations were alfo made where the radii of the convex lens were unequal, as well as thofe of the concave, but we do not learn that a good achromatic object-glafs, put together agreeably to Martin's calculations, was ever yet conftructed. In the inftance before us, it is evident that the curve 8.36, coming in contact with the concave 23, muft touch it in the middle, and therefore the proportions are impracticable.

While thefe various improvements in the conftruction of a telefcope were going on, we muft not omit to mention that different kinds of micrometers were applied to it fucceffively, by different ingenious men, for the purpofe of meafuring fmall angles; by which addition, the fcience of aftronomy has been greatly promoted. Among thofe promoters of this noble fcience, may be enumerated Auzout, Gafcoigne, Hooke, Le Fevre, Kirchius, Caffini, Fouchy, Hollman, B. Martin, Savery, J. Dollond, Dr. Mafkelyne, Ramfden, Dr. Herfchel, Smeaton, Rochon, Kæftner, Cavallo, Troughton, and Arago, the prefent aftronomer royal of France.

But it remained for the ingenious optician of Iflington, C. Tulley, to whom we are indebted for much valuable information on the fubject of our prefent inquiries, to calculate and manufacture, from any two given fpecimens of crown and flint glafs, a double object-glafs that fhall, generally fpeaking, be found both achromatic, and alfo as free from the effects of fpherical aberration as art can make it.

After this artift had made himfelf mafter of Martin's propofed plan of compounding an achromatic object-glafs, he found that the curves calculated for this purpofe would not produce their defired effect with any fpecimens of glafs that could be procured; but ftill he thought that a careful repetition of Martin's experiments might lead to refults favourable to his views, when fome modification was made in their application. He therefore, in the year 1800, obtained fix forts of glafs, differing in fpecific gravity, and ground them all to the fame radius by a tool of fpeculum metal, that did not much alter its figure by attrition in grinding, and in giving a partial polifh: thefe lenfes were fitted fucceffively to one cell, that was received by a tube having an eye-piece at the oppofite end, in order that the folar focus of the refracted rays might be the more accurately meafured with each glafs ufed as an object-glafs of a telefcope; and though the polifh was imperfect in thefe lenfes, ground and partially polifhed by the fame tool, yet the image of the fun was clearly defined by them. Thefe focal diftances, limited by the folar image, were in the next place meafured carefully by a nicely divided fcale, and were found to differ from one another confiderably, as we fhall hereafter have occafion to ftate more particularly: the radius of curvature of the tool was alfo afcertained with equal care, and found to exceed in length the longeft of the focal lengths of the refracted rays. The radius of the tool was then divided by each of the refracted focal lengths, and the quotients were called fo many divifors or multipliers, accordingly as the geometrical was to be determined from the refracted focus, or the contrary. Thefe quotients, therefore, bore the fame proportion to unity, that the geometrical focus bore to the refracted focus of each lens, and turned out to be very nearly the fame quantities that Martin had determined with glaffes of fimilar qualities, and that he denoted by the expreffion $2a$ in his rectified theorems. In fact, they were the numbers from which the ratio of the fines of the angles of incidence to the fines of the angles of refraction were accurately determined, as will be explained hereafter. The fpecific gravities of the different lenfes were then taken with a good hydroftatic balance, and were found to increafe with their correfponding divifors, but not in a regular proportion. From thefe experiments a fet of tables was conftructed, containing in parallel columns, both for crown and flint glafs, the fpecific gravities, varying from 3.466 to 2.428, together with the correfponding ratios of the fines of the angles of incidence and of refraction; and alfo the ratios of the two curves, that fhall produce an affigned longitudinal fpherical aberration in any lens; all which calculations are extended from the ratios 1 : 1, 1 : 1.01, 1 : 1.02, &c. in fucceffion, up to 1 : 6, where the aberration is a minimum, as was long ago determined by Huygens: and what is worthy of remark, the French plate-glafs, which had the fpecific gravity loweft, and its divifor only 1.004, and which, confequently, had its refracted focus nearly equal to its geometrical focus, was, in all probability, fimilar to the glafs manufactured at the time when the experiments of fir Ifaac Newton were made, from which the original optical theorems were framed. From thefe tables, our fkilful optician takes his curves by infpection fuitable for glafs of any given fpecific gravity, fuch as will fuit his tools for telefcopes of different lengths; and having as it were the command of the whole range of varying ratios, he can immediately fix on fuitable curves for any glafs, and for any compound focal length, or even affign a fellow that fhall match any practicable lens, convex or concave, that has been previoufly polifhed. Such is the facility which this ingenious and perfevering optician has attained in the higheft branch of his art, whilft, at the fame time, his fkill in grinding, polifhing, and centering his glaffes, is not exceeded by any other artift. The principal deviation from Martin's rules, that Tulley found it neceffary to adopt in his practice, is the application of a *correcting number* to the calculated or tabulated aberration arifing from the figure of the flint-glafs, on account of its difference of refractive power, as compared with that of the crown-glafs: in order to gain which correcting number in all different cafes, he firft reduces the geometrical foci of the two feparate lenfes into the refracted foci by his divifor = Martin's $2a$, and extracts the fquare root of the cubes of thofe refracted foci refpectively; then dividing the root of the flint-glafs by the root of the crown-glafs, he gains the *correcting divifor*, by which the calculated aberration of the flint-glafs is divided, to produce the *corrected aberration* for the concave lens; which lens muft now have its radii determined agreeably to this corrected aberration from the general theorem, or may be taken from the tables to be fubftituted for the radii that would have been requifite, if the proportional aberration had remained uncorrected. And laftly, that the foci of the feparate lenfes may be fo proportioned to each other, and to the compound focus of both the lenfes, which is ufually given when a telefcope is to be made, the ratio between the focus of the crown-glafs and of the compound glafs, having been calculated by an appropriate theorem, as will be explained, is tabulated to fuit different forts of glafs agreeably to their fpecific gravities; fo that Martin's conftant ratio of 5 : 3 is varied according to the variation of the fpecific

cific gravity, which is aſſumed as bearing a due proportion to the diſperſive power. Thus, when a piece of crown and a piece of flint glaſs are produced for an achromatic object-glaſs, the ſpecific gravity is firſt taken, and then the tabulated numbers, correſponding to theſe gravities, are taken from the columns of the tables, and the work is put in hand as ſoon as ſuitable tools are ſelected for producing the curves: or rather, when the relative foci are determined, the curves are fixed on in the tables that will ſuit the aberrations in queſtion, and that can alſo be produced by ſuch tools as are in uſe; for the formation of a new grinding tool is a ſerious undertaking, that the optician will wiſh to avoid. But after all, the chief practical difficulty remains; the ſame curves cannot always be worked to be exactly ſimilar, even in the ſame glaſs, with the ſame tools, and by the beſt workmen; which circumſtance leaves the nice calculator, in ſome meaſure, under the controul of his materials, and renders final adjuſtments indiſpenſable. Theſe obſervations are corroborated both by the candid acknowledgment of Tulley, and by the ſubjoined extracts, which we beg leave to tranſcribe from the letters of our eſtimable correſpondent Mr. G. Dollond.

"The perfection of our object-glaſſes," ſays Mr. Dollond, "is in a great degree promoted by the great pains we take in ſelecting thoſe glaſſes that ſuit each other the beſt; and alſo in adjuſting them very carefully: yet that is not every thing that is neceſſary to produce good object-glaſſes; they muſt be correctly worked, and the glaſſes be of perfect and proper quality.

"With reſpect to the ſurfaces uſed in our various object-glaſſes, it would be almoſt endleſs to enumerate them, as they depend upon, and vary with almoſt every piece of glaſs that is uſed in their formation; and there are ſome nice points in the method of working them, which I ſhould not wiſh at preſent to diſcloſe. Our uſual mode of proceeding is, in the firſt place, to calculate the proportions that are requiſite for the kinds of glaſs that are to be uſed, and then to ſelect from our great number of tools thoſe that come the neareſt to the ſurfaces determined upon; and it frequently happens that we have not any that will anſwer, particularly for the ſpherical aberration. We do not enter into thoſe very nice calculations that would be ſatisfactory to a theoriſt; we only aim at ſomething near to what is required; for to practical men, it is always more eaſy to produce what they wiſh by practical methods. Mr. Short, the celebrated maker of reflecting teleſcopes, uſed to proceed by firſt making his large metal as nearly correct or parabolical as he could, and then, from a number of ſmall metals, to ſelect, by trial, that which corrected the large one in the beſt manner.

"In all matters relating to the practice of optics there is much uncertainty, and it frequently happens that, with the very beſt endeavours, we cannot produce by the ſame means the ſame effect, where extreme correctneſs is required; ſo that you may very readily conceive, that very exact calculations, however requiſite, will not always anſwer. In a rough way of taking the focal lengths and ſurfaces of an achromatic object-glaſs, compoſed of crown and flint glaſs of the uſual denſities, we ſhould ſay crown 1 : 3 and flint 2 : 3; the outer ſurface of the crown ſhorter than that which is next to the flint, and the ſhorteſt radius of the flint next to the crown; and the nearer it can be brought without touching in the middle, the more perfect will be the performance; though this will in a great degree depend on the aberrating powers of the glaſſes uſed; for ſometimes we find it neceſſary to make the crown nearly of equal radii. The French opticians make the radii of the convex lens very unequal, and place the ſhorteſt radius next to the flint; and inſtead of crown they uſe Bohemian plate, which is nearly of the ſame refracting power, but of a different colour, their flint-glaſs being of a much leſs ſpecific gravity than the Engliſh.

"The great barrier to further improvement, particularly in the extenſion of the aperture, is the want of good glaſs, which circumſtance has ever been lamented; and from the exceſſively increaſed duties, which act againſt the improvement of every manufacture, a prohibition is now likely to take place altogether."

In this hiſtorical account of the invention and ſucceſſive improvements of the teleſcope, we have ſaid nothing about the ingenious experiments of Dr. R. Blair, profeſſor of aſtronomy in the univerſity of Edinburgh, which were made, with a view to aſcertain the diſperſive powers of different liquids, about the year 1787, and for this reaſon, that we conſider any teleſcope of which a liquid forms a conſtituent part, to be a temporary rather than a permanent inſtrument. Neither have we given Dr. Herſchel's labours ſo prominent a place in our narrative as they deſerve, becauſe we ſhall have occaſion to deſcribe his reflecting teleſcope, with reference to its appropriate plate, in a ſubſequent ſection of our article.

Beſides the preceding improvers of the teleſcope, ſeveral perſons, chiefly amateurs, have taken out patents, either for alterations in the appendages of this inſtrument, or for peculiar modes of uſing them for particular purpoſes, with a ſhort notice of which we ſhall conclude this ſection of our article. On the 4th of April, 1791, Mr. Robert Blair, a ſurgeon in the navy, took out a patent for ſecuring to himſelf the advantages to be derived from uſing a fluid medium, in conjunction with glaſs, to correct the priſmatic aberration in an object-glaſs of a refracting teleſcope, agreeably to the experiments previouſly made on this ſubject by Dr. Robert Blair, as we have juſt ſtated. On the 26th of January, in the year 1799, Mr. Cater Rand, of Lewes in Suſſex, took out a patent for "an improved military and naval teleſcope, for aſcertaining diſtances, and the ſize and extenſion of objects, at ſight, by means of a new micrometrical adjuſtment." This micrometrical teleſcope, however, was nothing more than the parallel wire micrometer, applied to a common pocket achromatic teleſcope, in which a vernier ſcale projected from the eye-piece, and indicated the quantity of the meaſured angle to the profeſſed accuracy of $6''$; but how the inſtrument was kept ſteady enough without a ſtand for the uſe of ſuch a micrometer, is not explained. Mr. Dudley Adams, of Fleet-ſtreet, optician, took out a patent, on May 30, 1800, for rendering teleſcopes more portable; the object of which was to ſecure the advantage to be derived from uſing tubes, with ſlits made in ſuch a way as to make them move ſmoothly, and yet without ſhake, within one another. Mr. G. H. Brown, ſecretary to the Weſtminſter fire-office, in Bedford-ſtreet, Covent-Garden, has deſcribed, in the 11th volume of the Repertory of Arts and Manufactures, a reflecting teleſcope, that always lies in a horizontal poſition; and, receiving the rays of light on an inclined plain mirror, having a central perforation, and placed near the inſertion of the eye-tube, reflects them to the large concave ſpeculum, which, by a ſecond reflection, forms the image in the eye-tube. Benjamin Martin conſtructed a reflecting teleſcope in this way, which he uſed in a vertical poſition for terreſtrial objects; and the only difference in the two conſtructions ſeems to be, that in Martin's, the main tube was reclined when viewing elevated objects, ſuch as the heavenly bodies, whereas Brown's plain mirror has a vertical motion independently of the main tube. They have neither of them come into common uſe.

Mr. Manton, gun-ſmith, of Davis-ſtreet, Berkley-ſquare, London, took out a patent on the 23d of January, 1810, for

for securing the use of an exhausted tube, on a supposition that there would be more light when the rays were refracted to a focus *in vacuo*. Mr. Cornelius Varley, artist, now of Newman-street, London, took out a patent for a graphic telescope, for the purpose of delineating drawings from nature, on the principle of Dr. Wollaston's camera lucida, the date of which is April 5, 1811. And on the 21st of May of the same year, Dr. Brewster of Edinburgh, and Mr. Harris, optician, of Holborn, London, jointly took out a patent for a micrometrical, double-image, and coming-up glass, &c. which has its scale of measurement running longitudinally along the tube. This telescope, being on a new construction, will be particularly described hereafter.

2. *Theory of dioptric Telescopes.*—Before we can properly describe the various constructions of either the refracting or reflecting telescope, it will be necessary to explain the principles on which those constructions are founded; and for the sake of order, we will confine ourselves, in the first place, to the consideration of the elementary principles of dioptrics, so far as they are connected with the theory of the refracting telescope. Among the various writers who have considered this subject, in both a scientific and practical manner, Benjamin Martin stands first in our estimation; and as his "New Elements of Optics," published in 1759, are but little known, by reason of the scarceness of this work, notwithstanding it contains the result of all his theoretical and practical investigations, we shall make no scruple in availing ourselves of his labours, as often as they contribute to the purpose of either illustration or practical application: our aim being, in this article, as in some former ones connected with it, to bring the mathematician and the mechanic into a state of mutual understanding.

We propose, therefore, to avoid as much as possible all abstruse calculations, that have no tendency to produce practical advantages, but to introduce, in as familiar a manner as possible, those mathematical investigations only, which are essentially explanatory. The first and fundamental principle in dioptrics is this, that in all uniform media, such as air, water, glass, &c. "the sines of incidence are in a constant ratio to the sines of refraction" of any homogeneal ray of light, incident on the surface of such refracting medium; which principle was first discovered by Snell, when Huygens had gone no further than to assert, that in small obliquities of incidence, the angle of refraction was about one-third of the angle of incidence. In the glass which sir Isaac Newton used, the ratio of the sine of incidence to the sine of refraction was found to be 30 : 21, or nearly 3 : 2, in passing out of air into glass: and had all kinds of glass been found equal with respect to their refractive powers, the radius of convexity would, in all cases, have been equal to the focus of a double convex lens of equal radii; which equality may be considered as the basis of all the *geometrical* theorems in optics, that take no account of the difference of the *refractive powers*. But since the difference of the refractive powers of various specimens of glass has become an object of indispensible examination to the optician of modern times, it has become necessary to introduce into each theorem the ratio between the sine of incidence and sine of refraction, whatever it may be found to be by experiment, before the *refracted* focus of any individual lens, depending on the quality of the glass, in some measure, can be determined from the *geometrical* focus depending on the radius of convexity or concavity. As we have demonstrated, under our article REFRACTION, the constancy of the ratio between the sines of the angles of incidence and of refraction of a mean refracted ray; and have also explained how the geometrical focus of any lens may be determined with converging, parallel, and diverging rays, under the term LENS; we will proceed to apply the doctrine arising out of these demonstrations and explanations to our present purpose. "Let D C (*Plate* XXIV. *Astronomical Instruments*, *fig.* 1.) be a ray of light incident out of any medium X, upon the surface, H O, of another medium Y, which we will suppose to be more dense than X; and from the point of incidence C, let it be refracted to F, out of its first direction D C M. This refraction may be considered as arising out of the attracting power at the surface of the medium Y, and as acting upon the ray in a perpendicular direction, by which, on mechanical principles, it will acquire some additional force and velocity of motion through the medium Y. Now upon the centre C describe the circle A O P H, cutting the incident ray in D; and drawing the diameter A C P perpendicular to H O, let D L fall perpendicular thereto, and it will be the *sine of incidence*. Let D C or C E represent the space described in a given time in the medium X; and from E draw E F parallel to A B, to denote the acquired force in C: then the motions in the directions C E and E F, in the same time, being compounded, will produce a motion in the direction found by joining C F; for C F will be the space described in the medium Y, in the same time that D C (= C E) was passed over in the medium X, and consequently will be the *refracted ray*; and G I, perpendicular to A B, will be the *sine* of refraction.

"Through F draw N M parallel to H O, and draw K E perpendicular to A B; then will B F = K E = D L be the *sine* of incidence; and in the similar triangles C I G, C B F, we have C G : C F :: G I : B F. Hence it appears that we have the sines of the angles of incidence and of refraction B F or D L, and G I, as the velocities C F and C D (= C G) in the different media inversely, and on this supposition they are in a *constant ratio;* because the velocities are invariable, being produced by the uniform operation of nature. And on the contrary, if the ray F C be considered as passing out of a dense medium Y, into a rare medium X, it will be deflected by the superior force of the medium Y, into the direction C D; making D L : I G :: C F : C D, as before.

"Let us now conceive A M D, in *fig.* 2, to be the curved surface of a refracting medium Y, and B a radiant point in a more rare medium X, from which two rays proceed, and fall upon the curve in the points M and N indefinitely near to each other: these rays will be so refracted as to cross each other in a certain point F; to determine which from the given equation of the curve, the distance of the radiant, and the refractions of the media, is that problem in dioptrics, on which the various calculations and inferences depend. That we may render the solution of this problem intelligible to our readers, let us make the lines C M and C N the radii of curvature, and consequently perpendicular to the curve at the points M and N; upon M F and N F let fall the perpendiculars C G and C g, cutting F M in S: also upon the incident rays B M, B N, continued, let fall the perpendiculars C E, C e; and on the centres B and F, describe the small arcs R M, M O; and put B M = d, M E = a, M G = b; the arc M R = s, and the arc M O = t; and lastly, the sine of incidence C E to that of refraction C G, as m to n, the radius of curvature being C M = r. Then the triangles M E C, M R N; M G C, M O N; M B R, Q B e, are similar, as is thus evident: if from the right angles R M E, C M N, you subtract the angle E M N, there remains the angle R M N = E M C; and if from the right angles F M O, C M N, you take the angle F M N, there will remain the angle O M N = G M C. These triangles

angles are, therefore, *equiangular*, and conſequently *ſimilar*. Hence we derive the following analogies for determining the refracted ray M F; *viz*. M E : M C :: M R : M N; that is, $a : r :: s : \frac{rs}{a} =$ M N.

“ Again, from the triangles M G C and M O N, we have M G : M C :: M O : M N; that is, $b : r :: t : \frac{rt}{b} = \frac{rs}{a}$ $\therefore sb = at$; and ſo $a : b :: s : t$, or $\frac{bs}{a} =$ M O. And in the triangles B M R, B Q e, we have B M : B e (= B E) :: M R : Q e; that is, $d : d + a :: s : \frac{ds + as}{d} = Qe$. But $Ce : Cg$ (:: C E : C G) :: $m : n$ :: $Ce - CE : Cg - CG$ :: Qe .: Sg :: $\frac{ds + as}{d} : \frac{nas + nds}{md} = Sg$.

“ Laſtly, the ſimilar triangles E M O, F S g, give M O : S g :: M F : S F or G F; therefore, M O − S g : M O :: M F − G F (or M G) : M F; that is, in ſymbols $\frac{bmds - aans - ands}{amd} : \frac{bs}{a} :: b : \frac{mdbb}{mdb - aan - nda}$ = M F, the focal diſtance required.

“ As the right angles at E and G are both ſubtended by the ſame hypothenuſe, or right line M C, it is evident that this line is the diameter of a ſemicircle, M E G C, paſſing through them, as in *fig.* 3; and if the curve A M D be a circle, then C will be its centre; and when the point M is extremely near to the vertex A, there will be M E = M G = M C, or $a = b = r$. In this caſe, the theorem becomes $\frac{rmd}{md - nd - nr} =$ A F $= f$; and the point F, or focus of refracted rays, is then in the axis B C produced.”

From this original theorem for finding the ſimple refraction of a pencil of diverging rays out of a rare into a denſe medium, may be derived other theorems for finding the ſimple refraction out of a denſe into a rare medium, and for the refraction of lenſes of any of the common ſhapes, either at the firſt or ſecond ſurface. We will ſubjoin a ſmall table of ſuch of thoſe theorems as apply to glaſſes of the ordinary conſtruction.

Theorems for one ſimple Refraction.

Out of Air into Glaſs		
Rays.	Convex.	Concave.
Diverging	$\frac{mdr}{md - nd - nr} = f.$	$\frac{-mdr}{md - nd + nr} = f.$
Parallel	$\frac{mr}{m - n} = f.$	$\frac{-mr}{m - n} = f.$
Converging	$\frac{mdr}{md - nd + nr} = f.$	$\frac{-mdr}{md - nd - nr} = f.$
Out of Glaſs into Air.		
Diverging	$\frac{-ndr}{md - nd + mr} = f.$	$\frac{ndr}{md - nd - mr} = f.$
Parallel	$\frac{-nr}{m - n} = f.$	$\frac{nr}{m - n} = f.$
Converging	$\frac{-ndr}{md - nd - mr} = f.$	$\frac{ndr}{md - nd + mr} = f.$

Hitherto we have conſidered the refraction of a ray at only one ſurface of a lens; but as every lens has two ſurfaces, or radii, r and R, it is neceſſary to carry our inveſtigation farther, and ſee what theorems can be obtained for finding the foci of glaſſes of the different ſhapes, when double refraction takes place, which is the caſe in all inſtances of complete tranſmiſſion. By way of diſtinction, we will conſider r as the radius of the firſt ſurface, or that which receives the rays from the radiant; and R as the ſecond ſurface, or that which is ſuppoſed to be turned from the radiant, in all our ſubſequent theorems. We muſt now conſider a ray, as M N, in *fig.* 4, coming out of a denſe medium Y, after proceeding in a direction towards F, into the rare medium X; but meeting with a ſpherical ſurface N D, on quitting the denſe medium, is refracted into the direction N f, to interſect the axis D f, in the focal point f. When two ſpherical refracting ſurfaces are near to each other, as A M, N D, in *fig.* 5, they conſtitute a lens A M N D, of which the radius of the curve A M is r, when the radiant is on that ſide, but that of N D is denominated R; and the line B A D F, paſſing at right angles through the middle of the lens, is called the axis. Now to

find

find the point f, or focal diſtance Df, of the ray BM, coming from the radiant B, after being twice refracted, *viz.* at M and N, the points of ingreſs and egreſs, is the *general problem of dioptrics.*

In ſolving this problem, our original theorem for ſimple refraction gives us $mdf - mdr = nrf + ndf$, (making $MF = \phi$,) from which equation we deduce this expreſſion; *viz.*

$$\frac{m}{n} = \frac{r+d}{\phi - r} \times \frac{\phi}{d} = \frac{BC}{CF} \times \frac{AF}{AB},$$ which gives this univerſal canon: *viz.* "the ratio of the ſine of incidence to the ſine of refraction, is compounded of the ratio of the diſtances of the conjugate foci B and F from the centre C, and of the ratio of their diſtances from the vertex A." This rule being *general*, finds the focus f, after the ſecond refraction at N: for let $Df = f$, the radius $GD = R$, and the thickneſs of the lens $AD = t$; then we have for the refraction out of a denſe medium into a more rare one, $\frac{n}{m} = \frac{FG}{fG} \times \frac{fD}{FD} = \frac{\phi + R - t}{1 + R} \times \frac{f}{\phi - t}$; from whence we get

$$f = \frac{n\phi R - ntR}{m\phi - mt + mR - n\phi + nt} = Df,$$ the focal diſtance required. If we omit the thickneſs of the lens t, as being inconſiderable, we may reduce the equation into a more ſimple form; for we ſhall have $\frac{n\phi}{m\phi + mR - n\phi} = f$; and this will give $\phi = \frac{mfR}{nR + nf - mf} = \frac{mdr}{md - nd - nr}$, which equation reduced gives

$$\frac{ndrR}{mrd - nrd + mdR - ndR - nrR} = f.$$

But to reduce the number of ſymbols, let us put $\frac{m-n}{n} = a$, and conſequently $m - n = a$, when n is unity, and then this equation becomes $\frac{drR}{ard + aRd - rR} = f$, and this may with propriety be called the *univerſal dioptric theorem*, by which the *refracted focus* of a ray may be determined after paſſing through any lens of a given denſity, or refracting power.

The theorems in the ſubjoined Table I. are all derived from the univerſal theorem thus determined, and will be of great uſe to the optician to determine the *refracted* focus of any lens, and for any diſtance of the radiant, which refracted focus, with parallel rays, will be always equal to the true, or nicely meaſured *ſolar focus*, where d is infinite; whereas the focus determined from the old theorems in Table II. where the value of a is omitted, is always the *geometrical* focus, determined on a ſuppoſition that the ſine of incidence is to the ſine of refraction in all glaſſes as 3 : 2, in which caſe $\frac{m}{n} - \frac{n}{n}$, i. e. $\frac{3-2}{2} = \frac{1}{2}$ invariably, and $\frac{1}{2}r$, in a double convex lens of equal radii, of whatever refractive power, $= f$. In order, therefore, to diſtinguiſh the focus determined from the theorems in Table I., from thoſe ariſing from the theorems in Table II., we will always call the firſt the *refracted focus;* which is that from which the *powers* of a teleſcope or of a microſcope are derived; and the ſecond we will denominate the *geometrical* focus, which is that ariſing from the ſimple conſideration of the radii of curvature, without reference to the refractive power of the glaſs, otherwiſe than as we have ſtated; but is notwithſtanding uſeful to opticians in the formation of the curved faces of their grinding and poliſhing tools; for when the curves of a lens of a given refractive power are to be formed, to produce a given refracted focus, as is frequently required in the nicer optical inſtruments, the refracted focus muſt firſt be converted, by means of the value a of its refractive power, into the *geometrical* focus, and then the radii of curvature belonging to this calculated geometrical focus, will be proper for the tools of the lens of a given refractive focus. Hence we conſider it as a matter of great practical importance, to give, in the ſame place, two tables, one for finding the *refracted*, and the other for finding the *geometrical* foci of ſuch lenſes as are uſually applied in either a teleſcope or microſcope of the refracting conſtruction. In all caſes where the glaſs has two radii, the firſt, as we have ſaid, will be denominated by r, and the ſecond by R.

But before we proceed to tabulate our theorems for both *refracted* and *geometrical* foci of ſingle lenſes, we wiſh it to be clearly underſtood by our readers, that the practical application of thoſe theorems, and of others to be derived from them, to the purpoſe of actual conſtruction of achromatic object-glaſſes, and of achromatic eye-pieces, is intended to be the leading feature of our article; for while volumes have been filled with abſtruſe calculations, derived from formulæ of the moſt celebrated mathematicians, the reſults of thoſe calculations have never produced proper data for the uſe of opticians; more particularly with reſpect to achromatic object-glaſſes, which cannot be conſtructed from any calculations but what are grounded upon experimental examination of the identical ſpecimens of glaſs that are intended to be uſed. And we flatter ourſelves, that the information we have to lay before our readers on this intereſting ſubject, will be the *firſt* that has yet been *publiſhed* in ſuch a *practical form* as will facilitate the labours of the working optician.

TABLE I.—Theorems for finding the *refracted* Foci of Lenfes.

Lenfes with unequal Radii.		
Rays.	Convex.	Concave.
Diverging	$\frac{d\mathrm{R}r}{adr + ad\mathrm{R} - r\mathrm{R}} = f.$	$\frac{d\mathrm{R}r}{-adr - ad\mathrm{R}r - \mathrm{R}r} = f.$
Parallel	$\frac{r\mathrm{R}}{ar + a\mathrm{R}} = f.$	$\frac{r\mathrm{R}}{-ar - a\mathrm{R}} = f.$
Converging	$\frac{-dr\mathrm{R}}{-adr - ad\mathrm{R} - r\mathrm{R}} = f.$	$\frac{-dr\mathrm{R}}{adr + ad\mathrm{R} - r\mathrm{R}} = f.$
Lenfes with equal Radii.		
Diverging	$\frac{dr}{2ad - r} = f.$	$\frac{-dr}{2ad + r} = f.$
Parallel	$\frac{r}{2a} = f.$	$\frac{-r}{2a} = f.$
Converging	$\frac{-dr}{-2ad - r} = f.$	$\frac{dr}{-2ad + r} = f.$
Lenfes with one Radius (R) infinite.		
	Plano-convex.	Plano-concave.
Diverging	$\frac{dr}{ad - r} = f.$	$\frac{-dr}{ad + r} = f.$
Parallel	$\frac{r}{a} = f.$	$\frac{-r}{a} = f.$
Converging	$\frac{-dr}{-ad - r} = f.$	$\frac{-dr}{ad - r} = f.$
Lenfes with one Radius (R) negative, or Menifci.		
	Unequal.	Equal.
Diverging	$\frac{-dr\mathrm{R}}{adr - ad\mathrm{R} + r\mathrm{R}} = f.$	$-d = f.$
Parallel	$\frac{-r\mathrm{R}}{ar - a\mathrm{R}} = f.$	$\frac{-r\mathrm{R}}{0} = f.$
Converging	$\frac{dr\mathrm{R}}{ad\mathrm{R} - adr + r\mathrm{R}} = f.$	$d = f.$
Lenfes with both Radii (r and R) negative, or double concave.		
Diverging	$\frac{dr\mathrm{R}}{-adr - ad\mathrm{R} - r\mathrm{R}} = f$, always negative.	
Parallel	$\frac{r\mathrm{R}}{-ar - a\mathrm{R}} = f$, always negative.	
Converging	$\frac{-dr\mathrm{R}}{adr + ad\mathrm{R} - r\mathrm{R}} = f.$	

TABLE II.—Theorems for finding the *geometrical* Foci of Lenses.

Lenses with unequal Radii.		
Rays.	Convex.	Concave.
Diverging	$\frac{2dRr}{dR + dr - 2rR} = f.$	$\frac{2dRr}{-dR - dr - 2Rr} = f.$
Parallel	$\frac{2rR}{R + r} = f.$	$\frac{2Rr}{-R - r} = f.$
Converging	$\frac{2dRr}{dR + dr + 2Rr} = f.$	$\frac{2dRr}{dR - dr - 2Rr} = f.$
Lenses with equal Radii.		
Diverging	$\frac{dr}{d - r} = f.$	$\frac{dr}{-d - r} = f.$
Parallel	$\frac{dr}{d} = r = f.$	$\frac{dr}{-d} = f.$
Converging	$\frac{dr}{d + r} = f.$	$\frac{-dr}{d - r} = f.$
Lenses with one Radius (R) infinite.		
Diverging	$\frac{2dr}{d - 2r} = f.$	$\frac{-2dr}{d + 2r} = f.$
Parallel	$\frac{2dr}{d} = f.$	$\frac{-2dr}{d} = f.$
Converging	$\frac{2dr}{d + 2r} = f.$	$\frac{2dr}{2r - d} = f.$
Lenses with one Radius (R) negative.		
	Unequal.	Equal.
Diverging	$\frac{-2dRr}{dR - dr + 2Rr} = f.$	$\frac{-2dRr}{2Rr} = -d = f.$
Parallel	$\frac{-2Rr}{R - r} = f.$	$\frac{-2Rr}{0} = f.$
Converging	$\frac{2dRr}{dR - dr + 2Rr} = f.$	$\frac{2drR}{2rR} = d = f.$
Lenses with both Radii (r and R) negative, or double concave.		
Diverging	$\frac{2dRr}{-dR - dr - 2Rr} = f.$	$\frac{dR}{-d - R} = f.$
Parallel	$\frac{2Rr}{-R - r} = f.$	$\frac{dR}{-d} = f.$
Converging	$\frac{-2dRr}{dR + dr - 2Rr} = f.$	$\frac{-dR}{d - R} = f.$

As we explained how Table I. is derived from an univerſal dioptric theorem, we ſhall explain how the theorems in Table II. are deduced from one fundamental equation, on a ſuppoſition that the ſines of incidence and refraction in glaſs are always as 3 : 2. Let L N, in *fig.* 6, repreſent a convex lens, O f its axis, O a radiant point therein, O A a ray proceeding from thence to A, a point in the ſurface L B N; then if C is the centre of convexity of that ſurface, C G, drawn through the point A, will be perpendicular to that ſurface in the point A; C A or C B is the radius, A f the refracted ray, and f the point where it meets the axis after the firſt refraction. Let D B $= d$, C A $=$ R, E B $= t$, the thickneſs of the lens; and let the ſine of the angle of incidence O A G be called m, and the ſine of the angle of refraction C A f or G A H be called n. Now, ſince the point A is ſuppoſed to be very near to the vertex B, O A may be conſidered equal to O B $=$ D, and in the triangle C A O, we ſhall have A O to A C as the angle C to the angle O; that is, d : R :: C : O. Alſo O B + B C $=$ D + R will be as the oppoſite angle C A O or O A G, the ſines of both being the ſame. Then as $m : n :: d + r :$ $\frac{\mathrm{D}n + \mathrm{R}n}{m}$, which will be as the angle C A f; this, taken from the angle A C O $= d$, leaves the angle A f O $= \frac{\mathrm{D}m - \mathrm{R}n - \mathrm{D}n}{m}$. Laſtly, as the angle f : O :: A O or O B : A f or B f; that is, as $\frac{\mathrm{D}m - \mathrm{R}n - \mathrm{D}n}{m}$: R :: D : $\frac{\mathrm{RD}m}{\mathrm{D}m - \mathrm{R}n - \mathrm{D}n} =$ B f, the diſtance of the point f in the axis, after the firſt refraction. But ſince there is a ſecond ſurface L E N of the lens, there muſt neceſſarily be a ſecond refraction of the ray A O to ſome other point in the axis, as F, in *fig.* 7. In this caſe, the refraction being out of a denſe into a rare medium, the ſine of incidence will be to that of refraction the *reverſe* of what it was before, *viz.* as n to m; that is, the ſine of I $a f$ is to the ſine of I a F as n to m, which, in the caſe of ſingle refraction, was as m to n. Here let K a be called r, and E $f = d$; then there will be $d : r ::$ K : f, and E f + E K $= d + r$, which will be as the angle f a K, or its complement I a f; therefore $n : m :: d + r : \frac{dm + rm}{n}$, which will expreſs the angle I a F. Then I a F − a K F $= \frac{dm + rm}{n} - d = \frac{dm - rm - dn}{n} =$ a K F. Now, as F : K :: K a or K B : a F or E F; that is, as $\frac{dm + rm - dn}{n} : d :: r :$ $\frac{ndr}{dm + rm - dn} =$ E F. But B f − B E $= \frac{\mathrm{DR}m}{\mathrm{D}m - \mathrm{R}n - \mathrm{D}n}$ $- t = d =$ E f; therefore, putting $m - n = b$, we ſhall have $d = \frac{\mathrm{DR}m}{\mathrm{D}b - \mathrm{R}n} - t = \frac{\mathrm{DR}m - \mathrm{D}bt + rnt}{\mathrm{D}b - \mathrm{R}n}$.

Alſo $dnr = \frac{\mathrm{DR}mnr - \mathrm{D}btnr + rtnnr}{\mathrm{D}b - \mathrm{R}n}$.

Again, $dm + rm - dn = \mathrm{D}b + rm$; if, therefore, we multiply the equation by b, and add thereto rm, we ſhall have $dm + rm - dn$

$$= \frac{\mathrm{DR}mb - \mathrm{D}btb + \mathrm{R}ntb + \mathrm{D}brm - \mathrm{R}nmr}{\mathrm{D}b - \mathrm{R}n}.$$

Then $\frac{dnr}{dm + rm - dn}$

$$= \frac{\mathrm{DR}mnr - \mathrm{D}btnr + \mathrm{R}tnnr}{\mathrm{DR}mb - \mathrm{D}btb + \mathrm{R}ntb + \mathrm{D}brm - \mathrm{R}nmr} = \mathrm{EF}.$$

This laſt equation may be abridged, by ſubſtituting p for $\frac{n}{b}$, that is, for $\frac{n}{m-n}$, then we ſhall have

$$\frac{p\mathrm{DR}mr - p\mathrm{D}btr + \mathrm{R}tnrp}{\mathrm{DR}m - \mathrm{D}bt + \mathrm{R}nt + \mathrm{D}rn - p\mathrm{R}mr} = \mathrm{EF}.$$

Laſtly, if we take $n = pb$ in $p\mathrm{D}btr$; and $m - n = b$ in $\mathrm{D}bt$; this equation will be finally reduced to this fundamental equation, *viz.*

$$\frac{p\mathrm{DR}rm - \mathrm{D}trn + \mathrm{R}trpn}{\mathrm{DR}m - \mathrm{D}tm + \mathrm{D}tn + \mathrm{R}tn + \mathrm{D}rm - p\mathrm{R}rm} = \mathrm{EF} = f.$$

The ratio of m to n being taken in glaſs as 3 : 2, we ſhall have $\frac{n}{m-n} = \frac{2}{3-2} = 2 = p$ for a glaſs lens, and the equation will then ſtand thus; *viz.*

$$\frac{6\mathrm{DR}r - 2\mathrm{D}tr + 4t\mathrm{R}r}{3\mathrm{DR} - 3\mathrm{D}r - \mathrm{D}t + 2\mathrm{R}t - 6\mathrm{R}r} = \mathrm{EF} = f;$$

and when t, the thickneſs, is diſregarded, we have from this fundamental theorem all the various theorems contained in Table II. for finding the geometrical focus under all the various circumſtances that are likely to occur in the poſition of a ſingle lens, where the refractive power is not adverted to.

To illuſtrate the reſpective uſes of the theorems contained in the two preceding tables, we muſt ſuppoſe the ratio between the ſines of the angle of incidence and of refraction known by ſome of the uſual modes of determining it experimentally; and then, when the ratio of $m : n$ is ſo determined, there will be $\frac{m-n}{n} = a$, the ſymbol introduced in the theorems of the firſt table; when d is equal to the diſtance of the radiant, r the radius, and f the proper focus determined by real refraction through the glaſs uſed, the theorem for finding the value of a is $\frac{dr - rf}{2df} = a$.

For inſtance, Martin ground a piece of white flint-glaſs with a tool of 21.5 inches radius, into a double convex lens, and when a lamp was placed at the diſtance of 417.25 inches, the refracted focus was meaſured accurately, and found to be only 18.75 inches; whence, according to the theorem, we have $\frac{\overline{417.25 \times 21.5} + \overline{21.5 \times 18.75}}{2 \times 417.25 \times 18.75} = 0.599 = a$ $= \frac{m-n}{n}$; and if we put $n = 1$, then m will be 1.599, for $\frac{1.599 - 1}{1} = 0.599$. When the ſun is the radiant, then d becomes infinite, and the theorem becomes, as in the firſt table, $\frac{r}{2a}$, which gives, in this caſe, $\frac{21.5}{1.198} = 17.94$ for the refracted

refracted *solar* focus; whereas, by Table II., the geometrical focus is $\frac{dr}{d} = r = 21.5$. If the refractive power of the glass, and consequently the value of a, had been given, and it had been required to determine the radius of the tool that will grind the given glass into such equal radii as will give the refracted solar focus exactly 17.82 inches, then the theorem $\frac{r}{2a} = f$ becomes, by transposition, $2af = r$, and $1.298 \times 17.94 = 21.5$, as before. In a specimen of crown-glass ground to the same radius, where d was 414.75 inches, $\frac{dr + rf}{2df}$ gave $a = 0.5318$, and consequently $m : n$ as $1.5318 : 1$, with which lens the true solar focus was $\frac{21.5}{1.0636} = 20.214$; and if the lens had been a single convex, the true solar focus would have been $\frac{r}{a} = \frac{21.5}{.5318} = 40.428$, or double the length of the former, while the geometrical focus for parallel rays, by Table II., would have been $\frac{2dr}{d} = 2r = 43.0$; so that for many practical purposes, where $m - n$ is known in the particular glass used, the advantage of the theorems in Table I., over those in Table II., must be evident

Again, let us suppose that the ratio of $m : n$ is ascertained by a prism of any specimen of glass, or by Dr. Wollaston's or Dr. Brewster's instruments for this purpose, and that it is known to be $1.599 : 1$; then we know that $.599 = a$, as before; and let it be required to find the refracted focus with diverging rays, when the radiant is as before at the distance of 417.25 inches, and the radius of curvature of each surface 21.5: in this case the theorem is $\frac{dr}{2ad - r} = f$, or, in numbers, $\frac{417.25 \times 21.5}{2 \times 0.599 \times 417.25 - 21.5} = 18.75$, as before; and in this way the terms given may be varied at pleasure, and the theorem made applicable to the case in question. If the rays had been converging in the last calculation, the theorem would have been $\frac{-dr}{-2ad - r} = f$; or, changing all the signs, (which are here negative, because the distance is more than infinite, that is, the rays more than parallel,) the same may be taken $\frac{dr}{2ad + r} = f$, or $\frac{417.25 \times 21.5}{2 \times 0.599 \times 417.25 + 21.5} = 17.204$, which is less than the solar focus by 0.74 of an inch. In this case the rays must have passed through some other glass, in order that they may proceed in a state of convergence before they enter the lens in question, and the focus of that other glass is here considered as the *radiant* point from which the rays proceed in a state of convergence; and this consideration leads us naturally to inquire into the nature of a focus when two glasses are employed jointly to produce it, under the different circumstances of figure and distance.

Suppose the parallel rays A N and B M, in *fig.* 8, to fall on a plano-convex lens M N, with the curved face turned to the radiant, and to be refracted to its focus at F; then if another plano-convex lens be placed in the line of its axis, at any distance less than C F, so as to intercept the converging rays, they will be refracted still more, and will now converge into the shorter focus f, which is therefore called the *compound focus* of both the lenses. The angle subtended at f, where the eye is supposed to be placed, and which is called the optic angle, is now larger than that formed at F by the first lens, and is equal to what would be formed by the imaginary double convex lens E E, the focal distance of which would be Qf. Now let C F be put = F for the focal distance of the lens N M; O P = y for the focal distance of lens G H; and $Qf = x$ for the focal distance of the imaginary double convex lens E E: also let Of, the compound focal distance, be $= f$; and C O, the distance between the lenses N M and G H, be = D. As the rays, which tend to the point F, after leaving the lens N M, fall on the lens G H *converging*, let us call O F = d, and then, by common optics, we shall have $d = \frac{yf}{y - f} = F - D$; from which equation we get $F + y - D : F - D :: y : f$; and from this analogy the compound focal distance Of is easily obtained. In like manner, the parallel rays L G and S H are refracted by the lens G H, now supposed to be the first lens, to the lens N M, as they proceed towards the point i; but are refracted to the nearer point ϕ, which is the compound focus on the other side; and now we have $C\dot{y} = \frac{F\phi}{F - \phi} = \dot{y} - D$; whence $F + y - D : y - D :: F : \phi = C\phi$, which is therefore known again, because of the similar triangles F N C, F G O, and fE Q, fG O; and because E Q = N C, we have C F : O F :: N C (= E Q) : G O :: $Qf : Of$; that is, $F : F - D :: x : f$; and, therefore, $\frac{Ff}{F - D} = x$. But we had above $\frac{\overline{F - D} \times y}{F + y - D} = f$; which being substituted for f, will give $\frac{Fy}{F + y - D} = x$; from which theorem our problem for finding the compound focus of two lenses, or rather the focus of one lens, that shall have the same focal distance and visual angle as two given ones placed at a given distance shall have together, may be thus found: *viz.* "divide the *product* of the two focal lengths of the given lenses by their *sum*, lessened by their *distance*, and the quotient will be the focal length of the single lens, as required." By way of exemplification, let the focus of N M be put = 6 inches, and that of G H = 4; and then, supposing the curved surfaces turned to the radiant, which is called the best position, as will be seen hereafter, and the distance = 2, we shall have, by the theorem for this purpose, $\frac{6 \times 4}{6 + 4 - 2} = \frac{24}{8} = 3$ for the focus in question; but if the distance had been = 3, then the result would have been $\frac{6 \times 4}{6 + 4 - 3} = \frac{24}{7}$, or 3.42 nearly. But if the distance had been made 4, equal to the focal distance of the lens G H, the compound focus would have been 4 also; and if 6, equal to the focal distance of the lens N M, the compound focus would still have been 6, without any gain of magnifying power in either case, over what would have accrued from the respective single lens; also if the lenses are brought into contact, that is, if D = 0, then we shall have the compound focus the shortest possible, *viz.* $\frac{6 \times 4}{6 + 4 - 0} = \frac{24}{10} = 2.4$. But *distinctness* is an object of of as much importance as magnifying power; and it will be feen hereafter, that there is a certain diftance between the lenfes that promotes this quality the moft poffible, whatever be the radii of the two lenfes. This condition is fulfilled when x is $= \frac{1}{2}$ F, that is, when the focus of the imaginary lens E E is juft one half of that of the outer lens N M; in which cafe the compound focus f will be in the middle of the line O F, and the lens G H placed at half the focal diftance of the imaginary lens. But it is not neceffary that the object, or image of an object $u\,v$, fhould be fituated in the exterior compound focus ϕ: this focus may be fuppofed negative, that is, the image may be between the two lenfes M N and G H, as B A in *fig.* 11. which will always be the cafe when D is greater than y; or, in other words, when the diftance between the two lenfes exceeds the focal diftance of the inner lens G H; for let $F = 6, D = 4$, and $y = 2$, and we fhall have $\frac{6 \times 2}{6+2-4} = \frac{12}{4} = 3$, as in the firft inftance. Neither is it neceffary that both the lenfes be convex or plano-convex, nor yet with the fame face outwards; for fuppofe N M concave, when its focus will be *negative*, or virtually on the oppofite fide of it, and muft be expreffed by $-$ F; in this cafe the theorem becomes $\frac{-Fy}{y-F-D} = x$, for the focus of the imaginary lens E E that fhall have its focus equal to the compound focus, which will always be *pofitive* while F + D is greater than y, but when lefs, then negative; and when $y = F + D$, the rays proceed parallel, and the focus is faid to be *infinite*. The compound focal diftance in this cafe is $\frac{-Fx - Dx}{-F} = f$, and muft be affirmative when x is fo; but when $D = o$, then $f = x$. As an example, let the concave N M have a negative focal diftance $-F = 3$, and let $y = 2$, while $D = 1$; then the focal diftance of the imaginary or equal lens will be $\frac{-6}{2-4}$, or $\frac{-6}{-2} = 3 = x$, and the compound focal diftance will be $\frac{-\overline{3 \times 3} - \overline{1 \times 3}}{-3}$, or $\frac{-12}{-3} = 4 = f$. Whence, in this cafe, fo is equal to 2 F O, whereas when N M was convex, we had the reverfe, F O = 2 fo. When $-F = y$, and $D = o$, i. e. when a concave lens and convex one are placed in contact, with their feparate focal diftances equal, then x becomes infinite, or, in other words, the rays emerge, and proceed in a parallel direction; but if the focal lengths are unequal, there will be a pofitive focus and magnifying power, when the convex has the fhorter radius; for fuppofe $-F = 3$, $y = 2$, and $D = o$, then by the theorem $\frac{F \times y}{F-y}$, we fhall have $\frac{-6}{-1} = 6 = x$, and in this cafe $x = f = 6$ likewife. From thefe inftances it will be feen, on examination, that the *compound focal diftance* O f, of the combined lenfes, is nothing more than the focal diftance f, found by the common geometrical theorem of optics, $\frac{dr}{d-r} = f$, adapted to the conftant lens G H, where O F $= r$, and O P $= f$, when the rays are *diverging*; or O $f = -f$ $\left(= \frac{-dr}{-d-r}\right)$ when the rays fall diverging on the faid lens. See Table II.

Our general theorem may be rendered more extenfive in its application, by varying it according to the data; thus, if F, x, and D be given to find y, it will be $\frac{Fx - xD}{F - x} = y$; to find F with the others given, it will be $\frac{xD - xy}{x - y} = F$; and to find D, there will be $F + y - \frac{Fy}{x} = D$. From thefe analogies we may further obferve, that we have alfo the ratio of the two compound focal diftances to each other, O f and C f, thus; as $f : \phi :: \overline{F - D} \times y : \overline{y - D} \times F$; and, therefore, when $f = \phi$, then $F = y$; or the faid focal diftances can never be equal, but when the lenfes are equal. Laftly, we may obferve, that fince the parallel rays L G, S H, refracted through both the combined lenfes, interfect the axis in the fame point, ϕ, as it would do if it were refracted by the fingle lens E E, as is evident by continuing it to R; therefore, fince G O = R Q, it will follow that the diameter I K, of the principal pencil of rays K ϕ I, diverging from the focus ϕ, will be the fame as it would have been, if it had proceeded directly to the fingle lens E E; and, confequently, this combination of lenfes makes no alteration in that refpect.

Having now explained how the focal point of any lens, or pair of lenfes, differently circumftanced, may be afcertained by one or other of the dioptric theorems, derived from the refractive power of glafs agreeably to certain laws of nature, it will be proper to explain the different fenfes in which the word *focus* is applied by optical writers under different circumftances, that our readers may not be at a lofs to know in what fenfe it is to be taken, whenever it occurs in our fubfequent details. The *principal* or *folar* focus of a lens, is that which is produced by parallel rays coming from an infinite diftance, which that of the fun may be confidered, and when the epithet *refracted* is added, it has reference to the particular glafs by which the rays are refracted; but when *geometrical* is expreffed or underftood, then glafs in general is meant: the *virtual*, refracted, or geometrical focus, is that which, in a concave glafs, would be formed by the diverging rays continued to a point backwards through the glafs till they meet, and is imaginary rather than real, and generally called *negative:* the focus arifing from converging rays paffing through a convex lens is fhorter, or nearer the lens, than the folar focus, and the radiant is fuppofed to be at a greater than an infinite diftance, if fuch an expreffion is allowable; but as no fuch diftance is in nature, converging rays can only be produced by their paffage through a firft lens before they fall on a fecond, which is often the cafe in the conftruction of optical inftruments: but the focus from diverging rays is always more remote than the folar focus from the lens that produces it; and, in confequence of the reference it has to the fituation of the radiant or illuminated object, is denominated the *proper* and fometimes the *relative* focus; for as the radiant approaches the lens, the proper focus recedes in the fame line, and *vice verfa*, as we have more fully explained under the article LENS. Becaufe the radiant and correfponding focus may change places at any time, the two points where they are placed, at oppofite fides of the lens, are called the *conjugate* foci, from their being fo clofely allied, that one cannot move without the other. When the radiant is placed therefore in the princi-

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pal or solar focus of a lens, the rays will emerge and continue parallel, on account of the other conjugate focus being at an infinite distance; and for the same reason, when an object, viewed by a single lens, is placed in its principal focus, the rays will enter the eye in a parallel state, and will be converged to a point on the retina by the humours of the eye, and a number of these rays crossing will form a picture behind the eye of the object viewed: for, what is one of the most remarkable properties of refracted rays coming from a luminous object, they bring with them not only the figure, but the *colours* of the object viewed, and form a picture or image of it, in the place where the different pencils of rays cross one another; and, what is equally remarkable, this picture is not visible until all extraneous light is excluded. We will not pretend to explain this wonderful property of a lens, that directs the transmitted rays so as to form a picture of a distant object in its focus, but merely mention here, that, without it, no telescope, microscope, camera obscura, or magic lantern, could be constructed on dioptric principles.

After having shewn, by our foregoing theorems, how any focus, solar, proper, conjugate, or virtual, may be determined of a single lens, or of a combination of two lenses with the intermediate distance given, the same might be done for any number of lenses, by considering the compound focus of the first two lenses, as the focal distance of a single lens, to be combined with the third lens, and so on till all the lenses are included. Dr. Smith has given, in his Optics, chap. v. the application of Cotes's theorem "for determining the apparent distance, magnitude, situation, degree of distinctness and brightness, the greatest angle of vision and visible area of an object seen by rays successively reflected from any number of plane or spherical surfaces; or successively refracted through any number of lenses of any sort, or through any number of different media, the surfaces of which are plane or spherical, with an application to telescopes and microscopes;" which account our readers may consult with advantage: but as the illustrations and demonstrations demand more plates than can be given to this article, in addition to the eight we have had occasion to introduce, we have been obliged merely to refer to them in this place.

We propose, however, to substitute some *practical* theorems, derived from our tables, which we have been favoured with by Mr. Tulley, that will be found extremely useful to the working optician, who must be supposed, generally speaking, unable to transform the theorems which we have given in our tables, for the purpose of finding the focal distance of a lens, or of a combination of lenses already constructed; and which tabulated theorems are principally useful for determining the powers, and for explaining the construction of an instrument to which they are applicable.

Practical Theorems.

1. When r, the radius of one face of a lens, is given, and F, its principal geometrical focus, to find R, the radius of the other face, the theorem is $\frac{r\,F}{2\,r - F} = R$ for a double convex: thus, let $r = 9$, and $F = 10.3$ inches, and the calculation will be $\frac{9 \times 10.3}{9 \times 2 - 10.3} = \frac{92.7}{7.7} = 12$ nearly, the truth of which may be proved by our theorem for parallel rays with a double convex lens, in Table II. *viz.* $\frac{2\,r\,R}{R + r}$, or $\frac{9 \times 12 \times 2}{9 + 12} = \frac{216}{21} = 10.3$, as before very nearly, for the required focus; and when the refractive power or ratio between the sines of incidence and of refraction is given, this geometrical may be converted into the refracted focus by the quantity $2\,a$, used as a divisor; or, on the contrary, the refracted focus may be turned into the geometrical focus by using $2\,a$ as a multiplier.

2. With a meniscus lens, where r, the convex side, is given, together with F, the theorem is $\frac{r\,F}{F - 2\,r}$ for finding R, the concave side.

3. But when the concave side of a meniscus is given with the focus, to find the convex, the theorem becomes $\frac{r\,F}{2\,r + F} = R$.

4. When the focus of a double convex lens, and the ratio between its two radii, are given, to find the actual radii r and R respectively, first our theorem in Table II. $\frac{2\,r\,R}{R + r} = F$, will give the focus, on a supposition that one side is unity, and the other any given quantity that forms the other term of the ratio; suppose as $1 : 4$; thus $\frac{1 \times 4 \times 2}{1 + 4} = 1.6$, the rational focus; then suppose the focus given $= 12$, and there will be this analogy, as $1.6 : 1 :: 12 : 7.5 = r$; and also as $1.6 : 4 :: 12 : 30 = R$, or otherwise $\frac{12}{1.6} = 7.5$, and $7.5 \times 4 = 30$ will be the respective radii r and R, as before.

5. When the compound focus of two convex lenses, and the separate focus of one of them, are given, to find the separate focus of the other, that shall be suitable to form the combination; if we put $f =$ the focus of the lens given, $F =$ the combined focus, and $x =$ the focus of the lens required, the theorem for this useful purpose is $\frac{f\,F}{f - F} = x$; for example, let $f = 36$, and $F = 15$, then $\frac{36 \times 15}{36 - 15} = 25.7$ nearly, for the focus of the lens required, which is a positive focus, because both lenses are double convex, and might be plano-convex, or one double convex and the other plano-convex, or even meniscus, as the ratio of the radii r and R may be disregarded when the focus only is the object of consideration. But whatever be the forms of the curves relatively, F, the compound focus of two lenses, or more, will, in practice, be the refracted focus; and, therefore, in this theorem, f and x will also be the refracted foci of the separate lenses, and, consequently, when the geometrical focus of f is given, it must be converted into the refracted focus by the divisor $2\,a$, before the calculation is entered upon; it being necessary that all the terms be of the same denomination.

6. If F, the compound focus, be longer than f, the focus of the given convex lens, as is the case in the construction of a double achromatic object-glass, then the lens required will be concave, of which the focus x is sought, and the theorem becomes $\frac{f\,F}{F - f} = x$. Let us, in this example,

reverse

reverse the numbers of f and F, as taken above, by making $f = 15$, and $F = 36$; and then, as before, there will be $\frac{15 \times 36}{36 - 15} = 25.7 = x$, the negative focus of the concave lens required, which may also have any ratio of its curves, or be a plano-concave, provided its focus be that which has been here determined.

Likewise it must be recollected, that when a positive focus is required from an union of two lenses, one convex and the other concave, the focus of the convex must be shorter than that of the concave; or, in other words, the refractive power, depending on the thickness of the lens, when the same glass is used for both lenses, must predominate in the convex; for it is the difference of the opposite refractions that brings the rays finally to a focus: consequently, if the foci are alike, the rays, being refracted alike in opposite directions, will become parallel, or have what is called an infinite focus: and also, if the focus of the concave be made the shorter of the two, the rays, after opposite refractions, will absolutely diverge by the difference of these refractions, and have an imaginary focus, called a virtual or negative focus, at the other side of the compound lens.

7. If the lens given be concave, and a convex one be required to produce a given compound focus, which is another case in the formation of an achromatic object-glass, the theorem will be $\frac{fF}{F+f} = x$, where f is the focus of the concave, and might be put $-f$, to denote its being a negative focus, and x the focus of the convex lens. Let us put $f = 25.7$, and $F = 36$, as above, and then there will be $\frac{25.7 \times 36}{36 + 25.7} = \frac{925.2}{61.7} = 15$, very nearly, for the focus x of the convex required; which, as we have said, must be the refracted focus, and also f of a like denomination, in order to make the refracted compound focus suitable for a tube of thirty-six inches.

8. If the compound focus should be required to be *negative*, or to have the refraction of the concave lens to predominate, when the convex lens is given with the compound focus, the concave may be found by this theorem $\frac{fF}{F+f} = x$, as in the last; but then x here is the focus of the concave lens, which therefore will be 15 when that of the convex is 25.7, and the negative focus, as before, 36.

9. But if the given lens be concave, and the compound focus be required negative, the focus of the convex sought will be had by this theorem $\frac{fF}{F-f} = x$, as in the sixth theorem; the focus x is here, however, that of the convex, which in the other was that of the concave; so that when $f = 15$, and $F = 36$, x will be again $= 25.7$, but negative.

In all these cases, the two lenses are supposed to be in contact with each other; but if D, the distance between them, which is a variable quantity, were given, similar theorems might be formed from our general theorem $\frac{fF}{f + F - D}$ above explained, where, in any position of two convex glasses, f is the focus of one lens, F the focus of the other, and D the distance between them, with a positive compound focus; but if one of the two lenses be convex, and the other concave, the general theorem becomes $\frac{fF}{f - F - D}$ or $\frac{fF}{F - f - D}$, accordingly as F, put for the concave, or f, put for the convex, is the larger: the former theorem being the "*product* divided by the *sum* of the foci, lessened by the *distance*," and the latter the "*product* divided by the *difference* of the foci, lessened by the *distance*." Hence, by a transposition of one or other of the forms of this general theorem, the data and postulata may be varied as occasion may require. The first form is applicable in cases where sliding eye-pieces, or a sliding secondary object-glass, are used in a telescope, which plans have been recommended and adopted by Dr. Brewster, as we shall see hereafter.

In considering the theory of a telescope, (of either the refracting or reflecting sort,) our attention must be directed to two essential particulars, the *image* of an external object formed at the focus of the object-glass, or of the large speculum, as the case may be; and the *means* by which this image is rendered visible to the eye of an observer: and accordingly as the dimensions, shape, quality, arrangement, and number of the lenses and specula vary from each other, may the constructions be said to differ, though the effect to be produced be intended to be the same. That telescope, of whatever construction, must be considered the most perfect, which exhibits to the eye an image of distant objects the most distinctly, as to light, colour, shape, and proportion; and which, at the same time, amplifies this image sufficiently to afford a minute examination of it, in a field of view that is proportionably large to contain it. That quality, which apparently amplifies the object, or rather the image of the object, by enlarging the angle subtended at the pupil of the eye, therefore called the visual angle, is denominated the *power* of the telescope; and in all telescopes, whatever their other qualities may be, the *light* is *diminished* as the *power increases*, so that in every telescope there is a limit to its useful power, which depends on the quantity of light emitted or reflected by the object to be viewed; and it would answer no good purpose to increase the power so much, that a corresponding deficiency of light may render the object invisible. Hence different powers may be applied, with advantage, to objects differently illuminated; and hence different eye-pieces are usually appropriated to the same telescope, particularly when it is destined for celestial, as well as for terrestrial observations. But we proposed to explain first the theory of those telescopes which are usually called *refracting* or *dioptric*, and afterwards of *cata-dioptric*, or those that magnify by the aid of *reflection*.

Under our article LENS we have said (in section 5.) that "the images of objects, opposed in any manner to a convex lens, are exhibited invertedly in its focus," and that "they will be represented distinctly, and in their natural colours," on a paper held at the opposite side of the glass, at nearly the distance of its proper focus, especially if the room be darkened; and in section 7. we have said, that "the diameter of the image of an object delineated beyond a convex lens, is to the object itself, in the ratio of the distance of the images to that of the object;" so that the more distant an object is from the lens, the smaller is the image of that object; and also the shorter is the focus of the lens, until the distance is such, that the rays fall on its surface parallel, or nearly so. Likewise (in section 8.) we have shewn, that "if the eye be placed in the focus of a convex lens, an object viewed through it appears erect and enlarged in the ratio of the distance of the object from the eye, to that of the eye from the lens, if it be near; but infinitely, if remote:" and what is said of an object itself, when viewed through a convex

convex glafs, is equally true of the *image* of an object fo viewed. It is eafy, therefore, to conceive, how two lenfes of different focal lengths may be fo arranged as to make a telefcope that will at the fame time invert and amplify, as to fenfe, a diftant object: for, firft, a lens of a long focal diftance will form a large image of the object oppofed to it, which image, by the croffing of the rays at the focal point, will be inverted a little beyond the folar focus: and fecondly, an eye applied to a lens of fhort focal diftance, which is held fo that its focal point may coincide with that of the larger lens, will receive parallel rays, and will fhew the faid image in an amplified or magnified ftate, and in the fame inverted pofition in which it is exhibited; which image, by being enclofed in a darkening tube, appears with all its natural colours. The power of fuch a telefcope, which is the fimpleft that can be made, is afcertained by finding how often the focal length of the fmall or eye-lens is contained in the focal length of the larger or object-lens; the quotient of fuch divifion will reprefent the *power*. But if the eye-lens be made concave, and placed within the focal point of the object-lens, as much as is equal to the virtual focus of the concave lens, then the converging rays will become parallel, and afterwards, on entering the eye, which may be confidered as a lens of fhort focus, will converge, and form a direct image on the retina; and though the total length of the telefcope will be fhortened by this latter arrangement, by twice the focal length of the eye-lens; yet if the virtual focus of the concave eye-glafs be the fame as the focal diftance of the convex lens, the power will be the fame, and may be afcertained by the fame procefs. With a convex eye-glafs, the inftrument arifing out of the firft arrangement is the original *aftronomical* telefcope, and that arifing out of the fecond is the *Galilean*. The field of view in the former conftruction is directly as the effective breadth of the eye-glafs, and inverfely as the interval between the lenfes; but in the latter, the field is directly as the diameter of the pupil of the eye, and inverfely as its diftance from the lens.

In both thefe conftructions, the fmalleft power, or, which is the fame thing, the fhorteft focus of the object-glafs is with parallel rays; and as the diftance of the object, or radiant point, decreafes according to the principles of optics laid down under Lens, the focal diftance of the object-glafs increafes: and thus the power increafes as the rays become more and more diverging, from a gradual decreafe of diftance; fo that, in fact, the fame telefcope magnifies a near object confiderably more than it does a diftant one; for while the focus of the object-glafs increafes after a certain law, inverfely as the diftance decreafes, the focus of the eye-glafs remains unaltered; and, confequently, the power varies inverfely as the diftance, or directly as the variable focus of the object-glafs.

To remedy the inconvenience of inverfion of the object in the aftronomical telefcope, and alfo of the contracted field of view of the Galilean, two more glaffes were added to the eye-tube, as we before ftated, to render the image of the object *erect*, or rather to form a fecond image in a contrary pofition. The primary intention of thefe two additional eye-glaffes was not to alter the power, but merely to give an erect pofition to the apparent object; the original lens therefore remained as before, and was called the *field*-glafs, as being neareft to the field of view of the old arrangement of two glaffes, while the next glafs was called the fecond eye-glafs, and was placed at double its focal diftance from the field-glafs, fo that the rays might be parallel, and that it might form another image in its focus: this being the image of an image, was denominated the fecondary image, and became erect by a fecond croffing of the rays, and was then viewed through the outermoft or firft eye-glafs, in the fame manner as the firft or inverted image was viewed through the original eye-glafs. This telefcope was denominated the *terreftrial* telefcope; and while the foci of all the three eye-glaffes were fimilar, its power and field of view remained the fame as in the aftronomical telefcope.

The theory of thefe three conftructions will be more clearly underftood by a reference to *Plate* XXV. of *Aftronomical Inftruments*, in which *fig.* 1. fhews the arrangement of the glaffes in the aftronomical telefcope; *fig.* 2. that of the glaffes in the Galilean, and alfo in the common opera-glafs, except that in it the object-glafs is ufually achromatic; and *fig.* 3. exhibits the fyftem of glaffes that compofe the original terreftrial telefcope, or perfpective glafs, before the fubfequent improvements took place. In all thefe figures the fame letters denote the fame parts, as far as they extend; and the magnifying power of each may thus be demonftrated to be as we have before ftated it. Let A B reprefent the object-glafs, and C D the eye-glafs of *fig.* 1; and let H F I and G F M be confidered as two pencils of light, proceeding in ftraight lines from the oppofite ends of a diftant arrow, and croffing each other at the centre F of the faid object-glafs; alfo let the dotted line be a pencil coming from the middle of the arrow, and falling perpendicularly on the fame central point, fo as to pafs along the axis of the glaffes F L E. Under thefe circumftances, the angle $GFH = IEM$, the oppofite angle, is that under which the arrow appears to the natural eye at F; but the angle $IEM = CKD$, is that under which the image I M of the diftant arrow is viewed, when magnified by the eye-glafs C D. But the angle I E M is to the angle I F M, as L F to L E, or as the focal diftance of the object-glafs to the focal diftance of the eye-glafs; therefore $\frac{LF}{LE}$ = the power, as before ftated; and as the lenfes C D, N O, and T U, in *fig.* 3. have equal foci, the fecondary direct image P Q is equal to the primary inverted one I M, and appears under the fame angle.

Now if all the rays of light had been, as they were fuppofed to be before fir Ifaac Newton's experiments, homogeneal; and if a double convex lens, of equal curvature on both fides, had been found to refract all thefe homogeneal rays into one focal point, without any aberration, either lateral or longitudinal; then the telefcopes, we have juft noticed, would have been fufficiently perfect for all the purpofes of exhibiting a well-defined picture of the object viewed in a magnified ftate; and the power might have been increafed to almoft any extent, by varying the ratio between F L and E L; that is, by increafing the focal diftance of the object-glafs, or by leffening the focal diftance of the eye-glafs, or by both; but it was foon found that the rays which enter a lens at or near the edges, are refracted to a point nearer to its furface than the rays that are tranfmitted near the centre; and alfo that the rays of different colours are differently refracted, even from the fame point of the lens, fo as to meet in the line of the axis at different diftances from the neareft furface of the lens. The former of thefe deviations, being occafioned by the fpherical figure of the lens, is called the *fpherical aberration*; and the latter, arifing out of the nature of folar light itfelf, is called the *prifmatic*, *chromatic*, or *Newtonian* aberration. The indiftinctnefs in the formation of the image, occafioned by thefe aberrations of the rays of light, became an object of fir Ifaac Newton's attention, and he foon difcovered that, whatever mechanical means might effect in the fhape of the curve that might rectify the fpherical aberration, the prifmatic aberration would

 remain

remain so long as one substance only remained to be the medium of refraction. The ingenious Huygens, however, supposing that the diminution of the spherical aberration would contribute greatly to the improvement of the telescope, instituted some experiments and calculations, which greatly promoted the science of Dioptrics. He found, that the lengthening of the radius of convexity of an object-glass shortened the versed sine of the curvature, or lessened the thickness of the glass, on which, with equal apertures, the spherical aberration seemed to depend; and also that, in a simple eye-glass, the aberration from the figure was greatest in a double convex lens, when the curves of the two faces were from the same radius; and also that it increased as the radius shortened. The ratio 1 : 1 being found to have the greatest aberration, and 1 : 2 to have less, an investigation was instituted, from which it was at length proved, that the aberration in a double convex lens is the smallest possible, when the radii of convexity are to each other as 1 : 6; the face 1 being turned to the radiant or object to be viewed. From these experiments originated the famous Huygenian telescope of 123 feet focal distance, and a table of apertures corresponding to the respective focal lengths of the object and eye glasses, that would exhibit an image equally well defined: which calculations were the basis of all the long or *aerial* telescopes that were in repute for a whole century; but which are now superseded by the short achromatic refractors.

The same ingenious author of *dioptrics* discovered, that the aberration arising from the curved figure of a lens might be still further diminished, by substituting two lenses in the eye-piece of a telescope instead of one; which discovery was the foundation of all the improved eye-pieces that have been since adopted, under different arrangements of intermediate distance, and with different degrees of curvature. But before we can explain how the indistinctness arising from both the spherical and prismatic aberrations of mixed rays, may be in a great measure counteracted, (on which important consideration, the excellence of modern improved telescopes depends,) it is necessary to examine this subject further, and to shew how the circle of aberration of mixed rays arising from their unequal refrangibility, and also the lateral and longitudinal aberrations arising from the spherical figure of refracting and reflecting surfaces, may be mathematically determined. In doing this, we shall avail ourselves of Dr. Smith's propositions, which are at the same time perspicuous and conclusive.

Prop. I.

Aberrations.—"Let the common sine of incidence be to the sine of refraction of the *least* refrangible rays, as I to R, and to the sine of refraction of the *most* refrangible rays, as I to S; and the diameter of the least circular space, into which heterogeneal parallel rays can be collected by a spherical surface, or by a plano-convex lens, will be to the diameter of its aperture in the constant ratio of S — R to S + R — 2 I."

For let an heterogeneal ray P A (*Plate* XXVI. *fig.* 1.) fall upon a spherical surface A C B, and let it be separated by refraction into the rays A F, A *f*, cutting the axis E C, drawn parallel to P A, in F and *f*. Take the arc C B equal to C A, and let another heterogeneal ray P B, coming parallel to P A, be refracted into the lines B F, B *f*, cutting the two former rays in R and S. Join R S, and produce it till it meets the incident rays produced in I and K, and the perpendiculars E A, E B, to the refracting surface at the points A, B, in H and L. And when A B, the breadth of the aperture or of the pencil, is but moderate, and consequently the refractions at A B but small, the angles of incidence and refraction H A I, H A R, H A S, or the arcs that measure them, or their perpendicular subtenses H I, H R, H S, will be to each other very nearly in the same given ratios as those of the sines I, R, S, of those angles. And disjointly, the differences of those subtenses will be proportionable to the differences of those sines; that is, the line R S : R I :: S — R : R — I, and doubling the consequents, R S : 2 R I or I K — R S :: S — R : 2 R — 2 I; and conjointly, R S : I K, or A B :: S — R : S + R — 2 I. From this given ratio of R S to A B, in which they increase or decrease together, it appears that all the intermediate rays which fall upon A B, will pass through R S. And when parallel rays fall perpendicularly upon the plane side of a plano-convex lens, they are refracted only at their emergence from its convex surface; and so the aberrations are the same in both cases. Q. E. D.

Corol. 1.—Hence the diameter R S, of the circle of prismatic aberrations that contains all the incident rays, is a 55th part of the diameter A B of the aperture of a plano-convex glass, whatever be its focal distance. For supposing with Newton the prismatic spectrum divided into seven colours, and A R and A S to be the outermost red and violet rays, their sines of incidence and refractions I, R, S, are to each other as 50, 77, 78. Whence S — R is to S + R — 2 I, as 1 to 55.

Corol. 2.—The diameter of the least circle that can receive the rays of any single colour, or of several contiguous colours, is also determinable from the proportions of their sines. Thus all the orange and yellow is contained in a circle, whose breadth is the 260th part of the breadth of the aperture of the plano-convex glass; the sines of the outermost orange A R, and yellow A S, being to the common sine of incidence, as $77\frac{1}{5}$ and $77\frac{1}{3}$ to 50.

Corol. 3.—In different surfaces, or plano-convex glasses, the angles of prismatic aberration R A S are as the breadths of the apertures A, B, directly, and as the focal distances C, F, inversely; because any angle, as R A S, is as its subtense R S directly, and as its radius A R or C F inversely.

Lemma.—The versed sines A B, A C, of very small arcs B D, C D, (*figs.* 2. and 3.) of unequal circles B D G, C D H, that have the same right sine A D, are reciprocally proportionable to their diameters B G, C H, very nearly; that is, A B : A C :: C H : B G.

For since the rectangles under B A G and C A H are each equal to the square of A D, and consequently to each other, their sides are reciprocally proportionable; that is, A B is to A C as A H to A G, or as C H to B G very nearly, when the versed sines are incomparably less than the diameters themselves. Q. E. D.

Prop. II.

"When homogeneal parallel rays N A, E C, (*fig.* 4.) fall upon a spherical surface A C, whose centre is E, the longitudinal aberration F T, of any refracted ray A T from F, the focus of the pencil, is to the versed sine of the arc A C, intercepted between the point of incidence and the axis E C F, in the given ratio of the square of the sine of refraction, to the rectangle under the sine of incidence, and the difference of the sines very nearly; and the aberration is the same when the rays fall perpendicularly upon the plane side of a plano-convex lens."

For when the refraction is made in the passage of a ray N A from a denser to a rarer medium, then the intersection T, of the refracted ray A T, with the axis E C F, lies between the refracting surface and its focus F. With the centre T and semi-diameter T A, having described the arc A D, cutting the axis in D, draw the sine A P of the arcs A C, A C, AD, and alſo E N and E M, the ſines of incidence and refraction, for which put n and m; then becauſe the triangles E T M, A T P, are ſimilar, it will be as E T : T A or T D :: (E M : A P or E N ::) E F : F C; and disjointly, T F : E F :: (F C − T D or) T F − C D : F C; and alternately, T F : T F − C D :: E F : F C; and disjointly, T F : C D :: (E F : E C ::) $m : m - n$. Again, ſince (P D : P C :: C E : D T or F C and conjointly) C D : C P :: (E F : F C ::) $m : n$; by compounding this and the foregoing proportion, it will be as T F : C P :: $mm : \overline{m-n},\, n$. Q. E. D.

Corol. 1.—The ſegment A C B P A may be conſidered as a plano-convex lens; and when rays fall parallel upon its plane ſide, the longitudinal aberration of the extreme ray falling upon A is equal to $\frac{9}{2}$ of its thickneſs P C, as appears by putting 3 and 2 for m and n reſpectively.

Corol. 2.—Alſo this aberration $FT = \frac{mm}{\overline{m-n},\,n} \times \frac{AP^2}{2EC}$ $= \frac{mm}{\overline{m-n}|^2} \times \frac{AP^2}{2CF}$. For $PC = \frac{AP^2}{2EC}$ very nearly, and $EC = \frac{m-n}{n} \times CF$.

Corol. 3.—Let the refracted ray A T G produced, cut the line F G, perpendicular to the axis, in G, and the lateral aberration $FG = \frac{mm}{nn} \times \frac{AP^3}{2EC^2} = \frac{mm}{\overline{m-n}|^2} \times \frac{AP^3}{2CF^2}$. For $FG : TF :: AP : TP$, or C F or $\frac{n}{m-n} \times CE$.

Corol. 4.—When the ſemi-diameter of the convexity or the focal diſtance is given, the longitudinal aberrations ariſing from the figure are as the ſquares, and the lateral aberrations as the cubes, of the linear apertures of a plano-convex lens.

Prop. III.

"When parallel rays Q A, E C (*fig.* 5.) are *reflected* from a ſpherical concave A C B, whoſe centre is E, and whoſe aperture, A C B, is but ſmall, the longitudinal aberration T F, of the extreme ray A T, from the geometrical focus F, is equal to half the verſed ſine C P of the ſemi-aperture A C very nearly."

In *fig.* 4. imagine E M, the ſine of refraction, to be diminiſhed to nothing, and then to become negative and equal to E N, the ſine of incidence, and the refraction of the ray to be changed to reflection, as in *fig.* 5; and by the former propoſition it will be, as T F : C P :: $mm : -\overline{m-n},\, n :: nn : -2nn :: 1 : -2$.

But the particular proof is this: By the laſt lemma, the verſed ſine C P nearly equals half the verſed ſine P D of the arc A D, whoſe centre is T, and ſemi-diameter T A or T E, or half the ſemi-diameter of the arc A C very nearly. But $2TF = 2TE - 2EF = ED - EC = CD$ exactly, or C P nearly. Therefore $TF = \frac{1}{2}CP$ nearly.

Corol. 1.—We had $2TF = CD$ exactly, which is the exceſs of the ſecant E D of the arc A C above its radius E A. For joining A D, the angle D A E in the ſemi-circle D A E is a right one.

Corol. 2.—The longitudinal aberration $TF = \frac{AP^2}{4CE}$. For $CP = \frac{AP^2}{2CE}$ nearly.

Corol. 3.—The lateral aberration $FG = \frac{AP^3}{2CE^2}$. For F G : F T :: A P : P T, or $\frac{1}{2}$ C E nearly.

Corol. 4.—When the diameter of the concave or its focal diſtance is given, the longitudinal aberrations are as the ſquares, and the lateral ones as the cubes of the diameters of the apertures.

Prop. IV.

"When parallel rays of any one ſort are refracted by a plano-convex object-glaſs, or when rays of all ſorts are reflected by a ſpherical concave, the diameter of each circle of aberration cauſed by the ſphericalneſs of the figures, is equal to half the lateral aberration of the extreme ray in each, and therefore is given by the former propoſitions."

Let a Y τ be any refracted or reflected ray, cutting the axis E C T in τ (*figs.* 6 and 7.), and the extreme ray A T G, that comes from the contrary ſide of the axis, in Y. Draw Y X perpendicular to the axis; and ſuppoſing the line A T G immoveable, as the point of incidence a moves from the vertex C, the perpendicular X Y will firſt increaſe, becauſe the angle C τa continually increaſes, and afterwards will decreaſe, becauſe the line T τ continually decreaſes; and when X Y is the greateſt, it is evident that all the rays, incident upon the ſame ſide of the axis as itſelf, will paſs through it. To find its greateſt quantity, let the incident ray qa cut the chord A P B in β, and ſuppoſing the variable aperture $P\beta = v$, the variable $TX = x$, and the given lines $PA = a$, $PT = f$, $TF = b$; by Cor. 4. Props. II. and III. the aberration F τ is to the aberration F T (b) as ϖa^2 or $P\beta^2$ (vv) to PA^2 (aa).

Wherefore $F\tau = \frac{vv}{aa} b$, and thence $TF - F\tau = T\tau$ $= \frac{b}{aa} \times \overline{aa - vv}$. Again, P T ($f$) : P A ($a$) :: T X ($x$) : $XY = \frac{ax}{f}$; alſo ϖa (v) : $\varpi\tau$ or P T (f) :: X Y $\left(\frac{ax}{f}\right)$: $X\tau = \frac{ax}{v}$. Hence again, $T\tau$, or $X\tau + XT =$ $\frac{ax}{v} + x = \frac{b}{aa} \times \overline{aa - vv}$ found before; or $\frac{x}{v} \times \overline{a+v}$ $= \frac{b}{aa} \times \overline{a+v} \times \overline{a-v}$. Whence $x = \frac{b}{aa} v \times \overline{a-v}$, and therefore x or T X is the greateſt poſſible when the rectangle $v \times \overline{a-v}$, or $P\beta \times \beta B$ is greateſt, that is, when its ſides $P\beta$, βB, are equal, or when $v = \frac{1}{2}a$. Subſtitute this value for v in the laſt equation, and it gives the greateſt value of $x = \frac{1}{4}b$, or the greateſt $TX = \frac{1}{4}TF$; and therefore the greateſt $XY = \frac{1}{4}FG$, becauſe T X : X Y :: T F : F G; and this X Y, turned about the axis P X, deſcribes the circle of aberrations through which all the rays falling upon A B will juſt paſs. Q. E. D.

Prop. V.

"The circle of aberrations cauſed by the ſphericalneſs of the figure of the object-glaſs of a teleſcope, compared with the circle of aberrations cauſed by the unequal refrangibility of rays, is altogether inconſiderable."

For if the object-glaſs be plano-convex, and the plane ſide be turned towards the object, and the diameter of a ſphere, whereof this glaſs is a ſegment, be called D, and the ſemi-diameter of the aperture of the glaſs be called S, and the ſine

ſine of incidence out of glaſs into air be to the ſine of refraction as n to m; the rays which come parallel to the axis of the glaſs ſhall, in the place where the image of the object is moſt diſtinctly made, be ſcattered all over a little circle, whoſe diameter is $\frac{mm}{nn} \times \frac{S^3}{DD}$ very nearly, if they were all equally refrangible. As for inſtance, if the ſine of incidence n be to the ſine of refraction m as 20 to 31, and if D, the diameter of the ſphere to which the convex ſide of the glaſs is ground, be 100 feet, or 1200 inches, and conſequently the teleſcope about 100 feet long, and S, the ſemi-diameter of the aperture, be two inches; the diameter of this circle of aberrations, that is $\frac{mm}{nn} \times \frac{S^3}{DD}$, will be

$$\frac{31 \times 31 \times 8}{20 \times 20 \times 1200 \times 1200} \text{ or } \frac{961}{72000000} \text{ parts of an inch.}$$

But the diameter of the little circle through which theſe rays are ſcattered by unequal refrangibility, will be about the 55th part of the breadth of the aperture of the object-glaſs, which is here four inches. And therefore the aberration ariſing from the ſpherical figure of the glaſs, is to the aberration ariſing from the different refrangibility, as $\frac{961}{72000000}$ to $\frac{4}{55}$, that is as 1 to 5449; and therefore, being in compariſon ſo very little, deſerves not to be conſidered in the theory of teleſcopes. If we ſuppoſe the little circle of aberrations ariſing from unequal refrangibility, to be 250 times narrower than the circular aperture of the object-glaſs, it would contain all the orange and yellow, and would permit the other fainter and darker colours to paſs by it, which perhaps may ſcarcely affect the ſenſe; yet even in this caſe, the aberration cauſed by the ſpherical figure, would be to the aberration cauſed by the unequal refrangibility, in a 100-feet teleſcope, but as $\frac{961}{72000000}$ to $\frac{4}{250}$, or only as 1 to 1200, which ſufficiently proves the propoſition. Q. E. D.

Corol. 1.—If the focal diſtances and apertures of a reflecting concave and a plano-convex glaſs be both the ſame, the diameter of the circle of aberrations, cauſed by their figures, will be above 30 times leſs in the reflector than in the refractor. For theſe diameters are $\frac{AP^3}{16CF^2}$ and $\frac{mm}{\overline{m-n}|^2} \times \frac{AP^3}{4CF^2}$; which are as $\frac{1}{4}$ to $\frac{mm}{\overline{m-n}|^3}$ or $\frac{31 \times 31}{11 \times 11}$.

Hence, if the length of each teleſcope be 100 feet, the lateral aberrations in the reflector would be 30 × 5449, or 163470 times leſs than the lateral aberrations cauſed by unequal refrangibility in the refractor.

Corol. 2.—The number of pencils, ſome of whoſe rays are mixed together in every point of a confuſed picture, is as the area of the circle of aberrations of the rays in any one pencil; and conſequently the mixture of the rays of different pencils, cauſed by the ſphericalneſs of the figure of an object-glaſs, if they were all alike refrangible, would be to their mixture cauſed by their unequal refrangibility, as 1 to 5449 × 5449, or 29691601 in the preſent inſtance. For conceiving any point in the confuſed picture to be a centre of a circle of aberration, it is manifeſt that all other equal circles of aberration, whoſe centres fall upon the firſt-mentioned circle, will cover its centre, that is, ſome rays of as many pencils will be mixed in this centre as there are points in the circle itſelf; or, which is the ſame thing, the number of pencils mixed in this centre is as the area of the circle of aberrations."

Double achromatic Object-glaſſes.—From theſe five *propoſitions*, and the *corollaries* deduced from them, in all of which the ratio of the ſines of the angles of incidence and of refraction out of air into glaſs is taken as 3 : 2, (which anſwers nearly to the French plate-glaſs,) our readers will ſee, that when any ſingle lens is uſed as the object-glaſs of a refracting teleſcope, there will be not only fringes of colour, but indiſtinctneſs in the image formed at its focal point, ariſing reſpectively out of the two kinds of aberration, the priſmatic and the ſpherical. But Dollond has ſhewn, that theſe aberrations are not the ſame in all ſorts of glaſs: the former depends on the diſperſive power of the glaſs uſed, and the latter on the ratio of the radii of curvature of the two ſurfaces of the lens. The diſperſive power of a priſm of any ſpecimen of glaſs will be to that of another like priſm of a different ſpecimen, as the lengths of the priſmatic ſpectra, formed by them, are reſpectively to each other: and if the foci of two lenſes of different diſperſive powers, one convex, of crown-glaſs for inſtance, and the other concave, of flint, be made directly as their diſperſive powers, and be placed contiguous, ſo that the convex lens may receive the rays firſt, and be of the ſhorter focus, or thicker, its diſperſive power will be ſo counteracted by the oppoſite diſperſive power of the other thin lens of longer focus, that the extreme or prevailing colours of the primary ſpectrum, being reverſed, will both diſappear; and a ſecondary ſpectrum, compoſed of the remaining intermediate colours, will be very inconſiderable in a good achromatic object-glaſs thus compoſed. If the refracted focal diſtances of the two lenſes remain unaltered, when duly proportioned, as 2 : 3, or nearly ſo, the proportion of the radii of the ſurfaces may be altered at pleaſure, ſo as to produce their due proportions of ſpherical aberration. To effect the deſirable purpoſe of baniſhing the ſpherical aberration as much as poſſible, the optician is obliged to calculate the aberrations belonging to convex lenſes of different unequal radii, in order to make the contrary aberrations of the concave as equal thereto as may be; and for this purpoſe the general theorem of Huygens is peculiarly adapted, which we ſhall, therefore, introduce and exemplify here, before we proceed to the conſtruction of an achromatic object-glaſs. According to this theorem, if we put r for the radius of the firſt ſurface of any lens, or that which firſt receives the incident rays; R for the ſecond ſurface; and T for the thickneſs of the lens: then the *aberration* ariſing from the figure of any lens, concave or convex, will be $= \frac{27r^2 + 6rR + 7R^2}{6 \times \overline{r+R}|^2} \times$ T univerſally. (See Martin's New Elements of Optics, part vi. chap. iii. and Dr. Smith's Optics, book 2. chap. xiii.) When the centres of the curves are on oppoſite ſides of the lenſes, the ſigns are as here put down; but if theſe centres are on the ſame ſide as in a meniſcus, then the ſign of r, or of R, muſt be negative, as the caſe may require. For inſtance, let us firſt put r and R equal, and each = 1; then, as unity is not altered by multiplication or diviſion, we ſhall have the ſimpleſt caſe, *viz.* $\frac{27+6+7}{6 \times 2 \times 2} = \frac{40}{24} = \frac{5}{3}$, or 1.66 of T, for the longitudinal aberration, and it will make no difference which face of the lens is turned to the radiant. Secondly, let us take $r = 1$, and R = 2, in which caſe we ſhall have $\frac{27+12+28}{6 \times 9} = \frac{67}{54}$, or $\frac{5}{4}$ of T, very nearly. But if we reverſe the ſides in poſition, by making $r = 2$, and

and R = 1, then the refult will be different, *viz.* $\frac{108 + 12 + 7}{6 \times 9} = \frac{127}{54}$, or nearly $\frac{40}{17}$ of T. The aberration here is more than in the former pofition, in the ratio of 127 : 67; and this is, therefore, called the *worft* pofition; that being always called the *beft*, where the firft furface has a fhorter radius than the fecond. If we fuppofe lenfes of unequal radii to have their focal diftances, their breadth, and confequently their thicknefs the fame, it will be found, by a fimilar procefs, that their aberrations will diminifh, as R continues to exceed r, until r is to R as 1 : 6; in which conftruction of a lens, placed in its beft pofition, the aberration will be a *minimum*, *viz.* $\frac{15}{14}$ of T; but in its reverfed or worft pofition, the aberration will be $\frac{115}{32}$ of the fame. A fingle convex lens, in its beft pofition, has its aberration only $\frac{7}{6}$ of T; but with the plane fide turned to the radiant, in which r may be faid to be infinite, the aberration will be $\frac{9}{2}$ of T. Alfo a double convex, when its radii r and R are to each other as 2 : 5, has the fame aberration as a fingle convex in its beft pofition, and has lefs fpherical aberration than any menifcus whatever; but there is no proportion of the radii of any one lens that will do away the fpherical aberration altogether. If the refractive power of any glafs be fuch, that the fines of incidence and of refraction are not exactly in the ratio 3 : 2, the calculated longitudinal aberration will differ a little from the true one, fo as to require a correction. And with refpect to the lateral aberration, if m be the fine of incidence, and n the fine of refraction = 1, where two lenfes have equal apertures and radii, then the errors arifing from obliquity of incidence will refpectively be as m^2 in one, to $'m^2$ in the other.

Likewife, we derive from the foregoing demonftrations of Dr. Smith the following general and important conclufions: firft, that in lenfes of equal apertures, the *longitudinal* aberrations, arifing from figure, are *inverfely* as the focal diftances (fee Cor. 2. of Prop. II. above quoted); and fecondly, that under like circumftances, the *lateral* aberrations are inverfely as the fquares of the faid focal diftances (fee Cor. 3. of the fame Prop.); and, on the contrary, that when the focal diftances are the fame, and the apertures differ, then the *longitudinal* aberrations are as the fquares (fee Cor. 4.), and the *lateral* as the *cubes* of thofe apertures. The utility of thefe proportions will more fully appear in the fequel.

We proceed now to the moft important part of our article, *viz.* to fhew what means have been not only devifed, but practically applied, for remedying the defects arifing out of thefe two different kinds of aberrations, and for rendering the apparent object, as viewed through a refracting telefcope, at the fame time diftinct and colourlefs. Telefcopes of what are called the *achromatic*, (from α, priv., and χρωμα, *colour*,) or colourlefs kind, are compofed, like other telefcopes, of two parts requiring feparate confideration; *viz.* the object-glafs and the eye-tube: the former being that which produces an *image* free from colours and miftinefs; and the latter that which either renders this image vifible, or produces a fecondary one to be viewed, without the reproduction of colours. But our prefent confideration is that of the object-glafs.

Before the working optician can proceed to prepare his tools for making an achromatic object-glafs, he muft know the refractive and difperfive powers of his glafs. Various methods have been propofed for determining thefe qualities with accuracy; but it will be fufficient for our purpofe to explain thofe which have been found moft practicable. As the ratio between the fine of incidence and the fine of refraction is conftant in the fame glafs, though not the fame ratio in different forts of glafs, the moft certain method of determining this ratio in different fpecimens of glafs is, to grind a piece of each of thofe fpecimens by the fame tool, as Martin and Tulley have done, and then to compare their refracted folar foci with the radius of curvature; and thofe which have the fhorteft refracted foci, will have the greateft refractive power; and the contrary. We have already explained, in the firft fection of our article, how this operation was conducted by Tulley in particular; and we will now ftate the refults of his experiments in the fubjoined little table.

Refults of practical Experiments on the refractive Powers of different Specimens of Glafs, by C. Tulley.

Kinds of Glafs.	R Radius of Tool.	F Focus of refracted Rays.	$\frac{R}{F} = 2a$ a Divifor.	Ratio of the Sines of I and R.	Specific Gravity.	Ratio of difperfive Powers.	Kinds of Glafs ufed together.
Flint 1. -	33.7	28.13	1.198	1.599 : 1	3.466	1.757 : 1	ufed with crown.
Flint 2. -	33.7	29.38	1.147	1.5735 : 1	3.192	1.524 : 1	ufed with crown.
Ratcliffe crown	33.7	31.91	1.056	1.528 : 1	2.527	1 : 1.757 1 : 1.524	ufed with flint 1. ufed with flint 2.
Dutch -	33.7	32.12	1.049	1.524 : 1	2.519	not known.	
Plate 1. -	33.7	33.43	1.008	1.504 : 1	2.450	1 : 1.65 1 : 1.623	ufed with flint 1. ufed with flint 2.
Plate 2. -	33.7	33.56	1.004	1.502 : 1	2.428	1.195 1.167	ufed with flint 1. ufed with flint 2.

If we explain how the numbers in the horizontal column of flint 1. were obtained, the reft of the table will require no further explanation. The tool on which the fix fpecimens of glafs were ground at the fame time, was of fpeculum metal, and did not vary its fhape much during the operation of grinding and partial polifhing, which was all that the glaffes required for viewing the fun, and for adjuftment to the folar focus. The firft flint-glafs, after being thus formed to a curvature on both fides of 33.7 inches radius, equal to that of the tool, was put into a tube and made into a temporary

porary

porary telefcope, when the principal or folar focus, from actual refraction of the rays, was found to be 28.13 inches, which is therefore called the *refracted* folar focus, the geometrical focus derived from the radius of curvature being 33.7. This is the fpecimen of glafs of the greateft denfity as well as of the greateft refractive and difperfive powers, its fpecific gravity having been repeatedly afcertained to be 3.466 with different hydroftatic balances of the moft delicate conftruction. Now if the radiant had been at a near diftance, inftead of the fun being ufed, Martin has fhewn that the value of $a = \frac{m - n}{n}$ may be had from this theorem, *viz.* $\frac{dr + rf}{2df} = a$ (where d, r, and f, are as in our Table I. of Theorems), which is demonftrated in his Philofophia Britannica; and from this theorem he determined the focal diftances and quantity a of his fpecimens of glafs; but when the fun is ufed as the radiant, the diftance becomes *infinite;* and then, neglecting rf as infinitely fmall, the left-hand term becomes $\frac{dr}{2df}$, and the theorem, by ejecting d from the numerator and denominator, is reduced into the form $\frac{r}{2a} = f$, as in our Table I. for parallel rays with a double convex of equal radii. Tulley, therefore, very properly preferred taking the folar focus at once, inftead of taking a meafured diftance for the place of the radiant, and of calculating from a long theorem, and from data that might not be perfectly correct; his refults, therefore, muft be confidered as being more fatisfactory than Martin's. The reduced theorem $\frac{r}{2a} = f$, by tranfpofition becomes $\frac{r}{f} = 2a$, and alfo $f \times 2a = r$; hence $2a$ may be either a divifor or multiplier, accordingly as r or f is given to find the other. Tulley has called this quantity a *divifor*, becaufe, having the radius or geometrical focus of a glafs always, from the known radius of his grinding tool, he can get the *refracted* focus by the proper divifor and a fimple calculation at any time; which mode, as we fhall fee prefently, is very ufeful in the calculation of the compound focus of an achromatic object-glafs. Now to get the actual quantity of $2a$ in figures, there will be $\frac{33.7}{28.13}$ taken from the third and fourth vertical columns, which may be called $\frac{R}{F}$ or $\frac{r}{f} = 2a = 1.198$ for the faid divifor, one half of which is $.599 = a$. Put now m, as before, for the fine of incidence, and n for the fine of refraction, and we have feen above that $\frac{m - n}{n} = a$. Let $n = 1$, and then $m = 1.599$; for $\frac{m - 1}{1} = a \therefore m = 1 + a = 1.599$, and $\frac{1.599 - 1}{1} = .599 = a$; therefore the fine of incidence is to the fine of refraction in this firft fpecimen, in the ratio of $1.599 : 1$; and in like manner the horizontal columns for all the other fpecimens are filled up with very little trouble, when $\frac{R}{F}$ is afcertained by fimple divifion of the tabular or experimental numbers.—With refpect to the vertical column of difperfive powers, thefe powers are beft afcertained by making fix equal prifms of the fame fpecimens of glafs, and by meafuring the coloured folar fpectra of each feparately, under exactly the fame circumftances of diftance, inclination, pofition, &c.; and as the angle of difperfion is meafured by the coloured fpectrum as its fubtenfe, the angles of difperfion of the different fpecimens will vary with the refpective lengths of their fpectra; and if the refracting angle of one of the fpecimens, the firft flint for inftance, be diminifhed by grinding and frefh polifhing, until its fpectrum is of precifely the fame length as that of any other, fay the crown, then the ratio of their refracting angles will be inverfely the ratio of their difperfive powers; and a pair of analogous lenfes, one convex and the other concave, (fuch as thofe feen in *Plate* XXVIII. *figs.* 5. and 6.) will have their difperfive powers fo counteracted, that a pencil of rays incident on the thick crown-glafs will emerge from the thin flint *colourlefs*, and will proceed without colour, notwithftanding the greater refractive power of the convex lens, till, by being refracted, they finally crofs the axis in which the focus is formed; and the focal point will be more or lefs diftant with a pair of lenfes fo combined, accordingly as the difference of the two refracting powers is greater or fmaller. To explain this analogy between a pair of prifms and a lens, either convex or concave, we will fhew how a pencil of folar rays paffing through a prifm of glafs is difperfed at the fecond furface, fo as to form the folar fpectrum compofed of the prifmatic colours: Let $a\,b\,c$, in *fig.* 9, be a triangular piece of glafs, called a prifm, and d a pencil of folar light, entering the prifm at e, in the line $d\,e$ B, parallel to the bafe $a\,c$: on entering the glafs it will be refracted towards this bafe, and emerge at the point f, a little nearer to c than e is to a. At this point of emergence, f, the pencil will begin to *difperfe* into rays of different colours, but whether into feven or any other number, is not our prefent object to enquire. Let A B be a fcreen, receiving the difperfed pencil in a darkened room, and $f\,g$ will be the ray of mean refraction, $f\,h$ will be the red ray, or ray of leaft refraction, and $f\,i$ will be the violet ray, or ray of greateft refraction, $h\,i$ being the length of the coloured fpectrum. Let this prifm be of crown-glafs; then fubftitute another of flint-glafs, exactly in the fame fituation, and the extreme rays, h and i, will now be difperfed to H and I, and the diftance between thofe new points will be the length of the fpectrum with flint-glafs. Now the angle $g\,f$ B with both prifms is called the angle of *deviation*, or of mean refraction; the angle $i\,f\,h$ is called the angle of *difperfion* with the crown, and I f H the fame with the flint prifm; but thefe angles of difperfion are fubtended by the lines $i\,h$ and I H refpectively, which are the lengths of their refpective fpectra, which therefore are the *meafures* of the angles of *difperfion* of the two different prifms. Martin found thefe exactly as 3 : 5, and therefore recommended the geometrical foci of the crown and flint glaffes to be *always* in this proportion; but Tulley has found that this ratio will not be accurate with all fpecimens of flint-glafs, and therefore takes a different ratio, for each fpecimen of glafs that differs in this quality, from Martin's. In the fame fpecimen of glafs, the angle of *deviation* always bears the fame proportion to the angle of *difperfion*, or *diffipation* as it is fometimes called; and it was the opinion of fir Ifaac Newton that this is the cafe in *all fpecimens;* but it remained for the fenior Dollond to difcover, which is the bafis of all achromatic conftructions of an object-glafs, that *the angles of deviation may be the fame, when the angles of difperfion are not the fame,* and *vice verfâ*; and we have a ftriking inftance in crown and flint glafs, in which, when the difperfive powers

powers are made to balance each other in opposite directions, there yet remains a balance of refractive power in favour of the crown, arising from its greater thickness, which disposes colourless rays still to deviate or be refracted, but to a more distant focus than would have been if the crown had been used alone. This effect may be seen in *fig.* 10, where a pair of prisms, *a* and *b*, are inscribed in the double convex lens of crown-glass, and the pair *c* and *c* within the double concave of flint: the incident rays *d e* and *d e*, at each side of the axis *g o*, enter the convex at the points *e* and *e*, and are refracted towards the axis, till they meet with the inverted prisms *c* and *c* of flint, when they are refracted in a contrary direction, so as to prevent their meeting at the point *o* of the axis to which they tended, and emerge at the points *f* and *f* colourless, in consequence of the opposite dispersions which take place in the prisms; but after emersion they tend to a new and more distant point O in the axis, and there come to an achromatic focus.

To render this explanation still more intelligible with respect to the *opposition* of two counteracting dispersions, let there be two separate prisms, placed, as in *fig.* 11, at a distance from each other, and inverted with respect to each other; let *a b c* be the prism of crown-glass, and A B C a similar one of flint-glass; and let two pencils of white light enter these lenses in opposite directions, one *d*, and the other D; then *g* and G will be the rays of mean refraction, *h* and H those of least, or red; and *i* and I those of most, or violet. Now as the refractive power of the flint prism A B C is greater than that of the crown *a b c*, the mean ray G in the first will be nearer its prism, than *g*, the mean ray of the second, to its prism; but the angle of dispersion subtended by H I, will be greater than that subtended by *h i*, while the prisms have the same refracting angles C and *c*. Now as the refraction and dispersion in the same prism are proportionate to the refracting angle, these may be both reduced to any assignable quantity by a reduction of the refracting angle; then let the side of the prism of flint C A be ground down till it becomes C K, thereby making the angle B C A, the original refracting angle, equal B C K, the new refracting angle; and let this second angle be to the first as the refractive power of the crown is to the refractive power of the flint; or, in other words, let the refracting angles C and *c* be inversely as the refractive powers of the two specimens of glass formed into prisms; *viz.* as that of *g f* F : G F *f*; and then the mean ray G will be extended to *c*, and F *c* will be parallel to *f* C; that is, the mean refraction of the two lenses will be alike, the angle G F *f* = ∠ *g f* F, by being alternate. In this situation of the refracting angles of the opposite prisms, the rays would both enter and emerge parallel as to *refraction*; but as to *dispersion*, that of the flint would still predominate a little, or the angle H F I would in some measure exceed the angle *h f i*: but these are the angles we want to have equal; therefore, to make the refracting angles C and *c* of the two prisms proportional to the *dispersive* powers, or to the spectra *h i* and H I in *fig.* 9, let the side B C also of the flint prism be ground down a little to *l*, so that the refracting angle *l* C *k* of this flint, shall be to the refracting angle *a c b* of the crown in this ratio of the spectra; and then not only will the dispersive powers of the two prisms become equal, but, what is equally necessary, G will now fall beyond *c*; that is, the refractive power of the flint by this second diminution of its refracting angle, will become less than the refractive power of the crown, and the difference of these powers will refract the transmitted rays, as in *fig.* 10, finally to the distant point O, as has been explained, while at the same time the rays that arrive there will be without colours. If now we conceive that the refracting angle of each of the flint prisms *e* and *c*, in *fig.* 10, inscribed within the concave lens *c c*, is so proportioned to the refracting angle of the prisms *a* and *b*, inscribed in the convex lens of crown *a b*, as the refracting angle *l* C *k* of the flint prism in *fig.* 11. is to the refracting angle *a c b* of the crown prism, then the double object-glass in *fig.* 10. will be achromatic; its lenses being analogous to the correcting prisms. Thus the theory of a double achromatic object-glass is within the comprehension of our ordinary readers; and as the triple object-glass has two thin convex lenses of crown, instead of one thick, to combine with the flint concave one, a farther explanation is unnecessary, particularly if the thick double convex be supposed to be divided longitudinally into two plano-convexes, and to be placed one on each side of the concave: for when these plano-convexes are formed into two curves, giving the same focal distance each as one of the plano-convexes, then the union of the three lenses will be that represented in *fig.* 7.

We may now proceed to exemplify this theory, arising out of Dollond's grand discovery; and to make the construction as familiar as possible, we will avoid all fluxional calculations, and explain such algebraical ones only, as are indispensable, in the first example at full length, as they occur, so that the abridgments in the subsequent examples may be clearly intelligible. Our aim differs from that of our predecessors in this respect. The illustrious mathematicians Euler, d'Alembert, Clairaut, Boscovich, Klugel, and Robison, have given formulæ for the calculation of achromatic object-glasses, that are above the comprehension of ordinary opticians; and Dr. Brewster has calculated tables, according to these formulæ, of the different curves that suit a *certain specimen* only of flint-glass, and that such as is not to be found, at least in England; *viz.* that which has its sines of the ∠ of incidence and of the ∠ of refraction as 1.604 : 1. Besides, the calculations tabulated are not in a practical form in Table II., the radius of the convex being shorter than that of its contiguous concave. On the contrary, we propose to take glass that falls in our way, and to calculate in a familiar manner the radii of curvature that shall suit specimens already within our reach. In short, our predecessors shew how achromatic object-glasses *may be* made, if *proper glass could be obtained;* and we will explain how achromatic object-glasses *are made*, and in the *best* manner, with glass of our own manufacture.

Example 1.—Let it be required to form a double object-glass of thirty inches focal length, from the second flint-glass and crown-glass given in Tulley's table of experimental results? In the crown-glass, the ratio of the sines of the angles of incidence and of refraction ($m : n$) is 1.528 : 1; and in the flint-glass it is 1.5735 : 1; while the ratio of their dispersive powers are .500 : .762, or 1 : 1.524. The first step is to determine the ratio of the geometrical focus of the first or crown-glass, to the compound focus of the proposed pair of glasses, in order that the radii of this lens may be known, before its proper companion, the flint lens, have its focus determined. It will be convenient to call the radius of the convex 1, and as it is proposed to have it a double convex, the geometrical focus will also be 1; but as the compound focus of both lenses is the *refracted* focus always, the geometrical focus 1 must be turned into the refracted focus also, in order to have both of the same denomination: but to do this we want the divisor, which may be taken from the table, or derived from $\frac{m-n}{n} \times 2$; thus $\frac{1.528 - 1.000}{1.000} = .528 \times 2 = 1.056$, the divisor

diviſor of the crown; and $\frac{1.5735 - 1.000}{1.000} = .5735 \times 2 = 1.147$, the diviſor of the flint. In the next place we have $\frac{1.000}{1.056} = .94697$ for the refracted focus of the crown lens; and becauſe the foci of the crown and flint lenſes muſt be in the ſame ratio as their diſperſive powers, which we have ſtated to be $1 : 1.524$, we ſhall have $\frac{1.524}{1.147} = 1.3827$ for the refracted focus of the concave or flint-glaſs. Now, having $.94697 : 1.3827$ as the ratio of the two ſeparate refracted focal diſtances that ſhall baniſh all colours by their equal and oppoſite diſperſive powers; we next find what will be the compound focus correſponding to theſe two when put in contact. Let F be the focus of the convex, and 'F that of the concave; and by our *practical* theorem 5. there will be $\frac{F \times 'F}{'F - F}$ = the compound focus, which in plain numbers will ſtand thus; $\frac{.94697 \times 1.3827}{1.3827 - .94697} = 3.29$, the proportional compound focus required. Now if the priſmatic aberration were the only one neceſſary to be counteracted, we have already obtained numbers that would enable us to conſtruct an *achromatic* or colourleſs compound object-glaſs; for if we multiply F, 'F, and f alike by $\frac{30}{3.29}$, or 9.12, the geometrical focus of the convex lens, we ſhould have the abſolute refracted focus of $F = \overline{.94697 \times 9.12} = 8.636$; that of $'F = \overline{1.3827 \times 9.12} = 12.61$; and the compound focus $= \overline{3.29 \times 9.12} = 30$ very nearly; and it would be immaterial what the curves were, provided the refracted focal diſtances of F and 'F were as above ſtated: but as the tools for forming the curves reſpectively for the ſides of theſe lenſes, muſt have regard to the *radii* of curvature, it would be now neceſſary to uſe the *diviſors* as *multipliers*, to convert the refracted into the geometrical foci, and then the buſineſs might be put in hand. On this ſuppoſition, of there being only one kind of aberration, the conſtruction of a compound achromatic object-glaſs would be no difficult affair; for while the focal diſtances only are required to be to each other in a given ratio, the radii of curvature might be varied almoſt at pleaſure, without affecting the focal diſtance. But there yet remains the ſpherical aberrations of the two ſeparate lenſes to oppoſe to each other in ſuch proportion, that their tendency to produce *indiſtinctneſs* may be completely obviated. Before the time of ſir Iſaac Newton, this was the only kind of aberration that opticians thought they had to contend with; and though it is ſmall in *quantity*, compared to the priſmatic aberration, yet it is more difficult to conquer. It is, however, contrary to the opinion of that great philoſopher and mathematician, in the power of the modern optician to cure this defect of ſpherical glaſſes, by means equally ſimple, when determined, as thoſe by which the priſmatic colours are made very nearly to vaniſh. As in the annihilation of the priſmatic colours, the *ratio* of the *focal diſtances*, made directly as the ratio of the *diſperſive powers*, is a cure for the firſt imperfection; ſo the *ratio* of the *radii*, r : R, of the two lenſes, ſo calculated as to counteract each other's ſpherical aberrations, is the cure for the ſecond imperfection; and this cure we have yet to apply, without interfering with the remedy which we have juſt preſcribed for the other. In order to mark the diſtinction that muſt be made in the ſymbols, as applied reſpectively to the convex and concave lenſes, let it be underſtood, that the ſubjoined notation will be attended to in our inveſtigation of the curves proper for our preſent purpoſe; *viz.*

Convex.	Concave.	
r	$'r$	means the radius of the firſt ſurface.
R	'R	means the radius of the ſecond ſurface.
F	'F	means the focus from ſolar rays, or geometrical, if ſo expreſſed.
T	'T	the thickneſs of the lens.
A	'A	the ſpherical aberration.
m	$'m$	the ſine of incidence.
n	$'n$	the ſine of refraction.
Φ		the compound focus.

It may be alſo neceſſary to premiſe, that whatever ratio of the radii r and R be fixed upon for the convex lens, the ratio $'r$: 'R of the concave may always be found by proper inveſtigation ſuch, that its aberration will counteract that of r : R; but the reverſe is not true; the aberration of $'r$: 'R may be too great for the aberration of any ratio r : R to equal; therefore the ratio r : R is firſt aſſumed, as is moſt convenient for the optician's tools already formed; and $'r$: 'R muſt be ſo calculated, that its aberration ſhall be in due proportion for correcting the aberration of the aſſumed convex lens. We now have to do with the *geometrical* foci of both lenſes, when their *radii* become the ſubject of inveſtigation; and we have ſeen that $9.12 \left(\frac{30}{3.29}\right)$ is the geometrical focus of the convex lens, therefore $1.524 \times 9.12 = 13.9$ is the geometrical focus of the concave, their ratio being ſtill as their diſperſive powers, very nearly. Let us now aſſume $r = 7.5$, or any other quantity at option, and ſee by the proper theorem what R will be, to have a focus of 9.12 inches: to do this we have, by No. 1. of our *practical theorems*, before given, $\frac{rF}{2r - F} = R$, or, in figures, $\frac{7.5 \times 9.12}{2 \times 7.5 - 9.12} = R = 11.63$; hence $r : R :: 7.5 : 11.63$, or as $1 : 1.55$. In the next place, we muſt determine what is the longitudinal aberration ariſing from the figure of a lens, where the ratio r : R is $1 : 1.55$, which is moſt conveniently done by the general theorem of Huygens, which we have before exemplified, and which ſtands thus; $\frac{27r^2 + 6rR + 7R^2}{6 \times \overline{r+R}^2} \times T = A = 1.3614 \times T$.

$$\begin{array}{lrl|lr}
\textit{viz.} & 27r^2 = & 27.0 & \overline{r+R}^2 = \overline{1+1.55}^2 = & 6.5025 \\
& +\ 6rR = & 9.3 & \text{multiplied by} & 6 \\
& +\ 7R^2 = & 16.8175 & & \\
\text{value of numerator} & = & 53.1175 & \text{value of denominator} = & 39.015
\end{array}$$

Then $\frac{53.1175}{39.015} = 1.3614 \times T = A$.

Having now found $1.361 \times T = A$ of the convex lens, the value of T, which is the ſum of the verſed ſines of the two interſecting curves of its ſurfaces, may be calculated by the ſquare root, or by plane trigonometry, and will be found = .252, when the ſemi-diameter of the lens is 1.5, conſequently $1.361 \times .252 = .3429$, is the abſolute quantity of the ſpherical aberration of the convex lens; but 'T of the

concave

concave is by calculation .1653, and $\frac{.3429}{.1653} = 2.074$ is its proportional aberration. But as the thickneſs, breadth, and geometrical focal length of every lens, of whatever form, muſt, from the properties of the circle, be in proportion to each other (ſee Martin's New Syſtem, art. 705.), 'F may be taken at once, inſtead of uſing T and 'T with their calculated values (which require ſome operations), and then the work will be greatly facilitated; thus $1.361 \times T \times 1.524 = 2.074 \times {'T} = {'A}$. Now, as this quantity 2.074 bears the ſame proportion to 1.361, as the focus of the concave does to the focus of the convex, it might be concluded that this would be the proper aberration to correct the aberration 1.361 of the convex lens; but this is not the caſe, for, firſt, the longitudinal aberrations ariſing from the figure are not in the *ſimple* proportion to the foci of the lenſes reſpectively, neither is the *quantity* the ſame with the flint as with the crown glaſs. Martin aſſerts that the ſpherical longitudinal aberrations are to each other, in like lenſes of different focal lengths, *inverſely* as the *ſquares* of the foci reſpectively; conſequently, in our example, theſe aberrations would be inverſely as $F^2 : {'F^2}$; or as $\overline{13.9 \times 13.9} : \overline{9.12 \times 9.12}$; that is, as 193.21 : 83.174, or as $\left\{ \begin{matrix} A & & 'A \\ 1.361 & : & 0.585 \end{matrix} \right\}$; but when Tulley took 0.585 = 'A, this aberration was found much too little; for when he had ground the lenſes with curves to produce this aberration, he found that the eye-tube required to be drawn outwards more than inwards by the ſcrew, from the true focal point, before the image diſappeared, which is a proof that the concave had leſs than its ſhare of aberration; it being conſidered as a teſt of good correction, when the image diſappears at points of the tube equally diſtant from the point of diſtinct viſion, accordingly as the tube is puſhed in or drawn out from its focal point. And here was probably the difficulty that Martin experienced between his theory and practice. Neither was the aberration thus obtained in due proportion, when corrected by the ſimple ratio of the two diviſors $2a : 2{'a}$, or 1.056 : 1.147, for the difference of the refractive powers; for as 1.147 : 1.056 :: 1.161 : 1.253; but $1.253 \times {'T} = {'A}$ was ſtill too little for due correction. Though the teleſcope was achromatic by virtue of the ratio of the foci of the crown and flint lenſes, yet there was a want of perfect *diſtinctneſs*, owing to the deficiency of aberration attaching to the concave lens. After a multiplicity of inveſtigations, calculations, and practical trials, Tulley at length diſcovered a method of balancing the oppoſite aberrations, which he has continued to practiſe with ſucceſs for years, and which is therefore no new project. The method is this: the value of 'A ($2.074 \times {'T}$) being firſt determined from A, in the ratio of F : 'F, as above explained, the *correcting number* is thus obtained; if we call the ſquare root of the cube of the refracted focus of the convex $= x$, the geometrical focus being taken = 1; and put alſo y for the ſquare root of the cube of the refracted focus of the concave, when its geometrical focus is = 1; then $\frac{y}{x} = z$ is the correcting number, by which the proportional aberration, before determined, muſt be *divided*, to gain the proper or *corrected* aberration, now expreſſed by the ſymbols $\frac{'A}{z}$. In the inſtance before us, the calculation will be $.947^3 = .8492781$, and its ſquare root $= .2914 = x$; and $\sqrt{.872^3} = .2575 = y$; then $\frac{.2575}{.2914} = .883 = z$, the correcting diviſor, and alſo $\frac{'A}{z} = \frac{2.074}{.883} = 2.348 = {'A}$ corrected.

Having now aſcertained the aberration $2.348 \times {'T}$ of the concave lens, that will balance the aberration $1.361 \times T$ of the convex, we muſt proceed to determine the ratio $'r : {'R}$ of the concave, that ſhall have exactly this aberration: to be able to do this without a table of aberration, requires an acquaintance with quadratic equations; for the proportion of the radii $'r$ and 'R muſt be inveſtigated from the corrected aberration which we have now aſcertained.

1ſt. We have $\frac{27r^2 + 6rR + 7R^2}{6 \times \overline{r + R}|^2} \times T = A$ (by the general theorem) $= 2.348 \times {'T}$, as before found; but we make no diſtinction between r, R, T, A, and $'r$, 'R, 'T, 'A, that we may ſimplify the ſymbols: this equation, by evolution of $\overline{r + R}|^2$ in the denominator, becomes $\frac{27r^2 + 6rR + 7R^2}{r^2 + 2rR + R^2} \times \frac{T}{6} = 2.348 \times T$: now by putting R = 1, there will be $\frac{27r^2 + 6r + 7}{r^2 + 2r + 1} \times \frac{T}{6} = 2.348 \times T$; or, dividing both ſides by $\frac{T}{6}$, $6 \times 2.348 = 14.088$, or $14.1 = \frac{27r^2 + 6r + 7}{r^2 + 2r + 1}$; and multiplying both by the denominator, $14.1r^2 + 28.2r + 14.1 = 27r^2 + 6r + 7$: then ſubtracting equal quantities from both, there remains $22.2r + 7.1 = 12.9r^2$; and by tranſpoſition, $12.9r^2 - 22.2r = 7.1$ for the *quadratic*. Now to find the *root*, we have firſt $r^2 - \frac{22.2r}{12.9} = \frac{7.1}{12.9}$; and adding the ſquare of half the co-efficient, $r^2 - \frac{22.2}{12.9}r + \overline{\frac{11.1}{12.9}}|^2 = \frac{7.1}{12.9} + \overline{\frac{11.1}{12.9}}|^2$; therefore the root $r - \frac{11.1}{12.9} = \sqrt{\frac{7.1}{12.9} + \overline{\frac{11.1}{12.9}}|^2}$, and $r = \sqrt{\frac{7.1}{12.9} + \overline{\frac{11.1}{12.9}}|^2} + \frac{11.1}{12.9}$.

Laſtly; to collect the aggregate of the values of r, we have $\frac{7.1}{12.9} = .55$, $\overline{\frac{11.1}{12.9}}|^2 = .74$, and $\sqrt{\overline{.55 + .74}} = \sqrt{1.29} = 1.135$; likewiſe $\frac{11.1}{12.9} = .860$; therefore $1.135 + .860 = 1.995 = r$, which was deſired; and the ratio r : R, which we now put again $'r : {'R} = 1.995 : 1$; and which in Tulley's Table ſtands 2 : 1. After having thus determined the ratio of the radii $'r$ and 'R to be 2 : 1 very nearly, we muſt now find the rational geometrical focal diſtance of this concave by the fourth of our *practical theorems* above exemplified; *viz.* from $\frac{2rR}{r + R}$, we firſt have $\frac{2 \times 2 \times 1}{1 + 2} = 1.333$; and as the geometrical focus is known to be 13.9, we have alſo $\frac{13.9}{1.333} = 10.428 = {'R}$, and 10.428

$\times 2 = {}'r$; ſo that the four radii of the faces and the correſponding foci will ſtand thus; *viz.*

$r = 7.50$, $R = 11.63$ } and F = 9.12, the geometrical focus of the convex lens.

$'R = 10.428$, $'r = 20.856$ } and 'F = 13.9, the geometrical focus of the concave lens.

$\Phi = 30.04$ the compound refracted focus of the teleſcope, according to the proper theorem.

We have now brought the calculations of our firſt example to a concluſion, accompanied by ſuch explanations as may render it unneceſſary to dwell ſo minutely on the following examples; and when we have gained theſe radii for a teleſcope of 30 inches focus, we have the means of making a teleſcope equally achromatic and diſtinct of any other length; for the ratios $r : R$ and $'r : 'R$, being once determined for crown and flint glaſs of given refractive and diſperſive powers, require only to be increaſed in equal quantities to ſuit the foci of the propoſed teleſcopes, as in the ſubjoined table; and it may be proper to notice, that though the ſpecific gravity has not been taken into the account in the calculations of this example, yet it is uſeful as an index to point out the ratio of the ſines of incidence and of refraction, and of the diſperſive powers to be uſed, when the ſpecimens of glaſs are ſelected by their ſpecific gravities only, without an experimental trial by grinding.

The ſubjoined table is ſuitable for achromatic double object-glaſſes of various lengths; where $m : n$ in the crown-glaſs is as $1.528 : 1$, and in the flint as $1.5735 : 1$; their diſperſive powers being $1 : 1.524$.

Table I.—Radii of double Object-glaſſes in Inches.

Φ	r	R	'R	'r
6	1.50	2.326	2.086	4.171
12	3.00	4.652	4.171	8.342
18	4.50	6.978	6.256	12.513
24	6.00	9.304	8.342	16.684
30	7.50	11.630	10.428	20.856
36	9.00	13.956	12.512	25.027
42	10.50	16.282	14.598	29.198
48	12.00	18.608	16.684	33.369
54	13.50	20.934	18.770	37.540
60	15.00	23.260	20.856	41.712
72	18.00	27.912	25.025	50.054
84	21.00	32.564	29.196	58.396
96	24.00	37.216	33.368	66.738
108	27.00	41.868	37.540	75.080
120	30.00	46.52	41.712	83.424

In this table, R and 'R are the faces of the two lenſes which come in contact, and r and $'r$ the external faces; and it will be ſeen that R, being a little longer than 'R, the convex face, will approach the concave one very cloſely, but will not touch it, which is a neceſſary practical condition. When the aberration exceeds 1.666, which is that of $r : R$ when they are each $= 1$, or alike; then r exceeds R, and the lens muſt be reverſed, or put in its worſt poſition; which is the caſe in all our tables for double object-glaſſes with the flint-glaſs; otherwiſe the concave would not have had ſufficient aberration for the convex.

In our next example it will not be neceſſary to do the work at full length, but only to give ſuch an abridgment as will be intelligible to the reader who underſtands the proceſs minutely explained in the preceding example. The denſity of different ſorts of crown-glaſs ſeldom varies; but two ſpecimens of flint can ſeldom be found to be alike. The greater the denſity of flint-glaſs, the more ſuitable it is for the purpoſe of making a concave lens of an achromatic object-glaſs, becauſe the radii of both the lenſes may be longer for the ſame compound refracted focus; and, conſequently, the ſpherical aberration will be leſs than in glaſs that requires ſhorter radii to produce the ſame compound focus. If the form of the concave had been given, the convex would have been determined by a reverſed operation, where the multiplier 1.524 would have been a diviſor, and z a multiplier, &c.

Example 2.—Let it be required to form a double object-glaſs of 30 inches focal length, as before, with the ſame crown-glaſs for the convex, but with the denſeſt flint, in which the ratio $m : n$ is as $1.599 : 1$, and their diſperſive powers $1 : 1.757$?

In this example we have $1.056 = 2a$, or the diviſor for the crown, as before, and $\overline{1.599 - 1} \times 2 = 1.198 = 2a$, or diviſor for the flint; then $\frac{1}{1.056} = .94697 =$ F refracted, and $\frac{1.757}{1.198} = 1.466 = {}'F$, alſo refracted; and alſo $\frac{F \times 'F}{'F - F} =$ 2.67, the ratio of the compound focal length, or what we called the *rational* compound focus; conſequently, the ratio between F geometrical and the compound focus is in this example $1 : 2.67$; and the ratio between the refracted foci of the ſeparate lenſes, to correct the colorific rays, is $\left\{\begin{matrix} F & & 'F \\ .94697 & : & 1.466 \end{matrix}\right\}$. With reſpect to the ſpherical aberrations, which are next to be conſidered, we may in the firſt place determine the quantities x and y, and z the *correcting* diviſor, which is derived from them, thus; $\left\{\begin{matrix} F \\ \surd .94697^3 = .2914 = x \end{matrix}\right\}$; and as $\frac{1}{1.198} = .834$, &c. gives the refracted focus of the flint or concave lens, (F geometrical being $= 1$ in this caſe,) $\surd .834^3 = .2408 = y$, and $\frac{y}{x} = \frac{.2408}{.2914} = z = .826$, the *correcting* diviſor required for this refractive power of the flint-glaſs. In the next place, $\frac{30}{2.67} = 11.23 =$ F (geometrical), and $11.23 \times 1.757 = 19.73 = {}'F$ (geometrical alſo). Let us here aſſume $r = 9$ inches, and then by the theorem $\frac{rF}{2r - F} = R$, we get $R = 14.92$, and conſequently the ratio $r : R$ will be $9 : 14.92$, or $1 : 1.66$ in its loweſt terms. A double convex lens

lens ground with its radii in this ratio, will have its ſpherical aberration $= 1.325 \times T$; to counteract which, the concave muſt have its proper aberration determined; and then the ratio of its radii muſt be inveſtigated, that ſhall make a lens with this determined quantity of aberration. We have ſeen already that $A = 1.325 \times T$, therefore $1.325 \times 1.757 = 2.328 \times {}'T = {}'A$, the proportional aberration for $'F$, conſidered as having the ſame refractive power as F; but the *correcting* diviſor muſt now be applied, and $\frac{'A}{z} = \frac{2.328}{.826} = 2.818$ is the corrected aberration, for which the radii $'r$ and $'R$ are now to be inveſtigated. By putting $'R = 1$, as before, and by working out the root of the quadratic ariſing from $\frac{27 r^2 + 6 r R + 7 R^2}{6 \times \overline{r + R}|^2} \times T = 2.818$, we ſhall have the ratio $'R : {}'r = 1 : 3.075$. And, laſtly, for the actual radii of the concave, we get, by our practical theorem $\frac{2 r R}{r + R} = F$, $\frac{2 \times 1 \times 3.075}{1 + 3.075} = 1.51 = {}'F$ rational, and $\frac{19.73}{1.51} = 13.06 = {}'R$; as alſo $13.06 \times 3.075 = 40.15 = {}'r$, the ſecond ſide of the concave. Whence we now have

$$\left.\begin{array}{l} r = 9.00 \\ R = 14.92 \end{array}\right\} \text{ and } F = 11.23 \text{ geometrical.}$$

$$\left.\begin{array}{l} 'R = 13.06 \\ 'r = 40.15 \end{array}\right\} \text{ and } 'F = 19.73 \text{ geometrical.}$$

$$\Phi = 29.81 \quad \text{according to the proper theorem.}$$

It may be ſatisfactory to prove, that the geometrical quantities F and 'F, which we have here determined, will make Φ, the compound focus of the teleſcope, = 30 inches. But it will be requiſite firſt to turn the geometrical foci F and 'F into the refracted foci, by their reſpective diviſors, denominated $2a$ and $2'a$, *viz.* 1.056 and 1.198: thus, $\frac{11.23}{1.056} = 10.634 = F$ refracted, and $\frac{19.73}{1.198} = 16.479 = F'$ refracted; then by our theorem $\frac{F \times {}'F}{'F - F} = \Phi$, we have $\frac{10.634 \times 16.479}{16.479 - 10.634} = \frac{175.237686}{5.845} = 29.81 = \Phi$; and if the decimal had been carried farther in the geometrical foci, the compound focus would have been quite 30, as required. It may be for the benefit of practical men to ſubjoin a table ſimilar to our preceding one, derived from the radii of curvature determined in this ſecond example. And let it be underſtood by our readers, that in all our tables for the radii of curvature, the length of the teleſcope in inches is denoted by the figures in the firſt vertical column; and that the numbers in the ſame horizontal column with any given length, ſhew the proper geometrical radii of curvature for convex and concave lenſes to conſtruct ſuch teleſcope.

The following table is ſuitable for double achromatic object-glaſſes of various focal lengths, where $m : n$ in the crown-glaſs is as 1.528 : 1, and in the flint as 1.599 : 1; and their diſperſive powers as 1 : 1.757.

TABLE II.—Radii of double Object-glaſſes in Inches.

Φ	r	R	'R	$'r$
6	1.80	2.98	2.61	8.03
12	3.60	5.97	5.22	16.06
18	5.40	8.95	7.83	24.09
24	7.20	11.93	10.44	32.12
30	9.00	14.92	13.06	40.15
36	10.80	17.91	15.67	48.18
42	12.60	20.89	18.28	56.21
48	14.40	23.87	20.89	64.24
54	16.20	26.85	23.49	72.27
60	18.00	29.84	26.12	80.30
72	21.60	35.82	31.34	96.36
84	25.20	41.78	36.56	112.42
96	28.80	47.75	41.76	128.48
108	32.40	53.71	46.98	144.54
120	36.00	59.68	52.24	160.60

Example 3.—We ſhall now take the ſame crown-glaſs, with a flint-glaſs between the two extremes, which we have uſed, *viz.* in which $m : n$ is as 1.584 : 1, and their diſperſive powers as 1 : 1.59; and let it be required to calculate a double achromatic object-glaſs of 30 inches focal length, as before?

Having already the diviſor $(2a)$ of the crown equal 1.056, we begin with getting that of the flint thus, $\overline{1.584 - 1} \times 2 = 1.168 = 2'a$, or proper diviſor; then $\frac{1}{1.056} = .94697 = F$ refracted, as before; and $\frac{1.59}{1.168} = 1.3613 = {}'F$ refracted. Alſo $\frac{F \times {}'F}{'F - F} = 3.111$, the rational compound focus; and $1 : 3.111$ is the ratio between F geometrical and Φ. We have $x = .2914$ from our former examples, and to get y, we have $\frac{1}{1.168} = .856 = {}'F$ refracted, when 'F geometrical is = 1; therefore $\sqrt{.856^3} = .2512 = y$; but $\frac{y}{x} = z$; hence $\frac{.2512}{.2914} = .862 = z$, the correcting diviſor. Again, $\frac{30}{3.111} = 9.643 = F$ geometrical, and $9.64 \times 1.59 = 15.327 = {}'F$ in the ſame denomination. In this example we will take $r = 8$ inches; then, by the proper theorem $\frac{r F}{2r - F} = R$, we have $\frac{8 \times 9.64}{2 \times 8 - 9.64} = 12.12 = {}'F$, and $\frac{12.12}{9.64} = 1.515$; conſequently the geometrical ratio $r : R = 1 : 1.515$. Alſo, from

from the general theorem of Huygens, we find $A = 1.374 \times T$, and $1.374 \times 1.59 = 2.184 \times {'T} = {'A}$ rational, which is yet to be corrected; then $\frac{2.184}{.862} = \frac{'A}{z} = 2.535$, the corrected aberration. By getting the root of the quadratic arising from this aberration agreeably to the general theorem, as before, the ratio of the radii $'R : 'r$ comes out $1 : 2.375$. Lastly, by the theorem $\frac{2rR}{r+R}$ we get $\frac{2 \times 1 \times 2.375}{1 \times 2.375}$ $= 1.407 = {'F}$ rational, and $\frac{15.327}{1.407} = 10.89 = {'R}$, and also $10.89 \times 2.375 = 25.864 = {'r}$. We have, therefore,

$$\left.\begin{array}{l} r = 8.00 \\ R = 12.12 \end{array}\right\} \text{ and } F = 9.643.$$
$$\left.\begin{array}{l} 'R = 10.89 \\ 'r = 25.86 \end{array}\right\} \text{ and } 'F = 15.327.$$

Hence the next table is suitable for double achromatic object-glasses of various focal lengths, where $m : n$ in the crown-glass is as $1.528 : 1$, and in the flint as $1.584 : 1$; and their respective dispersive powers as $1 : 1.590$.

Table III.—Radii of double Object-glasses in Inches.

Φ	r	R	'R	'r
6	1.60	2.42	2.18	5.17
12	3.20	4.84	4.36	10.34
18	4.80	7.27	6.53	15.52
24	6.40	9.69	8.71	20.69
30	8.00	12.12	10.89	25.86
36	9.60	14.54	13.06	31.03
42	11.20	16.97	15.24	36.20
48	12.80	19.38	17.42	41.38
54	14.40	21.81	19.60	46.55
60	16.00	24.24	21.78	51.72
72	19.20	29.08	26.14	62.06
84	22.40	33.93	30.49	72.40
96	25.60	38.77	34.85	82.75
108	28.80	43.63	39.20	93.10
120	32.00	48.48	43.56	103.44

Example 4.—Let us next take an example, in which plate-glass is substituted for crown, and let the sines of the angles of incidence and of refraction in it be as $1.504 : 1$, while $m : n$ in the flint is as $1.573 : 1$, and their dispersive powers $1 : 1.623$; and let the length of the telescope be required to be 30 inches, as before? Then $\frac{m-n}{n} \times 2 = 2a = 1.008$, is the divisor for the plate-glass; and $\frac{m-n}{n} \times 2 = 2a = 1.147$, or a divisor for the flint; also $\frac{1}{1.088} = .992 = F$ refracted; and $\frac{1.623}{1.147} = 1.415 = {'F}$ refracted. Again, $\frac{F \times 'F}{'F - F} = 3.318 = \Phi$ rational; also $\sqrt{.992^3} = x = .3124$, and $\left(\frac{1}{1.147} = .872\right) \sqrt{.872^3}$ $= y = .2575$; whence $\frac{y}{x} = \frac{.2575}{.3124} = .824 = z$. Likewise $\frac{30}{3.318} = 9.03 = F$, and $9.03 \times 1.623 = 14.65 = {'F}$. Put $r = 7.5$; then $\frac{rF}{2r - F} = R = 11.34$, and $\frac{R}{r}$ $= 1.51$, or $r : R :: 1 : 1.51$; hence A, by the general theorem of Huygens, $= 1.376 \times T$, and $'A = 1.376 \times 1.623 = 2.233 \times {'T}$ = the aberration of the concave corrected for the difference of refractive power. The root arising from a quadratic equation of this aberration is $'r = 2.78$, when $'R = 1$, consequently $\frac{2rR}{r+R} = 1.471 = {'F}$ rational, and $\frac{14.65}{1.471} = 9.96 = {'F}$ geometrical; also $9.96 \times 2.78 = 27.68 = {'F}$ geometrical. Thus,

$$\left.\begin{array}{l} r = 7.50 \\ R = 11.34 \end{array}\right\} F = 9.03 \text{ geometrical.}$$
$$\left.\begin{array}{l} 'R = 9.96 \\ 'r = 27.68 \end{array}\right\} 'F = 14.65 \text{ geometrical.}$$

Table IV.—Radii of double Object-glasses, with Lenses of Plate and Flint, in Inches.

Φ	r	R	'R	'r
6	1.50	2.27	1.99	5.54
12	3.00	4.54	3.98	11.07
18	4.50	6.81	5.97	16.61
24	6.00	9.08	7.96	22.15
30	7.50	11.34	9.96	27.68
36	9.00	13.61	11.95	33.22
42	10.50	15.88	13.94	38.76
48	12.00	18.15	15.93	44.30
54	13.50	20.42	17.92	49.83
60	15.00	22.68	19.92	55.36
72	18.00	27.22	23.90	66.44
84	21.00	31.76	27.88	77.51
96	24.00	36.30	31.86	88.59
108	27.00	40.83	35.85	99.66
120	30.00	45.36	39.84	110.72

Example 5.—Let the ratio of the radii of the convex lens be 1 : 6, in which the fpherical aberration is a *minimum*, and let the crown and flint glafs be as in the firft example for a telefcope of 30 inches?

Then, by the fame procefs, there will come out

$$\left.\begin{array}{l} r = 5.32 \\ R = 31.92 \end{array}\right\} F = 9.12, \text{ as before.}$$

$$\left.\begin{array}{l} 'R = 12.60 \\ 'r = 15.50 \end{array}\right\} 'F = 13.9, \text{ as before.}$$

This table is proper for glafs of the fame refractive and difperfive powers as in Table I., but with the fpherical aberrations the leaft poffible.

TABLE V.—Radii of double Object-glaffes in Inches, where the Convex has a Minimum of Aberration.

Φ	r	R	'R	$'r$
6	1.06	6.38	2.52	3.10
12	2.12	12.77	5.04	6.20
18	3.18	19.15	7.56	9.40
24	4.25	25.54	10.08	12.50
30	5.32	31.92	12.60	15.50
36	6.38	38.30	15.12	18.60
42	7.44	44.68	17.64	21.70
48	8.50	51.07	20.16	24.80
54	9.57	57.45	22.68	27.90
60	10.64	63.84	25.20	31.00
72	12.76	76.61	27.72	37.20
84	14.88	89.38	30.24	43.40
96	17.00	102.15	32.76	49.60
108	19.14	114.91	35.28	55.80
120	21.28	127.68	50.40	62.00

In the preceding example, where the ratio of the two radii of the convex lens were given, r comes out $= 5.32$ in a thirty-inch telefcope; and in like manner, when the aberration only is given, the ratio of the radii may firft be determined by a quadratic equation, and then the other curves may be determined as they have been here, without any affumption of r in the convex lens. But in all cafes the relative refractive and difperfive powers muft be known previoufly to the calculations fuch as we have exemplified.

Example 6.—In this example let us take the fame crown and flint glafs as we did in the fecond example, and put $r = 7.5$, as in our firft example; and then the radii will be as in the following table.

TABLE VI.—Radii of double Object-glaffes in Inches.

Φ	r	R	'R	$'r$
6	1.50	4.47	2.91	6.12
12	3.00	8.94	5.82	12.24
18	4.50	13.41	8.73	18.35
24	6.00	17.88	11.64	24.47
30	7.50	22.34	14.56	30.58
36	9.00	26.81	17.47	36.70
42	10.50	31.28	20.38	42.82
48	12.00	35.75	23.29	48.94
54	13.50	0.242	26.20	55.05
60	15.00	44.68	29.12	61.16
72	18.00	53.62	34.94	73.40
84	21.00	62.56	40.76	85.64
96	24.00	71.50	46.58	97.88
108	27.00	80.44	52.41	110.12
120	30.00	89.37	58.23	122.32

Example 7.—Let us take in this example the crown and flint glafs as in the firft example, and put $r = 9$, as in our fecond example, and then the radii will come out as in the fubjoined table.

TABLE VII.—Radii of double Object-glaffes in Inches.

Φ	r	R	'R	$'r$
6	1.80	1.85	1.83	5.86
12	3.60	3.70	3.66	11.72
18	5.40	5.54	5.48	17.58
24	7.20	7.39	7.31	23.44
30	9.00	9.24	9.13	29.30
36	10.80	11.09	10.96	35.16
42	12.60	12.94	12.78	41.02
48	14.40	14.78	14.61	46.88
54	16.20	16.63	16.43	52.74
60	18.00	18.48	18.26	58.60
72	21.60	22.18	21.92	70.32
84	25.20	25.88	25.57	82.04
96	28.80	29.57	29.23	93.76
108	32.40	33.27	32.87	105.48
120	36.00	36.96	36.52	117.20

In this and the six preceding tables, the radii are calculated for an aperture of three inches for a focal distance of thirty inches; and the optician who may use any of them, with *similar glass*, may increase or diminish his aperture accordingly as the focal length is greater or less than thirty inches.

If we examine and compare the respective radii r and R, and also $'r$ and $'R$ of the convex and concave lenses in the preceding tables, which are all calculated by the same process that is used by Tulley, and several of which have been used in practice, we shall perceive that a difference in the quality of the glass, as to *dispersive* and *refractive* powers, makes the curves of the lenses widely different; and that a small alteration in the assumed value of r, the first face of the convex lens, also produces a great alteration in the curves of the three other faces of the compound object-glass. For instance, if we compare the radii in Table I. with those in Table VI., where r is assumed equal, *viz.* 7.5, in both, and where the same crown-glass is used, and the *flint-glass alone* taken different, the former being No. 2. and the latter No. 1; the radii in the former are $r = 7.5$, $R = 11.63$, $'R = 10.43$, and $'r = 20.86$, in a telescope of thirty inches focal length; whereas in Table VI. there is $r = 7.5$, as before, but $R = 22.34$, $'R = 14.56$, and $'r = 30.58$; which curves are very widely different. And if we compare Table II. with Table VII., in both which r is again assumed equal, as well as the crown, while the two flints are *reversed*, *viz.* the former having No. 1. and the latter No. 2, the comparison will stand thus in telescopes of thirty inches focal length: in Table II. there is $r = 9.00$, $R = 14.92$, $'R = 13.06$, and $'r = 40.15$; but in Table VII. $r = 9.00$, as before, while R is $= 9.24$, $'R = 9.13$, and $'r = 29.30$. Hence it is manifest, that it is not only *useless* but *detrimental* to copy the radii of a double object-glass of even the best telescope that ever was made by any artist, unless the *refractive* and *dispersive* powers of *both* sorts of glass be *precisely the same*, in the given and proposed telescopes intended to be equally good: but when different specimens of glass are necessarily used by different artists, it is hardly to be expected that both the requisite qualities of each piece of glass will be found alike, or even sufficiently near a perfect similarity, to authorise the copying of the radii of a standard telescope, even if those radii could be measured by mechanical means with sufficient accuracy; but the measurement from the *solar focus* of a lens, as is usual, does not afford data for obtaining the *geometrical* focus, and from it the radii of curvature, unless the quantity $2a$ be previously known; though the converse operation, we have before seen, is not difficult to a practical optician. We have no hesitation, therefore, in condemning the practice of analysing a telescope for the purpose of copying it; for it is the certain guide to irrational constructions; and seldom will an instrument so made be free from either colours or indistinctness.

Neither is it safe to copy *tables*, such as those published by Dr. Brewster, in his edition of Ferguson's Lectures, of which the *forms* are also given under the article ACHROMATIC *Telescopes*, (in the Edinburgh Encyclopædia,) until the specimens of glass to be used are ascertained to have the same *refractive* and *dispersive* powers, as those from which the tables are calculated. On comparing these tables with the results of professor Robison's calculations, given in the Encyclopædia Britannica under the article TELESCOPE, we find not only that the basis of these tables is derived from this source, but that the calculations themselves are adopted, without further modification than what is necessary for adapting them to given focal lengths of the compound object-glass. As professor Robison's article on our present subject has hitherto been considered to be the only article in our language that has disclosed the steps by which an *achromatic object-glass* may be constructed directly from mathematical calculations; it will be satisfactory to our readers that we should try what curves will result from Tulley's practical mode of proceeding, when the same data are taken that Robison has used in one of his examples. In an example worked according to Boscovich's formula, the ratio of $m : n$ in the crown-glass is taken as $1.526 : 1$, and in the flint, so high as $1.604 : 1$; while the ratio of the dispersive powers, when converted into the proper terms, are only in the ratio $1 : 1.65$, or $1 : \frac{1}{.6054}$; let us see what will be the curves of a thirty-inch telescope, when r is assumed $= 9.7$, and $R = 9.54$, according to Dr. Brewster's Table VI., derived from Robison's numbers $0.32325 \times 30 = 9.6975$, and $0.31798 \times 30 = 9.5394$.

As r is greater than R in this assumption, the convex lens is in its worst position, and the spherical aberration, A, determined by the general theorem of Huygens, will be $1.682 \times T$: and as the geometrical foci of the two lenses must be directly as their dispersive powers, and as T and $'T$ are inversely as those foci, we shall have $1.682 \times 1.65 = 2.775$ for the proportional aberration $'A$ uncorrected; then as the correcting number, for flint of $1.599 : 1$, which is the most dense that Tulley has met with, is .826, we may take this without apparent error for that of $1.604 : 1$; and then $\frac{2.775}{.826} = 3.26 = {'A}$ is the *corrected* aberration of the concave; and according to this aberration, the root of the quadratic will give $'R : 'r$ as $1 : 5.40$; and by theorem $\frac{2\,r\,R}{r + R}$ the rational focus will be $\frac{2 \times 5.40 \times 1}{5.40 \times 1} = 1.688$; then having $r = 9.7$, and $R = 9.54$, by the same theorem we have F of the convex $= 9.618$, and $F \times 1.65 = 15.8697 = {'F}$, or focus of the concave. Also we have $\frac{15.87}{1.688} = 9.401 = {'R}$, or shorter radius of the concave; and $9.401 \times 5.4 = 50.76 = {'r}$, or longer radius of the concave. Lastly, to obtain the compound focus Φ, we must reduce the geometrical focus of each lens into its refracted focus, by the proper divisors 1.052 for the crown, and 1.208 for the flint; then we shall have $\frac{9.618}{1.052} = 9.14$ for the refracted focus of the convex, and $\frac{15.87}{1.208} = 13.04$ for the refracted focus of the concave; and by the theorem $\frac{F \times {'F}}{{'F} - F}$ these numbers will give $\frac{9.14 \times 13.04}{13.04 - 9.14} = 30.53 = \Phi$.

We have now obtained numbers that will enable us to form the desired comparison; thus, according to Robison,

$$r = 9.7,\ R = 9.54,\ {'R} = 9.54,\ {'r} = 47.47;$$

but according to Tulley,

$$r = 9.7,\ R = 9.54,\ {'R} = 9.40,\ {'r} = 50.7.$$

Also, according to Robison we have $F = 9.618$ and $'F = 13.25$ geometrical, and the compound focus $\Phi = 29.1$. But according to Tulley, $F = 9.618$ and $'F = 15.8697$ geometrical, while the compound focus $\Phi = 30.53$.

Now

Now as F : 'F :: 1 : 1.65 (the refpective difperfive powers), let us fee if either of thefe refults will make an *achromatic* telefcope : thus, as $\left\{\begin{matrix} & & F & 'F \\ 1 : 1.65 & :: & 9.618 : & 15.8697 \end{matrix}\right\}$ which fhews that Tulley's foci are *exactly as the difperfive powers*, and therefore would be *achromatic*, if the *difperfive power* had been truly proportioned to the *refractive* power ; but from long experience he knows, that the difperfive power of flint-glafs of the greateft denfity, compared with that of crown, which feldom varies, is not lefs than 1.759 : 1. Hence Robifon's difperfive power is in the firft place taken too low ; and in the next, allowing it to be truly taken, he has not preferved the two feparate focal diftances in fuch ratio, agreeably to that of the difperfive powers, as will make an *achromatic telefcope*. And this is further proved by the circumftance, that the compound focus does not come out exactly 30, which it will always do by Tulley's procefs, if the proportions are all *rational*. If we fubftitute the ratio 1.759 : 1, inftead of 1.65 : 1, for the difperfive power, which Tulley's table of difperfive powers gives, to correfpond with the refractive powers, when $m : n$ as 1.599 : 1 ; and if we take the convex lens of Robifon in the worft pofition, as before, with $r = 9.7$, and $R = 9.54$, the radii of the concave, by Tulley's mode of calculating, will be $'R = 9.65$, and $'r = 68.04$, and the compound focus $\Phi = 25.6$; with which curves and focal length the telefcope would be *achromatic*, and truly *corrected* for fpherical aberration ; but as R comes out a deeper curve than 'R, thefe furfaces would come in contact at the centre, and therefore are not in a practicable form. Hence we infer that the conftruction of an achromatic telefcope with Robifon's convex lens in its *worft* pofition is impracticable, though a concave might be determined to fuit it in its beft pofition ; *viz.* when its faces are reverfed. There is, indeed, no form of a double convex lens, but a concave may be calculated to fuit it, provided the curves come out in a practicable form ; but, on the contrary, a concave may be fixed on that, in its worft pofition, (which is always its pofition in a double object-glafs,) can have no convex that will match it. Martin has fhewn, that if the aberration of a given concave be $\frac{a}{b} \times 'T$, then $\frac{a}{b} \times 'T \times \frac{6}{T} = \frac{4a}{b} = 6.42857$ will be a *minimum* ; whence $a : b$ :: 6.43 : 4 :: 16 : 10 nearly. Therefore, when $\frac{4a}{b}$ is *lefs* than 6.43, the problem will be impoffible. For inftance, in a plano-concave lens, the aberration is $\frac{7}{6}$ of T, and $\frac{7}{6} \times 4 = 4.66$ only, which fhould not be lefs than 6.43 ; and therefore this lens cannot be ufed fingly with a convex of any defcription ; much lefs can a concave in its beft form, where $r : R :: 1 : 6$, be ufed ; for its aberration $\frac{15}{14} \times T$ gives $\frac{4a}{b} = 4.284$ only. But either of thefe may be ufed in their worft pofition, becaufe then either of them will have aberration enough for any convex. And this previous confideration will enable the fkilful optician to fix on a proper ratio of $'r : 'R$, before he proceeds to his calculation. Should it be afked, why we prefer Tulley's difperfive powers to profeffor Robifon's? our anfwer is this ; that Tulley's were not gained fimply by prifmatic meafurement of the fpectrum, like Robifon's, where fome errors are obvioufly unavoidable ; but have been corrected by repeated comparifon of the focal lengths of the convex and concave lenfes in the very beft achromatic telefcopes felected for the purpofe, where, when a high magnifying power was ufed, the leaft difcolouration would have been obfervable ; and as thefe foci are always in the fame ratio as the difperfive powers, no other method of determining thefe powers can have fimilar pretenfions to accuracy.

When the convex and concave lenfes are both ground and polifhed (fee Glass and Grinding), they require fome care in putting them properly into the tube, fo that they may have their common axis coinciding with the axis of the eye-glaffes, in order that every part of the field of view may be equally diftinct and free from colour : and as there will always be fome errors of workmanfhip, and as both lenfes, but particularly the flint, may not be perfectly homogeneal, one of the lenfes muft be turned round in the common cell, till the faults of one lens are obferved to correct thofe of the other as much as poffible ; which will be known when the vifion is moft diftinct, or the object beft defined. Should any colour remain about the edges of the object, the prifmatic aberration is not corrected ; and if indiftinctnefs does not take place foon, and at equal diftances from the point of diftinct vifion, when the eye-tube is moved in and out, the correction for fpherical aberration is not perfect. A double object-glafs is much more eafily adjufted for a good central pofition, and for the counteraction of oppofite errors of workmanfhip and imperfection of glafs, than a triple one, and has moreover more light, in confequence of having but four reflecting furfaces ; but as it does not admit of any change of the faces in the final adjuftment, the lenfes require to be both truly calculated and nicely worked, in order to make the practice correfpond with the theory ; which is probably the reafon why triple object-glaffes, that admit of changes in their pofitions, are moft frequently made, particularly for fhort telefcopes : befides, half a dozen of thefe lenfes may be ground and polifhed at the fame time ; whereas, for a double object-glafs, each lens requires to be ground and polifhed feparately, and with the greateft care.

Triple achromatic Object-glaffes.—After having explained the theory, and exemplified the conftruction of a double achromatic object-glafs with great minutenefs, we come now to treat of triple object-glaffes, that fhall have the achromatic property ; but it will not be neceffary to give fo many examples, nor fuch minute explanation, as feemed requifite in our preceding part of this fubject, feeing that the calculations for a triple object-glafs are grounded on thofe that we have given for a double one, and do not materially differ from them. It will, however, be proper to fhew how the compound focus of three lenfes is determined, before we proceed to find the achromatic proportions of the refpective radii.

Firft, we muft have recourfe to our *fundamental* theorem, (of Table I. of theorems for the refractive foci of lenfes,) *viz.* $f = \frac{p\,d\,r\,R}{d\,R + d\,r - p\,R\,r}$, where p is the reciprocal of the refracting power of the medium employed, or of $\frac{m-n}{n}$, the meafure of that power, r and R the radii, as before, and d the radiant diftance. To apply this theorem to a fyftem of glaffes, as B, C, D, &c. which we propofe doing, it is convenient to fubftitute, for the general expreffion $\frac{1}{p}$, the letters a, b, and c, as peculiar to each medium refpectively. Suppofing now our three lenfes arranged in the order B, C, D, with B next the radiant object (as in *fig.*

fig. 12. *Plate* XXVIII.), we first determine the focus of B, which becomes in this case, if we substitute $\frac{1}{a}$ for p,

$$F = \frac{1}{a} \times \frac{d r R}{d R + d r - \frac{R r}{a}} = \frac{d r R}{a d R + a d r - R r}.$$

Now f, the focal distance of B, thus found, is manifestly the radiant distance of the second or middle lens C; and as the general theorem above referred to involves the radiant distance d, we have only now to apply that theorem again to the second lens C, substituting, as before, b for $\frac{1}{p}$, and for d, the quantity last found as the focus of B. This gives the compound focal distance of these two lenses B and C, which we will call φ; and this again becomes the radiant distance of the lens D: therefore, lastly, the general theorem is again applied to this lens, substituting c for $\frac{1}{p}$, and the last found focus (φ) for d; by which process, we arrive at the compound focus (Φ) of all the three lenses. In the application of these successive steps, it will be proper to attend to the signs of the quantities, where one of them, which in our case is the middle one, has its focus negative with converging rays. To exemplify this process in a triple object-glass for parallel rays, let B represent the outermost lens, which we will consider as a double convex lens with $\frac{m-n}{n} = a = 0.53$, and r and R each $= 10$; let C be the double concave of similar radii $'r$ and $'R$, and with $\frac{m-n}{n} = b = 0.6$; and let D be a plano-convex, and consequently R infinite, but $r = 10$, as before, and $\frac{m-n}{n} = c = a = 0.53$: then for the focus of B, putting $\frac{1}{p} = a$, we have $\frac{1}{a} \times$

$$\frac{d r R}{d R + d r - \frac{R r}{a}} = \frac{d r R}{a d R + a d r - R r} = \frac{d r R}{a d R - r R}$$

($a d r$ being neglected, when R is infinite) $= \frac{d r}{a d - r}$; and since d is also infinite with parallel rays, the expression becomes $\frac{r}{a} = F$, as in our first table of theorems for the refracted foci of lenses, for the first lens B. This expression is now put for d, when we come to consider the theorem as applied to C: here we have $\frac{1}{p} = b$, and the expression becomes $\frac{1}{b} \times \frac{d r R}{d r + d R - \frac{r R}{b}}$, or $\frac{d r R}{b d r + b d R - r R}$; then, as r is taken equal to R, it will be $\frac{d r}{2 b d - r} = {}'F$ of the lens C. Now, if in this expression we substitute $\frac{r}{a}$, the focus of B, for d, we have for $\frac{d r}{2 b d - r}$ $\frac{r}{a} \times$ $\frac{r}{\frac{2 b r}{a} - r} = \frac{r}{2 b r - r a} = \frac{r}{2 b - a}$ for φ, the compound focus of B and C, or rather, as the rays fall converging on C, and $2b$ is more than a, $= \frac{-r}{-2b-a}$. Again, this quantity will become d for the lens D, and putting the same substitution as before, in the general theorem for D, where $\frac{1}{c}$ is put for p, we shall have $\frac{1}{c} \times$

$$\frac{d r R}{d r + d R - \frac{r R}{c}}, \text{ or } \frac{d r R}{c d r + c d R - r R}, \text{ or, when } r = R,$$

$\frac{d r}{2 c d - r}$; hence we obtain $\frac{r}{2 b - a} \times \frac{r}{2 c \times \frac{r}{2 b - a} - r} =$

$$\frac{r^2}{2 c \times r - \overline{2 b - a} \times r} = \frac{r}{2 c - 2 b + a} = \Phi,$$

or compound focus of all the three lenses, B, C, and D. Let us take, by way of example, three lenses as follow; *viz.* B, a double convex lens of crown-glass, with its refractive power by experiment $= 0.53 = a$, and with equal radii, where r and R are each $= 10$; let the second lens C be a double concave of flint-glass, with the same radii, and of a refractive power $= 0.6$; and let the third lens D be a plano-convex of crown-glass, of a refractive power of 0.53 also, with $R = 10$ likewise; then, according to our last expression $\frac{r}{2c - 2b + a}$, we have $\frac{10}{2c - 2b + c}$, or $\frac{10}{3c - 2b}$ $= \frac{10}{1.59 - 1.2} = \frac{10}{0.39} = 25.6 = \Phi$. In this way the compound focus of any number of lenses may be determined, and the course of the rays might be traced in a geometrical figure out of one glass into another, until they come to their ultimate focus.

For instance, let us consider S and s, in *fig.* 12, to be two parallel solar rays incident on the first lens B, at the points b and b: these rays, on entering, are bent towards the axis $\varphi f \Phi$, and then from the points of emersion tend to their principal focus f; but being intercepted by the double convex lens C, they diverge, after entering at c and c, in a direction which points backwards to the virtual focus φ; but in their progress, they again become incident on the plano-convex at the points d and d, and are again refracted towards the axis, and meet in a distant point Φ, which is, therefore, the compound focus of all the three lenses. And if we conceive the parallel rays, S and s, to be pencils of solar rays, that *disperse* on entering the convex lens B, they will disperse in a contrary direction on entering the concave C, and will again, on entering the plano-convex lens D, have the excess of dispersion of C counteracted by a second opposing dispersion of D, and, instead of coming to unite at the distant points P and Q, to which they tended on entering D, they will meet, by virtue of the prevailing refraction of the two lenses B and D taken jointly, over the refraction of C taken separately, at the compound focus Φ, where the image of the sun will be formed; and if both the focal distances and radii of curvature of all the lenses were achromatically adjusted, as we shall presently direct, the image would be free from colours, and well defined.

The same determination of the foci f, φ, and Φ, in any combination, may, however, be obtained more conveniently in in practice, when r and R are unequal, from our former practical theorems, thus: let us determine the compound focus of B and D by the theorem $\frac{F \times F}{F + F}$, as they have each a poſitive focus, and call this focus $= \varphi$ geometrical, and then $\frac{\varphi}{2a}$ will be φ *refracted;* and ſecondly, let $'F$ geometrical be turned into $\frac{'F}{2b}$ for the refracted focus of the concave C; and then, by the theorem $\frac{F \times 'F}{'F - F} = \Phi$, we ſhall have Φ for the compound refracted focus of the triple object-glaſs, or length of the teleſcope: for example, taking the ſame data as before, we ſhall firſt have $\frac{10 \times 20}{10 + 20} = \frac{200}{30} = 6.66 = \varphi$, and $\frac{6.66}{1.06}$, or $\frac{\varphi}{2a} = 6.28 = \varphi$ refracted; and $\frac{10}{1.2}\left(\frac{'F}{2b}\right) = 8.33 = {}'F$ refracted: alſo, by the theorem $\frac{\varphi \times 'F}{'F - \varphi}$, becauſe $'F$ has a negative focus, we get $\frac{6.28 \times 8.33}{8.33 - 6.28} = \frac{52.33}{2.05} = 25.53 = \Phi$, as was required. We ſhall uſe this method of finding the compound focus φ of two lenſes, and alſo Φ, the focus ariſing from all the three lenſes, where it is to be underſtood that a, the ſymbol for the refractive power of both the crown lenſes B and D, is taken the ſame; and that we expreſs the refractive power of C, the concave, by the ſymbol b, as a ſubſtitute for $'a$.

We muſt further premiſe, that when T, the thickneſs of each lens B and D, is not conſidered, we ſhall ſhew preſently that the ſpherical aberration, ariſing from any ſingle lens that receives the rays of light, may be diminiſhed as 4 : 1, by the combination of two lenſes, to be ſubſtituted for that one. Bearing theſe premiſes in mind, we now proceed to the conſideration of a triple object-glaſs, that ſhall have the due corrections for both the priſmatic and ſpherical aberrations. It will greatly facilitate both our explanation and exemplification, if we ſuppoſe the two convex lenſes B and D, having a compound focus $= \varphi$, to be repreſented by a ſingle lens E, with the ſame focus φ, but with a *diminiſhed* aberration; for then we may proceed nearly as in our ſeven preceding examples; but reverſing the proceſs, when the concave has its radii given, to find the convex lens.

Example 8.—Let it be required to conſtruct a triple achromatic object-glaſs of 30 inches focal length, with the ſame refractive and diſperſive powers as in the firſt example; *viz.* with $m : n$ in the crown as $1.528 : 1$, and in the flint as $1.5735 : 1$; and with the diſperſive powers as $1 : 1.524$; and let the two radii of the concave be each 13.9, ſo as to have $'F$, as in the firſt example.

In the firſt place we have $'r : {}'R :: 1 : 1$, and, as we have ſeen above, $'A = 1.666 \times {}'T$, by the general theorem of Huygens; in the next place, becauſe the *concave* C is *given* to find the *convex* E, the correcting number z, found as before, becomes a *multiplier*, in a reverſed operation, and we have $1.666\ ('A) \times {}'T \times .883\ (z) = 1.4715 \times T = {}'A$ *corrected:* we muſt alſo uſe the former multiplier 1.524 (the diſperſive power, or proportional focus) as a *diviſor*, and then we get $\frac{1.4715}{1.524} = .9655 \times T = A$ of the ſubſtituted lens E, with a focus $= \varphi$; but there is no ſuch ſmall quantity of aberration in any one lens. Let us however ſee what the abſolute aberration $'A$ will be, unconnected with the factor $'T$, which factor we have determined, from the verſed ſines to the radii 13.9 and 13.9, to be $= .1653$; therefore $1.4715 \times .1653 = .2432 = {}'A$ *abſolutely*. Now we have ſeen, in the firſt example, that .252 is = T of the proper convex; let us now conſider that $\frac{.252}{2} = .126$ is = T in one of the lenſes B and D, which we propoſe to make in every reſpect ſimilar, in order to have as few different curves, and conſequently as few different tools, as poſſible; then, becauſe .2432 is the *abſolute* aberration of C, the concave, we have $\frac{.24324}{.126} = 1.93 \times T = A$ of either of the convex lenſes; but T is .126; therefore $1.93 \times .126 = .2432$ is the *abſolute* aberration of each convex lens, exactly equal to the abſolute aberration of the concave. But we have aſſerted, and ſhall demonſtrate hereafter, that when the thickneſs of the lenſes is neglected, a proper combination of two lenſes, placed at a certain diſtance from each other, will diminiſh the aberration belonging to one *four times*, and even when the diſtance = 0, this will be nearly the caſe: now we have $.9655 \times T = A$ in the lens E of equal focus, let us leave out A, and multiply by 4, and we have $4 \times .9655 = 3.862$ very nearly, the ſum of the aberrations (without T) of the two convex lenſes B and D, taken together; *viz.* $2 \times 1.93 = 3.86$; but yet the abſolute aberration of each ſeparate convex lens (T being conſidered) is exactly equal to the abſolute aberration ($'T$ conſidered) of the double concave. This relation of the reſpective aberrations being once eſtabliſhed and confirmed by practice, which Tulley affirms to be the caſe, ſimplifies the complex buſineſs of calculating a triple object-glaſs: for the *ſum* of the abſolute aberrations of the two convex lenſes of like glaſs, muſt be always equal to *double* the abſolute *corrected* aberration of the concave alone, in order to have a due correction for ſpherical aberration, and conſequent indiſtinctneſs. Hence, when the focal diſtance, φ, of the two convex lenſes B and D is in the ſame proportion to $'F$, the focal diſtance of the concave, that their ſeparate diſperſive powers are relatively to that of the concave B, the relative radii of either B or D, or of both, may be *varied* at pleaſure, provided that the *ſum* of their *abſolute* aberrations remain equal to *double* the abſolute aberration of the concave C, and provided that φ, their compound focus, be not altered. But we have not yet adjuſted the two focal diſtances ſo as to make the object-glaſs achromatic, and Φ, or the compound focus of the three, to be equal 30 inches. From an equation of the aberration $1.93 \times T$, or from .2432 abſolutely, we find the ratio of $r : R$ in each lens to be as $1.34 : 1$, which is alſo agreeable to Tulley's tables, from which this ratio may be had by inſpection; alſo the rational geometrical focus for theſe numbers is 1.145. Now according to our firſt example, we have ſeen that when $'F = 13.9$ in a teleſcope of 30 inches focal length, F will be 9.12, when there is only one double convex lens; but here we have two lenſes to produce $9.12 = \varphi$, and therefore, as both lenſes are to be alike, we have $9.12 \times 2 = 18.24 = F$ for each ſeparate focus; therefore $\frac{18.24}{1.145} = 15.93 = R$ of each, and $15.93 \times 1.34 = 21.35 = r$;

$= r$; and the refult of our calculation will ftand thus; *viz.*

First convex B $\begin{cases} r = 21.35 \\ R = 15.93 \end{cases}$ $F = 18.24$, and $A = 1.93 \times T = .2432$.

Concave C $\begin{cases} 'r = 13.9 \\ 'R = 13.9 \end{cases}$ $'F = 13.9$, and $'A = 1.4715 \times 'T = .2432$.

Second convex D $\begin{cases} r = 21.35 \\ R = 15.93 \end{cases}$ $F = 18.24$, and $A = 1.93 \times T = .2432$.

Alfo - - - $\left\{ \frac{F \times F}{F + F} = \phi = 9.12 \right.$

And - - - $\left\{ \frac{'F \times \phi}{'F - \phi} = \Phi = 30.0 \right.$

It is hardly neceffary to obferve, that the quantities T and 'T are here given in *numbers*, for the fake of illuftration; but when the quadratic equation is worked, thofe fymbols may be exterminated, and their values involved in the procefs.

A table of radii for triple object-glaffes, in which the two convex lenfes of crown-glafs, and the one of flint, have refpectively the fame refractive and difperfive powers as in Table I. and $'r = 'R$.

TABLE VIII.—Radii of triple achromatic Object-glaffes.

	B Convex.		C Concave.		D Convex.	
Φ	r	R	'r	'R	r	R
6	4.27	3.19	2.80	2.80	4.27	3.19
12	8.54	6.38	5.60	5.60	8.54	6.38
18	12.81	9.56	8.40	8.40	12.81	9.56
24	17.08	12.74	11.20	11.20	17.08	12.74
30	21.35	15.93	13.90	13.9	21.35	15.93
36	25.62	19.11	16.70	16.70	25.62	19.11
42	29.89	22.30	19.50	19.50	29.89	22.30
48	34.16	25.48	22.30	22.30	34.16	25.48
54	38.43	28.67	25.09	25.09	38.43	28.67
60	42.70	31.86	27.80	27.8	42.70	31.86
72	51.24	38.22	33.40	33.40	51.24	38.22
84	59.78	44.60	39.00	39.00	59.78	44.60
96	68.32	50.96	44.60	44.60	68.32	50.96
108	76.86	57.34	50.10	50.10	76.86	57.34
120	85.40	63.72	55.60	55.60	85.40	63.72

Example 9.—Let it be required to conftruct another triple object-glafs of 30 inches focal length, with crown and flint-glafs exactly fimilar to what was ufed in the laft example; but let the radii of the concave be unequal; *viz.* $'r : 'R :: 1 : 1.23$, and in the beft pofition?

In this example we propofe to abridge the work thus; firft, $'A = 1.507 \times 'T$ and $z = .883$, and $\frac{'A}{z} = \frac{1.507}{.883} = 1.33 \times 'T = 'A$ corrected; then $\frac{1.33}{1.524} \left(\frac{'A \text{ cor.}}{'F \text{ rat.}} \right) = .873 \times T$ for the proportional aberration of the fubftituted lens E, as before; which is an impoffible quantity. The focus of this fubftituted lens, as in the laft example, is 9.12, and confequently $9.12 \times 2 = 18.24$ is again the focus of one of the two convex lenfes to be ufed, that of the concave being, as before, 13.9 (for $\frac{13.9}{1.524}$ is $= 9.12$); whence $'r$ and $'R$ will be 12.6 and 15.5 refpectively. T, as before, is $= .126$, and $'T = .1653$ (by calculation); hence $'T \times 1.33 = .2198$ is the *abfolute* aberration of the concave lens, as well as that of each of the two convexes of 18.24 focus; therefore $\frac{.2198}{.126} = 1.745 \times T = A$ of one of thofe lenfes, and the root of the quadratic arifing out of this equation of A, gives the ratio of the radii, where R is unity, thus; as $R : r :: 1 : 1.1$; and the rational focus, by the proper theorem, is 1.048; confequently $\frac{18.24}{1.048} = 17.40$ is $= R$ of each convex lens, and $17.40 \times 1.1 = 19.14$ is $= r$; fo that we have now the fubjoined refults; *viz.*

Convex B $\begin{cases} r = 19.14 \\ R = 17.40 \end{cases}$ $F = 18.24$, and $A = 1.747 \times T = .2198$.

Concave C $\begin{cases} 'r = 12.60 \\ 'R = 15.50 \end{cases}$ $'F = 13.9$, and $'A = 1.33 \times 'T = .2198$.

Convex D $\begin{cases} r = 19.14 \\ R = 17.40 \end{cases}$ $F = 18.24$, and $A = 1.747 \times T = .2198$.

Alfo - - - $\{ \phi = 9.12$ for the compound focus of B and D.

And - - - $\{ \Phi = 30.0$ for the compound focus of B, C, and D.

The following is a table of radii for triple object-glaffes, where the refractive and difperfive powers are as in the laft example, but where the radii of the concave are unequal, *viz.* $'r : 'R :: 1 : 1.1$.

Table IX.—Radii of triple achromatic Object-glasses.

	B Convex.		C Concave		D Convex.	
Φ	r	R	$'r$	$'R$	r	R
6	3.83	3.48	2.5	3.1	3.83	3.48
12	7.66	6.96	5.0	6.2	7.66	6.96
18	11.49	10.44	7.5	9.3	11.49	10.44
24	15.32	13.92	10.0	12.4	15.32	13.92
30	19.14	17.4	12.6	15.5	19.14	17.4
36	22.97	20.88	15.1	18.6	22.97	20.88
42	26.80	24.36	17.6	21.7	26.80	24.36
48	30.63	27.84	20.1	24.8	30.63	27.84
54	34.46	31.32	22.6	27.9	34.46	31.32
60	38.28	34.8	25.2	31.0	38.28	34.8
72	45.94	41.76	30.2	37.2	45.94	41.76
84	53.60	48.72	35.2	43.4	53.60	48.72
96	61.26	55.68	40.3	49.6	61.26	55.68
108	68.92	62.64	45.3	55.8	68.91	62.64
120	76.56	69.6	50.4	62.0	76.56	69.6

In like manner, any number of tables might be computed for the focal lengths of a triple object-glass, where the lenses have given refractive and dispersive powers, and where the radii assumed for one of the lenses are taken at pleasure; but it will be always desireable to fix on a *concave* lens first in a *triple* object-glass, notwithstanding we have shewn that it is better to assume a *convex* one first, where a *double* object-glass is calculated: for by attending to this direction, the optician will find that counteracting aberrations will be within his reach; and though he may fix on radii in the assumed lens that will not be the best in practice, yet, by changing the ratio of the assumed radii, he will find practicable lenses that will answer his purpose. In our tables of triple object-glasses, the numbers come out very convenient for practice; for in each, both sides of the convex lenses have longer radii than either face of the concave has got, so that there will be no point of contact, in the middle of any of the curves, when they are placed contiguous to one another; and in Table IX. there is just difference enough, between the radii of each of the convex glasses, to allow one of them to be reversed, if it is found that the errors of workmanship, or imperfection of the glass, should require such correction, when the object-glass comes to be finally adjusted. Indeed all the surfaces might be calculated to be a little different from one another, and then there would be the option of eight changes in the final adjustment: but if the glass is homogeneal, and the work well performed, it will always be found best to adhere to the positions for which the lenses have had their radii calculated.

Neither is it desireable, in a *good* achromatic object-glass, to use varnish of any description, as has been recommended.

As we have shewn that professor Robison's data, and the calculations founded on them, do not produce curves proper for an achromatic *double* object-glass, we will conclude this part of our subject by examining if his calculations for a *triple* object-glass are any better adapted for practice. In Dr. Brewster's Table V. (Appendix to his edition of Ferguson's Lectures, vol. ii. p. 418.) a thirty-inch triple object-glass is calculated, according to professor Robison's report of the radii used by the London artists, to have $r = 18.84$, (printed by mistake 18.34,) $R = 22.47$, $'r$ and $'R$ each 17.37, and the second convex the same as the first; where, as before, the ratio $m : n$ in the crown is taken as $1.526 : 1$, and in the flint as $1.604 : 1$, and the ratio of the dispersive powers as $1 : 1.65$. If these numbers will make an *achromatic* object-glass, we shall have $1 : 1.65 :: F : 'F$ exactly; *i. e.* the ratio of the dispersive power will also be the ratio of the geometrical focal distances, agreeably both to theory and practice; but we have, by the theorem $\frac{2rR}{r+R}$, $\frac{2 \times 18.84 \times 22.47}{18.84 + 22.47} = \frac{846.6696}{41.43} = 20.495$ for the focus of one convex lens, and therefore $\frac{20.495}{2} =$ 10.247 for the compound focus of the two; also we have the focus of the concave $= 17.37$ in the table, the radii being equal; hence we have as $1 : 1.65 :: 10.247 : 16.90$, instead of 17.37; therefore the object-glass is *not duly corrected* for the *prismatic* aberration. This conclusion, which is intelligible by every common reader, corroborates our former inference respecting the want of achromatism in the double object-glasses made from Robison's calculations; but let us pursue the enquiry a little farther, and see what focal distance will accord with these numbers: the refractive power of the convex being $.604 = a$, we have $\frac{10.247}{2a}$ $= 9.74$ for the *refracted* focus thereof; and the refractive power of the concave being $.526 = b$, we have $\frac{17.37}{2b} =$ 14.38 for its refracted focus, and by our theorem $\frac{'F \times F}{'F - F}$ $= \Phi$, we have $\frac{14.38 \times 9.74}{14.38 - 9.74} = \frac{140.0612}{4.64} = 30.18$, &c. for the focal length of the object-glass; which is much nearer to the proposed length than the focus of the double object-glass was which we before examined. If we calculate this triple object-glass according to our method, as practised by Tulley, we must begin with 16.9 as the proper focus for the concave, of which we disregard the negative sign, as of no importance in our mode of calculating; we shall then have as $1.65 : 1 :: 16.9 : 10.247$, and this ratio must not be compromised, on any consideration, as being the *achromatic* ratio, on a supposition that the refractive and dispersive powers, as above stated, are in natural proportion; then as the radii $'r$ and $'R$ are assumed *equal*, the aberration of the concave will be $1.666 \times T$, and $z = .826$; therefore $\frac{1.666}{.826} = 1.376 = 'A$ corrected; and $\frac{1.376}{1.65} = .834 = A$ of the substituted single lens E, which, as before, is an impossible quantity to be in *one* lens; but this being doubled, will be $1.668 \times T$ for the proper quantity of each lens; or multiplied by 4, will be a proper

proper quantity for the ſum of both the convex lenſes ; then 'T being found $= .136$, and $T = .112$ in each convex, we ſhall have $A = 1.668 \times 2 \times .112 = .1871$ for each convex, and $'A = 1.376 \times .136 = .1871$ alſo, for the concave, and conſequently the ratio of $r : R$ as $1.01 : 1$; then by uſing the proper theorems, as before directed, theſe radii will come out $r = 20.57$, and $R = 20.37$ in each convex, while the concave will have each of its radii $= 16.9$, as originally aſſumed ; and if the diſperſive was great enough for the refractive power, as above ſpecified, not only would the object-glaſs be *achromatic*, but its focal length would be $= 30$. But we find the geometrical $F = 10.24$, and refracted $F = \frac{10.24}{1.056} = 9.696$, and $\frac{'F}{2\,a} = \frac{16.9}{1.198} = 14.107 =$ 'F refracted, and $\frac{'F \times F}{'F - F} = \Phi$, gives $\frac{14.107 \times 9.696}{14.107 - 9.696} = \frac{136.781}{4.451} = 31$ very nearly ; and hence we infer, that the diſperſive and refractive powers are *irrational* in this calculation, and the exceſs in the focal length is double the quantity with theſe two convex lenſes, B and D, to what we found it with one, in a double object-glaſs, in our former examination. We are not however diſpoſed to depreciate the mathematical labours of a man, whoſe memory will always be dear to every lover of ſcience, and whoſe article TELESCOPE in particular has obtained the encomium of an eminent contemporary mathematician ; but we have felt it our duty to point out the ſource of inaccuracy, which, by entering into the data, has affected the reſult of long and tedious calculations, and may have given much trouble to many, as we know it has done to ſome opticians, who have attempted to copy thoſe reſults in practice. The learned profeſſor has indeed ſtated, as he proceeds, that the value of certain appreciable quantities has been neglected, to ſimplify the proceſs ; and if thoſe quantities had affected the focal diſtance more, and the ratio of the radii $r : R$, and alſo that of $F : 'F$ leſs, the reſulting priſmatic and ſpherical corrections might have been more perfect, even with a defect of diſperſive power, than we now find them. We have not room, however, to enter farther into particulars.

From Dr. Brewſter's experiments, made in his "Treatiſe on New Philoſophical Inſtruments," it appears that the *green* ray is not always in the *middle* of the ſolar ſpectrum, and that with rock-cryſtal it is at the oppoſite ſide of the middle from what it is in glaſs ; hence Tulley infers, that if glaſs could be found of the ſame diſperſive power as rock-cryſtal has, the intermediate colours might be corrected as well as the extreme colours ; and that the ſecondary ſpectrum would diſappear. To effect this improvement, the convex lens of rock-cryſtal muſt be at one ſide of the concave of flint, and the convex of crown or other glaſs, with equal diſperſive power to that of the cryſtal, muſt be at the other ſide. This object is worthy of the optician's future conſideration and purſuit.

Celeſtial achromatic Eye-pieces.—We have already explained, in the former part of this ſection, how the focus of two glaſſes, placed at a *given diſtance* from each other, may be aſcertained, and alſo what is the focus of a ſingle imaginary lens that ſhall be equal to them both in *power :* we propoſe therefore preſently to return to the ſame figure, (*fig.* 8. *Plate* XXIV.) in order to ſhew what the advantage will be in point of *diſtinctneſs*, which is as eſſential a quality in an eye-piece as power. But, in the firſt place, let us ſuppoſe in *fig.* 10. the points 1, 2, and 3, ſo many points of an object, of which the image is formed at F, after paſſing through any lens A B ; then as the point 1 has rays iſſuing from it, that fall on every part of the lens, and as theſe rays are differently refracted at different diſtances from the axis, both towards A and towards B, there will be ſeveral images of this point at the focus F, lying contiguous to each other ; but the rays that come to a focus, after paſſing in and near the central part of the glaſs, will form their images very cloſely together, ſo as very nearly to coincide. The ſame will be true of the points 2 and 3 ſeparately conſidered, under the ſame circumſtances, ſo that while the ſingle lens A B continues to produce both priſmatic and ſpherical aberrations, there will be a confuſion or *indiſtinctneſs* in the image, ariſing from a promiſcuous mixture of a number of contiguous and nearly coincident images ariſing out of the ſpherical figure of the lens, as well as fringes of colour ariſing out of the diſperſion of the differently refrangible rays. This indiſtinctneſs is more conſiderable in a lens uſed as an object-glaſs, than as an eye-piece ; becauſe the image formed by it becomes an object to be viewed by means of the eye-piece, and therefore any diſtortion, confuſion, or colouration that exiſts in the image, will be *magnified* by the eye-piece ; and the greater the magnifying power, the greater will be the evil produced thereby. To obviate this conſequence, which will exiſt partially, even when the beſt compound object-glaſs is uſed that art can accompliſh, the ſingle eye-glaſs has been laid aſide, and a ſyſtem of glaſſes ſubſtituted, that will admit of a high power in the eye-piece, without a proportionate increaſe of indiſtinctneſs or of colour in viewing the image. The firſt arrangement of two glaſſes, as a ſubſtitute for one, to be uſed as a celeſtial eye-piece, where inverſion of the object is not material, was calculated and applied by the ingenious Huygens, who, not aware that the priſmatic aberration could be cured by an oppoſition of *diſperſive* powers, according to Dollond's noble diſcovery, deviſed the method of reducing the quantity of ſpherical aberration by *diviſion ;* and the reſult of his inveſtigations was, that two plano-convex lenſes, (which have each but little aberration in their beſt poſitions,) when placed at ſuch a diſtance from each other that their focal points, for parallel rays, might coincide, would have ſuch a compound focus, as would not only greatly increaſe the power, but ſtill more diminiſh the ſpherical aberration. An arrangement of this ſort was put into the hands of W. Molyneux by Mr. Flamſtead in the year 1686, of which Molyneux determined the compound focus, depending on the radii of curvature of the two glaſſes and the diſtance between them, in the manner we have above explained. But the firſt mathematician who gave the *rationale* of the advantage to be derived from a combination of lenſes, as they have reference to the ſpherical aberration, was ſir Iſaac Newton, whoſe method of explaining it Martin has given in his New Elements of Optics, part i. p. 27, thus: "Let N B M (*fig.* 9.) be the ſpherical ſurface of a plano-convex lens N G M B ; C the centre ; C B the radius or ſemi-diameter taken in the axis ; A N an incident ray ; and N K the ſame refracted, cutting the axis produced in the point K. Alſo let F be the focus of parallel rays which paſs through the glaſs infinitely near to the axis : let F D be a perpendicular to the axis in the point F, then will K F be the curve or difference of the focal diſtance of parallel rays which are incident near the axis, and at the diſtance G N, the ſemi-aperture of the lens. This is called the *aberration* of the extreme ray in *longitude*. Again, let any ray (*a n*) be incident on the other ſide the lens, at the diſtance *b* G, the refracted part of this ray, *n d*, will interſect the other refracted ray N D in the point Q, at the perpendicular diſtance Q O from the axis. This

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is called the *lateral* error, or the *aberration* in *latitude*. It is evident from the figure, that as the ray $(a\,n)$ approaches the extreme ray A M, the point of interſection Q will approach the axis; and when $a\,n$ coincides with A M, the point Q will coincide with the point K in the axis; and it is as obvious that the point Q will coincide with F, when the ray $(a\,n)$, approaching the axis a B, at laſt becomes coincident with it: therefore there is one poſition of the ray $(a\,n)$, in which it will cut the ray N D in a point Q, which will make Q O a *maximum*, or the greateſt of all. If we take the arc $B\,m = B\,n$, and B M = B N, the rays incident on m and M will interſect in the point P on the other ſide, and ſo make P Q = 2 Q O; and it is alſo plain, that all the rays which fall on the lens between N and M are refracted through the ſpace P Q. Now P Q is the diameter of the *leaſt circular ſpace* poſſible, in which *all the rays* can be congregated, becauſe there will be ſome ray $(a\,n)$ that will meet the extreme ray N D, at the diſtance $Q\,O = \frac{1}{2}\,Q\,P$ from the axis. Hence it follows, that the circular ſpace is the *focus*, or place of the *image* of an object, belonging to parallel rays incident on the lens N M. Further, by reaſon of ſimilar triangles K O Q, K F D, and N G K, we have Q O : K O :: D F : K F :: N G : G K. But it is demonſtrable, (ſee Philoſ. Britannica, 3 edit. p. 58. art. 14.) that when Q O is greateſt, then $K\,O = \frac{1}{4}\,K\,F$, and alſo that K F is always $\frac{9}{2}$ of G B, the thickneſs of the lens; ſo then $K\,O = \frac{9}{8}\,G\,B$, and conſequently $G\,K : G\,N :: \frac{9}{8}\,G\,B : Q\,O$, whence $\frac{9\,G\,B \times G\,N}{8\,G\,K} = O\,Q$; whence P Q, the diameter of the circle of aberration, is known for any given lens.

"It has been demonſtrated, that the error P Q will always be proportioned to $\frac{N\,G^3}{B\,C^4}$; ſo that when the radius is given, the error will be as the cube of the aperture directly: and when the aperture is given, the ſaid error will be as the ſquare of the radius inverſely. It has alſo been demonſtrated, that when the convex ſide of the lens N B M is turned towards parallel rays, the error K F will be but $\frac{7}{6}$ of the thickneſs of the lens G B, and therefore near four times leſs than in the other caſe; for $\frac{9}{2}\,G\,B : \frac{7}{6}\,G\,B :: 54 : 14$, which is almoſt as 4 to 1.

"It has been further demonſtrated, that the aberration P Q is as the ſquare of the ſine of refraction (the ſine of incidence being unity) in all media of different refractive powers: thus if a lens of the ſame focal diſtance and aperture were made of glaſs and water, and ſuppoſe thoſe ſines in glaſs to be as $m : n$, and in water as $'m : 'n$; then will P O in the glaſs lens be to the ſame in the water lens as $m^2 : 'm^2$, or the area of the circles of aberration, and of courſe the indiſtinctneſs of the object will be as the refractions m and $'m$ of the media.

"Whatever has been obſerved with regard to convex and plano-convex lenſes, will hold good in concave and plano-concave ones. And in both ſorts, it is ſuppoſed that all of them have the ſame focal diſtances, apertures, and thickneſſes, while we are comparing their reſpective aberrations.

"Hence it is very evident, that if rays proceed from any point, as (a) at an infinite diſtance to a lens N M, (*fig.* 10.) the image of that point will not be a point, but the area of a circle, whoſe diameter is P Q; and, therefore, that point cannot be diſtinctly repreſented, but will be rendered indiſtinct and confuſed in proportion to the area of the ſaid circle of aberration in the lens, as it is the image of this circle (or dilated point) that is impreſſed on the retina, and excites the idea of the point in the mind.

"Hence it appears alſo, that the points in the ſurfaces or ſubſtances of bodies cannot be perfectly and diſtinctly ſeen, as each of them will be dilated into a ſenſible area; and ſuch as are contiguous, as 1, 2, 3, will have their confuſed images all blended together nearly in the ſame ſpace, *viz.* in the circle of aberration, the diameter of which is P Q.

"Therefore the ſtars, which as to ſenſe are only lucid points, will appear to have ſome magnitude (and not as points) in the focus of the beſt ſort of teleſcopes, even ſuppoſing there were no other cauſe of confuſion or indiſtinct viſion, beſides what reſulted from the ſpherical figure of the lens.

"Now, if the error from a ſpherical ſurface, or, which is the ſame thing, the *indiſtinctneſs* of viſion, depending on, and commenſurate with, the ſpherical aberration of a lens, is as the ſquare of radius inverſely; the *diſtinctneſs* of viſion, on the contrary, will be as the *ſquare* of the *radius directly*; and, therefore, if, by means of two glaſſes, we can get the view of an object, where the radii of the glaſſes bear a greater proportion to their reſpective apertures, than the radius of a ſingle glaſs of equal magnifying power does to its aperture; it is evident the diſtinctneſs of that view will be promoted in proportion to the ſquare of that ratio.

"For example, ſuppoſe (*fig.* 8.) $F - D = y$, or O F, to be the focal diſtance of the lens G H, ſo that the focus of each of the lenſes N M and G H falls on the ſame point F; then, by the proper theorem, we have $x = \frac{1}{2}\,F$, or $Q\,f = \frac{1}{2}\,C\,F$: alſo, ſince in this caſe we have $F : y :: x : f$, therefore $f = \frac{1}{2}\,y$, or $O\,f = \frac{1}{2}\,O\,F$. Now, ſince we have the ſame optic angle G F O by both the glaſſes, as by the ſingle one E E, the ratio of the radius O F to the aperture G O, or of the radius C F to the aperture N C, is double the ratio of $O\,f$ to O G, or of the radius $Q\,f$ to the aperture E Q, and therefore the *diſtinctneſs* of viſion by *both* the lenſes is *four times* greater than that by the *ſingle* lens E E.

"The ſame thing may be demonſtrated from the conſideration, that the aberration P Q is, in the ſame glaſs, always proportioned to the cube of the ſemi-aperture E Q, or ſine of half the optic angle $E\,f\,Q$; and that in ſmall angles (as in the glaſſes of teleſcopes, &c.) the ſine E Q is nearly as the angle $E\,f\,Q$. The aberration, therefore, being as the cube of that angle, it is plain, if we make the ſame angle by two refractions inſtead of one, the quantity of the aberration will be greatly leſſened, ſince the ſum of the cubes of the parts will be much leſs than the cube of the whole; and when the parts are equal, the *ſum* of the cubes of *each* will be but a *fourth part* of the cube of the *whole*. Thus, if the whole angle $E\,f\,Q$ be as 1, the cube thereof is 1; but the half is $\frac{1}{2}$, the cube of which is $\frac{1}{8}$, and twice that, $\frac{2}{8} = \frac{1}{4}$, which is as the aberration ariſing from the two halves, and is therefore but a *fourth part* of the whole.

"This is evidently the caſe when the optic angle $G\,f\,O$ $(= E\,f\,Q)$ is made by two refractions, by the two lenſes N M and G H, ſo poſited, that the focus of each may fall on the ſame point F; for then the angle $G\,f\,O = L\,G\,f$, which is compoſed of the two angles L G F = T N F = G F O, (by reaſon of the parallel lines T N, L G, and F C,) which is the part made by the lens N M. Alſo the angle $F\,G\,f$ is the refraction of the ray N G, or ſecond refraction of the ray A N; and ſince, in the preſent caſe, $O\,f = f\,F$, and $O\,f$ in ſmall angles is equal to $G\,f$ nearly; therefore the angle G F O is equal to the angle $F\,G\,f$ very nearly, thoſe angles being in the ſame ratio with the equal lines $G\,f$ and $f\,F$, when they are not large; and the optic angle $G\,f\,O = G\,F\,O + F\,G\,f$; conſequently the aberration P Q is but a fourth part ſo great by the two lenſes N M and G H together, as it is by lens E E alone.

"But to render this theory general for any poſition or form of of the lenses N M and G H, it is evident, since the aberration is lessened by dividing the optic angle, that the *distinctness* of vision will be thereby promoted; and because each of the angles contribute thereto in proportion to its magnitude, the joint effect of both parts, or angles G F f and f G F, will be as the product or rectangle under both, or as the rectangle of the lines O f and f F; but, according to our former notation, $Ff = F - D - f$; and $Of = f$; consequently $Ff - Df - ff$ will be every where as the distinctness of vision by the two lenses, above that of a single lens of the same magnifying power.

"Let the degree of distinctness thus obtained be represented by $G = Ff - Df - ff$; when this is a *maximum*, or the greatest possible, the fluxions thereof will be nothing; *viz.* $Ff - Df - 2ff = 0$, whence $F - D = 2f$; or $FO = 2Of$; that is, $Of = f$F, or the angle G Ff = fG F, in the *best* position of the lenses, as before demonstrated.

"Consequently, since in that position we have shewn the distinctness of vision to be four times as great as by a single lens, this will be the whole effect of a combination of two glasses, and it may be shewn that three glasses will produce nine times the distinctness, and so on in proportion to the *square* of the *number* of *glasses*; but then if we consider the evil to be remedied is but small, and the damage we sustain in *loss* of *light* and irregularity of refraction through so many lenses, we may soon make the remedy worse than the disease; and every thing considered, it appears probable that two lenses are better than a greater number, particularly for a celestial eye-piece."

By similar reasoning we may explain the advantage of any other eye-piece, as Boscovich's, when we know the radii, the position, and the distance of the lenses that compose it. The Huygenian eye-piece, which we have said has the foci of the two plano-convex lenses, as 3 : 1, at the distance of 2, with 1 next the eye, and the curves exterior to the eye, is peculiarly adapted for a reflecting telescope that has only the spherical aberration; but for a refracting telescope, though achromatic, a little deviation from this form was found necessary to correct the remaining prismatic aberration also. On enquiring of the best opticians, we learn that the final adjustment of distance between two lenses, in a celestial achromatic eye-piece, is made from trials in the tube of the telescope it is intended for; because this distance, and indeed the ratio of the radii of the two lenses, will greatly depend on the state of convergence of the rays, when they are incident on the first surface of the interior glass; and this state will depend on the focal length of the telescope, conjointly with the aperture, and achromatism of the object-glass: so that it would not answer any good purpose to give a table of dimensions, which might mislead rather than assist the young optitian in his practice. The form of an achromatic celestial eye-piece, composed of two plano-convex lenses, is represented in *Plate* XXVIII. *fig.* 13, where the distance exceeds the focal length of the lens 1 next the eye, and in which consequently the image is between the lenses; which is the usual construction when the heavenly bodies are viewed without any reference to the measurement of angles; but as the place of the image will vary in some degree with a change of distance, in taking terrestrial measures, there is another form, commonly called Ramsden's, which is more suitable for micrometrical measurements; because the image, being beyond both lenses, (counting from the eye,) keeps its place, as it regards any scale, wire, or spider's line, that may be used in a micrometer: this form is given in *fig.* 14. of the same plate, and has the position of the interior face reversed, so that the plane face may be parallel to the contiguous image to be viewed: these two lenses are sometimes alike, and always nearly so, in focal length; and the distance between them is less than the focal length of either by such a quantity, that the compound focus falls just beyond the flat face of the interior lens 2, where the image and scale, wire, or line coincide in due adjustment for vision. This form has likewise the advantage of reduced aberration, and is sometimes called the *positive* eye-piece, in opposition to the other form, which is therefore by some astronomers called the *negative* eye-piece. This positive eye-piece is also best adjusted to the instrument of which it is destined to form a part; and either lens may exceed the other in focal distance in a small degree, as circumstances may require.

When this eye-piece is used with a transit instrument, zenith sector, equatorial, or circular instrument for taking altitudes, it is convenient to put a diagonal reflector between the lenses, and to have the eye-lens in the *side* of the tube, for the purpose of taking observations in high altitudes, or even in the zenith. This form is seen in *fig.* 15. of the same plate, and is called a prismatic eye-piece.

The *terrestrial eye-tube* is that which gives an *erect* position to the object, as viewed in a telescope of the refracting sort, to which only it is applied, though it might be applied to the Cassegrainian reflector with equal advantage. It has been seen that, originally, this eye-piece was composed of three similar lenses, placed from each other respectively at the sum of their focal distances, as in *fig.* 3. *Plate* XXV. In this arrangement the magnifying power is not increased, unless the lens, T U, nearest to the eye has its focal distance diminished more than the rest: but the aberration that would arise from the figure of the field-lens C D, is diminished about *nine* times, if we disregard their thickness, *viz.* as the square of the number of glasses employed between the image I M, and the eye at K; consequently, the advantages derived from this eye-piece of Rheita are two-fold; for, first, it gives an erect position to the object; and, secondly, it greatly diminishes the quantity of spherical aberration, and consequently produces a corresponding distinctness; but the *power* of this eye-piece is *simply* that of one of the three lenses. To effect an increase of power at the same time that the two preceding advantages are preserved, various arrangements of three, four, and even of five lenses, have been made for the purpose of constructing a good terrestrial achromatic eye-tube; and the ingenuity of a Dollond and of a Ramsden has been exercised successively to accomplish the desired object. These arrangements, so far as the diminution of spherical, and even of prismatic aberration was concerned, have been understood and explained; but the total power arising out of a number of lenses differently shaped, and placed at different *distances* relatively to each other, has not been so clearly explained; and it should seem, from the manner in which such arrangement has been described by different authors, that the result has generally been ascertained practically rather than theoretically; which indeed must in some degree be the case whenever *power*, or, which is the same thing in effect, whenever actual focal distance, simple or compound, is to be accurately determined. We will not proceed upon the intricate plan of tracing the passage of a refracted pencil of rays through various lenses of different refractive qualities, and placed at various intervals, until they arrive at their last focus, or place of the image of a distant radiant body; neither do we propose to follow the more familiar but less instructive method of simply giving in figures the radii and relative distances of three, four, or five lenses, that shall compose an achromatic eye-tube; but, avoiding each extreme, we shall describe the most improved eye-tube for erect position, upon the principles of a *compound microscope*, which instrument this tube

really

really is of itself, and that of the best construction. We have reserved an account of the *theory* of the *compound microscope* until we arrived at this article, on purpose to shew the intimate connection that it has with the refracting telescope, which, it will be seen presently, is also the case with a compound *reflecting* microscope, that composes a portion of both the Gregorian and Cassegrainian telescopes. First, let $a\,b$ (*Plate* XXV. *fig.* 8.) be considered as an object to be magnified for examination by a compound microscope of the simplest construction; let $d\,f$ be the small object-glass, of which i is the solar focus; then as the radiant object $a\,b$ is at a small distance from the lens $d\,f$, beyond its solar or principal focus, the incident rays coming from it will converge slowly after passing through this lens, and consequently the conjugate focus at the other side of the lens will be remote, as at A B, where an inverted image, A B, of the object $a\,b$ will be formed; and if the object is brought nearer to the solar focus i, the image A B will recede with a linear amplification, for it always subtends the same angle at e, the centre of the object-lens, that the object subtends at the same point; it is therefore obvious, that the linear amplification of the image, compared with the length of the object, will be as their respective distances from the object-lens, *viz.* as $\frac{C\,e}{c\,e}$; and, consequently, the farther the image recedes, that is, the nearer the object is brought towards the solar focus i, the more it will enlarge, which principle is the basis of both the magic lantern, and solar as well as lucernal microscope. Let us call the ratio of the object to its image 1 : 5, as in our figure; then if D F be a double convex eye-glass, placed so that this image, A B, may be in its principal focus, the rays of light coming from it, now considered as a *radiant*, will, by passing through this lens, become *parallel*, in which state they will enter the eye at I, and after converging to a new focus on the retina, will there make a picture of the image of the object, but in a reversed position. The principal pencil of rays coming from d and f of the object-lens, will meet at C, the centre of the image, and diverge till they come to the eye-lens D F, where they are made parallel, and where they define the size of the eye-hole in the cap of the eye-piece; while the angle of vision will be G E H = B E A. In this situation, the image A B is magnified by the eye-glass inversely as its focal distance, that is, as many times as F C is contained in e C; for the visual angle B E A, subtended by B A, exceeds the angle B e A, subtended by the same line B A; and, consequently, its opposite angle $b\,e\,a$, subtended by the object, is in the ratio of $C\,e : C\,E$; and also, when $C\,E = c\,e$, in the ratio of $C\,e : c\,e$; and the whole amplification will consequently be by compounding the ratios $= \frac{C\,e^2}{C\,E \times c\,e}$. But in this construction the field of view is small, though the power is great; and the colorific effect of the prismatic aberrations, as well as the indistinctness and distorsion of the figure of the object, are fully experienced. To do away these impediments to a pleasing view of the object, a second lens was introduced into the eye-piece, as M N, in *fig.* 11. *Plate* XXIV., the original intention of which was, principally, to enlarge the *visible area*, or circle of vision, which it did effectually, while, at the same time, it diminished the power, and in some measure the spherical aberration, though the latter advantage does not seem to have been contemplated; and in this state the compound microscope remains in the present ordinary construction, one of the three lenses, $d\,f$, being the *object-lens*; the second being the *amplifier* M N; and the third the eye-glass G H. Now if we compare the compound celestial eye-piece in *fig.* 8, before described, as having the same power with the single imaginary lens E E in the same figure, we shall see that the only difference in the two arrangements is, that the image in *fig.* 11. is between the lenses, but in *fig.* 8. beyond them both. We have demonstrated the advantages of the combination in *fig.* 8, and have shewn that those advantages will continue, if the image be formed between the lenses; and also that making the distance between the glasses to exceed the focal distance of the eye-glass, will bring the image into this intermediate situation, as is actually the case in the best achromatic telescopes, with both the celestial and terrestrial eye-pieces; particularly when the wire, or cobweb micrometer, is not used. If then we consider the object $a\,b$ in *fig.* 11. to be the small or *primary* image of a distant object, formed in the focus of the achromatic object-glass, the image A B will become the image of an image, or *secondary* image, in a contrary position; and this is the one actually viewed in the terrestrial tube of a telescope. Let us in the next place conceive the terrestrial tube to have only the three glasses that compose the arrangement of the compound microscope, and it is obvious that the image $a\,b$ will be rendered as distinct, and as much enlarged in it, as the object $a\,b$, of similar dimensions, would be in the like compound microscope. Thus have we a terrestrial eye-piece with an arrangement of *three* glasses, which magnifies greatly, and, so far as the pair of eye-glasses are concerned, is achromatic; but with respect to the object-lens $d\,f$, (which might indeed have been made achromatic by a balance of contrary *dispersive* powers, on Dollond's plan of an object-glass for a telescope), there remained room for improvement; and this has been effected by the same principle of *division* of the aberrations, that contributed to the improvement of the celestial eye-pieces with two lenses.

Plate XXVIII. *fig.* 15. shews a combination of two plano-convex lenses, that perform the office of one double convex lens in a compound microscope, or terrestrial eye-tube, in which the lens A is placed next the object in a microscope, or image in a telescope, with its plane face outwards, and the lens B is placed at a distance from A, that exceeds the focal length of either of the two lenses, and that is also greater than the distance between the two eye-glasses; but the proportions vary with circumstances. In the patent micrometrical telescope of Harris, in which the eye-tube is $7\frac{1}{4}$ inches long, the focus of the eye-glass is $1\frac{1}{8}$, that of the field-glass, or amplifier, $1\frac{7}{8}$, and the distance $2\frac{1}{4}$; while the lenses of the eye-end are both menisci; the outermost lens having a focus of $1\frac{1}{4}$, and the inner lens one of 1.2 or $1\frac{2}{10}$, at a distance of $2\frac{1}{2}$. This novel form of a terrestrial eye-tube is found very good for a short telescope, and answers equally well for any variable length of focal distance of the patent object-glasses; and when the telescope has its focal length invariable, the difference between each separate pair of lenses may be varied at pleasure, and then the *power* of the whole combination will vary with the variations of this distance. In all other telescopes of the refracting kind, the two eye-glasses, as well as the pair of lenses at the remote end of the terrestrial tube, near the primary image, are all plano-convex, as we have shewn; and that combination which suits a short telescope, will generally suit a long one; but frequently that which is made purposely for a long one, will not suit a short one. A very good 12-inch terrestrial eye-tube, for a day and night telescope of two feet length, that we lately examined, has the proportions in the eye-tube somewhat different from telescopes with larger power; the eye-lens has a focus of 2 inches; the amplifier $3\frac{1}{2}$, at a distance of 3 inches; and the third and fourth lenses are respectively

respectively $3\frac{1}{2}$ and 3, at a distance of $4\frac{1}{4}$; the fourth lens being that next the primary image. The convex portion of all the four lenses is turned to the centre of the tube in all the terrestrial eye-pieces, except when Ramsden's, or the positive eye-piece, is substituted for the common or negative one. Another good day eye-tube, of $9\frac{1}{4}$ inches length, has the first, or eye-lens, $1\frac{1}{3}$; the second, or amplifier, 2, at a distance of $2\frac{1}{4}$; the third 3, reversed as usual; and the fourth $2\frac{1}{3}$, at a distance of $3\frac{3}{8}$. When a *great power* is wanted, the *celestial* eye-piece does very well for the eye-end of the terrestrial tube; and it would be an advantage to every good telescope, if they were fitted for this purpose by an *adapter*, such as we shall have occasion to describe in our fifth section; for then each telescope would have a great variety of powers; and if the celestial eye-pieces were screwed into a separate tube, instead of a simple adapter, the power might be varied at pleasure, in any proportion, by altering the distance between the two separate pairs of lenses, as we shall hereafter shew has been done by the writer hereof, in his micrometrical measurement of distances in the last section of this article.

But to resume the consideration of our compound microscope (*Plate* XXIV. *fig.* 11.), we now see that the lenses C D and *d f combine* in such a way, that the object *a b*, instead of being a little out of the focus of the single lens *d f*, is a little way out of the *compound* focus of the two; and a circular piece of metal, perforated in the centre, called a diaphragm, is fixed in the tube, at the separate focus of the lens *d f*, to exclude the coloured rays arising from the prismatic dispersion of this lens; and then the rays of least dispersion, that pass through this hole, enter the lens C D near its centre, and, therefore, have afterwards but little spherical aberration; on which account it is obvious, that the image in the microscope, or secondary image in the telescope, will be *distinct* and *colourless;* and it is very extraordinary, that while improvements are daily meditated in every mechanic art, the addition of a second lens, to diminish the aberrations, is not yet made to the object-end of the compound microscope, though the same thing has been done in the terrestrial eye-tube of an achromatic telescope, which not only answers precisely the same purpose, but is in fact itself an *achromatic compound* microscope.

After having gone through our explanation of the practical forms of both the double and triple achromatic object-glasses, and also of the various achromatic eye-tubes, which we have endeavoured to render intelligible to young opticians, we shall finish this long section by giving a short account of the different arrangements of the glasses of an achromatic telescope depending on these various forms, as we have already done with respect to the old telescopes, represented by *figs.* 1, 2, and 3. *Plate* XXV. *Fig.* 4. shews the arrangement of a double object-glass in conjunction with a negative eye-piece of two lenses, with the image between them, the power of which is simply the compound focal length of the object-glass A, divided by the compound focal length of the eye-lenses B and C. This arrangement is that of the best achromatic telescope with a celestial eye-piece, and, being shorter than the terrestrial telescope, is more conveniently managed. When the eye-piece has a slip of graduated mother-of-pearl, contrived by Cavallo, and divided by Mr. Barton, at its diaphragm, it makes an useful micrometer for measuring small angles: and when this eye-piece is taken out, the wire or cobweb micrometer may be screwed in, instead thereof; and then, if the telescope is of a good size, an angle within its reach may be measured with great accuracy. With this celestial telescope the object is inverted, and the light will be directly as the area of the aperture, and inversely as the magnifying power. *Fig.* 5. gives the arrangement of the lenses in a terrestrial achromatic telescope with a triple object-glass; in which A is the object-glass, B the eye-lens, and C the amplifier, or field-lens of the eye-piece B C; D is the third lens, that diminishes the aberration of the fourth lens E, which, in a compound microscope, is called the object-lens. This is considered the best construction of a terrestrial telescope. The power is equal to the compound focus of the object-glass, divided by the compound focus of the eye-piece B C, when the quotient is multiplied by the first part of the microscopic power of the lenses E, D, which part will vary with the distance between the two pairs of lenses. The arrangement in *fig.* 6. differs from that in *fig.* 4. only in the eye-piece, which has here the image beyond it. Also the arrangement in *fig.* 7. differs in like manner from that in *fig.* 5; and what we said respecting power and light of those lenses, is equally true of these. The eye-pieces of the telescopes in *figs.* 6. and 7. are those of the wire and cobweb micrometers.

3. *Theory of cata-dioptric Telescopes.*—When the image of a distant object is formed in any telescope entirely by *reflected* rays meeting at a focus, this image is properly *catoptric* (from the Greek word κάτοπτρον, *speculum*); but when it is formed partly by reflection and partly by refraction of the rays, in coming to a focus, it is then *cata-dioptric*, that is, both catoptric and dioptric; and as the image cannot be viewed without an eye-glass, all reflecting telescopes are promiscuously called *cata-dioptric.*

Before we describe any of the different constructions of a telescope where reflection is concerned, we will explain the principles on which the catoptric theorems are founded, and give a small table of those theorems that determine the focus under different circumstances, as we have already done with respect to the dioptric theorems; at the same time referring our readers for farther information on this subject to the articles CATOPTRICS, MIRROR, and SPECULUM. In *Plate* XXVI. *fig.* 8. *Astronomical Instruments*, let the curve G E be considered as a portion of a convex speculum, formed from the centre C, and C A or C E its radius; then suppose D A to be a ray of light proceeding from D, the radiant point, in the axis of the speculum, and falling on the point A, from whence it is reflected in the direction of the line A c, tending in a contrary direction to a point F, its *virtual focus*, in the axis of the speculum behind the vertex E: then put D E = d; C A or C E = r; C F = z; and F E = $f + z = r$ = C E. Now if we suppose the point A to be very near to E, a point in the axis, the angles at D and C will become very small, and will, consequently, have the same proportion to each other as their opposite sides A C and A D have; but A C = A E, and D A may be taken = D E without any sensible error; hence there will be this analogy, A D C : A C D :: C E : D E :: r : d. Produce now C A to I, and I A will be perpendicular to the face of the speculum in A, the point of reflection; and, therefore, the angles D A I and I A ϕ will be equal. But D A I = ∂ A C, and I A ϕ = C A F, as being respectively opposite, therefore ∂ A C is equal C A F: also ∂ A C = A D C + A C D = $r + d$, and consequently the angle C A F = $r + d$. Again, in the triangle C F A, when the point A is near the axis at E, the angles at A and C will be very small, and will have the same proportion to each other as their opposite sides F C and F A, and the angle F A C : F C A :: F C : F A; but in this case F A may be esteemed = F E, and therefore we have F A C : F C A :: F C : F E :: z : f. But we have seen that the angle at C is as D A or D E, that is, as d, and

d, and also the angle F A C as $r + d$; therefore we have as $f : z :: d : d + r$; and by composition of ratios, $f + z : f :: 2d + r : d$; but $f + z = r \because r : f :: 2d + r : d$; then by multiplying the extremes and means together, we have the equation $dr = 2df + fr$, and dividing by $2d + r$, there results the theorem $\frac{dr}{2d + r} = f =$ EF. This may be considered as the *fundamental theorem* in *catoptrics*, from which the focus may be determined in any speculum, concave, convex, or even plain, whether the rays fall on it diverging, parallel, or converging; and from a due variation of the symbols and signs, as the case may require, we have all the variety of theorems for finding the focus contained in the subjoined table.

TABLE for finding the Focus of Rays reflected by any Speculum.

Rays.	Convex.	Concave.
Diverging -	$\frac{dr}{2d + r} = f.$	$\frac{-dr}{2d - r} = f.$
Parallel - -	$\frac{r.}{2} = f.$	$\frac{-r}{2} = f.$
Converging -	$\frac{-dr}{-2d + r} = f.$	$\frac{dr}{-2d - r} = f.$

To illustrate the utility of this little table, let it be required to determine the respective foci of two specula, both ground and polished, on tools of 30 inches radius, when the radiant object is placed at 300 feet distance, one speculum being convex, and the other concave? In the first place, as the distance is less than infinite, the rays will come diverging from a luminous point; and, therefore, with respect to the convex speculum, we must use the theorem $\frac{dr}{2d + r} = f$, which in figures will stand thus, $\frac{300 \times 2.5}{2 \times 300 + 2.5} = \frac{750}{602.5} = 1.245$ feet, or 14.94 inches for the required focus; but for the concave speculum, the theorem $\frac{-dr}{2d - r} = f$ (or $-f$, because the focus and centre of the curve are on the same side of the speculum) will give us these numbers, *viz.* $\frac{300 \times 2.5}{2 \times 300 - 2.5} = \frac{750}{597.5} = 1.255$ feet, or 15.06 inches for its focal distance; and in like manner may the proper focus be determined for any other radius and distance, however the rays may be circumstanced when they fall on the speculum: whenever they come converging or diverging from a first to a second speculum, the focal point, real or virtual, must be considered as the radiant, and its distance reckoned accordingly.

These theorems, however, imply that the speculum is already made, whereas in many practical cases, the focus is first assumed, and the proper radius of convexity or concavity is required, or, which is the same in effect, the radius of the tool is required that shall be proper for forming the requisite curve. For instance, let it be required to form a tool of such a radius, that an image of any very remote object may be formed, by a speculum ground and polished to its dimensions, at the distance from its reflecting surface of just 18 inches? In this case, the rays must be considered as parallel, because the object is remote; and, indeed, it is always for a remote object that the curve of a large speculum is formed; consequently the theorems $\frac{r}{2} = f$, and $\frac{-r}{2} = f$, or $-f$, will be suitable for the required purpose, in both which $2f = r$; therefore $18 \times 2 = 36$ will be the proper radius of either the convexity or concavity of the tools to be used. If the ray had been diverging, and the focus *affirmative*, or behind the speculum, for a convex speculum the theorem arising from transformation would have been $\frac{2df}{d - f} = r$; and for a concave $\frac{2df}{f - d} = r$; but in the case of a negative focus, or focus before the speculum, the former would have been $\frac{-2df}{d + f} = r$, and the latter $\frac{-2df}{-d - f} = r$. In like manner, the distance may be determined from the radius and proper focus being given; for, supposing the focus affirmative, with a convex speculum, the transformed theorem for diverging rays will be $\frac{rf}{r - 2f} = d$, and with a concave $\frac{fr}{2f + r} = d$: but when the focus is negative, the former will be $\frac{-fr}{r + 2f} = d$, and the latter $\frac{fr}{2f - r} = d$. Hence, when any two of the terms f, r, and d are given, the third may be readily determined.

Thus, in the case of a convex speculum with diverging rays, if we put $d = r$, we shall have $\frac{r}{3} = f$; when $d = \frac{1}{2} r$, then $\frac{r}{4} = f$; when $d = \frac{1}{3} r$, then $\frac{r}{5} = f$; and when $d = \frac{1}{4} r$, then $\frac{r}{6} = f$: from which results we see, that the points D and F both approach the speculum in a regular manner, till at last they will coincide at its vertex; and the same will be the case with a concave speculum, when the rays are converging, except that the focus is negative, or on the same side with the centre of convexity. Also, when a convex speculum is used with converging rays, or a concave with diverging, when $2d = r$, f will be infinite; or, which is the same thing, the rays will be reflected parallel, as is the case in reflecting lamps; and, generally speaking, the focus of any concave or convex speculum may be made to fall in a given point, accordingly as the radiant object is made to approach to or recede from its principal focus with parallel rays; and wherever the focus is made to fall, there an *image* is formed of the object by reflection, in the same wonderful manner as we have had occasion to mention before, when speaking of its formation by refraction. Likewise the connection between D, the radiant point, and F, the focus, is so intimate, that they may at any time change places without error; that is, when D is the radiant, F will be the focus; but if F is taken as the radiant, then D will be the proper focus in all cases.

In order to shew what proportion the length of an image, formed in the focus of reflected rays, will bear to the length of of the object which it represents, let D E (*fig.* 9.) be a portion of a convex speculum, C its centre, V the vertex, O B an object, and I its image; and let it be required to find the proportion that the object, or line B O, bears to the image, or line I M. From the centre C, let the perpendicular C A fall on the object or radiant; and from its extreme points O, B, draw O C and B C, to meet the speculum in the points D and E; and do the same in *fig.* 10, where the curve D E represents a concave speculum: then the line A V will be the axis, in some part of which the rays proceeding from the points O and B will meet, and the points of intersection will be the foci respectively. From O, let a ray O V pass to the vertex of the speculum, so as to make the $\angle$ F V A = $\angle$ O V A, then will V F be the reflected ray, which tending to the point I, in the axis C O, shall there form the image of the point O of the radiant. In like manner, the ray B V will be reflected in the direction V G, and intersecting the axis C B in M, will there depict the point B of the said radiant; and thus all the intermediate points lying between O and B will be represented between I and M, and a complete image of O B will be formed at I M. If we suppose the object at a great distance, and consequently small, the arc E D of the speculum will be very minute, and not sensibly different from a right line, and consequently will be parallel to the radiant B O, because C A is perpendicular to both B O and E D. Also, since the distances O D, A V, and B E, are very nearly equal, from their contiguity, it is plain that the focal distances D I, V *a*, and E M, will also be nearly equal; and, therefore, the image I M will be very nearly a right line, and parallel to the radiant O B, as well as perpendicular to C A.

Now from the nature of reflection, we have $\angle BVA = \angle AVG = \angle aVM$; therefore, $\angle OVA + BVA = \angle aVI + aVM$; namely, $\angle OVB = IVM$; so that the radiant, or object B O, and its image I M, are seen under the same angle from the vertex of the speculum. But the triangles A V O and *a* V I are similar, for the $\angle$ O V A = *a* V I, and the angles at A and *a* are both right angles; therefore, $VA : Va :: AO : aI$. For the same reason, $VA : Va :: AB : aM$; and $VA : Va :: OA + AB : Ia + aM :: OB : IM$; or, in words, "the distance of the object is to the distance of its image, from its vertex V, as the length of the object is to the length of the image."

From the analogy here deduced, it is easy to form theorems, that shall determine either *d*, *f*, or the proportion O : I, when O is the length of the object and I of the image, when the two others are given. For we have given $O : I :: d : f$, and consequently $\frac{Id}{O} = f$; but our fundamental theorem was $\frac{dr}{2d + r} = f$, consequently $\frac{Id}{O} = \frac{dr}{2d + r}$, and so $2dI + Ir = rO$; and $2dI = Or - Ir$; consequently for a convex speculum, the theorem will be $\frac{Or - Ir}{2I} = d$; and for a concave, where *r* is negative, it will be $\frac{Ir - Or}{2I} = d$. But if the focus be required to be negative in a convex, the theorem will be $\frac{-Or - Ir}{2I} = d$; and in a concave, where *r* and *f* are both negative, it will be $\frac{Or + Ir}{2I} = d$. If *r* be required in a convex speculum, when *d* and O : I are given, the theorem will be $\frac{2Id}{O - I} = r$, and in a concave $\frac{2Id}{I - O} = r$; but if the focus is required to be negative, the first will be $\frac{-2Id}{O + I} = r$; and the second $\frac{2Id}{O + I} = r$.

Lastly, when *d* and *r* are given, to find O : I, we shall have this analogy for a convex speculum $O : I :: 2d + r : r$; and for a concave, $O : I :: r - 2d : r$. But if the focus be negative, for a convex, it will be $O : I :: -2d - r : r$; and for a concave, $O : I :: 2d - r : r$; so that, as we have said, when any two of the three terms are given, the other may be determined by calculation. By way of exemplification, let it be required to find the radius of a concave speculum, that shall make the image of an object, placed at 100 feet, as 1 : 60, in front of the speculum. Now *f* being in this case negative, we have the theorem, as before specified, $\frac{2Id}{O + I} = r$, or, in figures, $\frac{2 \times 1 \times 100}{60 + 1} = \frac{200}{61} = 3.28 = r$, nearly; or if *r* be given, and *d* required, the theorem $\frac{Or + Ir}{2I} = d$ will give $\frac{\overline{60 \times 3.28} + \overline{1 \times 3.28}}{2 \times 1} = \frac{200.08}{2} = 100.04 = d$; and if 3.28 had been the *exact* radius, the distance would have come out exactly 100. If the image and object had been given equal, they would both have fallen exactly at the centre of concavity of the mirror; which coincidence affords a ready method of determining the radius of concavity of any speculum, by means of a luminous point used as an object, and brought so that its image will exactly coincide with it. It is hardly necessary to add here, that a concave speculum forms an *inverted* and magnified image; and that a convex one makes it erect, and at the same time diminishes it.

We have before shewn how the aberration of the rays of light may be calculated, when reflected to a focus by a speculum of a spherical figure, when the rays are parallel before they suffer reflection; and it has been demonstrated, that for such rays a parabolic curve is the best suited for correcting such aberration, particularly when the image is formed by only one reflecting surface; but when there is a second or small speculum, either concave or convex, employed in forming a secondary image, or in assisting to form the primary one, a parabolic curve will not be the best for correcting the aberration of the rays; because each speculum will have its own aberration; and the practical optician can employ his skill in producing suitable specula for counteracting each other's errors, with respect to the united effect of their separate aberrations, better than the calculating theorist can pretend to direct; for the moment he screws his eye-tube alternately out and in, beyond and short of distinct vision, he knows the nature of the curves of his specula, and whether the indistinctness arising from aberration is the consequence of too much or too little curvature at the vertex of the large speculum, and can make the final alteration accordingly. This practical dexterity, arising out of experience, supersedes the necessity of tedious mathematical calculations, where some part of the data must necessarily be assumed; and it is much to be wished, that practical men, who have excelled

excelled in this particular, and in other practical niceties, would initiate their successors in the secrets that promoted their excellence, that posterity may benefit from their successful labours; which could not have been Mr. Short's wish, when he deliberately provided for the destruction of his best tools, after he no longer wanted them.

The circumstances that led to the construction of a reflecting telescope did not arise out of chance, as is supposed to have been the case with the dioptric, but out of the difficulty of avoiding the *indistinctness* produced by aberrations of both kinds; and the first arrangement that would probably occur, would be that of a speculum opposed to the eye of the observer, whose head in that case would intercept the incident rays, and prevent their falling on the speculum, unless it were made of an unmanageable diameter. To avoid this inconvenience, Gregory, who was the first to undertake the arduous task of a new construction, devised the expedient of opening a hole in the centre of the large speculum, sufficiently large to admit of the rays that came reflected a second time from a smaller speculum without a central perforation: it would naturally occur to him, that if this second speculum was not larger in diameter than the central hole of the large speculum, no incident light would be intercepted by it, when the rays came parallel, but what would have passed through the central hole of the speculum. This consideration brought the eye to the same end of the tube in which the large speculum was placed, and thus freed the aperture from all obstacles to the free admission of light; but whether the small speculum at first tried was a plain one, or concave, is not of importance to ascertain; it is sufficient for our purpose to know, that a concave one was ultimately adopted, and probably from the property which it possesses of varying the magnifying power to a considerable extent.

We have already said that Gregory's construction of the reflecting telescope is the most ancient, and indeed continues to be the most common, even at this time, on account of the convenience attending its use, and therefore we will begin with an explanation of its theory. *Plate* XXVII. *fig.* 1. *Astronomical Instruments*, represents a section of this instrument as it was originally made, and *fig.* 2. is a representation agreeably to its improved modern construction; in both which we shall use the same letters of reference to the corresponding parts. A B C D, in each figure, denote the tube of wood or brass in which two concave specula are contained; the large one, B D, is perforated at the centre, and placed contiguous to the interior end of the tube, but in such a way as to have a little play when pressed by a circular spring behind it; E F is the small speculum, which is of shorter radius than the speculum B D, and has its centre placed exactly in the centre of the tube opposite the central aperture in the large speculum, and is so adjusted by the screws behind it, that the image of the large speculum forms a concentric circle on its reflecting surface, when viewed by an eye situated in the central hole of the large speculum. In this instrument, as in the refracting telescope, it will be most convenient to describe first the formation of the primary image of a distant object in the body of the tube, and then the microscopic means applied for rendering this image visible in an apparently magnified state; for in truth there is actually a *compound reflecting microscope* made use of as a constituent part of this instrument, in like manner as the terrestrial tube of a refracting telescope of the best achromatic construction, is in itself a compound *refracting microscope.* In the first place, agreeably to the laws of catoptrics, which we have explained, if we consider *a b* and *c d* two rays of light coming from the centre of a distant arrow in a state of divergence approaching to parallelism, and impinging on the large speculum at the points *b* and *d* near the remote edges of the speculum, and at equal distances from its axis, they will be reflected inwardly so as to meet at the point *e*, in the common axis of both the specula, and will form the image of the central point of the arrow; and in like manner, any number of rays proceeding from the opposite ends of the said arrow may be conceived to fall on the speculum, and to be reflected to the points *h* and *i*, and to all the intermediate points, so as to form a perfect image *h e i* in an inverted position, because the rays which enter the tube from the right-hand end of the arrow, will after reflection cross the axis, and form the left-hand end of the image, and *vice versa.* When an image is thus formed, if it could be viewed, under sufficiently favourable circumstances, by an eye placed in the vertex or central aperture of the large speculum, it would subtend the same angle as the object itself seen from the same situation, as we have already demonstrated; and therefore the length of the image will bear the same proportion to the length of the object which it represents, as its distance from the eye, or vertex, is to that of the object; so that the longer the radius of the speculum which forms the image, the more distant, and consequently the longer will this image be, as compared with the object; and for the same reason, the nearer the object, the longer will its image be, until the situation is at the centre of concavity of the speculum, where the object and image will coincide, and appear of like magnitude, but in contrary positions.

This formation of the primary image being understood, we must in the next place consider it as a real microscopic object, placed somewhere between the face of the large speculum, and its centre of concavity, which situation will always depend on the distance of the real object itself, or, which is the same thing, on the degree of divergence of the incident rays coming from the object. Now if the small speculum were so placed as to have this primary image, or microscopic object, in its solar focal point, the rays coming from it would be reflected towards the large speculum in a parallel state; and passing through the central opening of the large speculum, would never converge so as to form a secondary image, in which case the conjugate focus would be said to be *infinite:* and if the said primary image were nearer to the small speculum than its solar focus, the reflected rays would diverge so as not to reach the central hole of the large speculum at all; but if the distance of the primary image *h e i* exceeds the solar focus of the small speculum E F, which is at the point *f*, then the reflected rays coming from the primary image will converge to a conjugate focus somewhere in the axis, and form a *secondary* image, the magnitude of which will increase with its distance from the primary image, which we now consider as a real microscopic object. The place where this secondary image will fall, will depend on the distance of the primary image from the solar focus of the small speculum; and a small change of this distance will cause a great corresponding change in the place of the secondary image, or conjugate focus; so that an adjustment for a small forward and backward motion of the small speculum, by means of a screw at the end of a long rod placed parallel to the tube, and reaching to the eye-end, will suffice for regulating the place where the secondary image shall most conveniently fall to be viewed by an eye-glass. The secondary image has its position reversed, as it regards the primary one, and is therefore in the same position as the object itself, or what is usually called *erect*, in opposition to *inverted.* This secondary image was originally made to fall within the tube, as at *k l*, in the focus of the eye-glass G H, through which it may be viewed by a small hole at I, where the visual angle

G I H is now confiderably enlarged. In order to explain the theory of this reflecting compound microfcope, compofed of the fmall fpeculum E F, and eye-glafs G H, more particularly, which we purpofely omitted to do under the term MICROSCOPE, let us fuppofe a ray of light proceeding from the end *h* of the microfcopic object, or primary image *h e i*, and falling on the central part of the fmall fpeculum at *g*, it will return reflected from this point, fo that the angle of reflection on the other fide of the axis or line *g e*, will be equal to the angle of incidence on this fide, and will therefore return in the line *g e l*, to the place of the conjugate focus, where the point *h* will be depicted at *l*: alfo a ray coming from the point *i* of the fame primary image, and falling on the point *g*, will be reflected in a fimilar manner along the line *g h k*, and will form the point *i*, at *k*, in the fecondary image, which we have reprefented by a dotted line. Now as the primary and fecondary images are fubtended by the fame angle *h g i*, or *k g l*, at the vertex *g* of the fmall fpeculum, agreeably to the laws of catoptrics, it is evident that the linear magnitudes of thefe two images will be directly as their refpective diftances from *g*, the vertex of the fmall fpeculum; therefore, as often as the diftance *g h* is contained in the diftance *g k*, or the diftance *g i* in the diftance *g l*; fo often will the length of the fecondary image *k l*, exceed the length of the primary one *h i*. But this fecondary image *k l* is viewed through the eye-glafs G H, under the vifual angle G I H, and is faid to be again magnified thereby: let us next fee what is the amount of this amplification; we have already faid that an eye at the vertex *g* of the fmall fpeculum, would view both the primary and fecondary images under the fame vifual angle *h g i* or *k g l*; but by an eye at I, the vifual angle is G I H = *k* K *l*, becaufe *l* K is parallel to H I, and *k* K to G I; and *k l* is the common fubtenfe of both angles; confequently, as the diftance L K, or focus of the eye-glafs G H, is to the diftance of L *g*, or diftance of the fmall fpeculum from the fecondary image; fo is the apparent magnitude of the fecondary image, or vifual angle to the eye at *g*, to the fame with the eye at I; and if the diftance *g* L be that at which an object may be beft feen by the naked eye, the whole power of magnifying of fuch microfcope will be $= \frac{g\,k}{g\,h} \times \frac{g\,\mathrm{L}}{\mathrm{K\,L}}$, provided that *h i* be confidered as a real object under microfcopic obfervation. But in a telefcope, the fize of *h i* has a reference to the diftance of the object which it reprefents, and this circumftance muft be taken into confideration in eftimating the power of the Gregorian telefcope. When the eye is placed at *o*, the vertex of the large fpeculum, we have faid, that the object and its primary image are feen under the fame vifual angle; therefore, wherever the primary image may fall in the line of the axis, the angle *h o i* will be to the angle G I H, or *k* K *l*, as the object feen by the naked eye is to its fecondary image, as feen through the eye-glafs, and confequently the latter, divided by the former, will give the power. But the vifual angles *h o i* and *k* K L are to each other in the compound ratio of $\frac{o\,e}{e\,g} \times \frac{\mathrm{L}\,g}{\mathrm{L\,K}}$, which formula, expreffed in meafured diftances, will be more convenient for afcertaining the whole power of a Gregorian telefcope, than the ratio of the vifual angles, which would require previous calculation. For inftance, let *o e*, the diftance of the primary image from the great fpeculum, be given = 24 inches; and *e g*, the diftance of the fame from the fmall fpeculum, be = 3.3; alfo let L *g*, the diftance of the fecondary image from the fmall fpeculum, be = 25.5, and L K, the focus of the eye-glafs, be = 2.3; then we fhall have, agreeably to our formula, $\frac{24}{3.3} \times \frac{25.5}{2.3}$, or, which is the fame thing, $\frac{24 \times 25.5}{3.3 \times 2.3} = \frac{612}{7.59} = 80.6$ for the power of fuch a telefcope, when directed to an object at fuch a diftance as fhall make the primary image fall as we have taken it. For objects very near, the focus of the large fpeculum will be long, and confequently the primary image will approach the fmall fpeculum as the diftance decreafes; for which reafon, the magnifying power will increafe with the diminution of diftance, and *vice verfâ*; fo that the power with parallel rays, or when the telefcope is ufed for celeftial purpofes, will be the fmalleft poffible, and yet this is what is ufually called the power of the telefcope, which circumftance fhews the impropriety of taking the power of a large telefcope from a meafure of a near terreftrial diftance, which mode has been practifed by eminent aftronomers, and recommended by men of fcience. If, however, a correction is applied for the want of parallelifm in the incident rays, as we fhall have occafion to do prefently, then the power may be as accurately obtained at a fhort as at a long diftance. In the old conftruction, which our *fig.* 1. reprefents, the piece of bent brafs at *c*, which fupports the fmall fpeculum, is acted on by the long rod *l* C, that has a milled nut at *l*, and a fcrew cut on the end C, that draws the projecting part N, of the piece *c*, along a flit made in the tube, while a contrivance in the cock M prevents the rod M N from advancing or receding as the rod revolves. Hence the eye-glafs G H remains fixed, and the adjuftment for diftinct vifion is made by the rod M N moving the fmall fpeculum to its proper diftance from the primary image *h i*; and in this way the fecondary image may be made to reft in any given fituation beyond or fhort of the point L, fo that various eye-glaffes may be ufed with the fame fpecula in fucceffion; or different fmall fpecula may be ufed with the fame large one, from which changes a variety of powers may be had with fixed eye-glaffes; but if the eye-glaffes be inferted into a fmaller fliding tube, there will be a third method of varying the power, by bringing the fecondary image into the fliding tube out of the body of the large tube, fo as to increafe the diftance L *g*, which is one of the factors of the dividend in our formula. Thus, whatever may be the arrangement of the fpecula, eye-glafs, and diftance of the primary image, when any three out of the four terms of the formula are given, together with the whole power, the fourth may always be had by a fimple calculation, which is a matter of great convenience to the maker. If, for example, we take the power 80.6 = P, and the radius of curvature of the large fpeculum = 48 inches, in which cafe the primary image with parallel incident rays will fall at $\frac{48}{2} = 24$; and let L *g* and *e g* be refpectively 25.5 and 3.3, to find the focus of the eye-glafs that fhall produce fuch power; we fhall have $\frac{24 \times 25.5}{3.3 \times 80.6} = 2.3$ for the focus of the eye-glafs; or for the diftance *e g* of the primary image from the fmall fpeculum, when the eye-glafs is given, we fhould have $\frac{24 \times 25.5}{2.3 \times 80.6} = 3.3$, as before. But it was foon found, that a fingle eye-glafs not only produces fringes of colour near its edges, arifing from the prifmatic aberration of the rays coming from the fecondary

ary

ary image, now confidered as a real object, but that the field of view is thereby circumfcribed into a fmall area. For thefe reafons, the Huygenian eye-piece, already explained, was fubftituted for the fingle eye-glafs, which fubftitution left little more to be done, in the way of the improvement of the Gregorian telefcope, except what related to the conftruction of the fpecula, which have now been brought nearly to a ftate of perfection, as we have explained, at fome length, under our article SPECULUM. We have introduced *fig.* 2. for the purpofe of explaining more clearly, than we could by a mere verbal defcription, the plan of the Gregorian telefcope in its moft improved ftate, in which, we repeat, the fame letters indicate the fame parts as in *fig.* 1. In this figure we have made the pencils of rays *a b* and *c d* to confift each of three lines, for the purpofe of fhewing how the image is formed at the points of convergence after reflection, and alfo how the inverfion of the image is produced by the croffing of the pencils before they converge to a point at each end of the image. It may alfo be feen how the rays pafs through the interior eye-glafs, before they form the fecondary image between the two glaffes, as in the achromatic aftronomical telefcope, thereby conftituting this image a cata-dioptric one, which before was a catoptric one, according to our definition. The Huygenian eye-piece is peculiarly adapted for the Gregorian telefcope; and when the fpecula have their curves fo adapted as to counteract each other's aberrations, as we before recommended, and are alfo well polifhed, as well as of fuitable metal, a very high power may be applied, and the light by reflection will be to that by refraction alone nearly as 5 : 8, where the apertures are equal; but as a reflector is capable of having a much greater aperture than any refractor that can be conftructed, it will have a proportional advantage in the effential quality of illumination combined with power, on which union its excellence depends. It will not be neceffary to repeat here what we have faid above refpecting the manner of determining a fingle eye-glafs, equal in power to the combined eye-glaffes in the Huygenian eye-tube; but it may be proper to mention here, that fuch a glafs, when determined, muft be fubftituted for the compound eye-piece, in computing the power of the telefcope according to our preceding directions. The diaphragm that precludes the ftraggling and extraneous rays from coming to the eye is put where the fecondary image is formed, and the aperture at the eye is obliged to be fmall in this conftruction of a telefcope, to prevent any other light being admitted into the eye than what is reflected from the fmall fpeculum, and is neceffary for the formation of the fecondary image. When the diameter of the fmall fpeculum, and alfo the exact fituation of the primary image, are known, the aperture at the eye, that fhall admit the principal pencil, may be exactly determined by the fubjoined analogy; *viz.* as the diftance of the fmall mirror from the fecondary image, is to the focal length of the neareft eye-glafs; fo is the diameter of the fmall fpeculum, to the neceffary aperture at the eye. And to find the proper diameter of the fmall fpeculum, or central aperture of the large one, the proportion will be, as the diftance of the primary image from the large fpeculum, is to its diftance from the fmall one, with incident parallel rays; fo is the diameter of the large fpeculum, to the diameter of the fmall one, or of its own central aperture; and when this proportion is preferved, all the reflected light will enter the fmall tube that contains the eye-glaffes, and alfo the extraneous light not falling on the large fpeculum, if any, will be excluded. Laftly, fhould the field of view be required to be equal to a given vifual angle, fuch as that fubtended by the diameter of the fun, this will depend on the *power* of the inftrument, which for this purpofe muft be limited, as in the following example: let a reflecting Gregorian telefcope of four inches diameter of the large fpeculum, and 17.5 inches focus, with a hole in the centre 1.1 diameter, (which is confidered in practice a good proportion,) be required to have a field of view juft 32′, when the focus of the eye-glafs is two inches? The thing required is, that the enlarged fecondary image of the fun fhould juft fill the aperture in the centre of the large fpeculum. The fize of the primary image of the fun depends on the focal length of the large mirror, and muft firft be found: it has been afcertained that, in the focus of a fpeculum (or lens) of fix inches focal length, the image of the fun is .05586 diameter, when he meafures 32′; therefore, as it will be proportionably more in a longer focus, fay as 6 : .05586 :: 17.5 : .1629; alfo, as often as this image .1629 is contained in 1.1, the diameter of the hole in the large fpeculum, which quotient is = 6.75; fo much does the fmall fpeculum magnify the primary image, in converting it into a fecondary one of 1.1 diameter. Again, if we divide the focus of the great fpeculum 17.5, by 6.75 − 1, we have 3.04, the diftance of the primary image from the fmall fpeculum, which is fomewhat more than its folar focus; and alfo if we divide 4, the diameter of the large fpeculum, by the fame (6.75 − 1), we fhall have .695 = the diameter of the fun's image on the face of the fmall metal, while the fecondary image will juft cover the hole of the large fpeculum, as required. Now, laftly, to find what is the power of the telefcope under thofe limitations, we have 17.5 × 6.75 = 118 for the firft part of the power; then $\frac{118}{2} = 59 =$ the whole power, when 2 is the focus of the fingle eye-glafs. If the length of the focus of the principal fpeculum were increafed to 30 inches, or even to 30 feet, while the aperture remains as before, no advantage would be gained in this conftruction from fuch length; for in the cafe of 30 inches focus, the primary image would be .2793, and the power of the fmall fpeculum only 3.93 $\left(\frac{1.1}{.2793}\right)$, while the diftance of the primary image from the fmall fpeculum would be 10.24; the diameter of the image on the face of the fmall fpeculum 1.36; and the magnifying power $\frac{30 \times 3.93}{2} = 59$, as before. There would, indeed, be this difadvantage, that, as the fmall fpeculum has an increafed radius here, its diameter will neceffarily be fo much augmented, as to intercept feveral of the beft rays of light, which are thofe that fall near the centre. The opinion, confequently, that a Gregorian telefcope will be improved by having a long focus of the great fpeculum, with the fame aperture, is erroneous. When two reflecting telefcopes perform alike, as to light and diftinctnefs, the fquare fquare roots of the diameters of the fpecula muft be as the cubes of their foci refpectively. There can always be more power got by the fmall fpeculum and eye-glafs, in even a fhort tube, than the aperture will bear.

The theory of Caffegrain's telefcope is very fimilar to that of the Gregorian, the principal difference being that, in Caffegrain's, the fmall fpeculum is convex inftead of concave. When the radii of the two fpecula and the eye-piece are refpectively the fame in each conftruction, the *powers* will be the fame, though the apparent pofition of the laft image, which we have fhewn to be erect in the Gregorian, is inverted in the Caffegrainian conftruction; for on examining *fig.* 3, which explains the courfe of the rays in Caffegrain's telefcope, it will be feen that the incident rays *a b* and *c d*, after being reflected from the large fpeculum, are

are prevented from coming to a point at the *virtual* image $h\,i$, behind the ſmall ſpeculum, in conſequence of its interpoſition, but are again reflected towards the eye in a ſtate of leſs rapid convergence, till, falling on the lens G H, they are refracted to a focus at L, and form the *real* image $K\,l$, which may be conſidered as the primary image, and is, therefore, not in the ſame poſition as the ſecondary image, which is formed in the Gregorian teleſcope after the rays have *croſſed* each other. When the rays fall on the large ſpeculum, they are reflected in a ſtate of convergence towards the ſmall ſpeculum, becauſe coming from a diſtant object; and they enter the tube either parallel or diverging, accordingly as the object is more or leſs diſtant; but they fall on the ſmall ſpeculum converging, ſo as not to become quite parallel after the ſecond reflection, but ſlowly converging; and the quantity of convergence will depend on the diſtance of the *virtual*, or what may be called imaginary focus, or image $h\,i$, from the ſmall ſpeculum E F, which is here between f, the ſolar focus, and the convex ſpeculum; whereas in the Gregorian inſtrument, the ſolar focus f is between the concave ſpeculum and image $h\,i$. In both conſtructions, $\frac{o\,e}{e\,g} \times \frac{L\,g}{L\,K}$ is the meaſure of the power; and it is evident that the part $\frac{L\,g}{L\,K}$ is the ſame in both; but it is not equally clear that $\frac{o\,e}{e\,g}$ is the ſame, or in the ſame ratio in both. The diſtance $o\,g$ between the two ſpecula is leſs in Caſſegrain's inſtrument than in the Gregorian, by twice the ſolar focus of the ſmall ſpeculum, and by ſo much may the principal tube be ſhorter; therefore, it remains to be proved that $g\,e$ is to $g\,o$ in one teleſcope as $g\,e$ is to $g\,o$ in the other, though differently poſited. In order to prove this analogy, let H D (*Plate* XXVI. *fig.* 11.) be a concave ſpeculum, and E C a convex one, both deſcribed with the ſame radius C D, and on the common axis B C D; and let the point N interſect the radius, ſo as to become the ſolar focus of each ſpeculum, one really, and the other virtually. Let F be a radiant point, from which the ray F H is incident on the concave mirror at the point H, or to which the ray K E incident on the convex ſpeculum is tending: then both theſe rays will be reflected from their reſpective ſpecula to the ſame point B in the axis, and will paſs in the ſame line E B. Again, let C F be an object, and the image thereof $a\,b$, formed by the concave, will be equal to the image A B made by the convex. This may be proved from our preceding theorems for convex and concave ſpecula reſpectively, *viz.* $\frac{d\,r}{2\,d + r} = f$, and $\frac{-\,d\,r}{2\,d - r}$, or $\frac{d\,r}{r - 2\,d}$, when all the ſigns are changed. For as $d =$ F C, C B $= f$ in the convex; ſo in the concave, let F D $= \delta$, and D B $= \phi$; and then we have in the former $d : f :: 2\,d + r : r$, and in the latter $\delta : \phi :: r - 2\,\delta : r$. But $\delta = d + r$, therefore $2\,\delta = 2\,d + 2\,r$, whence $r - 2\,\delta = 2\,d + r$; conſequently $d : f :: \delta : \phi$, that is, C F : C B :: D F : D B; alſo the object and image are to each other in the ſame ratio with each ſpeculum; and, therefore, ſince the object is the ſame in both, the image will be the ſame alſo, or A B $= a\,b$, which was to be proved. After having given this demonſtration, it will be unneceſſary to ſhew how the powers may be varied at pleaſure, agreeably to the variation of the radii of the ſpecula and lenſes that compoſe the eye-piece, all which we have juſt explained with regard to the Gregorian arrangement. As the inſtrument which is the ſubject of our preſent conſideration inverts the objects to which it is directed, it is ſeldom uſed but in aſtronomical obſervations, for which it is peculiarly adapted, ſeeing that it is capable of having greater power, with the ſame length of tube, than any other teleſcope that has been yet invented; though with a terreſtrial eye-piece, it might be uſed for the examination of terreſtrial objects. While we are writing our preſent article, we have before us a Caſſegrainian teleſcope by Tulley, of 36 inches of tube, and $6\frac{1}{2}$ aperture, that will ſhew Saturn or Jupiter, with their moons very well defined, with a power of 440; and that will diſtinctly define the words of a page in this Cyclopædia, at the diſtance of 210 yards with a power of 295.

The maker of this inſtrument has conſtructed two pairs of teleſcopes, one of each pair a Gregorian, and the other a Caſſegrainian, ſo as to match each other exactly in dimenſions, powers, and quality of the metals and glaſs, in order to aſcertain if one conſtruction has any advantage over the other in quantity of light, under exactly the ſame circumſtances; and though ſeveral ſcientific gentlemen, beſides the author of this article, have examined and compared different objects as ſeen ſucceſſively by each of the two teleſcopes of both pairs, yet not the leaſt difference can be diſcerned by any obſerver. When the laſt glimmering of day-light remained, the vaniſhing object ceaſed to be viſible with each like teleſcope at the ſame time, as nearly as could be aſcertained, and that with both pairs, though they are conſtructed with dimenſions greatly different the one pair from the other, and vary conſequently in their powers and quantity of light. This experiment originated out of captain Kater's paper on this ſubject, which was publiſhed in the Philoſophical Tranſactions of London, in the year 1813; and we have no heſitation in ſaying that the quantity of illumination is the ſame in both conſtructions, when the dimenſions and qualities of the conſtituent parts are perfectly ſimilar. Whatever may be the diſperſion of light at the point of croſſing of the rays, in the Gregorian conſtruction, when the diſperſed rays are returned from the ſecond ſpeculum, they are collected again, it ſhould ſeem, *without loſs*, certainly without apparent diminution of light. This conviction we put on record, not out of a ſpirit of controverſy, but from a love of truth.

The firſt account that was publiſhed of the French reflecting teleſcope was in the fifth volume of the Philoſophical Tranſactions of London, in the month of May, in the year 1672, almoſt immediately after the account of ſir Iſaac Newton's conſtruction, which was given in the ſame volume; and a claim was ſet up by Caſſegrain as to the priority of his contrivance, which, however, was not ſubſtantiated; nor was the matter of importance to determine, as the conſtructions are diſſimilar, and as Dr. Gregory's inſtrument preceded both. The ſuppoſed advantages of Caſſegrain's teleſcope over Newton's were ſtated to be theſe: *viz.* 1ſt. That the aperture was not limited to a confined number of rays incident on the large concave ſpeculum; 2dly. That the reflection of the rays will be natural, ſince it is made upon the axis itſelf, and will therefore be more vivid; 3dly. That the viſion will be more pleaſing, when the face is ſcreened from too much light by the broad end of the tube; and, 4thly. That there will be leſs difficulty in diſcovering objects with the eye facing them, than when turned from them. If theſe are advantages, they are, however, equally belonging to the Gregorian teleſcope; and we ſhall preſently have occaſion to ſtate what was Newton's opinion on each of theſe points. In this, as in the Gregorian conſtruction, the power can always be increaſed farther than the aperture will bear; and,

and, therefore, an increase of focal distance of the large speculum, without a proportional increase of aperture, will answer no good purpose, but will render the tube unmanageable. When the aperture of a Cassegrainian or of a Gregorian telescope is to that of a Newtonian as 7.5 to 6, it has been proved that they have equal light with the same powers; the Newtonian having the advantage, in consequence of the obliquity of the angle of reflection of the small plain speculum.

Sir Isaac Newton's construction of the reflecting telescope differs from both the Scotch and French in this respect, that the large concave speculum is entire, and that the small one is quite plain, and placed at an angle of 45°, a little short of the focus; so that the converging rays come to a focus between the small speculum and the side of the tube near its superior end, as seen in *fig.* 4. of our last plate. Sir Isaac had discovered, in his experiments on reflected light, that more rays are reflected in an oblique than in a perpendicular direction; and that, consequently, there would be more light returned to the eye by a small speculum set at 45°, than would be if the angle of reflection were greater. In this instrument, the theory is much more simple than in either of the preceding instruments, on account of there being but one image, *h i*, formed by the incident rays *a b* and *c d*, after two reflections, one of which takes place at the large metal B D, and the other when the rays are in a state of convergence, at the small plain speculum E F; so that the whole length of the focal distance of the large metal B D, is B F + F *e*, or D E + E *e*; and this distance, divided by the focal distance of the small eye-glass G H, reaching to *e*, gives the whole power. This calculation is as simple as in the astronomical refracting telescope above explained, and is analogous thereto. In the instrument first completed by sir Isaac, the eye-glass was a plano-convex, with the plain face turned to the eye, and $\frac{1}{6}$th of an inch focus, while the focal distance of the large speculum was $6\frac{1}{3}$ inches, and its aperture $1\frac{1}{3}$; hence its magnifying power was $\frac{6.33}{.166}$, or $\frac{6\frac{1}{3}}{\frac{1}{6}} = 38$. This was at the time considered a good proportion between the power and aperture, and a table was constructed for different focal distances upon this radical proportion; but it would answer no purpose to copy this table at a time when the reflecting telescope, in every construction, is brought to nearly a state of perfection by the successive improvements of different artists. In this way of producing the image, the position is inverted; and the only mode of increasing the power with the same eye-glass, is by lengthening the tube and focus of the large speculum; or with the same large metal, by shortening the focus of the eye-glass. In this telescope, any of the eye-pieces, simple or compound, may be applied at pleasure: and if the large speculum be made of the best metal, of a proper parabolic figure, and with a good polish, the image will be sharp and well defined; and as there are no colorific rays in a separated state, the charge, or power of the eye-piece may be great in proportion to the focal length of the large metal, which is the distinguishing character of this construction, particularly when the small speculum is perfectly flat and well polished. The principal objection to this, as a portable instrument, is its unmanageable length, which was first given it by Hadley, who out of a pigmy made it a giant, and astonished the philosophic world. The length of the tube was made six feet, in which was included a metal of six inches aperture, and $62\frac{5}{8}$ focus; and Newton's power of 38 was increased to 230. See Phil. Transf. vol. xxxii. p. 303, or Abr. vi. p. 165.

In sir Isaac Newton's reply to Cassegrain's claim of superior advantages, he states, first, that there will be more light lost by reflection from a small convex speculum, than from a plain speculum of an oval shape, and placed in an oblique position; secondly, that the convex speculum will not reflect the rays so truly as the plain one, unless it be of an hyperbolic figure, which is difficult to form, and even then will reflect only those rays truly which respect the axis; thirdly, that the errors of the convex surface will be augmented by the distance through which they pass before they reach the eye; fourthly, that the errors of the convex surface will be increased by the deflection or bending of the figure from the points where the incident rays ought to fall; fifthly, that on this account the figure is required to be more perfect than art can make it; sixthly, that the errors of the large metal, which is considered to be spherical, will be so augmented by reflection from the small convex metal, that indistinctness will ensue, such as will not allow either a great aperture, or a high charge; and lastly, that as the small metal contributes to increase the power, an over-charge of power, compared with the aperture and focal length of the large speculum, will be unavoidable, so as to produce very obscure and confused vision; for if the small metal be made with a larger radius, in order to diminish the power, too many of the incident rays will be intercepted; and if the charge of the eye-glass is diminished, the area of the field of view will be so far diminished, as to render a small object only visible, and that difficult to find. These might be objections a century and a half ago; but most of them have yielded to subsequent improvements in the nice art of casting, grinding, and polishing of specula, which we explained under the word Speculum, and in the formation and arrangement of the Huygenian eye-piece, which we have said is peculiarly suited to reflecting telescopes; though single lenses will do very well when the spectator confines the axis of his eye to coincide with the axis of the lens, so as not to produce distorsion in the figure of the image viewed. It may be proper to mention further here, that the small telescope called the *finder*, attached to telescopes of considerable power, was first proposed by sir Isaac Newton, to remedy the difficulty of finding the object with his reflecting telescope; and Descartes hath described it in his "Dioptrics" as answering the same purpose when applied to his best telescopes. Indeed objections well founded and rationally stated have led to various improvements in the mechanical arts, and are never to be disregarded, unless they are obviously futile. Had sir Isaac Newton lived to have a peep at the instrument which next claims our attention, he would no doubt have been highly gratified at the progress which the art of constructing telescopes has made since his six-inch reflector, with its ball and socket, was mounted over a candle-stick, or a small pillar greatly resembling this domestic utensil! And yet, to do justice to his inventive genius, if we may apply figurative language to such a subject, the seeds of all the fruit that has since been matured were contained in his primitive little kernel; and we are proud to claim the Newtonian as the *English* production.

"Though last not least," the Herschelian telescope now offers itself to our consideration, which we might with some propriety call the German telescope, inasmuch as the celebrated contriver of its stupendous mechanism is a native of Hanover: it was however constructed in England, and by English workmen, except so far as the ingenious knight of the Royal Hanoverian Guelphic order lent his powerful

powerful aſſiſtance, partly in the execution, but chiefly in the contrivance of the mechanical appendages. The work was immenſe, but royal means furniſhed the power that overcame every obſtacle. In magnitude, as in power, the forty-feet reflector at Slough exceeds every inſtrument that human induſtry has yet put together, and ſtands as a proof of great mechanical ſkill directed by an enterpriſing mind. We truſt that we cannot be underſtood to derogate from the merit of Dr. (now ſir William) Herſchel, when we ſtate that the idea of giving a ſmall degree of obliquity to the large ſpeculum of a reflecting teleſcope, ſo as to bring the image formed in the focal point out of the body of the tube, at its aperture, originated with Le Maire (ſee Machines Approuvées, par l'Acad. vi. p. 61.) about the year 1728; for as we know not that this ſuggeſtion ever met the eye of this illuſtrious aſtronomer and mechanic, previouſly to his undertaking the Herculean labour of conſtructing a teleſcope with a ſpeculum of forty feet focal diſtance, and four feet diameter, it would be unfair not to allow him the credit of the invention as well as of the conſtruction. We mention the name of Maire in compliance with our ſyſtem of tracing, or attempting to trace, from hiſtorical evidence, the origin of each mechanical invention that has contributed, immediately or remotely, to the promotion of the mechanic arts. The theory of this conſtruction is eaſily explicable, by a reference to *fig.* 5. of our plate of the *Theory of Reflecting Teleſcopes*, in which, as before, A B C D is the tube, and B D the large ſpeculum of the immenſe weight of 2118 lbs.; the incident rays *a b* and *c d*, which would have come back to a focus at the point *c*, in the centre of the aperture, if the axis of the ſpeculum had coincided with the axis of the tube; in conſequence of a ſmall inclination of the ſpeculum, given by ſcrews behind, come to a focus near A, at the edge of the tube, where the image of the object is formed by only *one reflection*, which is the leading feature of the conſtruction. This ſimplicity of principle is very convenient when a large aperture is wanted, becauſe the head of the obſerver may be placed entirely at one edge of the tube, ſo as not to intercept any of the rays at the time of making an obſervation; but as the eye looks down the tube in every ſtate of elevation, not only muſt the back be turned to the object viewed, but the obſerver muſt be mounted nearly as high as the ſuperior end of the tube, in order to make his obſervations: hence various pullies, ladders, ſcaffolds, &c. became neceſſary to enable the obſerver to adjuſt both the inſtrument, and at the ſame time his own poſition, all which will be beſt underſtood from the drawing, when we come to explain the particulars of the *conſtruction* hereafter. The power of the Herſchelian, as that of the Newtonian teleſcope, is obtained from the ratio between the focus of the ſpeculum and the focus of the eye-glaſs, which in this inſtrument is not very ſhort, though the image is formed by ſimple reflection. The mode of varying the power is the ſame, therefore, as in the Newtonian reflector, and requires no further explanation.

4. *The Conſtruction of Teleſcopes.*—As we have now given both the *hiſtory* and *theory* of teleſcopes at conſiderable length, we ſhall not be under the neceſſity of dwelling long on each of the ſeveral conſtructions; particularly as a reference to the drawings which we have given, and which are moſtly original, will exhibit to the eye more preciſe information on this part of our article, than any the minuteſt detail would do, unaccompanied by ſuch viſible repreſentations. Now that the long *aerial* teleſcopes are no longer in uſe, we ſhall not fill our pages by deſcribing the different kinds of mechaniſm that were applied for rendering them uſeful in obſervations, by Huygens, Perrault, Sebaſtian, Mairan, and others; moſt of which are deſcribed in vols. i. v. and vi. of the "Machines Approuvées par l'Academie, &c." to which we beg leave to refer the curious reader who wiſhes to know the particulars. All the ſupports for long teleſcopes had neceſſarily one property, which is deſirable alſo in ſtands that are made for modern teleſcopes, but which is frequently neglected; and that is, that the object-end of the teleſcope was ſteadily ſupported by ſome point of reſt near the remote extremity, where the rays were incident. Indeed various ſtands or mountings, as they are ſometimes called, have been contrived for the convenient ſupport of a teleſcope, when it is too heavy for the pocket, and incapable of ſliding by concentric tubes into a portable form; but in every uſeful ſtand the following properties ought to combine: firſt, the inſtrument held by it ſhould be kept firmly in its place, if of the refracting ſort, ſo that the image may have no vibratory motion unfavourable to diſtinct viſion, occaſioned by an unſteady poſition of the object-glaſs; but if it be of the reflecting kind, then it ſhould be ſo ſuſpended, that tremulous motions ariſing from compactneſs of the materials, ſuch as eaſily tranſmit vibratory impulſes, may be avoided: ſecondly, a motion in azimuth, and another in altitude, are indiſpenſable; and if the inſtrument be bulky, or have great power, in each of theſe reſpects there ſhould be both a quick and a ſlow motion, the former to ſave time, and the latter for the ſake of accuracy: thirdly, when the inſtrument is pointed to the required object, it ſhould not be liable to be eaſily moved by any accidental touch of the obſerver's hand or body; unleſs it is managed in a ſtate of ſuſpenſion, as is the caſe with the larger reflectors: fourthly, the parts of the ſtand ſhould be ſtrong enough to bear the ſuperincumbent weight, and not liable to get out of repair; and fifthly, its poſition ſhould be in a ſituation not eaſily ſhaken, or moved by the obſerver's weight, or that of a byſtander. When theſe properties are attended to, the exact ſhape and external appearance become matters of ſecondary conſideration, and each artiſt may purſue his own ſchemes in the conſtruction; but in this, as in ſeveral other departments of the mechanical arts, that work is beſt and quickeſt performed, which is done from approved patterns.

Refracting.—We will firſt deſcribe the refracting teleſcopes repreſented in *Plate* XXIX., and ſhall then proceed to the reflecting inſtruments contained in *Plates* XXX. and XXXI. of *Aſtronomical Inſtruments*, omitting thoſe portable inſtruments that are in the hands of every reader, ſuch as opera-glaſſes, &c. and that belong more properly to the head of Optics.

One of the beſt ſtands for a thirty-inch refractor, by which we always mean an *achromatic* refractor, is that exhibited in *Plate* XXIX. *fig.* 1.; in which A B is a tube of braſs, mounted on the tripod ſtand of the ſame metal C D, and fixed by means of the ſcrews Q and R. In the common conſtruction, the horizontal motion is at C, at the top of the ſtem or cylinder, and the ſyſtem of tubes F, E, P, is not applied, ſo that there is neither the ſlow adjuſtable motions, nor is the inſtrument ſteady in any given poſition; but here the horizontal motion is at D, at the lower extremity of the cylinder, where there is a long bearing for the pivot, with a tightening ſcrew underneath the junction of the feet, and a clamp S to fix the inſtrument in any given direction. Alſo the handle in *fig.* 5, with a Hooke's joint, taking the ſquared axis of the ſcrew at D, gives the ſlow motion in azimuth, while the ſliding and adjuſtable tubes F, E, P, keep the angle of elevation unaltered. Theſe tubes turn on a joint at P; and when a due elevation is given by the quick motion, occaſioned fioned by the freedom of fliding, one within another, a clamping fcrew at E fixes them, and the flow motion produced by the fcrew F, finifhes the obfervation in altitude, as the handle in *fig.* 5. does in azimuth; and both flow motions can be managed, one with each hand, at the fame time. In the prefent reprefentation, the celeftial eye-piece H is fcrewed into its fmall tube, which bears a concealed rack, that is acted on by a pinion on the axis of the thumb-piece G, which may be made more or lefs tight by a fcrew in the middle of its plane, and which adjufts the eye-pieces for diftinct vifion. There may be any number of various celeftial eye-pieces, but two or three are as many as are ufually delivered with an inftrument of this fize. The object-glafs fcrews into the mouth of the tube at B, and is fo fixed by trial, that the moft diftinct view of an object is had when the fcrew is carried home, in which fituation the receiving focket is fixed by the maker; fo that unfcrewing the object-glafs at any time does not injure the inftrument. The centre of motion in altitude is at a joint above C, and the fteadinefs of the tube A B will depend on the diftance of this joint from the fyftem of concentric tubes F, E, P, which may be more conveniently placed towards the eye-end than towards the object-end of the main tube, and with equal effect. When the cylindrical piece beyond the joint of the loweft tube at P, is withdrawn from its hole in a cock, attached to the vertical cylinder, the tubes will pack into one another, and the cylindrical end-piece will enter the hole of the cock T, under the main tube, and remain out of the way of injury, parallel to this tube. The tube I K, in *fig.* 2, fcrews at the end I, into the fame place that the celeftial eye-piece H now occupies, and is called the terreftrial tube, or terreftrial eye-piece, becaufe objects are feen in their direct pofition through it, which through the celeftial eye-piece are feen inverted. Near the end I, a pair of glaffes, called the *field*-glaffes, are fcrewed, and the end K contains the pair of glaffes which is denominated the eye-piece. We have already fhewn that thefe two pairs of glaffes conftitute an achromatic eye-piece, at the fame time that they erect the inverted image formed by the object-glafs in the fmall tube between H and A; and when this image is confidered as a real object, then the terreftrial tube is a compound microfcope of the beft conftruction. This mode of defcribing the arrangement of glaffes, it is prefumed, will be more eafily underftood by thofe readers who underftand the conftruction of a compound microfcope, than any other explanation that can be given. The tube L, in *fig.* 3, is an open tube, which is fometimes made, by particular defire, to receive at its end L the eye-piece, now fcrewed into the tube I K at K; and then, as the empty tube L flides in the tube I K, the diftance between the pair of field-glaffes and pair of eye-glaffes may be varied at pleafure; and as the magnifying power of the compound microfcope varies directly with this diftance, it is evident that the power of the telefcope thus conftructed will vary in like manner. But we have fhewn above, that the power of the telefcope may be varied alfo by varying either the pair of field-glaffes, or the pair of eye-glaffes; hence, when a great variety of powers is defired for the fame inftrument, different pairs of field and of eye-glaffes may be adapted to the fame terreftrial tube with very little additional expence; and in *fig.* 4. we have given three different pieces of fhort tube, containing male or female fcrews, or both, which are called *adapters*, by means of which the celeftial eye-pieces may be adapted as eye-pieces to the terreftrial tube, fo as to gain a great increafe of power for particular purpofes. When the adapter M, in *fig.* 4, which has both a male and female fcrew, is fcrewed into the end K, of the terreftrial tube in *fig.* 2, the celeftial piece H, *fig.* 1, may be fubftituted for the pair of eye-glaffes belonging to this long tube, whenever occafion may require; or the pair of terreftrial eye-glaffes may be made a celeftial pair, on occafions when a low power and enlarged field are wanted. The adapter O, in *fig.* 4, has two diffimilar female fcrews, the fmaller one of which fcrews upon the long tube at the end I, while the larger end receives the outer end of the celeftial eye-piece H, in *fig.* 1, and converts it into a pair of field-glaffes, for which it may be fubftituted, to get the greateft poffible power, with a high magnifier alfo at the end K, or rather at L, with the fliding eye-tube; and in this way the power may be increafed fo much, that all light will difappear, and the inftrument, confequently, will then become ufelefs: but it is better to have additional pairs of proper field-glaffes, than to fubftitute eye-glaffes for this purpofe, becaufe the arrangement of the focal diftances of the field-glaffes is different from that of the eye-glaffes, when they are arranged in the beft manner, as we have explained under our laft fection. The adapter N has two male fcrews and a female fcrew, one of which male fcrews will fit the tube at H, *fig.* 1, and the other the tube at K, *fig.* 2, or L, *fig.* 3, and the female fcrew will receive Troughton's micrometer in either place, or any eye-piece having a mother-of-pearl micrometer, even though it may belong to another telefcope. Thus the adapters, which are fimple in their conftruction, of little expence, and very portable, afford a variety in the ufe of a telefcope, that is at the fame time both ufeful and entertaining; and we have been the more minute in our defcription of them, becaufe they have never before been brought into public notice. The powers of this telefcope ufually vary from 25 to 100 without the adapters, as they are made by opticians; and opticians are no advocates for adapters that increafe the powers too much; but for certain purpofes the power may be augmented to about 120 with diftinctnefs and tolerable light; but then it muft be recollected, that the field of view will admit of only a fmall object, as well as little light, when the power is augmented out of due proportion.

Fig. 6. is a reprefentation of a five-feet achromatic refractor, mounted in the moft ufeful and convenient manner for making either celeftial or terreftrial obfervations, and has all the appendages which we have juft defcribed as belonging to the thirty-inch refractor, when made in the beft manner. A B, as before, denote the main tube, which has a diameter of $4\frac{1}{2}$ inches; and inftead of one fet of fliding concentric tubes, here are two, inferted into the cocks P and P, of a three-legged ftand of mahogany, of which two legs only are feen in the figure, and thefe fhortened, fo as to fall within the room allotted them in the plate. The conftruction of this ftand has been defcribed under the article Equatorial *Stand*, with a reference to *fig.* 5. *Plate* XIII. of our prefent feries of plates; therefore we fhall fatisfy ourfelves with fuch a fhort defcription of the conftituent parts here, as will fimply enable the reader to underftand their ufes. The milled nuts Q and R, attach the main tube A B to the wooden ftand; and the tubes A P and A P keep it fteady from vibratory motion: the femi-circle of brafs between Q and R, moveable about its centre, is racked at the concave part of its circumference, fo as to fit the fcrew on the axis of the handle U, which we have made fhort, to avoid confufion in the figure; therefore, when the fcrew is preffed clofe into the notches of the rack-work, a revolution of the handle U, in either direction, will produce a correfponding motion, in elevation or depreffion, in the telefcope borne by this femi-circle, while the vernier and divifions on the face of the femi-circle indicate the quantity of elevation, when zero is properly adjufted. The manner in which this mechanifm acts, and alfo the method of

producing

producing horizontal motion, will be beſt underſtood from an examination of *fig.* 7, in which the parts are enlarged, and in which the ſame letters denote the ſame things. The thumb-ſcrew V, concealed in *fig.* 6, when turned round, preſſes on the fixed metal under it, and draws up the frame Y, of which one ſide is ſeen, that holds the axis of the ſcrew U, and that turns on two pivots at its remote end X; and in this manner the ſcrew is brought into contact with the notches of the racked ſemi-circle, or is detached from it by a contrary motion. In the former caſe there is a ſlow motion in altitude, and in the latter a quick one. Again, the axis S, of another horizontal and parallel ſcrew, receives the handle, like *fig.* 5, for giving the motion in azimuth. This ſcrew is alſo preſſed into contact with a horizontal racked wheel, that lies fixed between S and W, and gives the ſlow motion. The ſcrew of preſſure is ſeen above S, and when the axis of the handle has its ſcrew detached from the racked circle, the teleſcope is at liberty to have a quick motion in azimuth. The chamfered plate, on which the racked circle reſts, is graduated, and the vernier at W reads the hours and minutes of time: but in order that this circle may be parallel to the equator in the heavens, ſo as to indicate time truly, it is neceſſary to turn the upper half, C, of the block half round, and to turn the whole ſtand ſo that the plane of the graduated circle may be parallel to the plane of the equator, which it will be when the upper point of the axis of motion is directed exactly to the north pole, in which ſituation the hour-circles will coincide with the horary circles of the heavens, or muſt be made ſo by an adjuſtment, which the graduated circle is capable of receiving, by means of an elongated hole, into which the ſcrew enters that fixes it to the block. This block, we have ſaid before, is called Smeaton's block, and anſwers the purpoſe of giving an equatorial motion to the teleſcope, when following a heavenly body by night, and is uſeful for finding one by day, from a knowledge of its right aſcenſion and declination; for what was altitude in the horizontal poſition, becomes declination in the equatorial elevation. This teleſcope is one of the four of which we propoſe to exemplify the uſes in conjunction with Troughton's micrometer; and therefore we have had the micrometer put into its place at K, when the terreſtrial tube I K is uſed; but it might have been at H in place of the celeſtial eye-piece, where the value of the revolutions of the micrometer ſcrew would have been as we have tabulated it in our laſt ſection. The two terreſtrial eye-pieces in *fig.* 8, and one not given there, are made to ſcrew into the terreſtrial tube at K, in addition to all the four celeſtial eye-pieces, which have an adapter to fit them to the ſame place ſucceſſively; which variety affords the choice of ſeven terreſtrial powers with one pair of field-glaſſes; and as there are three pairs of field-glaſſes, the variety becomes $3 \times 7 = 21$ different powers with a fixed eye-tube; but as the eye-tube alſo ſlides, the powers may be varied in ſmall quantities at pleaſure between the two extremes. In this inſtrument, the end I of the terreſtrial tube does not ſcrew into the celeſtial tube that bears the rack, but into an intermediate ſliding-tube, which is here marked H, the uſe of which is to allow an adjuſtment for viſion at very ſhort diſtances, which adjuſtment requires a great length of tube to be drawn out. For the conſtruction of Troughton's and other micrometers, we muſt refer to our article MICROMETER.

The ſcrew G of adjuſtment for diſtinct viſion, is concealed in our drawing by the *finder* or ſmall teleſcope attached, over A, to the main tube, the uſe of which is to bring the object readily into the field of view of the large teleſcope; which is not an eaſy matter, when the power is great; for as the field of view increaſes with a diminution of the power of the teleſcope, and *vice verſâ*, the ſmall teleſcope ſaves much time in ſearching for any object that is viſible in it. But the micrometer would be of little uſe in the night for meaſuring ſmall angles, except when the moon is the object, unleſs ſome mode of illuminating the wires, or ſpider's lines, uſed in making the meaſurement could be adopted. Formerly this object was effected by a piece of braſs, faced with card paper, attached to the object-end of the teleſcope, as in *fig.* 15, and turning on a pivot, A, to any angle of inclination or reclination that the poſition of a lamp, or candle, might require, of which the light was to be reflected into the tube; and an oval hole, in the middle of the reflecting plate, admitted the incident rays coming from the object to be viewed: this plan, however, is attended by the inconvenience, that either the lamp muſt be ſuſpended by the object-end of the teleſcope, ſo as to riſe and fall with it, or otherwiſe the angle of inclination or reclination of the reflecting piece muſt be altered in every new poſition. The firſt perſon who, we believe, laid aſide this apparatus, and introduced a diagonal reflector into the body of the tube, was the Rev. Dr. Uſher of Dublin, who brought the light within the axis of motion of his tranſit teleſcope, as is now commonly done; which method has the advantage of giving light in the ſame manner at all elevations, while the place, where the lamp is placed, never varies. (See the Tranſactions of the Royal Iriſh Academy, 1788, vol. ii. p. 13.) This method, however, was not conſidered as applicable to an ordinary teleſcope, where the axis of motion is below the tube; but Mr. Troughton has very lately applied this principle with ſucceſs in the teleſcope before us, and in others of the ſame conſtruction. At Z, over the centre of motion, a hole is made in the tube, of about one half the diameter of the tube, into which a covering cap of braſs ſcrews, when extraneous light is not wanted; then an elliptical plate of braſs, rough gilt, with an elliptical hole in the middle, is reclined in an angle of 45°, within the main tube, in ſuch a way as to receive the lateral light of a lamp or candle, which it reflects along the tube to the eye-piece of the micrometer; and the light thus reflected is not only mild and pleaſant to the eye, but may be modified, as to quantity, by the poſition of the lamp, and will remain the ſame in all altitudes, if the lamp be in the ſame horizontal line with the reflector, and ſtand at a proper angle with the plane of the reflector. In uſing the teleſcope before us, we found that ſome of the rays falling on the extreme parts of the object-glaſs were loſt in the tube, and that conſequently either the diaphragm was too ſmall, or that the oval aperture of the inclined reflector was not ſufficiently large; but the diſtinctneſs of the image is no doubt promoted by ſuch excluſion: and, indeed, it is the practice of ſome opticians, when they find the longitudinal aberration ariſing from the ſpherical figure of the convex glaſs not well compenſated by the concave one, to ſhut out the extreme rays on purpoſe, by the uſe of a ſmall diaphragm, for which aſſertion we have Mr. Dollond's authority. In the inſtance before us, we have aſcertained by a dynameter, that the reduction of the aperture is in the ratio 30 : 25.6, namely, from 4.5 to 3.84 inches: but our intention is to have the original aperture reſtored.

When a refracting teleſcope exceeds five or ſix feet in length, it requires to be ſupported at both ends, and then the nearer ſupport muſt have adjuſtments for both altitude and azimuth, while the remote one may be a point of reſt. *Fig.* 8. *Plate* XXX. ſhews a ſupport for the eye-end of a long teleſcope, which we believe was contrived by Smeaton, and which anſwers its purpoſe ſufficiently; A B C D is a mahogany

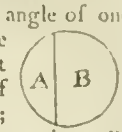
mahogany light frame, four feet fix inches high; the crofs-piece, A B, is fifteen inches long, and the piece C D feventeen, at the diftance of eighteen from the other; another frame, E F G H, with parallel fides, nine inches apart, and more flender than the other frame, paffes through the crofs-bars of the former, in fuch way, as to have an eafy motion; a cylinder or rod of brafs is fcrewed by its head-piece to the crofs-bar E F, and defcends from M to N, through a wooden fcrew L O, which is hollow within, and cut into a fcrew round its circumference: this wooden fcrew terminates above with a brafs focket and thumb-fcrew, which acts as a fcrew of preffure againft the interior brafs rod: the thick wooden piece L has a female fcrew, acting with the male fcrew of the hollow wooden cylinder L O, but is fo made faft to the crofs-bar A B, by a circular plate of brafs above, that though it will turn round, it will neither afcend nor defcend; confequently will produce an afcending or defcending motion in the wooden cylindrical piece L O, and alfo in the brafs rod M N, held by the fcrew K, attached to it. The concave piece of brafs I has two motions in its ftem, one horizontal, and the other vertical, like thofe in the ftem of a fmall telefcope, and receives the eye-end of a long telefcope, to which it is fcrewed, while the remote end is fupported by the branch of a tree, the block of a pulley, an opening in the roof of a houfe, or other elevated part of a building. The adjuftments are thus managed; when the elevated end of the telefcope is made to reft on its bearer, the eye-end adapts itfelf to the inclination by the joint in its ftem under I; then the whole frame is turned to face the object, when the circular motion of the fame fmall ftem yields, and allows the long tube to remain quiet; and if the tube is not exactly pointed in azimuth to the object, the brafs piece P, into which the ftem I is made faft, flides along a groove made in the front face of the crofs-bar E F, until the adjuftment for azimuth is complete. This fliding motion, being manual, may be either quick or flow, as the obferver defires; therefore, when a body in motion is once in the field of view, it may be followed without difficulty, by pufhing the fliding-piece P in a proper direction. The quick and flow motions for adjuftment in altitude are feparate, and are thus produced; firft the thumb-fcrew K is turned back, fo as to let the rod M N afcend freely, till the altitude is nearly right, when it is fixed, and then the piece L is turned, backward or forward, as the cafe may require, with the right hand, while the left flowly flides the piece P, until the object is in the middle of the field; and when diftinct vifion has been properly obtained by the fmall tube at the eye-piece of the telefcope, the pieces L and P, held refpectively in each hand, will always afford the means of keeping the object in the proper part of the field; and though the fupport has but two legs, yet its connection with the fupport at the object-end, through the heavy tube of the telefcope, will always keep it in its place when the adjuftments are fettled. It will not be neceffary to defcribe any more ftands, of which a great variety might be produced, that have been devifed for refracting telefcopes, becaufe we prefume that our readers will be able, after what we have faid on this fubject, to felect fuch as may beft fuit their refpective purpofes.

We come now to defcribe the portable patent achromatic telefcope, without a ftand, that was invented by Dr. Brewfter, and is fold under the patent by Mr. Harris, optician, in Holborn, London. The conftruction of this telefcope, of which we have already explained the theory, is two-fold, and may be explained by *figs*. 4. and 5. *Plate* XXX. In *fig*. 4. the tubes are fuppofed to be tranfparent, or otherwife fo divided, that the interior parts may be feen in their refpective fituations; A B C D is the outermoft tube, of mahogany, with brafs ends, containing an achromatic object-glafs, A B, at its exterior end; E F G H is the next tube of brafs, fliding fmoothly into the mahogany one, without lateral fhake, and may be called the fecond tube: into this tube the third tube I K fcrews; and in its turn receives the fourth, or terreftrial eye-tube L O, containing the pair of field-glaffes L M, and pair of eye-glaffes N O; all which tubes flide into the fpace of twelve inches, (including the cap,) to fit the pocket. The principal object-glafs, A B, is an inch and feven-eighths in diameter, and has a folar focus of 18.5 inches; and if there were no other glaffes but the four contained in the terreftrial, or fourth tube, this would be nothing more than an ordinary portable or pocket achromatic telefcope: but at I, in the fecond tube, is fcrewed a fecond object-glafs of the achromatic fort, the diameter of which is one inch and three-eighths, and its folar focus 14 inches. When the fecond tube, E F G H, is pufhed into the wooden tube A B C D, the fecond object-glafs, I, approaches the principal object-glafs A B; and when the third tube, I K, is alfo pufhed in, the two object-glaffes come nearly in contact at the end A B of the telefcope: in this fituation, the compound focus of the two object-glaffes, by the theorem $\frac{F \times f}{F + f}$, is about eight inches, which is the fhorteft poffible; and in this ftate of the tubes, when the eye-glaffes are adjufted for diftinct vifion, the power is the fmalleft poffible; but when all the tubes are drawn out, the diftance between the object-glaffes, and confequently the power, will be the greateft poffible, becaufe the converging rays coming from the principal object-glafs A B, will have paffed through one half of the tubes before they fall on the fecond object-glafs, and undergo a fecond refraction, fo as to come to a fhortened focus. In every intermediate pofition of the object-glafs I, the power of the telefcope, that is, the compound focus of the two object-glaffes, will be determined according to their intermediate diftance, by the theorem $\frac{F \times f}{F + f - d}$. Thus in every new pofition of the fecond object-glafs I, the telefcope will have a new power, and thefe powers might be marked by a fcale running lengthwife along the fecond and third tubes which feparate the two object-glaffes; but the inventor has made another ufe of this property, by converting it into an *optical micrometer*: he has fixed two parallel wires in the focus of the eye-piece, and alfo two points of metal, to include a larger angle, in a direction at right angles to the former; fo that when one pair includes a horizontal angle, the other will include a vertical one: an experiment is then made by actual meafurement, of a divided fcale, placed at a meafured diftance, to afcertain what is the angle meafured by the points in the eye-piece, when the object is feen between the parallel wires in each of the extreme pofitions of the fecond object-glafs I, and ftrokes are marked accordingly, as the boundaries of the intended fcale, the end of the next contiguous tube being the index; thus in the inftrument before us, the extreme points or ftrokes of the fcale *a b*, in *fig*. 5, meafure 110′ and 218′ refpectively, at an interval of $15\frac{1}{2}$ inches; and as it has been determined, both from theory and practice, (fee Dr. Brewfter's Treatife on New Philofophical Inftruments,) that the fcale of meafures is a fcale of *equal* parts, thefe $15\frac{1}{2}$ inches are divided into 108 (218 − 110) minute fpaces, while each minute fpace is bifected into fpaces of 30″, which might again be bifected by the eye, if the adjuftment for vifion could be made fo nicely as to admit of fuch eftimation. Hence it is eafy to conceive how this telefcope will meafure any angle fubtended by a diftant object of unknown dimenfions, sions, between 110′ and 218′, within the accuracy of 30″: it is also easy to conceive, that, the angle increasing as we approach an object, the same object may be made to fill the field between the measuring points in a new station, provided the distance between the two object-glasses be so altered, by trial and adjustments, that the exact power is found such as will command this condition, and the new angle at the second station will be indicated, as the old one was at the first; and when the distance between the stations is measured in a right line leading directly to or from the object, the difference of the angles will afford data for determining the distance of the object from either station. For example, supposing the tangents of small angles to be equal to the angles themselves, which they are very nearly, let us call the greater angle *m*, the smaller angle *n*, and the distance between the stations *a*; then, as the distances of the object from each station will always be inversely as the measured angles, we have $n : m$ (of the angles) for the *ratio* of the distances, and the real difference of the same distances by measurement of the interval; therefore, by one of the simplest theorems in algebra, we have $\frac{a\,m}{m - n}$ = the greater distance, and $\frac{a\,n}{m - n}$ = the smaller distance: thus, if we suppose the first, or smaller angle = 46′, and the second, or nearer = 68′, with the interval 120 feet, we shall have $\frac{120 \times 68'}{68' - 46'} = \frac{8106}{22} = 370.9$ for the greater distance, $\frac{120 \times 46'}{68' - 48'} = \frac{5520}{22} = 250.9$ for the smaller, and the difference, as before, 120. But it will be seen in a subsequent section of our article, that to determine distances from small angles with *great accuracy*, the value of a single second ought not to be neglected; and that a correction for want of parallelism, at short distances, is necessary for obtaining the *true* angle, whenever that is wanted. The author, however, has shewn, that the correction in question will vary nearly with the varying length of the telescope, and will not affect the *ratio* of the angles measured, on which the respective distances depend; but this coincidence of the correction with the length or power of the telescope, does not obviate our objections where *real* measures of angles are required, and where extreme accuracy is necessary for the success of the operation. But we have said the construction is twofold: it is extremely difficult, if at all possible, to hold the telescope so steady without a stand, that the angle, contained between the two fixed points in the focus of the piece, can be measured with precision; and this difficulty probably led to the substitution of the divided object-glass, seen in *fig*. 6, and edgewise in *fig*. 7, for the second object-glass I, which we have described. If this divided object-glass, screwed into the second tube at I, had *precisely* the focal distance as the entire one, and had the centres of the semi-lenses brought exactly into contact, the same scale and the same mode of taking the measure of an angle, would apply with it as with the one we before denominated I; likewise the points in the eye-piece would be necessary. But to do away the use of such points, and to render the instrument equally useful without as with a stand, the second object-glass that we have now to describe, as constituting the second construction of the telescope, was divided in the centre diametrically, and had its centres removed from each other, so that each semi-lens forms a separate image of the object viewed. In this construction, two *points* may be fixed on in any object, and when the tubes are so drawn out, that point *a* in one image coincides with point *b* in the other, as in Dollond's object-glass micrometer, then the angle subtended by a line connecting the points *a* and *b* will be indicated on the second scale, or scale *c d*, in *fig*. 5. This scale in our instrument begins with 11′, and ends with 75′; so that the length of $15\frac{1}{2}$ inches, being divided into 64 (75 − 11) spaces, admits of these minute spaces being subdivided into three of 20″ each; and if the adjustment for distinct vision would allow these to be bisected by estimation, the smallest quantity to be measured would be 10″ on this scale, which is indeed as small a quantity as the power of the telescope is capable of distinguishing; and therefore a longer scale would have been of no greater use. The peculiar advantage of this construction is, that, as in Hadley's sextant, a motion in the instrument does not injure the accuracy of the observation, or impede the operation of taking it, but affords the opportunity of re-examining the exactness of the apparent contact. Hence the use of this instrument affords a pleasing exercise, and the necessity of a stand is entirely obviated. We have the authority of Tulley, the only maker, to say, that his grace the duke of Wellington had one of these telescopes, with silver tubes, presented to him by a friend, and there is reason to infer, that his using it as a *coming-up* glass gave him the advantage of ascertaining, better than any of his staff, in what direction the enemy was moving on certain critical occasions. For when it is ascertained by observation, whether the angle subtended by a man in motion is increasing or diminishing, it is easy to infer whether the man is approaching or receding, though the exact measure of the angle be disregarded. And at sea it is equally easy to ascertain whether a ship is gaining or losing ground in a chase, wheu two points in a mast can be distinguished. When this patent telescope has the divided object-glass as the sliding one, the two images appear exactly similar to those in Dollond's divided object-glass micrometer, but the range of scale is much greater: if Dollond's has any advantage over this, it is, that the power of his telescope is usually greater, and that the measures taken at different stations do not depend on two adjustments of the tubes longitudinally, though it is necessary always to have distinct vision, when the edges of the images are brought into contact. We consider that neither of the constructions of the patent telescope, on its present scale, is competent to the measurement of distances from one station with sufficient accuracy; neither has it a range of scale sufficient to make it generally useful for all angles. The writer of this article has had the divided object-glass made to have their centres adjustable to different distances from each other, so as to be capable of measuring all small angles from 1′ up to 75′, and to be estimated by the same scale in the different positions, the value of the first and last positions of the tubes being determined experimentally for each position of the semi lenses, and the marks for the positions being so made, that when the scale runs out in the first position of the semi-lenses, the same value shall begin the scale at their next position; and thus a succession of minutes is continued from unity to the extreme end of the scale at the last position of the glasses; consequently one such instrument is capable of doing as much as several instruments with different pairs of semi-lenses can do, when put in a fixed position according to the patent. But after all, the initial and final values of a scale of a given length must depend on the difference of the focal lengths of the principal and sliding object-glasses; and, therefore, to observe the nice variations in the diameter of the sun or moon, it would be desirable, that the whole scale should measure only about 5′, *viz*. from 28′ to 33′; and then, if the telescope had power enough, the subdivisions of the scale might ascend by single seconds. Indeed it is yet a desidefideratum in aftronomical inftruments to obtain an unobjectionable, and at the fame time an eafy method of meafuring, by a micrometrical telefcope, the diftance between two very fmall ftars, fo near to each other as to be called *double* ftars; for when fo *much* extraneous *light* is admitted into the telefcope as to fhew the fpider's lines, or fcales of a mechanical micrometer, the minute ftars vanifh; and, when optical micrometers with double images are ufed, the light is fo divided between the images, that the ftar alfo vanifhes, in this cafe, from *want* of *light*. Dr. Mafkelyne's prifmatic micrometer is, perhaps, lefs liable to this objection than any other, but is not yet brought into common ufe.

Before we difmifs this part of our article, we beg leave to ftate, that about a hundred years ago, De la Hire contrived a method of giving different values to a pair of wires fixed in the focus of the principal object-glafs of a telefcope, by means of another moveable object-glafs; and alfo that about the year 1771, Mr. James Watt, celebrated for his improvements on the fteam-engine, not only contrived the fame thing, but actually made the meafurement by a longitudinal fcale marked on his tube, nearly as done by Dr. Brewfter. Mr. Watt's claim to *originality*, we believe, is undifputed, and may be proved both by his letter on the fubject to Mr. Smeaton, written near that time, which letter is ftill in exiftence; and alfo from the circumftance of his having about the fame time defcribed his new inftrument to the late Mr. Ramfden. With thefe prior inventions, however, we are well affured Dr. Brewfter was not acquainted at the time of his taking out a patent, in conjunction with Mr. Harris, the prefent vender of the patent telefcope; and therefore he alfo is entitled to the merit of *originality;* and moreover appears to have the fole right to the idea of converting it into a general micrometer, of applying it to the divided object-glafs, and of converting a Gregorian or Caffegrainian telefcope into a micrometer, without any additional lens or mirror. Mr. Watt never made much ufe of *this* micrometrical telefcope, the impreffion on his mind being, that the fcale ought not rigidly to be a fcale of equal parts, which Dr. Brewfter has fince demonftrated to be the cafe, and his line of bufinefs not leading him to finifh all the adjuftments for real ufe.

This ingenious gentleman had previoufly, *viz.* in the year 1770, conftructed a micrometer, with a pair of parallel horizontal wires, croffed by a fingle wire at right angles, in the principal focus of an ordinary telefcope, which acted as a micrometer for determining diftances at one ftation thus; a twelve-feet rod had a circular difc of wood, eight inches in diameter, painted white, that was croffed by a red horizontal line of an inch in width, which difc was made to flide along the rod, while another fimilar difc was fixed faft about a foot above the ground, when the rod ftood in a vertical pofition; then, at any unknown diftance, the fliding difc was lowered till one wire of the telefcope covered its red line, while the other wire covered the red line of the fixed difc; and then a fcale upon the rod, graduated by experimental meafures, indicated the *diftance* by infpection to within $\frac{1}{100}$ part of the whole. This inftrument was ufed with a telefcope of only twelve inches focal length, and an eye-glafs of an inch and a half focus, fo that the magnifying power was only eight times with this inftrument. The furvey of the intended canals of Crinan, Gilp, and Tarbert, was made by Mr. Watt in 1772, as well as the furvey of the canal running from Invernefs to Fort William, called the Caledonian canal, in 1773. This contrivance was fhewn to feveral friends, and amongft them to Mr. Smeaton, though an account of it has never before been publifhed. In the year 1778, a Mr. Green applied to the Society of Arts in the Adelphi for a premium for a fimilar invention; on which occafion, Mr. Smeaton advifed Mr. Watt to attend at the Society's rooms, to ftate the *priority* of *his* claim, which was accordingly done; but as Green's telefcope had more magnifying power than Mr. Watt's, *viz.* 40, and was fuppofed on that account to be more accurate in determining diftances, the claim of priority was ceded in Green's favour, and Mr. Watt's invention was fuffered to go unnoticed by the Society.

A double-image micrometer was alfo invented by Mr. Watt in the year 1771, which, as it has never been defcribed, we fhall make no apology for introducing here, in company with his other ingenious inventions. This inftrument confifted of a circular difc of glafs, whofe plane fides were not ftrictly parallel, but formed with each other an angle of one or two degrees, fay a wedge or prifm of one or two degrees. This difc or prifm was cut by a diamond, at right angles to the flope of the prifm, into two unequal fegments thus;



The leffer piece, A, was fixed, while the larger piece, B, was moveable upon the diamond-cut line, as upon an axis or hinge, as feen in this plan, in which the dotted lines fhew one of the pofitions into which B may be moved.

When the two fegments remain in the fame plane, they refract all the rays, which pafs through them equally; but A remaining fixed, and B moving upon a centre, as drawn in dotted lines, the rays which pafs through B, will be more refracted than thofe which pafs through A, and this will vary with the angle which B makes with A. This divided prifm being fixed in the focus of (or before) the object-glafs of a telefcope, two images are formed of every object by which its diameter may be meafured. An index and divided fector of a circle ferve to meafure the comparative refractions. This inftrument, however, has the fault, that the divifions are not equal parts for equal angles, and moreover the prifms would require to be achromatic, where high magnifying powers are required.

It was not till the year 1777, that the abbé Bofcovich publifhed an account of the prifmatic micrometer of the abbé Rochon made of rock-cryftal, with double refraction, and alfo of his own improvement, or fubftitution of glafs prifms, where one of them revolved round an axis of motion like Mr. Watt's; nor was it till the fame year that Dr. Mafkelyne publifhed his account of a prifmatic micrometer, that meafures a fmall angle by the refracting angle and the diftance of the prifms from the focus of the object-glafs conjointly; where the length of the telefcope was the fcale of meafurement. See Phil. Tranf. 1777.

Reflecting.—We proceed in the next place to defcribe the conftruction of reflecting telefcopes. *Fig.* 1. *Plate* XXX. fhews the figure of a reflecting telefcope of either the Gregorian or Caffegrainian kind, for their external appearance and mode of ufing are the fame, though we have fhewn that their fmall fpecula are differently formed. After the minute defcription that we have given of the ftands for achromatic reflecting telefcopes, we may avoid prolixity, by giving a lefs minute account of thofe that have been appropriated to reflectors, where the ufes of the fame parts are the fame: A B is the main tube of a reflecting telefcope of moderate fize, which may be either with or without a finder, as the power may require, mounted on the tripod G F; at A is the open aperture, and a little fhort of it, within, is the fmall fpeculum, drawn in or out by the fcrew C, which is connected with a longitudinal bar of metal, into which the heel-piece of the ftem of the fmall fpeculum flides, fo as to be taken away or put in at pleafure; within the interior end B of the large tube is the perforated large fpeculum, always concave, and of a proper figure to fuit the face of the

the small speculum. This large speculum is put in with some liberty, as is also the small one in a box containing a spiral spring acting against it to prevent tremors; B is the eye-piece of the Huygenian kind, of which there are usually two or three, according to the size of the instrument. The semi-circle D is racked, and the handle H turns the screw that gives elevation, while the handle I gives the horizontal motion, by its screw driving the racked horizontal plate E: both which are clearly seen in the figure. The vertical motion takes place at the centre of gravity of the tube at the top of the frame between E and D, and the horizontal motion is from an axis in the centre of the racked plate E, which axis has a long bearing down a tube to G, under the junction of the three legs. The three-barred bracing piece F has a joint at each leg, and also at the circular brass plate in the centre, so that a little force applied under this plate will raise it, and allow the legs to come together into contact, as well as the three arms that keep the legs open when the stand is used. This mounting is very portable and steady, particularly when the tube is short, and is every way convenient for use, except that both the vertical and horizontal motions are slow motions, the former of which is tedious when a great change of altitude is wanted in a given time, but the latter is in some measure remedied by the portability of the stand, which may be easily turned altogether, to face any particular object.

When the length of the tube is three feet and upwards, and proportionably wide, *fig.* 2. represents a stand that is greatly to be preferred to that represented by *fig.* 1. We shall put the same letters of reference to the same parts, though there is a difference in the constructions that may require explanation. This stand was contrived and first made by Tulley, who, we understand, claims also the invention of the three-armed brace F, in *fig.* 1, above described. The contriver has evidently contemplated all the requisites for a good construction, and has succeeded in the execution of his plan: A B, as before, is the main tube, B one of the eye-pieces, C the adjusting screw for distinct vision, hid in our drawing behind the tube; but in place of it is seen the finder, attached above the eye-end of the main tube. At D is a sliding-piece of metal with a cylindrical hole, through which the round rod H D passes, and to which it may be fixed, by the pressing screw D, in any given elevation; to this sliding-piece D, two rods D K, D K, are attached by two joints, and two other joints attach them below to the frame E K, so that these rods K, K, are at liberty to rise and fall as the tube is elevated or depressed, but not until the sliding-piece at D has moved along the rod H D. When the piece D is fixed to the rod by the screw of pressure, it forms a point of bearing for the tube at a distance from the centre of motion, which is at the centre of the tube's gravity above the frame of brass work, seen in the figure; thus the telescope is kept steady by two points of bearing in every degree of elevation, though these points will recede from each other gradually as the telescope is depressed towards an horizontal position. When the screw at D is turned back, the motion is sufficiently quick; but when it is fast, the slow motion is produced by the handle at H; for while this handle turns the rod, a screw cut on its interior end works in a fixed cock, near H, that has a female screw within it, and draws the sliding-piece and rod together towards the eye, and thus elevates the tube, while the joints of the rods K, allow a corresponding elevation in them; so that, without undoing the screw at D, a slow motion up or down is produced by merely turning the handle H, which motion, being free from jerks, is very pleasant. Between the brass frame bearing the telescope and the large wooden frame E F, are three circular plates, the uppermost of which is attached to the brass frame, or may be said to form the basis of it, and has an axis of steel fast in its centre; the second circular plate is racked at the concave edge all round, and has a circular hole in the centre, just large enough to receive the steel axis we have mentioned; the third circular plate forms the top of the wooden tripod, and has also a hole in its centre, just sufficient to admit the steel axis above described; but its diameter is somewhat less than the diameter of the racked plate next above it, so that a rim, made fast to the racked plate, surrounds it, in the manner of a box-lid; but there is no other fastening of these three plates together, than the pressure occasioned by the superincumbent weight of the telescope, and of its subjacent frame E K K: the axis, or screw, of the handle I is made fast to the uppermost plate of the said frame, and takes hold of the notches in the racked plate below it, so that when the telescope is turned round in azimuth, by a quick motion, it takes the frame under it, and also the racked circle, round along with it, while the stand or wooden four-footed frame E F stands quiescent; but when the quick motion is finished, the handle I is still in its place at the eye-end of the tube, and turning it round, will give the requisite slow motion; for turning the handle, in connection with the racked plate, turns the superincumbent frame and telescope, without any motion being given to the racked plate itself, which is now kept down to its place by simple pressure of its load above. The stand, or large wooden frame, is braced in all directions, as may be seen in the drawing, and might be advantageously made of cast-iron, as it is not contrived for the convenience of portability.

The best stand for the Newtonian telescope is that which is represented by *fig.* 3, in which A is the elevated mouth of a seven-feet tube, and B the place of the large speculum, that reflects the rays of light back to the small diagonal plane metal near C, which, by a second reflection, brings them to a focus at the eye-piece below C, as seen in the drawing. Above C is the finder, the upper end of which has a small achromatic object-glass, and the lower end the eye-glass. The upper end of the tube rests on a support D, that is capable of being raised or lowered slowly by a pinion on the axis of the handle under D, while the lower end rests on the horizontal bar of the frame E F, that is suspended by a pulley over F; the four pivots *a*, *b*, *c*, and *d*, of the said frame, sliding in the open grooves, seen near those letters, in the main frame, keep the small frame in any given situation, and allow a free motion, first down the vertical, and then down the inclined pieces, that compose the main frame, as low as to G and H; and when the lower end of the tube has been depressed into this situation, the tube may have an elevation approaching towards the zenith: for not only is the upper end elevated by the handles at J for the quick, and at D for the slow motions; but the lower one is depressed by the handle at I, round which the cord is coiled, that goes round a fixed roller at K, and two others at L and M, before it embraces the pulley N, and is hooked to a pin at O, above the frame. The rest of the main frame is so clearly exhibited in the drawing, that no farther description of it is necessary. In some of the instruments of this construction, when the handle J is omitted, and a quicker motion in altitude is required, and also a greater elevation than can be given simply by the handle at D, the second square stem that carries the pinion of the handle is raised by hand, and kept to its elevation by means of a second rack, which is set at liberty by pressing a button at P, connected with the spring-catch of the rack, when this squared stem is lowered again, all which motions will be readily comprehended by any

any perſon tolerably acquainted with the mechaniſm of rack-work. The quick motion in azimuth is given by ſliding the lower end of the tube gently along the bar on which it reſts, or by moving the whole frame, which moves on caſtors; but the ſlow motion is produced by the ſcrew at D. It is ſcarcely neceſſary to add, that the eye of the obſerver is applied to the *ſide* of the tube near its mouth, when the finder has pointed the tube properly to its object. This ſtand was contrived by ſir William Herſchel, whoſe experience in the uſe of various ſtands directed him to prefer one that is not liable to propagate vibratory motion to the large ſpeculum, and that has a point of ſupport near the upper extremity of the tube. We have, however, ſeen a ſix-feet reflector very ſteadily ſupported on a frame ſimilar to that exhibited in *fig.* 2; and the compoſer of the preſent article has a Caſſegrainian teleſcope, with a three-feet tube, fixed between the cheeks of one of the doors of his obſervatory, which turns round with the moveable dome in azimuth, and which elevates in altitude on two pivots reſting in the notches of a pair of braſs plates let into the ſaid cheeks; which mode of mounting is not only convenient for celeſtial obſervations, but is remarkably free from tremors, which advantage may be owing partly to ſteadineſs of poſition, and partly to the mouth of the tube being nearly two feet advanced into the open air. If the dome had not a remarkably eaſy motion on three looſe ebony balls, placed at equal diſtances, this mode of mounting a large teleſcope would not afford a ſlow adjuſtment for motion in azimuth, which it now does with facility.

It is always intereſting to a man of ſcience to know by what progreſſive ſteps a great undertaking is accompliſhed, as well as to learn under what impreſſion the original idea was entertained of forming the plan of operations. When ſir William Herſchel, who was brought up a muſician, reſided as organiſt at Bath, the natural bent of his mind led him to cultivate the pleaſing ſcience of optics, and to ſtudy the theory of mechanics ſo far as to enable him to amuſe himſelf with attempts to conſtruct a reflecting teleſcope: his ſucceſs, in an undertaking of conſiderable difficulty, increaſed with his endeavours to attain ſome degree of excellence; and though at firſt he was ſatisfied to pick a tolerable ſpeculum out of ſome dozens at which he had laboured; yet, feeling that his experience began to give him facilities both in the contrivance and execution of his manipulations, he proceeded by degrees to conſtruct ſpecula of ſeven, ten, and even twenty feet focus of the Newtonian form, to the number of more than 400, beſides ſeveral of the Gregorian kind: but as yet he was unacquainted with any certain practical method of giving a parabolic curve to the face of his metal; on which account he ſelected, by trial, ſuch ſpecula for uſe as he found moſt perfect in figure, and repoliſhed the remainder. In all theſe operations there was much room for experimental obſervation, and the time was not expended in vain. To a mind like Herſchel's, even a failure rouſed a feeling for a new enterpriſe; and it was no ſmall ſtep towards advancement, to have perceived the cauſe of unſucceſsful meaſures: the object being attainable, the means were to be found by ſkilful perſeverance. Nor were the labours of our optician to be confined to the formation of a ſpeculum; his mechanical ſkill was directed to the contrivance and execution of various ſtands for teleſcopes of an unuſual length; and in the year 1778, he produced that which is now uſually applied to the Newtonian teleſcope, and which we have juſt deſcribed as repreſented by *Plate* XXX. *fig.* 3. By the year 1781, Herſchel (beſt known by this title at that period) felt ſuch confidence in his improved methods of proceeding, that he erected a ſtand for a thirty-feet reflecting metal of 36 inches aperture, and ſucceeded in caſting it; but to his mortification the metal cracked in the cooling. The diſappointment attending this accident muſt have been ſevere, but did not damp the ardour of the mechanical adventurer, in which light, no doubt, the enterpriſing contriver was now viewed. A ſecond melting of the ſame metal was immediately determined upon, and a furnace was conſtructed for the purpoſe, which unfortunately gave way, and the liquid metal blew up the pavement. The mortification conſequent on this ſecond accident only plunged our adventurer the deeper, that he might riſe the higher in his next attempt. During an interval of ſome reſpite from optical and mechanical labours, the aſtronomer, however, was not aſleep; and while obſervations were making on the rotations of the planets, with teleſcopes of the Newtonian form, of 7, 10, and 20 feet focal length, the little planet, at firſt ſuppoſed to be a comet, from its having a viſible magnified diſc, was diſcovered. This lucky event rekindled the optician's ardour, and at the ſame time introduced him to the notice of his majeſty; who, by his liberal patronage, promoted the views of this amateur inſtrument-maker, and afforded facility to his future operations.

In the year 1782, a good twenty-feet reflector was finiſhed with a large aperture, and mounted on the Herſchelian ſtand for admitting of *front obſervations*, for which it is found very uſeful. The forty-feet teleſcope, or maſter-piece of mechaniſm, which is more immediately the object of our examination, was begun at Clay-Hall at the latter end of the year 1785, when, through the mediation of the preſident of the Royal Society, the ſupport of regal munificence had been graciouſly promiſed; and, when the various portions of the bulky ſtructure, which employed forty workmen of different denominations, had been removed to Slough, near Windſor, the foundation was begun, which was to be the ſcite for the largeſt teleſcope that had ever been pointed to the heavenly regions. We will not detain our reader by deſcribing the details of maſonry, carpentry, and ſmith's work, which have occupied eighteen large plates, in the ſecond part of vol. lxxxv. of the Philoſophical Tranſactions, for their explanation, but deſcribe ſo much of the inſtrument, and of its appendages, as are uſeful in making actual obſervations.

The beſt view for general repreſentation of the Herſchelian teleſcope, is that which has been given in plate 24. of the volume juſt named, which therefore we have copied into our *Plate* XXXI. of *Aſtronomical Inſtruments*, with ſome ſlight alterations ariſing out of ſubſequent improvements or curtailments of unneceſſary appendages. This view, taken from a ſtation to the ſouth-weſt of the erection, repreſents the teleſcope elevated in the meridian line, and affords the means of ſeeing the front parts of the inſtrument, and of its numerous appendages; but does not allow the mechaniſm that ſupports the inferior end of the tube, and that gives motion in ſome of the adjuſtments, to be explained by a reference to their parts, and therefore muſt be comprehended from a verbal deſcription. The foundation on which the frame-work of the forty-feet teleſcope is erected, conſiſts of two concentric circles of brick-work, one 42, and the other 21 feet in diameter, both ſunk $2\frac{1}{2}$ feet under ground, and tapering from the breadth of 2 ft. 3 in. below, to 1 ft. 2 in. above, where they are capped with paving-ſtones of $12\frac{1}{4}$ inches wide, and 3 thick. In the centre of theſe circles, is fixed faſt into the ground by brick-work, and oppoſite braces of wood, a vertical beam, as a centre of motion, round which the whole ſtructure may

may have a circular motion in azimuth, the plane of the outer circle being made perfectly level. The platform that connects the different parts of the frame-work below, has three principal horizontal beams lying parallel to each other, and three others lying parallel, croſſing the firſt at right angles, beſides various bracing-beams, that tie the whole compactly together, by iron bolts paſſing through the places of croſſing. In our drawing, the outer circle of brick-work and maſonry is denoted by the letters A B, and the circumference of the platform of wood by C D: under each oppoſite end of the ſix main beams is fixed a roller, of ſix inches in diameter, and eight long, having each a ſtrong iron frame bolted into the end of its reſpective beam; ſo that the outer circle has twelve rollers: but theſe were not ſufficient to bear the whole at 21 feet from the centre of motion; therefore eight more rollers, nearly equidiſtant, were fixed to ſtrong parts of the platform, ſo as to be borne by the inner circle of 21 feet diameter; and thus the whole platform, with its ſuperſtructure, is capable of making a revolution, when ſufficient force is applied round the central vertical beam, that enters a hole at the junction of the two central main beams, and that aſcends but a little way out of the ground. Six out of the twelve rollers of the outer circle are ſeen between A B, the brick-work, and C D, the circular edge of the platform, and the reſt may be imagined, not only on the remainder of this circle, but alſo on the inner circle, which is concealed. In theſe rollers, it is of great importance that the axes of motion all point towards the central beam round which they carry the platform, and alſo that their diameters and frames be preciſely of like dimenſions, otherwiſe they will not bear alike on the baſis of maſonry. At twelve feet diſtance from, and all round this moveable platform, are fixed faſt into the ground eight equidiſtant poſts, to an oppoſite pair of which the ends of a long pliable rope are hooked, that give the motion in azimuth; which rope, being conducted over two ſeparate pullies, fixed upon the platform, at oppoſite ſides of the centre, has its ends turned in the direction of tangents, that point in oppoſite directions to their reſpective poſts. The middle part of the rope is made to paſs round one of the ſpokes of a large wheel, carried by the platform, before it winds round the axle, ſo as to coil up both ends of the rope equally; which rope therefore pulls by both tangental ends alike, ſo as to apply an equal force at each oppoſite pulley, while the reſiſtance of the poſts produces the requiſite motion, without a ſtrain on the centre. This mechaniſm gives the operator a great mechanical advantage. That part of the platform C, which connects the extreme ends of the three longitudinal beams, over the rollers at A, is made ſtrong, and is the ſupport for a pair of double ladders, that are ſeen aſcending to the ſummit of the whole frame-work, one on each ſide of the large tube E; and at D is another ſimilar ſupport for two other double ladders, which, aſcending in like manner, meet the former ones, and croſs into them in ſuch a way, as to admit of being bolted together at the points of croſſing. Theſe ladders are propped by other ſhorter ladders, as ſeen in the figure, and ſome upright maſts, of which one is ſeen erected over the roller at B, aſcend in like manner, and afford the means of obtaining horizontal braces at different heights, all round the frame, except where the elevated end E of the teleſcope requires an opening to be left between the front ladders for its different degrees of elevation. The tranſverſe beam F G, which lies horizontally over the croſſings of the double ladders, and is bolted to them, receives the hooks of the different pullies, which we ſhall ſhortly have occaſion to deſcribe, at the ſame time that it connects and braces together all the ladders at their upper extremities. Theſe ladders are each 49 feet 2 inches long, ſo that the height of the tranſverſe beam F G muſt be $\sqrt{49 \times 49 - 20 \times 20} = 45$ nearly, and will therefore admit of the long tube, of 40 feet in length, to be raiſed into a vertical poſition under it. Below the mouth of the large tube, a gallery H I, with its attached brackets K and L, reſts upon the ſlopes of the interior halves of the double ladders, at K and L reſpectively, and may be made to ſlide up or down, into any ſtate of elevation, by two ſyſtems of pullies, and ropes going round the blocks hooked at the junction of each pair of ladders, to the tranſverſe beam F G, as may be ſeen in the figure; and when this gallery is lowered to the landing of the pair of ſteps M, a party may be admitted into it to gratify their curioſity, the floor being 13 feet 6 inches by 6 feet 1½ inch, and paliſaded on the front, as well as partly at both ends. The baſes, or ſliding parts of the brackets, are prevented from ſlipping aſide by lateral rollers of braſs, acting againſt the ſtraight ſides of the middle pole of each double ladder, while other rollers of the ſame metal, acting under them, diminiſh their friction, when drawn up or let down by the pullies. In the framing of theſe brackets, it was neceſſary to introduce contrivances for allowing ſome deviation of the gallery from an exact level, in caſe one of the brackets was elevated by its pulley faſter than the other; which contrivances are not eaſily deſcribed without a reference to the drawings of the ſeparate parts in the original account, or without inſpection of the parts themſelves.

The tube of the teleſcope, which is 39 feet 4 inches in length, and 4 feet 10 inches in diameter, is made entirely of iron; it having been aſcertained that a wooden tube would have exceeded an iron one in weight by at leaſt 3000 lbs. The ſheets were firſt put together by a kind of ſeaming, that requires no rivets; and when the ſides of the iron platform were cut ſtraight, it was lifted by proper tackle into a hollow gutter, and then brought gradually, by various tools, into a cylindrical form. Various hoops are fixed within the tube, and longitudinal bars of iron, connecting ſome of them, were attached to the two ends of the tube, by way of bracing the ſheets, and keeping the ſhape perfect when the pullies are applied to give the neceſſary elevation at the upper end, and that the ſpeculum might be kept ſecure in its bed at the lower end. The hoop by which the upper end of the tube is ſuſpended is eight inches broad, and thicker than the reſt; and the ſyſtem of three pullies, ſeen at N, with each a double block, has a correſponding ſet at O, hooked to the tranſverſe pole G F; and the bars to which the blocks are hooked are ſo bent, that the moving ropes will not come in contact; nor will the elevated tube have its vertical motion diſturbed by the tackle, either in aſcending or deſcending, which was an important precaution. The lower end of the tube is firmly ſupported on rollers, that are capable of being moved forwards or backwards by a double rack, moved by wheels and pinions at R, which we ſhall not attempt to deſcribe minutely; but the uſe of which every mechanic will comprehend without particular explanation. Originally there were ſeveral appendages near the mouth of the tube ſliding by pullies, or fixed to the tube, for the purpoſe of regulating the *ſweeps* taken by this inſtrument; but as the twenty-feet reflector is now uſed for this purpoſe, they are taken off, and have been omitted in our drawing. By an adjuſtment at the lower extremity of the tube, the ſpeculum is turned to a ſmall inclination, ſo that the line of collimation is not coincident with the longitudinal axis of the tube, but croſſes the tube diagonally, and meets the eye in the air, at about two inches from the edge of the tube. Hence no part of the head intercepts the incident rays, and the obſervation

tion is taken with the face looking at the fpeculum, or by what the author has called, by way of diftinction, the *front view*, the back being always turned to the object to be viewed. Befides the pullies of elevation, and of azimuthal motion, there are others for the purpofe of communication, as well as fpeaking-pipes, repeating-bells, and fignals by clock-work, which cannot be clearly comprehended without infpection, or numerous drawings to be referred to; but the dexterity of the obferver has rendered fome of thefe fuperfluous. The large fpeculum is enclofed in a ftrong iron ring, braced acrofs with bars of iron, and an enclofure of iron and tin fheets makes a cafe for it; it is lifted by three handles of iron attached to the fides of the ring, and is put into and taken out of its proper place by the help of a moveable crane, running on a carriage, which operation of courfe requires great care. Three fmall vanes attached to the edge of the tube at the mouth, affift to put the line of collimation right, when they are feen reflected from the fpeculum to the eye-piece. We vifited Slough lately, with a view of examining all the minutiæ of the ftupendous apparatus that is rendered neceffary for the management of this huge telefcope, and that can only be well defcribed on the fpot, and found the fubftance of a letter written by the late Mr. Smeaton on this fubject, immediately after a vifit for the exprefs purpofe of infpecting the apparatus then in exiftence, fo accurate, that we avail ourfelves of this fource of information; and as the letter which is before us is a copy taken from the writer's own manufcript, we have no doubt of its authenticity. It relates however principally to the twenty-feet inftrument.

Gray's Inn, Nov. 4th, 1785.

"My dear friend,

"Since my laft, I have been to pay my vifit to Mr. Herfchel, and according to my promife, proceed to give you fome account of what I have feen; and indeed he has fo much originality about him, as well as natural ingenuity, accompanied with great readinefs and dexterity, that to enter into the detail would be far to exceed the bounds of a letter; I will therefore enter into the great outlines, and fill up as I can. You muft know that, till this vifit, I have held the doctrine about telefcopes that I believe is the common one; that, having fixed upon a proportion that you by experience find to do well in any one fpecies of telefcope, what you are to expect from any other fize of the fame fpecies, is in proportion to the fquare root of the length; fo that increafing the length four times, your telefcope will allow you to take an image of double the diameter; every point of it being illuminated with the fame quantity of light, and painted with an equal degree of diftinctnefs and precifion. This idea and expectation I carried with me to Thornhill, and carried the fame to Clay-Hall; but I did not bring it back with me. Mr. Herfchel's doctrine will illuftrate his purfuits better than minute defcriptions. Whatever his doctrine originally was, experience has taught him that large furfaces of fpeculums are not to be ground and polifhed fo as to preferve fo accurate a figure as thofe of a fmall or moderate fize; he therefore divides the maximum that telefcopes may be expected to bring out, into three diftinct claffes; firft, the greateft poffible degree of magnifying power, where there is a fufficiency of light; fecondly, the greateft degree of diftinctnefs, where there is alfo a fufficiency of light, but where the natural fize of the object does not require the greateft degree of magnifying power; thirdly, the greateft degree of light, where the objects are naturally obfcure, which will afford difcoveries that cannot be brought out either by great degrees of magnifying power, or a capacity of diftinctnefs, where, on thefe accounts, a fufficiency of light is wanting. In conformity with this doctrine, his principal difcoveries have been made upon the ftars, where the greateft degree of magnifying powers have been required, and ufed with his original telefcope of feven feet focal length, which he has pufhed to between fix and feven thoufand times. The greateft difcoveries have alfo been made with thefe, where the greateft diftinctnefs has been required, and a moderate degree of magnifying power; the diameter of the fpeculum of this telefcope being no more than $6\frac{1}{4}$ inches: and alfo, for the fame purpofe, he finds his ten-feet telefcopes applicable, the diameter being 9 inches; but for objects naturally obfcure, he can diftinctly fee an object with his twenty-feet telefcope the diameter 19 inches, (which is feldom charged with a magnifying power of more than 200 times,) which the others will not reach. With this telefcope he is now and has been for fome time paft at work, as he calls it, *fweeping* the heavens. The whole apparatus can upon occafion be turned to any azimuth, but is chiefly ufed with the telefcope turning in the plane of the meridian. The inferior or fpeculum end of the tube is fupported immediately upon the ground; the other end of the tube is raifed and lowered by a tackle, fupported at top upon a double equilateral triangle (or thereabouts); the obferver is alfo hoifted up in a chair, that works on rollers, upon the inclined legs of the triangle next the eye-glafs; and the eye-glafs is brought to anfwer to this ftraight line by fliding the butt of the telefcope near the centre of the whole machine; and by the fame means it can be put into a vertical pofition. The raifing the chair and the fliding of the butt are done by feparate tackles refpectively, touched only occafionally; but the main tackle that raifes the telefcope, when brought to its intended elevation, that is, polar diftance, is worked by a diftinct motion, that caufes it to rife and fall alternately through a fpace of two degrees of the meridian, which being done with fome degree of brifknefs, a plot in the heavens is examined at once of two degrees broad, the motion of the heavens in AR bringing on the objects in fucceffion. By way of regifter, large fheets of paper are prepared, marked and numbered, being ruled into parallel long and crofs lines at a quarter of an inch diftance; a fmall fquare of this kind reprefenting a quarter of a degree in AR and declination: all thofe that are examined being marked with a crofs, and thofe that have been feen, but not fully examined, with a ftroke one way; and when afterwards feen to fatisfaction, the crofs is completed. The place and fpecies of the object are alfo marked upon the paper. In this operation, three perfons are concerned; a labourer works continually the handle backwards and forwards for performing the deftined range; and in this he is prevented from ranging too little or too much, by a fmall piece of machinery, that ftrikes a bell at each end of the range; he alfo ftops on notice: and if any thing comes requiring this notice, and the object to be purfued, the telefcope can by an apparatus, which occafionally heaves it from its meridian bearing, purfue it in right afcenfion for near a quarter of an hour; and that there may be no need for the obferver's eye to be taken from the eye-glafs, an affiftant (Mr. Herfchel's fifter) fits in an adjacent room with the fquared fheet before her, who notes down and in a book writes what is dictated. The time fhe has by the clock facing her, and the polar diftance by a piece of machinery, which continually fhews the degree and minute, and is worked by a ftring actuated by the telefcope in rifing and falling, which comes into the room, and winding round a barrel, performs the requifite motions. The telefcope is fet to its

altitude

altitude by a ſmall quadrant fixed over it, and the correſpondent index is regulated anſwerable to the ſtretching of the cord of communication, by obſerving the firſt known ſtar that paſſes of Flamſtead's catalogue. By this means, what has been done and what is to do is diſtinctly ſeen by the ſheets. In this way, many hundred nebulæ have been diſcovered, not only unknown before, but which no ordinary teleſcopes will reach. The ſpeculum of the great teleſcope of 40 feet is caſt, but was not got home; it is four feet diameter, and about 1050 lbs. weight. Mr. Herſchel tells me there is a warehouſe in Thames-ſtreet, where they keep for ſale metal ready made into ingots, of which they have two ſorts, what they call white metal and bell-metal; I ſuppoſe ſuch as the bells of clocks are made of, but he did not know exactly their compoſition: for his ſpeculum, they put two ingots of bell-metal to one of white metal. He thinks it a lower metal than what he uſed for his former ſpecula of 19 inches, *viz.* $7\frac{3}{4}$ ounces of tin, to 20 ounces of copper. I am not ſure, however, whether I remember right, but you probably will gueſs. He does not propoſe it to magnify more than the preſent one of 19 inches, but to take the whole advantage in light, he makes all his ſpecula flat upon the back ſide. The thickneſs of this laſt great one at the edge was to have been two inches, but by ſome ſhrinking in the mould, and particularly in the middle, I underſtand it is not there above $1\frac{1}{2}$ inch, and alſo leſs at the edge than it was to have been, ſo that it is hollow in the back as well as face; but as it came pretty well upon the face, he promiſes to make uſe of it; and when he has got thus furniſhed, he promiſes to caſt another, having duplicates of all he makes, ſo that while one is in uſe, another can go to the poliſher. They are made to be encloſed in braſs boxes, and their weight lays ſimply upon ſeveral thickneſſes of cloth, and are poliſhed in theſe boxes, and are made to go in and take out ſo conveniently, that they are very frequently put into their tubes and tried with an object while under the operation of poliſhing; and to theſe frequent trials he aſcribes the principal cauſe of his ſucceſs in theſe operations.

* * * * * * *

I remain, dear ſir,
ever your's,
J. Smeaton.

We have only to add farther, on this ſubject, what we learnt in a converſation with ſir William Herſchel, that he prefers ſingle lenſes, before what are called achromatic eye-pieces, from an idea that more *light* is thus had for both his 20 and 40 feet reflectors, and that greater *power* may thus be obtained for his ſmaller inſtruments. We have, however, to regret, that his mode of giving the parabolic curve to the great ſpeculum, by mechanical means, muſt for the preſent remain a *ſecret*, for the diſcloſure of which we feel that we have no right to aſk, while there is an exiſting manufactory that might be injured thereby. The peculiar advantage of the Herſchelian conſtruction is, that there is no light loſt by a *ſecond reflection*, and that the large quantity of poliſhed ſurface reflects more rays than can be collected by any other means. The weight of the metal, which is very brittle when of the beſt mixture, made it neceſſary to have a prevailing portion of copper in the large ſpeculum, which is, therefore, liable to be the ſooner tarniſhed, and to require more frequent poliſhing than would have been requiſite, if the beſt proportion for brightneſs could have been preſerved in the ingredients of the compound metal: but what is defective in quality, is compenſated by the quantity of poliſhed ſurface. It is hardly neceſſary to inform the practical aſtronomer, that when the greateſt powers are uſed, both the light and the field of view, and conſequent time of apparent paſſage through the field, are proportionably diminiſhed. We underſtood the ingenious and dextrous obſerver to ſay, that inſtruction and practice are neceſſary to enable any other perſon to follow a ſtar or planet with the forty-feet reflector; for that a heavenly body ſeen with one of the higheſt powers does not continue in the field more than a few *ſeconds* of time, unleſs the motion of the tube is regulated ſo as to keep pace with the apparent motion of the body; and this is probably the reaſon why few perſons have been in a ſituation to form an eſtimate of the merits of this tranſcendant inſtrument. For the detail of all the parts, ſee vol. lxxxv. of the Philoſ. Tranſ. of London, part ii. 1795.

5. *On the Powers, &c.*—After having deſcribed the moſt convenient conſtructions of a teleſcope, of both the dioptric and cata-dioptric kinds, we propoſed to ſhew how their powers may be practically varied and eſtimated. We have already ſeen, in our ſection on the theory of teleſcopes, how the powers may be calculated, when the focal diſtances of the glaſſes are known. In teleſcopes with one object-glaſs, or concave ſpeculum, and one eye-glaſs, the ſolar foci of which may be called F and f reſpectively, the power P may be always expreſſed by $\frac{F}{f}$; but F varies inverſely with the *diſtance* of an object viewed, while f remains the ſame, therefore the power P will vary alſo inverſely with the diſtance. So long ago as in the year 1740, Benjamin Martin, to whoſe ingenuity the practical opticians of the preſent day are much indebted, propoſed to determine diſtances at one ſtation by this *variation of power* in a long teleſcope; but as the diſtance increaſed, the proportional elongated portion of the ſliding tube containing the eye-glaſſes became ſo ſmall, that the ſcale was too limited to be of any real uſe. We mention this circumſtance, merely to ſhew that the ſame teleſcope with the ſame glaſſes has its powers naturally varying with the diſtance, but in an inverſe ratio, until the incident rays become parallel in conſequence of the great diſtance of the radiant object; hence we may account for the reaſon why the famous Short attributed to his teleſcopes powers which they did not poſſeſs, when directed to very diſtant objects. But, generally ſpeaking, when we ſay that a teleſcope magnifies fifty times, we are underſtood to mean, that it enlarges the diameter of the ſun, or of ſome *diſtant* object, ſo many times; becauſe in this caſe F and f remain both unaltered. (See LENS, 5.) But when the object viewed is at no great diſtance, calling the elongated portion of the ſolar focus e, and the diſtance d, Martin has ſhewn that $e : F :: F + e : d$, or that $\frac{\overline{F+e} \times F}{e} = d$; and he propoſed to determine the quantity of e in all ſituations by mechanical meaſurement. Now ſuppoſing the power to be conſidered as always determined from the ſolar focus of an object-glaſs or ſpeculum, in teleſcopes of the ſimpleſt conſtruction, this power, where the object-glaſs or ſpeculum remains the ſame, can be increaſed only by ſhortening the focus of the eye-glaſs or eye-piece, when it is compoſed of two glaſſes; but there is a limit in the power of dioptric teleſcopes conſtructed with ſingle object-glaſſes, which depends on the priſmatic and ſpherical aberrations, beyond which limit *indiſtinctneſs* takes place; and even in good achromatic and reflecting teleſcopes, the eye-piece may be ſhortened until a deficiency of *light* renders the increaſed power of little uſe, and thus fixes a limit to uſeful power.

After a power is fixed on, in the uſe of a ſimple teleſcope,

scope, such as admits of sufficient light, and allows a field of view large enough to contain the images of the object to be examined, the magnitude of this power may be ascertained by different means, besides $\frac{F}{f}$, which expression is better calculated to explain the theory than to define the practical result; for it is not an easy matter to measure precisely the *exact* compound solar *focus* of an eye-piece composed of two glasses, nor yet that of a single lens, when its focus is short, and consequently its substance considerable in thickness. Neither is it easy to obtain the *exact power* of a terrestrial eye-tube constructed on the principles of a compound microscope. The first practical method of measuring the total power of a telescope, that we shall describe, is extremely simple, and is applicable to telescopes of all constructions, however complex the calculation by theory may be, and gives the result with very little trouble. Whatever be the diameter of the object-glass or speculum of a telescope, in inches and parts, the diameter of its image, or luminous disc, formed in the anterior focus of the eye-piece, by the condensed rays, will bear the same proportion to that diameter, as the focal length of the eye-glass or glasses jointly, bears to the focal length of the object-glass or speculum; these diameters, therefore, may be substituted for the two foci of the respective glasses, or speculum and its eye-glass, in determining the power. Different methods of measuring the luminous disc have been proposed; a nicely divided slip of mother-of-pearl, fixed in a small piece of tube bearing a magnifier at the opposite end, forms a simple instrument, which has been called the pearl *dynameter*, (from δυναμεως, *of power*, and μετρον, *a measure*,) and which answers the purpose very conveniently, when sliding within another short tube for the sake of adjustment, as is seen in *fig.* 9. *Plate* XXIX.

Suppose that the disc of a telescope, with an object-glass of 3.25 inches diameter, measures $\frac{12}{200} = \frac{6}{100}$ of an inch by the pearl dynameter, then $\frac{3.25}{.06} = 54\frac{1}{6}$ is the power required to be measured: and if the same disc had been measured with a reflecting telescope of 7.5 inches diameter of the large speculum, whatever its construction in other respects, the power would have been $\frac{7.5}{.06} = 125$. The correctness of this simple method will depend on the accuracy with which the respective diameters of the disc and object-glass, or speculum, are taken, and the distance to which the telescope is adjusted for distinct vision. The powers of the four achromatic telescopes, for which we have adapted our Tables I. and II. in the next section, were taken in this way, when Troughton's micrometer was applied as a celestial eye-piece, and were determined to be as follow: *viz.*

In.			
30.15	focus	$\left\{ \frac{2.025}{.0663} \right.$	= 30.5 = power.
45.75	ditto	$\left\{ \frac{3.3}{.077} \right.$	= 45.3 = ditto.
63.5	ditto	$\left\{ \frac{3.5}{.0512} \right.$	= 63.5 = ditto.
118.8	ditto	$\left\{ \frac{3.000}{.052} \right.$	= 120.0 = ditto.

These powers, if the data had been taken with perfect accuracy, would have been respectively to each other as the focal lengths of the object-glasses directly, which they are nearly, or inversely as the values of the micrometrical screw, which values have been tabulated, as will be seen in our subsequent section; therefore, when the power of one of the telescopes is obtained accurately by the pearl dynameter, the powers of all the others may be had from the micrometrical values, by reciprocal proportion. Before, however, the dynameter is used, it will be necessary to adjust the eye-piece to distinct vision when viewing a remote object, otherwise the disc will be too small, and the power larger than when celestial observations are taken. Also, to avoid mistaking the anterior glass of the eye-piece for the disc or diminished image of the object-glass, a slip of paper may be stuck on the centre of the exterior face of the object-glass, the image of which will appear on the centre of the disc, and assist the adjustment of the dynameter to its true place of distinct vision, which is essential at the moment of taking the exact measure of the disc. If one of the celestial eye-pieces has got a divided slip of pearl, as recommended by Cavallo, to be used as a micrometer, the interior lens may be taken out, and then the eye-piece will become a dynameter for measuring the powers of all the other eye-pieces, whether celestial or terrestrial, in the way we have here described; but it will be more convenient to use one with a sliding tube of adjustment for distance, as made by T. Jones, of Charing-Cross.

As this dynameter has lately been constructed in an *improved* manner, by the maker we have just named, and as it has never been described, we will here give our readers a short account of its improved construction. *Fig.* 9. of *Plate* XXIX. represents this neat little instrument of nearly its full size, where *a*, *b*, and *c*, are so many small tubes within one another: the shortest tube, *a*, contains the two plano-convex lenses *f* and *g*, which constitute what we have called the positive, or Ramsden's eye-piece, with the two curved faces opposed to each other; and as this eye-piece screws into the tube *b*, near the end *g*, it may be considered as a part of this tube, when screwed into its place: the tube *b* has a slip of the mother-of-pearl, *d d*, very delicately made, and screwed fast across a diaphragm near its remote end, at such a distance from the lens *g*, that the screw of the eye-piece *a* will adjust the pearl for distinct vision, as an object in the compound focus of the eye-piece, for any eye that may have occasion to use it. The slip of pearl is divided into such minute parts, that 500 of them are equal to an inch, and yet the eye-piece has power enough to give a clear view of them, and to enable the eye to count the dividing strokes, of which every fifth is of double, and every tenth of four times the length of the subdividing strokes. When the scale is rendered clearly visible and legible, by the screw of adjustment, the tube *b* is inserted into the outermost tube *c*, which has a diaphragm and covered hole at *c*, and when this hole is uncovered, tube *c* is brought into contact with the eye-piece of the telescope, centre to centre, so as to receive the pencil of condensed rays, that usually enters the eye of a spectator; then, if the image of the object-glass of the telescope formed at the place of the eye, is not well defined on the slip of pearl, tube *b* must be pushed into tube *c*, till this will be the case, and then the number of divisions and sub-divisions of the pearl scale, that the little luminous circle exactly covers, will give the measure required; and if the number read be *doubled*, because they are 500th parts of an inch, they will then be so many parts out of 1000, and will therefore be decimal parts of an inch; the denominator being considered = 1000.

Another method of ascertaining the powers of a telescope, when a dynameter is not at hand, is by what is called *false vision*, which requires a little practice before it can be applied with success. By this method, one eye views the magnified image of a distant object *in* the telescope; and the

the other eye, being alſo uſed, but *out of* the teleſcope, projects that image upon a horizontal line, bounded by ſome obſervable diſtinct marks, that can be known again: then as often as the angle ſubtended at the place of obſervation by the object, of which the image was obſerved, is contained in the angle ſubtended by the horizontal line into which it was projected, ſo much does the image apparently exceed the object; *i. e.* ſo much does the teleſcope magnify. For inſtance, ſuppoſe that forty bricks in the wall of a diſtant building appeared juſt to occupy the whole field of view of any teleſcope, and that the angle ſubtended by thoſe bricks meaſured 50′, by any other inſtrument, which would be the caſe at the eighth of a mile very nearly; then ſuppoſe that the horizontal line covered by the forty magnified bricks, or by the luminous circle of the field of view, was bounded by two trees, and ſubtended an angle of 41° 40′; on theſe ſuppoſitions, the power would be $\frac{41^\circ\,40'}{50'} = 50$: and in this way, but not ſo well as by the pearl dynameter, a teleſcope compoſed of any number of glaſſes, or ſpecula and glaſſes, may have its power determined, without any regard to the radii of the glaſſes or ſpecula, or to their reſpective poſitions. Should the reſults of the two methods accord, it may be taken for granted, that the determination ariſing from the average is ſufficiently accurate. The powers of the four teleſcopes with the ſame eye-piece, which we have before mentioned, were taken again by this ſecond method, and found to be as in the ſubjoined ſtatement; *viz.*

In.		
30.15 focus -	$\frac{681'}{22'}$	= 30.9
45.75 ditto -	$\frac{681'}{14'.5}$	= 47.0
63.5 ditto -	$\frac{681'}{10'.5}$	= 64.8
118.8 ditto -	$\frac{681'}{5'.6}$	= 121.6

In taking theſe meaſures, it was found convenient to make uſe of the ſpace included between the two ſpider's lines of Troughton's micrometer, inſtead of the whole field of view; which ſubſtitution not only prevented diſtorſion, by confining the objects to the middle of the field of view, but diminiſhed the angle to be projected within the dimenſions of the pupil of the eye, ſo that the head did not require to be turned from its firſt poſition in making the projection. Two painted ſtaves were ſtuck into the ground at about 700 feet from the eye, at ſuch a diſtance from each other, that they could both be ſeen within about one-half of the field of view; the ſpider's lines were then opened till they coincided with the two ſtaves, when projected upon them by falſe viſion, and the value of the revolutions was then found to be as above ſtated. This was done with the teleſcope of 30.15 inches focus; but the ſame projection would have taken place at the ſame opening of the lines, with any of the other three teleſcopes at the ſame diſtance from the ſtaves; therefore it was not neceſſary to repeat this operation with the other teleſcopes, becauſe the reſpective values of the ſame opening, or number of revolutions, are given in our Tables I. and II., as will be ſeen preſently, for all the teleſcopes, as ſo many diviſors for the common dividend. Thus Troughton's micrometer may be uſed with great advantage in determining the power of any teleſcope to which it is adapted; and even Cavallo's may be ſubſtituted for the ſame purpoſe, when that eye-piece is uſed to which it is appropriated. But the moſt convenient, as well as moſt accurate dynameter that we have ſeen, is that which has an eye-glaſs divided, ſo as to form two images of the luminous diſc, when the centres of the ſemi-lenſes are ſeparated by a ſcrew with a divided head. This double-image dynameter was invented by Ramſden, probably ſoon after Dollond's object-glaſs micrometer was invented, and is now made by G. Dollond, and alſo, with ſome variation, by Thomas Jones, of Charing-Croſs, who was a pupil of Ramſden's ſchool. As this elegant and uſeful little inſtrument has not been deſcribed, we ſhall introduce a ſhort account of it in this place. *Fig.* 12. *Plate* XXIX. *of Aſtronomical Inſtruments*, repreſents the exterior appearance of Mr. Dollond's conſtruction, and *fig.* 14. its plan, when the covering plate is taken off; in both which figures the ſame letters refer to the ſame parts. The frame that contains the ſcrew is denoted by *a*, and *b* is the interior or ſliding-tube of braſs, made faſt to the ſaid frame, having the divided lens at the eye-end, near the letter of reference *a* in *fig.* 12; and *c* is the outer tube, which is placed in contact with the outermoſt eye-glaſs of the teleſcope, when the luminous diſc is to be meaſured, and admits of adjuſtment of the tube *b* to diſtinct viſion of the diſc: *d* is a milled head of a concealed ſcrew, which ſeparates the two ſemi-lenſes until the luminous diſc is ſeen double, with the oppoſite edge of each diſc nearly in contact, as in *fig.* 13: *e* is the divided head of the ſcrew, or micrometrical head, with 100 diviſions properly numbered; and *f* is the ſcale for indicating the number of revolutions of the ſcrew, as the divided head *e* does the parts of a revolution. The axis of this ſcrew is made faſt to the frame, ſo as not to move from its ſituation while it revolves, and is of bell-metal; it is made hollow within, and is tapped to a thread of the ſame fineneſs as that of the exterior ſcrew; then a ſmaller ſcrew of ſteel enters the tapped tube, as ſeen in *fig.* 14, and has its other end pinned faſt to the piece of braſs *g b*, at the point *g*, which piece carries one half of the divided lens, while the other half is carried by a ſimilar piece, *b h*, to which the ſcale *f* is alſo ſcrewed faſt. The foot-piece of *b h* is tapped, ſo as to receive the thick ſcrew of the axis; and a bent ſpring of metal, *i h*, bears againſt both pieces, *g b* and *b h*, ſo as to keep the ſcrews connected with them free from ſhake. During this deſcription of the concealed parts of the frame, the mechanical reader will have anticipated, that when the micrometer head, and nut *d*, made faſt to the axis of the thick ſcrew, turn together in the direction that makes the figures increaſe, the thick ſcrew will draw the piece *b h*, and with it the ſcale *f*, and one ſemi-lens, towards the nut; but as the ſmall ſcrew of ſteel is a left-handed ſcrew, *i. e.* has its thread winding in a contrary direction, and is faſt to the piece *g b*, it will recede from the nut, and take the other ſemi-lens in a contrary direction, ſo that the centres of the ſemi-lens will ſeparate with a velocity equal to the ſum of the contrary motions of the two ſemi-lenſes; and as theſe centres recede, the original diſc will become a double diſc, as in *fig.* 13, and may by ſeparation be made two diſcs, when the ſemi-lenſes are removed to their greateſt diſtance. Hence, when the value of one revolution is known, the amount of any given number of revolutions and parts is had, as being multiples of that revolution. In the dynameter before us, there is a diſc of thin horn or ivory, juſt $\frac{1}{10}$th of an inch in diameter, in the ſliding-piece that cloſes the aperture of the exterior end of tube *c*; and five revolutions of the ſcrew juſt divides this diſc into two contiguous ones, ſo that each ſubdiviſion of the micrometer *e* is juſt $\frac{1}{1000}$th of an inch, and when doubled, may be put down in decimal numbers. But there is another uſe of the horn diſc, beſides that of giving a value to the micrometer; it ſo fo much refembles the luminous difc formed by the image of the object-glafs which is to be meafured, that the mode of dividing this difc by the fcrew may be illuftrative of the mode of application to the meafurement of the actual difc formed with diftinct vifion, by the refracted rays that have paffed through the eye-tube of a telefcope.

This inftrument forms, befides, a pleafing microfcope not only for viewing, but for meafuring too, the real dimenfions of any microfcopic object; and when applied to a nicely divided fcale, it may be afcertained whether or not the horn difc is exactly $\frac{1}{10}$th of an inch in diameter; *viz.* whether or not five revolutions of the fcrew will bring the ftrokes that include $\frac{1}{10}$th of an inch into exact apparent coincidence; for if not, a correction depending on the excefs or deficiency muft be applied to all meafures of a luminous difc, that are to determine the total power of any telefcope; or otherwife the two lenfes of the eye-piece muft have their *diftance* between them fo adjufted, that five revolutions will exactly meafure $\frac{1}{10}$th of an inch; for as the two femi-lenfes, when brought to have their centres coincident, conftitute one of the two lenfes of a pofitive eye-piece, as in the pearl dynameter, and as in Troughton's micrometer, we have fhewn that altering the diftance between thefe lenfes, will alter their compound focus, and confequently their magnifying power, on which the apparent magnitude of the luminous difc depends. In ufing this inftrument, the eye is applied above the centre of the tube *b*, over *a* in *fig.* 12, and the tube *c* is ufed, as in the pearl dynameter, for adjuftment for diftinct vifion of the difcs.

When Ramfden firft made the double-image dynameter, as now conftructed by Mr. Dollond, and as we have here defcribed it, he found that there was fome play in the fcrews after they had been in ufe for fome time, fo that they would not immediately obey the direct and retrograde motions of the nut *d*; and that the lofs thus arifing affected the meafure by the femi-lenfes, which did not move contemporaneoufly; but in the inftrument under our examination there is no fault of this kind.

The dynameter which Ramfden confidered as on an improved conftruction, as it regards the imperfection juft noticed, is now made by his pupil Thomas Jones, who, we have faid, has alfo improved the pearl dynameter already defcribed. *Figs.* 10. and 11. reprefent the interior parts of Thomas Jones's dynameter, which we have alfo before us; there is no frame *a* here, but the tube *b* contains the lenfes of the eye-piece, of which that next the eye is divided, as in Dollond's inftrument; and the tube *c* is the fame, except that it carries a lens *k*, with which the divifions on the fcale *f* are read, when the dynameter has its pofition reverfed, after the meafurement is finifhed. The nut *d*, and divided head *e*, are alfo the fame as we have defcribed; but the femi-lenfes are not fixed in fliding-pieces of metal, fuch as we have defcribed; neither is the fcrew fimilar to what we have above noticed. Within the tube *b* is an interior tube of much fmaller diameter, and nearly of equal length, which is divided longitudinally into two fimilar halves, which turn on feparate pivots in a gimbal, or moveable ring, within the remote end of the tube *b*, and each femi-lens is fixed in the nearer end of its own femi-tube. Thefe femi-tubes are marked *m* and *n* refpectively in *fig.* 10, and one of the pivots in the ring is at *o*; the other being at the oppofite end of the diameter of the ring: the extreme ends of the pivots turn in the tube *b*. The fection of the femi-tubes, holding the femi-lenfes, is feen in *fig.* 11, together with the micrometer head and nut. The axis of the fcrew is of bell-metal, and folid: the end neareft to the micrometer head has threads of double finenefs to the end within the tube, and the action is fo ingenioufly contrived, that the femi-lenfes are moved in contrary directions by the fame fcrew, notwithftanding the threads all incline one way. The cylindrical nut *g* is tapped for the finer thread; and as this nut is fcrewed faft to the tube *b*, as feen in *fig.* 11. more plainly, the forward motion of this axis has its velocity guided by this fine part of the fcrew; and the end that enters the tube, preffes againft a ftud *h*, made faft to the femi-tube of the femi-lens 1; and a longitudinal counteracting fpring concealed in tube *b*, and made faft to it at the lower end, allows the femi-tube to recede, but preffes it clofe to the end of the fcrew; then another ftud *l*, made faft to the femi-tube of the femi-lens 2, is tapped for receiving the coarfer thread on the axis of the fame fcrew, which thus gives a double retrograde velocity to this femi-tube, compared with what it receives from the pufh of the finer fcrew; and as there are two threads in the fine fcrew for one in the coarfe one, and as both are cut on the fame axis, the apparent motion of the femi-lens 2, is actually the difference of two contrary, but contemporaneous motions; and thefe motions are fo flow, that five revolutions are equal to $\frac{1}{10}$th of an inch, and confequently the reading is in decimal numbers already. Otherwife, this dynameter is applied exactly as we have above explained.

Befides thefe dynameters, we have examined a double-image one by Dollond, in which the micrometer head was divided into forty parts, and in which the ivory difc was only $\frac{1}{16}$th of an inch, fo that 2.50 revolutions meafured the difc, and a *double* meafure might be obtained by making the contact of the two difcs firft to the left and then to the right, in order to make the error of zero vanifh, in which cafe half the fum of the two meafures was the true meafure corrected for the oppofite errors of zero, and the graduated circle or head of the micrometer turned ftiff on the axis of the fcrew for adjuftment to zero. This inftrument profeffed to have $5 \times 40 = 200$ divifions in $\frac{1}{10}$th of an inch, and confequently only 2000 in an inch; but on examining the value of a revolution with a fine fcale, we found that 198 divifions meafured $\frac{1}{10}$th of an inch: we will therefore exemplify the ufe of this inftrument, by fhewing how the correction for the imperfection of the fcale may be applied in actual practice. In the firft place, the fcrew is turned in a retrograde direction until contact of the two difcs takes place to the left of the original fingle difc; in this fituation the 40 on the divided head muft be put to zero, or the lozenge marked as a pointer to the micrometer head, and the ftroke indicated on the fmall fcale *f*, by another lozenge or index, muft be noted; then turn the fcrew, firft till the two difcs unite in one, where a fingle meafure might be taken, and then till they are again in contact to the right; in which fituation, the whole diameter of one difc will have croffed the whole diameter of the other, and therefore the fcrew and its parts will give a *double* meafure of the real diameter. In an actual trial of a telefcope, this double meafure was found to be two revolutions of the fcrew, and 37 parts of the head, or $\frac{37}{40}$ of another revolution; and on an average of feveral trials, $\frac{1}{10}$th of an inch was found not exactly equal to 200, but to 198 of the divifions of the head, as we have ftated above; then $\frac{117}{198}$ of $\frac{1}{10}$th of an inch was the double meafure of the difc; or $\frac{117}{3960} = .0295$ of an inch was the fingle meafure; and the diameter of the object-glafs being 3.24 inches, we have the power $= \frac{3.24}{.0295} = 110.1$ with great correctnefs, the telefcope having been previoufly adjufted for viewing the folar fpots. This was the determination of the power of our telefcope of 63.5 inches focal diftance, when No. 4. of the celeftial eye-pieces was on; and in the fame way all the other powers, celeftial or terreftrial,

trial,

trial, may as readily be obtained. T. Jones's conſtruction is however more convenient for uſe, and is more accurate, though it meaſures only one diſc, unleſs the power be great, and conſequently the diſc ſmall. The divided head is fixed faſt to the axis of the ſcrew, and is divided into 100 parts, 500 of which meaſure exactly $\frac{1}{20}$th of an inch, ſo that the inch is ſub-divided into 10,000 of theſe parts, and the decimal numbers are read off at once without calculation: thus, when the diſc is adjuſted to appear ſingle and well defined, the index, which is the edge of the ſcale *f*, ſtands at 100, or zero of the micrometer head, and the edge of the circular rim of the head is coincident with the firſt ſtroke of the ſcale; but when one revolution of the ſcrew has taken place, the ſaid edge is found coincident with the ſecond ſtroke of the ſcale, and ſo on, as the divided head revolves; when the two diſcs were brought into contact, the quantity indicated, as ſeen through a lens *k*, was 2.95, *viz.* two revolutions, and $\frac{95}{100}$ on the head of the ſcrew; but in this inſtrument, five revolutions, we have ſaid, are equal to $\frac{1}{20}$th of an inch, and therefore one revolution $= \frac{1}{100}$, conſequently $\frac{295}{10000}$, or .0295 of an inch, is the meaſure, as before; ſo that all that is requiſite to do, in regiſtering the meaſures taken with this inſtrument, is to prefix a cipher to the figures read off by inſpection, and then the decimal quantity, or diviſor, is had, without further calculation, for a teleſcope of any aperture, either dioptric or cata-dioptric, and of any conſtruction.

In both Dollond's and T. Jones's dynameters the diſc is ſeen without diſtorſion and without priſmatic colours, and the inſtrument forms a ſingle microſcope of the moſt uſeful kind; for, by the latter in particular, ſmall objects may have their dimenſions taken to the accuracy of $\frac{1}{10000}$th part of an inch, and at the ſame time the figures may be had by inſpection, from the ſcale and its parts, to form places in decimals when a cipher is prefixed, as we have above explained. The powers of our four teleſcopes, with the eye-piece of Troughton's micrometer, were found by T. Jones's double-image dynameter agreeably to the ſubjoined ſtatement; *viz.*

In.				
30.15 focus	-	$\left\{\frac{1.50}{.049}\right.$	$= 30.6$	= power.
45.75 ditto	-	$\left\{\frac{3.50}{.076}\right.$	$= 46.0$	= ditto.
63.5 ditto	-	$\left\{\frac{3.25}{.0504}\right.$	$= 64.5$	= ditto.
118.8 ditto	-	$\left\{\frac{3.000}{.0252}\right.$	$= 119.0$	= ditto.

In all the three determinations of powers, the adjuſtment for viſion was to a diſtant *terreſtrial* object, and conſequently theſe are ſomewhat too great. From the experience we have had of theſe different modes of aſcertaining the powers of a teleſcope, we have no heſitation in giving the preference to the double-image dynameter, in which the two images may be brought into very nice contact: whereas in the pearl dynameter, which is alſo very good, ſomething is always left to eſtimation in taking the fractional part of a diviſion; and when *falſe viſion* is uſed, the adjuſtment of the eyes to different diſtances, one within the teleſcope and the other without, at the ſame time, leaves conſiderable uncertainty in the ſize of the projected field of view, which will vary according to the ſtate and poſition of the eye in every trial. We mention this laſt circumſtance as worthy of conſideration, becauſe ſeveral micrometrical determinations of the diſtance between double ſtars have been made, particularly by ſir W. Herſchel, where the *power* of the teleſcope determined by *falſe viſion* is made in effect the *ſcale* of the *meaſure*; conſequently if the *power* is not accurately aſſigned, the *meaſure* of the angular diſtance depending on it will be proportionably erroneous. Aſtronomers, we repeat, are yet in want of an unobjectionable mode of meaſuring the angular diſtances of *very ſmall* double ſtars, which cannot be ſeen when extraneous light is admitted into the teleſcope, and which therefore have hitherto been projected on two luminous points, placed at meaſured diſtances from each other, for the purpoſe of aſcertaining the apparent celeſtial interval in its magnified ſtate, from a compariſon with a known terreſtrial interval in its unmagnified ſtate, which method is liable to conſiderable uncertainty, and can only be admiſſible upon the principle of its admitting of an average taken from a ſucceſſion of meaſures under different circumſtances.

We have already explained, in our preceding ſection, how the powers of any teleſcope that has a terreſtrial eye-tube, may be varied by the application of the celeſtial eye-pieces to the eye-end of this, by the help of adapters, and therefore we ſhall only ſay further on this part of our ſubject, that however the power is varied by changes of poſition of the eye-pieces, or by additional field-glaſſes, any of the dynameters will give the total power, under any of the diſpoſitions, by the ſimple meaſurement of the diſc, which we have explained; but ſhould there be any doubt about the *excluſion* of the rays incident on the extreme circular edge of the object-glaſs by the diaphragm, or by Troughton's new illuminator, a meaſured circle, or long ſlip of paper, ſtuck to the face of the object-glaſs, muſt neceſſarily be ſubſtituted for the glaſs itſelf, which we were obliged to do with three out of the four of our teleſcopes, and then its image at the eye muſt be ſubſtituted for the *diſc*, that we have hitherto deſcribed as the true image of the glaſs itſelf, which it will be only when *all* the rays are tranſmitted and refracted to a focus at the place of the ſaid diſc or image.

In all refracting teleſcopes, that are not achromatic, of which indeed very few are now made, the *indiſtinctneſs* of an object is directly as the area of the aperture, and inverſely as the ſquare of the focal diſtance of the eye-glaſs, when this is ſingle, becauſe the aberrations are proportional to theſe data; but in a reflecting teleſcope, the indiſtinctneſs will be, with ſpherical curves, as the ſixth power of the diameter of the large ſpeculum directly, and as the fourth power of its focal diſtance inverſely, and alſo as the ſquare of the focal diſtance of the eye-glaſs inverſely.

The *light* in any teleſcope, refracting or reflecting, if we diſregard what is loſt by reflection, is directly as the ſquares of the linear apertures, and inverſely as the ſquare of their linear amplifications.

In refracting teleſcopes of various lengths, not achromatic, a given object will appear equally bright and diſtinct, when their linear apertures, and the focal diſtances of their ſingle eye-glaſſes, are ſeverally in a ſubduplicate ratio of their lengths, or focal diſtances of their object-glaſſes: and then alſo their linear amplifications will be in a ſubduplicate ratio of their focal lengths. But in reflecting teleſcopes, and in the beſt achromatic refractors, of various lengths, a given object will appear equally bright and equally diſtinct, when their linear apertures, and alſo their linear amplifications, are as the ſquare-ſquare roots of the cubes of their lengths; and conſequently when the focal diſtances of their eye-glaſſes are alſo as the ſquare-ſquare roots of their lengths. See Smith's Optics, p. 140, et ſeq.

6. *Meaſures taken by Micrometrical Teleſcopes.*—Though the primary uſe of a teleſcope is to render a diſtant object viſible,

visible, by amplifying the visual angle, yet its application to the measurement of small angles was an object that engaged the astronomer's attention at no great distance of time from its invention. When the apparent diameters of the planetary bodies had once been increased, so as to subtend an appreciable angle at the eye of the observer, it soon became a matter of interest to measure those angles in their enlarged state. We have already given the description of the different MICROMETERS that have been successively applied to a telescope for the purpose of measuring minute angles, and terrestrial distances corresponding thereto; but we have reserved our account of the means proper to be used in these operations, as constituting a portion of our present article. We propose to illustrate the use of a few of the most accurate and useful micrometers by such examples, as will suffice to render the application of any other micrometer intelligible.

When an object to be viewed is remote, the rays of light which proceed from it may be considered as coming from it in parallel lines, and in this case the focus of the object-glass, or speculum, is the shortest possible; consequently, the power of the instrument depending on this focal distance, is the smallest possible with the same eye-piece; but the rays which proceed from a near object, come to the object-glass or speculum *diverging*, and consequently do not come to a focus so soon as in the former case; so that the *power* is greater than when a distant object is viewed. This variation of power depending on the distance of the object viewed, is accompanied by a new adjustment of the eye-piece for distinct vision in every telescope of considerable magnitude; and the longer the focus of the object-glass is, the greater is the variation of power with the same variation of distance. Hence the angle that is measured by any of the micrometers attached to a telescope, is the true angle only when the object subtending that angle is remote; and a correction, depending both on the distance and focal length of the telescope, becomes necessary for converting the *apparent* measured angle into the *true* one. To a want of attention to this circumstance in the practical application of micrometrical telescopes to the measurement of terrestrial distances, is principally to be attributed the failure of their success; and celestial objects have consequently engrossed their utility almost exclusively. We conceive, therefore, that we shall render our readers an acceptable service by shewing, not only how small celestial angles may be measured by a telescope fitted up with an accurate micrometer, but also how terrestrial angles, subtended by objects at various distances, may be ascertained, and their corresponding distances be obtained with great accuracy; and that by simple vision at one station, when the distance is not very considerable. The composer of the present article has made experiments with different micrometers adapted to telescopes of various lengths, and can therefore illustrate the theory by actual examples in sufficient variety.

Celestial Measures.—When a micrometer of any description, mechanical or optical, is proposed to be used with a telescope, it is necessary that the value of one of its divisions be ascertained with that identical telescope when viewing a remote object, such as a heavenly body; or otherwise, that a correction for distance be applied previously to the determination of such value. We will first suppose the object at a sufficient distance to require no correction for want of parallelism of the rays of light, and will shew how to appreciate the micrometrical scale for such remote distance without correction. The diameter of the sun has been so well ascertained by actual measurement of the best instruments, from month to month, and from year to year, that it may be taken from the Nautical Almanac, or Connoissance des Tems, on any given day, as a standard, from which the value of a corresponding number of divisions on the scale of the micrometer may be assigned with great accuracy, after allowance is made for apparent variation in the sun's diameter by altitude; and when the number of minutes and seconds corresponding to a certain number of divisions on the scale is ascertained, the value of one division is readily obtained by dividing the whole number of minutes and seconds by the whole number of divisions that measure the said quantity: and then whatever may have been the error of the observation, as affecting the whole scale, the quantity of it belonging to one division will be only $\frac{1}{30}$, $\frac{1}{40}$, or $\frac{1}{50}$ of the whole, accordingly as there were 30, 40, or 50 divisions in the scale that corresponded to the correct diameter of the sun. For instance, on the 7th of August 1815, the sun's diameter was measured at noon by a Troughton's micrometer, attached to a five-feet refracting achromatic telescope made by Tulley, and was found to be equal to 60.65 turns of the screw, when taken in a vertical direction, while the sun passed horizontally between the two parallel spider's lines in the focus of the eye-piece. In this situation the altitude of the sun was so great, that the difference between the refractions of the upper and lower limbs was insensible, and therefore may be neglected in the calculation of the value of the scale of notches that indicate the revolutions of the screw. On this day, the semi-diameter of the sun, as given in the Nautical Almanac, was $15' \, 48''.3$, and the notches corresponding to the sun's diameter were 60.65, or 60 entire notches, and $\frac{65}{100}$ taken from the divided head of the screw; then $\frac{15' \, 48''.3 \times 2}{60.65} = 31''.27$ is the value of one notch, or revolution of the screw, according to this observation. Again, on the 15th of October, of the same year, the sun's diameter, at nine o'clock A. M., was found equal to 61.50 revolutions of the same screw, used with the same telescope, when the sun's semi-diameter is given $16' \, 4''.8$, or the diameter $32' \, 9''.6$; but at the low altitude at which this measure was taken, the difference of the two refractions of the upper and lower limbs amounted, by the table of refractions, to $2''.6$, to be subtracted from the real to produce the apparent diameter, because the vertical diameter was contracted by this quantity, the lower limb being more elevated by refraction than the upper one; therefore, according to this observation, the value comes out $\frac{32' \, 7''}{61.5} = 31''.33$ for each revolution; hence the average of the two measures, taken at different times, and at different altitudes, is $\frac{31''.27 + 31''.33}{2} = 31''.3$, which determination accords with measures taken at other periods, and also with terrestrial measures subsequently taken, as will appear hereafter.

When this value of the micrometer's revolutions was ascertained, the solar focus of the object-glass was exactly measured, and found to be 63.5 inches. Three other achromatic telescopes were then procured, and had the same micrometer adapted to them respectively, by as many rings of brass, which had each a male and a female screw: the former to screw into the tube of its telescope, and the latter to receive the coarse thread of the micrometer; which rings we have called *adapters*. The focal lengths of the respective object-glasses were found by accurate measurement to be 30.15, 45.75, and 118.3 inches; and the corresponding values

values of the micrometer's revolution, found as above deſcribed, were 66″.0, 43″.5, and 16″.8; *viz.* exactly in the inverſe proportion of their focal lengths, as the theory requires. Hence, when the value of the micrometer is known with a teleſcope of a known focal length, its value may be had, when applied to any other teleſcope of a determined focal length, by reciprocal proportion; for as 30.15 in. : 63.5 in. :: 31″.3 : 66″.0; and converſely, when the values are known, and the focal length of one of the teleſcopes, the focal lengths of all the others may be determined; which is equally the caſe with the *powers*, depending ſolely on the focal lengths when the ſame eye-piece is uſed with each. When the values of the micrometer ſcrew had been determined, both by meaſurement of the ſun, and by mutual compariſon of the focal lengths of the four achromatic teleſcopes, the two following tables were conſtructed to facilitate the uſe of the micrometer with any or all of the ſaid teleſcopes, which we ſubjoin as a ſpecimen by which other tables may be conſtructed by the ſimple arrangement of the multiples of the value of unity.

Table I.—Values of entire Revolutions of the Micrometer's Screw, with four different Teleſcopes.

Revol.	30.15	45.75	63.5	118.3	Revol.	30.15	45.75	63.5	118.3
	′ ″	′ ″	′ ″	′ ″		′ ″	′ ″	′ ″	′ ″
1	1 6	0 43.5	0 31.3	0 16.8	31	34 6	22 28.5	16 10.3	8 40.8
2	2 12	1 27.0	1 2.6	0 33.6	32	35 12	23 12.0	16 41.6	8 57.6
3	3 18	2 10.5	1 33.9	0 50.4	33	36 18	23 55.5	17 12.9	9 14.4
4	4 24	2 54.0	2 5.2	1 7.2	34	37 24	24 39.0	17 44.2	9 31.2
5	5 30	3 37.5	2 36.5	1 24.0	35	38 30	25 22.5	18 15.5	9 48.0
6	6 36	4 21.0	3 7.8	1 40.8	36	39 36	26 4.0	18 14.8	10 4.8
7	7 42	5 4.5	3 39.1	1 57.6	37	40 42	26 47.5	19 18.1	10 21.6
8	8 48	5 48.0	4 10.4	2 14.4	38	41 48	27 33.0	19 49.4	10 38.4
9	9 54	6 31.5	4 41.7	2 31.2	39	42 54	28 16.5	20 20.7	11 55.2
10	11 0	7 15.0	5 13.0	2 48.0	40	44 0	29 0.0	20 52.0	11 12.0
11	12 6	7 58.5	5 44.3	3 4.8	41	45 6	29 43.5	21 23.3	11 28.8
12	13 12	8 42.0	6 15.6	3 21.6	42	46 12	30 27.0	21 54.6	11 45.6
13	14 18	9 25.5	6 46.9	3 38.4	43	47 18	31 10.5	22 25.9	12 2.4
14	15 24	10 9.0	7 18.2	3 55.2	44	48 24	31 54.0	22 57.2	12 19.2
15	16 30	10 52.5	7 49.5	4 12.0	45	49 30	32 37.5	23 28.5	12 36.0
16	17 36	11 36.0	8 20.8	4 28.8	46	50 36	33 21.0	23 59.8	12 52.8
17	18 42	12 19.5	8 52.1	4 45.6	47	51 42	34 4.5	24 31.1	13 9.6
18	19 48	13 3.0	9 23.4	5 2.4	48	52 48	34 48.0	25 2.4	13 26.4
19	20 54	13 46.5	9 54.7	5 19.2	49	53 54	35 31.5	25 33.7	13 43.2
20	22 0	14 30.0	10 26.0	5 36.0	50	55 0	36 15.0	26 5.0	14 0.0
21	23 6	15 13.5	10 57.3	5 52.8	51	56 6	36 58.5	26 36.3	14 16.8
22	24 12	15 57.0	11 28.6	6 9.6	52	57 12	37 42.0	27 7.6	14 33.6
23	25 18	16 40.5	11 59.9	6 26.4	53	58 18	38 25.5	27 38.9	14 50.4
24	26 24	17 24.0	12 31.2	6 43.2	54	59 24	39 9.0	28 10.2	15 7.2
25	27 30	18 7.5	13 2.5	7 0.0	55	60 30	39 52.5	28 41.5	15 24.0
26	28 36	18 51.0	13 33.8	7 16.8	56	61 36	40 36.0	29 12.2	15 40.8
27	29 42	19 34.5	14 5.1	7 33.6	57	62 42	41 19.5	29 44.1	15 57.6
28	30 48	20 18.0	14 36.4	7 50.4	58	63 48	42 3.0	30 15.4	16 14.4
29	31 54	21 1.5	15 7.7	8 7.2	59	64 54	42 46.5	30 46.7	16 31.2
30	33 0	21 45.0	15 39.0	8 24.0	60	66 0	43 30.0	31 18.0	16 48.0

Table

TABLE II.—Value of the Parts of the Micrometer's Screw, with four different Telescopes.

Parts.	30.15	45.75	63.5	118.3	Parts.	30.15	45.75	63.5	118.3	Parts.	30.15	45.75	63.5	118.3
	″	″	″	″		″	″	″	″		″	″	″	″
.01	0.7	0.4	0.3	0.2	.35	23.1	15.2	10.9	5.9	.69	45.6	30.0	21.6	11.6
.02	1.3	0.9	0.6	0.3	.36	23.8	15.6	11.3	6.0	.70	46.2	30.4	21.9	11.7
.03	2.0	1.3	0.9	0.5	.37	24.4	16.1	11.6	6.2	.71	46.9	30.9	22.2	11.9
.04	2.6	1.7	1.2	0.7	.38	25.1	16.5	11.9	6.3	.72	47.6	31.3	22.5	12.1
.05	3.3	2.2	1.6	0.8	.39	25.8	17.0	12.2	6.5	.73	48.2	31.7	22.8	12.3
.06	4.0	2.6	1.9	1.0	.40	26.4	17.4	12.5	6.7	.74	48.9	32.2	23.2	12.5
.07	4.6	3.0	2.2	1.2	.41	27.1	17.8	12.8	6.9	.75	49.5	32.6	23.5	12.6
.08	5.3	3.5	2.5	1.3	.42	27.8	18.3	13.1	7.0	.76	50.2	33.0	23.8	12.8
.09	5.9	3.9	2.8	1.5	.43	28.4	18.7	13.5	7.2	.77	50.9	33.5	24.1	12.9
.10	6.6	4.3	3.1	1.7	.44	29.1	19.1	13.8	7.4	.78	51.5	33.9	24.4	13.1
.11	7.3	4.8	3.4	1.8	.45	29.7	19.5	14.1	7.5	.79	52.2	34.4	24.7	13.3
.12	8.0	5.2	3.8	2.0	.46	30.4	20.0	14.4	7.7	.80	52.8	34.8	25.0	13.5
.13	8.6	5.6	4.1	2.2	.47	31.0	20.4	14.7	7.9	.81	53.5	35.2	25.3	13.7
.14	9.2	6.1	4.4	2.3	.48	31.7	20.9	15.0	8.0	.82	54.2	35.7	25.7	13.8
.15	9.9	6.5	4.7	2.5	.49	32.4	21.2	15.3	8.2	.83	54.8	36.1	26.0	14.0
.16	10.6	7.0	5.0	2.7	.50	33.0	21.7	15.6	8.4	.84	55.5	36.5	26.3	14.1
.17	11.2	7.4	5.3	2.8	.51	33.7	22.1	16.0	8.5	.85	56.2	37.0	26.6	14.3
.18	11.9	7.8	5.6	3.0	.52	34.4	22.6	16.3	8.7	.86	56.8	37.4	26.9	14.4
.19	12.5	8.3	5.9	3.2	.53	35.0	23.0	16.6	8.9	.87	57.5	37.8	27.2	14.6
.20	13.2	8.7	6.3	3.3	.54	35.7	23.4	16.9	9.0	.88	58.1	38.3	27.5	14.8
.21	13.9	9.1	6.6	3.5	.55	36.3	23.9	17.2	9.2	.89	58.8	38.7	27.9	14.9
.22	14.5	9.6	6.9	3.7	.56	37.0	24.3	17.5	9.4	.90	59.4	39.1	28.2	15.0
.23	15.1	10.0	7.2	3.9	.57	37.7	24.7	17.8	9.5	.91	60.1	39.6	28.5	15.2
.24	15.8	10.4	7.5	4.0	.58	38.3	25.2	18.1	9.7	.92	60.7	40.0	28.8	15.3
.25	16.5	10.9	7.8	4.2	.59	38.9	25.6	18.5	9.9	.93	61.4	40.4	29.1	15.5
.26	17.2	11.3	8.1	4.3	.60	39.6	26.1	18.8	10.0	.94	62.0	40.9	29.4	15.7
.27	17.8	11.7	8.4	4.5	.61	40.3	26.5	19.1	10.2	.95	62.7	41.3	29.7	15.9
.28	18.5	12.2	8.8	4.7	.62	41.0	26.9	19.4	10.4	.96	63.4	41.7	30.0	16.1
.29	19.2	12.6	9.1	4.9	.63	41.7	27.4	19.7	10.5	97	64.0	42.2	30.4	16.3
.30	19.8	13.0	9.4	5.0	.64	42.3	27.8	20.0	10.7	.98	64.7	42.6	30.7	16.4
.31	20.5	13.5	9.7	5.2	.65	42.9	28.3	20.3	10.9	99	65.3	43.1	31.0	16.6
.32	21.2	13.9	10.0	5.3	.66	43.6	28.7	20.7	11.1	1.00	66.0	43.5	31.3	16.8
.33	21.8	14.3	10.3	5.5	.67	44.3	29.1	21.0	11.2					
.34	22.5	14.8	10.6	5.7	.68	44.9	29.6	21.3	11.4					

The use of these tables will be best understood from a few real examples.

1. The sun's diameter was taken by Troughton's micrometer, applied to the telescope of 45.75 inches focal length, on the 27th of May 1815, when his altitude was so high as to require no correction for the difference of the two refractions of the lower and upper limbs, and was found equal to 43.62 turns of the screw: then by Table I. 43 = 31′ 10″.5, and by Table II. .62 = 26″.9, the sum of which is 31′ 37″.4, the diameter given in the Nautical Almanac being 31′ 37″. In this observation the thickness of the spider's line was allowed for.

2. On the 7th of August 1815, the sun's diameter at noon measured 60.60 turns, when the micrometer was used with the telescope of 63.5 inches focal length; whence we have 60 in Table I. = 31′ 18″, and .60 in Table II. = 18″.8, making together 31′ 36″.8, the diameter in the Nautical Almanac for that day being 15′ 48″.3 × 2 = 31′ 36″.6. When these measures were taken, the telescope was on an equatorial stand, and the parallel lines were so placed, that the sun's body passed along the space contained between them, without any apparent variation of altitude, which position is necessary in every observation taken with Troughton's micrometer, when the object has an apparent motion.

3. On the 14th of August 1815, the moon's diameter was measured about 9 P.M. not far from the meridian, when her altitude was about 18°, with Troughton's micrometer, attached to the telescope of 45.75 inches focus, and was found equal to 41.52 turns of the screw; the horizontal semi-diameter, according to the Nautical Almanac, being at noon 15′ 4″, and at midnight 15′ 0″, consequently at the time 15′ 1″. To the horizontal diameter 30′ 2″, add the augmentation at 18° altitude, (from Table IV. of the *requisite tables*,) *viz.* 5″, and the diameter in altitude will be 30′ 7″. Now from Table I. take the value of 41 turns = 29′ 43″.5, and from Table II. take the value of .52 = 22″.6; the sum of which two values will be 30′ 6″.1, which must be increased by 5″, the difference of refraction at 18°, and 18° 30′ of altitude; so that the diameter, when the reductions are all made, is too great by 4″ nearly, which error may be in the lunar tables, or in the observation, which was made when the moon's age was only eleven days, and therefore under an unfavourable circumstance;

for

for in this ſituation the illuminated portion of the moon is always apparently larger than the dark portion.

4. The ſun's diameter was again taken at nine o'clock A.M. on the 15th of October, with the teleſcope of 63.5 inches, and was found equal to 61.56 turns, when the altitude was ſuch as to require an addition of 2″.6 for the variation of the refraction in half a degree of altitude; and here we have from Table I. 60 + 1 = 31′ 18″ + 31″.3 = 31′ 49″.3, and from Table II. .56 = 17″.5, making, together with + 2″.6 the correction, the ſum 32′ 9″.4, the diameter given in the Nautical Almanac being 16′ 4″.8 × 2 = 32′ 9″.6.

In all theſe examples, as well as in the data from which the preceding tables were computed, Troughton's micrometer was uſed as a celeſtial eye-piece, where the object was conſequently inverted, which is the manner in which this micrometer was intended to be uſed; but according to the conſtruction of the modern terreſtrial eye-tube, this micrometer may be ſubſtituted, by help of an adapter, for the two glaſſes at the eye-end of this tube, in which ſituation the magnifying power is very conſiderably increaſed, and conſequently the ſcale rendered capable of meaſuring ſmaller portions of a ſecond, than in the uſual way, particularly when there is light enough in the field of view, *i. e.* when the object-glaſs has a large diameter. When the micrometer in queſtion is applied to the eye-end of the terreſtrial tube of the teleſcope of 45.75 inches, one turn is equal to only 16″.03, which ſhews the power to be ſomewhat greater than when the 118.8 inches teleſcope was uſed as a celeſtial teleſcope with the ſame micrometer; and with the teleſcope of 63.5 inches, which has three pair of ſeparate field-glaſſes, the terreſtrial powers with the ſaid micrometer gives the reſpective values of one turn of the ſcrew 9″.97, 7″.98, and 5″.15; ſo that this teleſcope has four various values of the micrometrical ſcale, which may be uſed in ſucceſſion for meaſuring the ſame angle, according to circumſtances, and each variety may have a ſeparate table computed for its particular uſe. This application of Troughton's micrometer to the terreſtrial tube, and the additional pairs of field-glaſſes, were contrived by the author of this article, and led to another addition, which in itſelf admits of ſtill greater varieties. On obſerving that the modern terreſtrial eye-tube is in fact a *compound microſcope*, it occurred to him, that there are three modes of increaſing the power of this inſtrument; firſt, by ſhortening the compound focus of the eye-glaſſes; ſecondly, by ſhortening the compound focus of the pair of field-glaſſes; and thirdly, by lengthening the diſtance between the compound eye-glaſs and compound field-glaſs (or object-glaſs of the microſcope). The two former modes had now been tried, and afforded the varieties in the meaſures which we have ſpecified: the laſt one was therefore reſorted to thus; a tube was made to ſlide within the terreſtrial tube, after its own eye-piece was withdrawn, and the micrometer was made to ſcrew into this moveable tube, ſo as to vary the diſtance of the micrometer glaſſes from the field-glaſſes of the teleſcope at pleaſure. The reſult proved as was expected; every new poſition for diſtance gave a new value to the ſcale of the micrometer, and the two extremes of theſe values, with the 63.5 inch teleſcope, were 10″ and 5″ reſpectively *per* revolution of the ſcrew; at leaſt the points were found by experiment on the ſliding tube, where theſe values, and alſo the intermediate ones 9″, 8″, 7″, and 6″ *per* revolution, were marked with a graver. The diſtances of theſe points depended on the field-glaſſes uſed with the ſliding tube; and three ſets of points were inſerted, to correſpond to the three pairs of field-glaſſes, any one of which admitted the ſcale to be ſubdivided into tenths of a ſecond. This mode of applying a ſliding micrometer in the terreſtrial tube is as uſeful as novel; for when the poſition is made for an exact number of ſeconds *per* turn of the ſcrew, the tables are diſpenſed with; the only operation being to multiply the number of turns by the number of ſeconds belonging to the poſition of the ſliding tube, and then to reduce them to minutes by 60 as a diviſor. A few examples will render theſe new methods of uſing the micrometer perfectly intelligible, and will at the ſame time ſhew that they contribute greatly to accuracy, by a ſpecies of repetition of the meaſure, of which they are capable. We will firſt exemplify the method without the ſliding tube.

1. The meaſures of Jupiter's diameter, taken by the 63.5 inch teleſcope on the 19th of April 1816, were as follow:

By Troughton's micrometer uſed as a celeſtial eye-piece -	1.43	× 31.3 ″	=	44.8 ″
By N° 1. of the field-glaſſes with the terreſtrial tube -	4.23	× 9.97	=	42.2
By N° 2. of ditto - -	5.53	× 7.98	=	44.13
By N° 3. of ditto - -	8.32	× 5.15	=	42.85
			4)	173.98
Average of the four meaſures - -			=	43.495

The values of the three field-glaſſes had been taken by terreſtrial meaſurement at 700 feet, on the 31ſt of March 1816, and may require farther correction.

2. On the 30th of April 1816, Jupiter being very nearly in oppoſition, his diameter was meaſured with the 45.75 inch teleſcope, which has only two varieties, a celeſtial and a terreſtrial application of the micrometer, and the reſult was thus: *viz.*

By the celeſtial meaſure, taken to the right of zero - - -	1.04 turns.	
By the ſame, taken to the left of zero -	1.05 ditto.	
	2)2.09	
	1.045	= 43.52 ″
By the terreſtrial meaſure 2.72 × 16″.03		= 43.50
		2)87.02
The average of the celeſtial and terreſtrial meaſures		= 43.51

3. On the 25th of October 1815, the following meaſures were taken of the diameter of Mars with Troughton's micrometer attached to the ſliding tube of the teleſcope 63.5 inches; *viz.*

	Turns.		″		″
Firſt poſition at the dot of 7″ with third field-glaſs -	3.43	×	7	=	24.01
Second poſition with ditto -	2.96	×	8	=	23.68
Third poſition with ditto -	2.68	×	9	=	24.12
Fourth poſition with ditto -	2.40	×	10	=	24.00
With N° 1. field-glaſs and its dot 4″ - - -	6.0	×	4	=	24.00
With N° 2. field-glaſs and its dot 8″ - - -	3.0	×	8	=	24.00
With the micrometer uſed as a celeſtial eye-piece -	0.77	×	31.3	=	24.10
				7)	167.91
					23.987

Theſe

Thefe obfervations of Mars were made near the meridian, when he was a little paft oppofition, and confequently when his diameter was near a maximum, which circumftance we mention, becaufe aftronomers have given very difcordant accounts of the apparent diameter of this planet; and perhaps no determination has been more accurate than we have here given.

4. The fun's diameter was meafured at noon on the 24th of September 1816, by Troughton's micrometer adapted to the 30.15 inch telefcope, in the following manner; *viz.*

By the celeftial power -	$29.21 \times 65''.7$	$= 31'\ 59''.1$
By the terreftrial, with the eye-tube flided to dot 30″	63.92×30	$= 31\ 57.6$
By the terreftrial, at dot 28″	68.50×28	$= 31\ 58.0$
By the terreftrial, at dot 25″	76.74×25	$= 31\ 58.5$
		4)127 53.2
Average meafure - - - - -		$= 31\ 58.3$
By the Nautical Almanac $15'\ 59''.1 \times 2$		$= 31\ 58.2$

On the fliding tube of this telefcope, the dots on the fcale run from 31″ to 19″, at which dots the powers are to each other inverfely as thefe numbers; but the whole diameter of the fun cannot be taken on the fcale of the micrometer when a greater power is ufed, than when the pofition is at dot 25″, or middle dot of the fliding tube, where the power is about 82.

In thefe four examples, the diameters meafured were the vertical diameters, for taking which Troughton's micrometer is peculiarly adapted; but the horizontal diameter of a body in motion cannot be taken with the fame accuracy with this inftrument, on account of the difficulty of keeping the extreme edges of the object in contact with the fpider's lines, while the final adjuftment of the meafure is making. For this purpofe, Dollond's divided object-glafs micrometer is more convenient, and may have its fcale appreciated, and the values thereof tabulated in the way we have already explained. For inftance, we obtained a divided object-glafs, with the requifite adjuftments both for circular motion and for the feparation of the centre of the femi-lenfes, of three inches and a half diameter, and fitted it over the object-end of the 45.75 inch achromatic of Tulley, while the original object-glafs, of the fame dimenfions, remained in its place. The focus of this divided object-glafs was fo long, that it fhortened the original focus only to 40.3 inches. The fcale of the object-glafs is divided into inches and twentieth parts of an inch, one of which parts or fubdivifions is again reduced by a vernier into twenty-five fubordinate parts, fo that $\frac{1}{25}$ of $\frac{1}{20}$, or $\frac{1}{500}$th of an inch, is the fmalleft quantity appreciable by the vernier. On the 9th of Auguft 1816, when the fun's diameter was 31′ 37″, or 1897″, the oppofite limbs of the two apparent images of the fun coincided when the fcale indicated three inches, one-twentieth part, and eleven towards 25 on the vernier, after an allowance was made for the index error by a croffed obfervation of a very fmall angle. Now thefe numbers reduced into the loweft denomination, give 1536 parts of the vernier, and $\frac{1897''}{1536} = 1''.235$ is the value of one of thofe parts; but by a terreftrial meafurement, to be explained hereafter, the value taken at 700 feet diftance, with a correction for want of parallelifm of the rays at this diftance, the value came out $\frac{888''}{713} = 1''.245$; the average of which two determinations, unconnected with each other, is 1″.24 for each unit read on the vernier, and this determination was afterwards confirmed by an obfervation of the fun taken on the 25th September 1816, *viz.* $\frac{1919''}{1549} = 1''.24$ very nearly. After having given a value to Dollond's micrometer thus fitted up, on the 21ft of Auguft 1816, the diameter of Saturn's ring was meafured when its longer diameter was very nearly horizontal, both to the right and left of zero, and was found equal to one fubdivifion and 7.7 on the vernier, or $25 + 7.7 = 32.7$ parts of the vernier; then $32.7 \times 1''.24 = 40''.548$ is the meafure of the greateft length of Saturn's ring taken near the meridian, when the paffage was at nearly 28 minutes paft eleven P.M.; and, confequently, when the planet was at no greater diftance than eight days from oppofition. On the 4th of Auguft 1815, the greateft diameter of Saturn's ring however, meafured with Troughton's micrometer attached to the 63.5 inch telefcope, had been found by careful meafurement $= 1.50 \times 31''.3 = 46''.95$, the planet being then only three days from oppofition. By the fame apparatus the ring had been made 48″.2 on the 10th of September 1815, and on the 25th of the fame month only 43″. Thefe difcrepancies fhew that no dependence can be placed in horizontal meafures made with Troughton's micrometer when the object is *in apparent motion*, but for all other meafures of fmall angles, it is no doubt the beft that has been yet invented.

Dr. Brewfter's micrometer has the fame advantage as Dollond's, when the divided lens is ufed as the fliding lens within the tube; but the power of the patent telefcopes hitherto conftructed is fo fmall, that an angle can feldom be meafured with it nearer than to 10″, and frequently not fo near. The principle, however, is applicable to telefcopes of larger dimenfions.

When Dollond's and Troughton's micrometers are both applied to the telefcope of 45.75 inches, the value of the fcale of Troughton's becomes altered from 43″.5 to 49″.4, namely, in the inverfe ratio of the diminifhed focus; and they may both be ufed with great convenience at the fame time, in which cafe, one may meafure the angular length and the other the angular breadth of the fame body; or, if the body be celeftial, one may give the horizontal and the other the vertical dimenfions at the fame inftant. This mode of applying two micrometers, one optical and the other mechanical, at the fame time, affords a mutual check on the meafures of each, when the body is round, like one of the heavenly bodies, and gives a very fatisfactory refult, when it can be adopted. When Troughton's micrometer is ufed as a celeftial eye-piece, along with Dollond's micrometer attached to the telefcope 45.75, fhortened to 40.3, the double images are formed beyond both eye-glaffes, reckoning from the eye, and gives there 1″.24 as the value of one ftroke on the vernier; whereas when a common celeftial eye-piece is ufed with Dollond's, the fecond glafs of the compound piece fhortens the focus of the object-glafs a little, and the images are feen between the two glaffes of the eye-piece; confequently the value of Dollond's micrometer varies a trifle with every different eye-piece, which is not the cafe with Troughton's, where the image is always in the unaltered focus of the object-glafs. On the 26th of September 1816, a careful feries of obfervations was made of the fun's diameter with both Troughton's and Dollond's micrometers ufed at the fame time, when the former gave $38.85 \times 49''.4 = 31'\ 59''.2$, and the other 15.47 (3 in. 1 div. 22 on vern.) $\times 1''.21 = 31'\ 58''.28$, the diameter of the fun by the Nautical Almanac being

being $31' \, 59''.2$ horizontally, and $31' \, 57''.9$ vertically, at the altitude of $38°$.

Terreſtrial Meaſures.—In the examples which we have given of celeſtial angular meaſures taken by a micrometrical teleſcope, no correction of the meaſured angle was neceſſary, becauſe the rays of light coming from theſe objects may be conſidered as parallel on entering the object-glaſs, and as always converging to the ſame focal point, where the image is formed; hence the magnifying power of the celeſtial teleſcope does not vary. But when terreſtrial objects are viewed at different diſtances, there is a deviation from parallelism in the courſe of the rays, which increaſes in the inverſe ratio of the diſtance, and which lengthens the focus of the object-glaſs, and conſequently increaſes the power of the inſtrument, even with the ſame glaſſes. This alteration in the effective length of a teleſcope is practically diſcovered by the adjuſtment of the eye-piece for diſtinct viſion, which is neceſſarily different at different diſtances from the object viewed. But we have ſhewn, that the ſcales of Troughton's and of Dollond's micrometers will vary with the variable powers of even the ſame teleſcope, and therefore will require a correction for each variety of power, or, in other words, for each variety of terreſtrial diſtance. The determination of theſe varying corrections, therefore, is eſſential to the accuracy of the meaſures taken by a micrometer in all caſes, where the incident rays of light come diverging from objects placed at moderate diſtances. If we put f for the ſolar or principal focus of the object-glaſs of any teleſcope, and d for the diſtance of an object from the ſaid object-glaſs when uſed, the addition to the length of the ſolar focus, which we will call e, according to the laws of *dioptrics*, may be found by this theorem, $\frac{f^2}{d-f} = e$; that is, the ſquare of the ſolar focus, divided by the diſtance in the ſame meaſure, when diminiſhed by one focal diſtance, will be the elongation, or exceſs of the lengthened focus over the ſolar focus; then as the powers are to each other reſpectively as the focal lengths, with the ſame eye-piece, we ſhall have $f : f + e ::$ true angle : meaſured or apparent angle; and converſely, as $f + e : f ::$ apparent angle : true angle. For inſtance, let it be required to aſcertain what is the neceſſary correction for an angle, meaſured by a teleſcope of 63.5 inches focus, that is ſubtended by one yard at a hundred yards diſtance from the object-glaſs. By a ſimple caſe in plain trigonometry, the true angle ſubtended by a yard, at a hundred yards diſtance, is $34' \, 59''.4$, or $34'.99$; and 63.5 inches are 1.764, when reduced into the denomination of yards and decimal parts; then $\frac{1.764 \times 1.764}{100 - 1.764} = \frac{3.111696}{98.236} = 0.03167 = e$, the increaſed length of the focus; and $\frac{1.764 + 0.03167 \times 34'.99}{1.704} =$ $35'.618$, or $35' \, 37''.08$ will be the meaſured angle, therefore $35' \, 37''.08 - 34' \, 59''.4 = 37''.68$ is the correction to be added to the true angle, in order to obtain the apparent angle, that would have been the true angle alſo, if the focus of the object-glaſs had remained unaltered at the diſtance of 100 yards. But it is the correction anſwering to the apparent or meaſured angle that we want, and the determination of this requires a tranſpoſition which is operoſe, and therefore objectionable in practice; on which account we recommend each ſurveyor, military tactician, and leveller, who is diſpoſed to avail himſelf of the uſe of a micrometrical teleſcope, for ſhortening his labours, to uſe tables adapted to the focal length of his own teleſcope, which may give by inſpection the correction proper in all caſes for reducing the apparent angle into the true one, and *vice verſâ*. Tables III. and IV. which are ſubjoined, were computed for this purpoſe, from the theorem juſt exemplified, and are adapted for a teleſcope of 63.5 inches focal length, to which we have added Table V., as a general table for finding the diſtance, in yards and decimal parts, correſponding to any angle, from $1'$ to $30' \, 59''$ incluſively; even to the accuracy of a ſingle ſecond, when that angle is ſubtended by an exact yard. The labour of conſtructing theſe tables has been conſiderable, but the facility and accuracy with which they give the deſired reſults, has amply repaid the computer, and, it is preſumed, will be a recommendation to the notice of our ſcientific readers, to whom their application may in many caſes be found uſeful.

TABLE III.—For converting the true into the apparent Angle.

True Angle	0″	10″	20″	30″	40'	50″
	″	″	″	″	″	″
1′	+0.03	+0.04	+0.05	+0.06	+0.08	+0.10
2	0.12	0.14	0.16	0.19	0.22	0.25
3	0.28	0.31	0.34	0.37	0.41	0.45
4	0.49	0.53	0.57	0.61	0.66	0.71
5	0.76	0.81	0.86	0.92	0.98	1.04
6	1.10	1.16	1.22	1.29	1.36	1.43
7	1.50	1.57	1.64	1.71	1.79	1.87
8	1.96	2.04	2.12	2.20	2.28	2.37
9	2.46	2.54	2.63	2.72	2.82	2.92
10	3.03	3.14	3.25	3.36	3.46	3.57
11	3.68	3.79	3.90	4.02	4.14	4.26
12	4.39	4.51	4.64	4.76	4.89	5.02
13	5.15	5.29	5.43	5.57	5.71	5.85
14	5.99	6.13	6.28	6.43	6.58	6.73
15	6.88	7.03	7.18	7.33	7.48	7.64
16	7.80	7.96	8.13	8.36	8.47	8.64
17	8.82	8.99	9.17	9.35	9.53	9.71
18	9.89	10.07	10.25	10.44	10.63	10.82
19	11.01	11.20	11.39	11.59	11.79	11.99
20	12.19	12.40	12.61	12.82	13.04	13.26
21	13.48	13.69	13.90	14.11	14.32	14.53
22	14.74	14.96	15.18	15.40	15.63	15.86
23	16.09	16.33	16.57	16.81	17.05	17.29
24	17.53	17.77	18.01	18.25	18.49	18.74
25	18.99	19.25	19.51	19.77	20.03	20.29
26	20.56	20.82	21.08	21.34	21.60	21.87
27	22.14	22.41	22.68	22.96	23.24	23.52
28	23.81	24.09	24.37	24.66	24.95	25.24
29	25.53	25.82	26.11	26.41	26.71	27.01
30	27.31	27.61	27.91	28.21	28.52	28.83
31	29.14	29.45	29.47	30.09	30.41	30.73
32	31.05	31.37	31.69	32.01	32.33	32.66
33	32 99	33.32	33.65	33.99	34.33	34.67
34	35.01	35.35	35.69	36.03	36.38	36.73
35	37.08	37.43	37.79	38.15	38.51	38.87
36	39.23	39.59	39.95	40.31	40.67	41.03
37	41.40	41.77	42.14	42.51	42.88	43.25
38	43.62	44.00	44.38	44.76	45.15	45.54
39	45.93	46.32	46.71	47.10	47.49	47.89
40	48.29	48.70	49.11	49.52	49.93	50.34
41	50.75	51.16	51.57	51.98	52.39	52.81
42	53.23	53.65	54.08	54.51	54.94	55.37
43	55.80	56.23	56.66	57.09	57.52	57.95
44	58.38	58.82	59.26	59.71	60.16	60.61
45	61.06	61.51	61.96	62.41	62.86	63.31
46	63.77	64.22	64.67	65.12	65.58	66.04
47	66.50	66.96	67.42	67.88	68.34	68.81
48	69.28	69.75	70.22	70.70	71.18	71.66
49	72.14	72.63	73.12	73.61	74.11	74.61
50	75.11	75.61	76.11	76.61	77.12	77.63
51	78.14	78.66	79.18	79.70	80.22	80.74
52	81.26	81.78	82.36	82.83	83.36	83.99
53	84.42	84.95	85.48	86.01	86.54	87.08
54	87.62	88.15	88.69	89.23	89.77	90.31
55	90.85	91.39	91.93	92.48	93.03	93.58
56	94.13	94.68	95.23	95.78	96.33	96.88
57	97.43	97.98	98.53	99.09	99.65	100.21
58	100.77	101.33	101.89	102.46	103.03	103.60
59	104.17	104.75	105.33	105.91	106.50	107.09
60	107.68	108.27	108.86	109.45	110.04	110.64

TABLE IV.—For converting the apparent into the true Angle.

Apparent Angle.	0″	10″	20″	30″	40″	50″
	″	″	″	″	″	″
1′	−0.03	−0.04	−0.05	−0.06	−0.08	−0.1
2	0.1	0.1	0.1	0.2	0.2	0.2
3	0.3	0.3	0.3	0.4	0.4	0.5
4	0.5	0.5	0.6	0.6	0.7	0.7
5	0.8	0.8	0.9	0.9	1.0	1.0
6	1.1	1.1	1.2	1.3	1.3	1.4
7	1.5	1.6	1.7	1.7	1.8	1.9
8	2.0	2.0	2.1	2.2	2.3	2.4
9	2.5	2.6	2.7	2.8	2.9	3.0
10	3.1	3.2	3.3	3.4	3.5	3.6
11	3.7	3.8	3.9	4.0	4.1	4.3
12	4.4	4.5	4.6	4.7	4.8	4.9
13	5.0	5.2	5.4	5.5	5.7	5.8
14	5.9	6.0	6.2	6.3	6.5	6.6
15	6.8	7.0	7.1	7.3	7.4	7.5
16	7.7	7.8	8.0	8.1	8.3	8.5
17	8.7	8.8	9.0	9.2	9.4	9.5
18	9.7	9.8	10.0	10.2	10.4	10.6
19	10.8	11.0	11.2	11.4	11.6	11.8
20	12.0	12.2	12.4	12.6	12.8	13.1
21	13.3	13.5	13.6	13.8	14.0	14.2
22	14.4	14.6	14.7	14.9	15.1	15.3
23	15.6	15.8	16.0	16.2	16.5	16.7
24	17.0	17.2	17.5	17.7	18.0	18.2
25	18.5	18.7	19.0	19.2	19.5	19.7
26	20.0	20.2	20.5	20.8	21.0	21.2
27	21.5	21.7	22.0	22.3	22.5	22.8
28	23.0	23.3	23.6	23.9	24.2	24.5
29	24.8	25.1	25.4	25.7	26.0	26.3
30	26.6	26.9	27.1	27.4	27.7	28.0
31	28.3	28.6	28.8	29.1	29.4	29.7
32	30.0	30.3	30.6	31.0	31.3	31.6
33	32.0	32.3	32.7	33.0	33.3	33.6
34	33.9	34.2	34.5	34.9	35.2	35.5
35	35.8	36.1	36.4	36.7	37.1	37.5
36	37.8	38.1	38.5	38.9	39.3	39.6
37	40.0	40.3	40.8	41.0	41.3	41.7
38	42.0	42.3	42.7	43.1	43.5	43.9
39	44.2	44.5	44.9	45.2	45.6	46.0
40	46.4	46.8	47.2	47.6	48.0	48.4
41	48.8	49.2	49.6	50.0	50.4	50.7
42	51.0	51.4	51.8	52.2	52.6	53.0
43	53.4	53.8	54.2	54.7	55.1	55.6
44	56.0	56.4	56.8	57.3	57.7	58.1
45	58.5	58.9	59.3	59.8	60.2	60.7
46	61.1	61.6	62.1	62.5	62.8	63.2
47	63.6	64.1	64.5	64.9	65.3	65.8
48	66.2	66.7	67.1	67.5	68.0	68.4
49	68.9	69.3	69.8	70.2	70.7	71.1
50	71.6	72.0	72.4	72.9	73.3	73.8
51	74.3	74.8	75.3	75.8	76.2	76.7
52	77.2	77.7	78.2	78.7	79.2	79.7
53	80.2	80.7	81.2	81.7	82.2	82.7
54	83.2	83.7	84.2	84.7	85.2	85.7
55	86.2	86.7	87.2	87.7	88.2	88.7
56	89.2	89.7	90.3	90.8	91.3	91.8
57	92.3	92.8	93.3	93.8	94.3	94.9
58	95.4	95.9	96.4	97.0	97.5	98.1
59	98.6	99.1	99.6	100.2	100.7	101.3
60	101.8	102.4	102.9	103.5	104.0	104.5

TABLE V.—For finding the Diſtance in Yards from the True Angle ſubtended by one Yard.

True Angle.	0″	1″	2″	3″	4″	5″	6″	7″	8″	9″
1′	3437.7	3381.34	3326.8	3274.	3222.8	3173.26	3125.15	3078.54	3033.25	2989.3
2	1718.85	1704.64	1690.67	1676.93	1663.4	1650.1	1637.	1624.11	1611.4	1598.93
3	1145.9	1139.56	1133.3	1127.11	1120.98	1114.92	1108.94	1103.	1097.15	1091.33
4	859.43	855.83	852.32	848.81	845.33	841.88	838.46	835.06	831.7	828.36
5	687.54	685.25	682.98	680.73	678.45	676.27	674.05	671.86	669.63	667.51
6	572.95	571.36	569.78	568.21	566.65	565.10	563.55	562.02	560.49	558.98
7	491.1	489.93	488.77	487.62	486.46	485.32	484.18	483.05	481.92	480.80
8	429.71	428.81	427.91	427.03	426.16	425.28	424.40	423.53	422.66	421.80
9	381.96	381.25	380.55	379.85	379.15	378.46	377.77	377.07	376.39	375.70
10	343.77	343.19	342.62	342.05	341.49	340.93	340.36	339.79	339.23	338.69
11	312.52	312.02	311.52	311.09	310.63	310.17	309.70	309.23	308.77	308.31
12	286.47	286.07	285.68	285.28	284.89	284.49	284.10	283.71	283.32	282.93
13	264.44	264.10	263.76	263.42	263.09	262.76	262.42	262.08	261.75	261.42
14	245.55	245.26	244.97	244.67	244.38	244.09	243.81	243.52	243.23	242.94
15	229.18	228.92	228.67	228.41	228.16	227.91	227.66	227.41	227.16	226.91
16	214.85	214.62	214.40	214.17	213.95	213 72	213.51	213.29	213.08	212.86
17	202.22	202.02	201.82	201.62	201.42	201.22	201.03	200.83	200.64	200.44
18	190.98	190.80	190.62	190.35	190.27	190.09	189.92	189.74	189.57	189.40
19	180.93	180.77	180.61	180.45	180.29	180.13	179.98	179.82	179.67	179.51
20	171.88	171.73	171.59	171.44	171.31	171.17	171.02	170.88	170.74	170.60
21	163.70	163.57	163.44	163.31	163.18	163.05	162.92	162.79	162.66	162.53
22	156.26	156.13	156.01	155.88	155.76	155.64	155.54	155.42	155.31	155.19
23	149.46	149.35	149.24	149.13	149.03	148.93	148.82	148.71	148.60	148.49
24	143.23	143.13	143.03	142.94	142.84	142.75	142.64	142.54	142.44	142,34
25	137.51	137.41	137.32	137.23	137.14	137.05	136.96	136.87	136.78	136.68
26	132.22	132.13	132.05	131.96	131.88	131.80	131.71	131.62	131.54	131.46
27	127.32	127.24	127.16	127.08	127.00	126.93	126.85	126.77	126.69	126.61
28	122.78	122.70	122.63	122.55	122.48	122.41	122.33	122.26	122.19	122.11
29	118.54	118.47	118.40	118.33	118.26	118.19	118.13	118.07	118.00	117.93
30	114.59	114.52	114.46	114.39	114.33	114.27	114.20	114.14	114.08	114.01

TABLE V.—*continued.*

True Angle.	10″	11″	12″	13″	14″	15″	16″	17″	18″	19″
1′	2946.6	2905.1	2867.75	2825.5	2787.25	2750.16	2713.97	2678.73	2644.38	2610.91
2	1586.63	1574.52	1567.57	1550.84	1539.27	1527.86	1516.62	1505.56	1494.65	1483.9
3	1085.6	1079.9	1054.27	1068.71	1063.25	1057.75	1052.35	1047.01	1041.74	1036.49
4	825.05	821.76	818.5	815.22	812.05	808.86	805.7	802.57	799.46	796.37
5	665.36	663.22	661.09	658.98	656.88	654.8	652.73	650.67	648.62	646.58
6	557.46	555.96	554.47	552.98	551.5	550.03	548.58	547.12	545.66	544.23
7	479.68	478.59	477.66	476.36	475.26	474.16	473.08	472.0	470.92	469.84
8	420.94	420.08	419.23	418.38	417.53	416.69	415.85	415.01	414.18	413.35
9	375.02	374.34	373.66	372.98	372.31	371.64	370.97	370.31	369.65	368.98
10	338.13	337.57	337.62	336.47	335.93	335.38	334.82	334.29	333.76	333.22
11	307.85	307.39	306.93	306.47	306.02	305.57	305.12	304.67	304.22	303.77
12	282.55	282.16	281.77	281.39	281.01	280.63	280.24	279.86	279.49	279.11
13	261.09	260.76	260.13	260.11	259.78	259.45	259.12	258.80	258.47	258.15
14	242.66	242.37	242.09	241.80	241.52	241.24	240.96	240.68	240.40	240.12
15	226.66	226.41	226.6	225.91	225.67	225.42	225.18	224.93	224.69	224.44
16	212.64	212.42	212.20	211.98	211.76	211.54	211.33	211.11	210.90	210.68
17	200.25	200.05	199.86	199.66	199.47	199.28	199.09	198.90	198.71	198.52
18	189.23	189.05	188.88	188.70	188.53	188.36	188.19	188.02	187.85	187.68
19	179.35	179.19	179.04	178.88	178.73	178.57	178.42	178.26	178.11	177.96
20	170.46	170.32	170.8	170.04	169.90	169.76	169.62	169.48	169.34	169.20
21	162.41	162.28	162.16	162.03	161.91	161.77	161.65	161.51	161.39	161.26
22	155.08	154.96	154.85	154.73	154.62	154.50	154.38	154.27	154.15	154.03
23	148.38	148.27	148.17	148.06	147.96	147.85	147.75	147.64	147.54	147.43
24	142.24	142.14	142.05	141.95	141.85	141.75	141.66	141.56	141.46	141.36
25	136.59	136.50	136.41	136.32	136.23	136.14	136.05	135.96	135.87	135.79
26	131.38	131.29	131.21	131.12	131.04	130.95	130.87	130.79	130.71	130.62
27	126.54	126.45	126.38	126.30	126.23	126.14	126.07	125.99	125.92	125.84
28	122.04	121.97	121.90	121.83	121.76	121.69	121.62	121.54	121.47	121.40
29	117.86	117.79	117.73	117.66	117.59	117.52	117.46	117.39	117.32	117.26
30	113.95	113.89	113.83	113.76	113.70	113.64	113.58	113.51	113.45	113.39

TABLE V.—*continued.*

True Angle.	20″	21″	22″	23″	24″	25″	26″	27″	28″	29″
1′	2578.27	2546.44	2515.4	2485.1	2455.5	2426.6	2398.4	2370.82	2343.87	2317.55
2	1473.3	1462.86	1452.55	1442.38	1432.37	1422.49	1412.75	1403.14	1393.62	1384.31
3	1031.31	1026.17	1021.1	1016.07	1011.05	1006.16	1001.27	996.43	991.64	986.9
4	793.32	790.24	787.26	784.26	781.28	778.34	775.42	772.51	769.64	766.78
5	644.56	642.56	640.56	638.38	636.61	634.65	632.70	630.77	628.85	626.94
6	542.8	541.37	539.95	538.56	537.18	535.75	534.36	532.99	531.62	530.25
7	468.77	467.70	466.63	465.59	464.55	463.51	462.47	461.46	460.45	459.41
8	412.53	411.70	410.88	410.06	409.25	408.42	407.61	406.81	406.03	405.22
9	368.33	367.66	367.02	366.36	365.71	365.06	364.42	363.78	363.14	362.49
10	332.68	332.14	331.61	331.08	330.55	330.02	329.49	328.96	328.44	327.92
11	303.32	302.87	302.43	301.99	301.55	301.11	300.67	300.23	299.80	299.36
12	278.73	278.35	277.98	277.60	277.23	276.86	276.49	276.12	275.75	275.38
13	257.82	257.49	257.16	256.83	256.51	256.20	255.90	255.58	255.27	254.96
14	239.84	239.56	239.29	239.01	238.73	238.45	238.18	237.90	237.63	237.35
15	224.20	223.95	223.71	223.46	223.22	222.98	222.74	222.50	222.26	222.02
16	210 47	210.25	210.04	209.82	209.61	209.40	209.19	208.97	208.76	208.55
17	198.33	198.13	197.94	197.75	197.56	197.37	197.18	197.09	196.81	196.72
18	187.51	187.34	187.17	187.00	186.83	186.66	186.49	186.32	186.15	185.98
19	177.81	177.65	177.50	177.35	177.20	177.04	176.89	176.74	176.59	176.44
20	169.06	168.92	168.78	168.64	168.51	168.37	168.24	168.10	167.97	167.82
21	161.14	161.01	160.89	160.76	160.64	160.51	160.39	160.26	160.14	160.01
22	153.92	153.80	153.69	153.57	153.46	153.34	153.23	153.12	153.01	152.89
23	147.33	147.22	147.12	147.01	146.91	146.80	146.70	146.59	146.49	146.38
24	141.27	141.17	141.08	140.98	140.88	140.78	140.69	140.59	140.50	140.40
25	135.70	135.61	135.52	135.43	135.34	135.25	135.16	135.07	134.98	134.89
26	130.54	130.46	130.38	130.29	130.21	130.13	130.05	129.97	129.89	129.80
27	125.77	125.69	125.62	125.54	125.47	125.38	125.31	125.23	125.16	125.08
28	121.33	121.25	121.18	121.11	121.04	120.97	120.90	120.83	120.76	120.69
29	117.19	117.12	117.05	116.98	116.92	116.85	116.78	116.71	116.65	116.58
30	113.33	113.26	113.20	113.14	113.08	113.01	112.95	112.89	112.83	112.77

TABLE V.—*continued.*

True Angle.	30″	31″	32″	33″	34″	35″	36″	37″	38″	39″
1′	2291.8	2266.61	2241.97	2217.87	2194.3	2171.2	2148.55	2126.41	2104.7	2083.47
2	1375.08	1365.97	1356.93	1348.1	1339.36	1330.72	1322.19	1313.77	1305.45	1297.23
3	982.2	977.54	972.93	968.36	963.84	959.36	954.91	950.51	946.15	941.83
4	763.93	761.11	758.31	755.54	752.78	750.04	747.33	744.62	741.95	739.29
5	625.03	623.15	621.23	619.40	617.55	615.71	613.87	612.05	610.24	608.44
6	528.88	527.53	526.18	524.84	523.50	522.18	520.87	519.55	518.24	516.95
7	458.36	457.34	456.33	455.33	454.32	453.32	452.33	451.34	450.36	449.37
8	404.43	403.64	402.85	402.06	401.29	400.51	399.73	398.95	398.19	397.41
9	361.86	361.22	360.59	359.96	359.35	358.71	358.09	357.47	356.85	356.23
10	327.40	326.88	326.36	325.84	325.33	324.82	324.32	323.81	323.29	322.78
11	298.93	298.49	298.06	297.65	297.20	296.77	296.35	295.92	295.50	295.08
12	275.01	274.65	274.29	273.92	273.56	273.18	272.83	272.47	272.11	271.75
13	254.64	254.33	254.02	253.71	253.39	253.08	252.76	252.46	252.15	251.85
14	237.08	236.81	236.54	236.27	236.00	235.73	235.46	235.19	234.92	234.65
15	221.78	221.54	221.31	221.07	220.83	220.59	220.36	220.12	219.89	219.66
16	208.34	208.13	207.92	207.71	207.50	207.29	207.09	206.88	206.67	206.46
17	196.44	196.24	196.06	195.87	195.69	195.50	195.32	195.13	194.95	194.76
18	185.82	185.64	185.48	185.31	185.15	184.98	184.82	184.65	184.49	184.32
19	176.29	176.14	175.99	175.84	175.69	175.54	175.39	175.24	175.09	174.94
20	167.69	167.54	167.41	167.27	167.14	167.00	166.87	166.73	166.60	166.47
21	159.89	159.76	159.64	159.51	159.39	159.27	159.15	159.02	158.90	158.78
22	152.78	152.67	152.56	152.45	152.33	152.22	152.11	151.99	151.88	151.77
23	146.28	146.17	146.07	145.97	145.86	145.76	145.66	145.56	145.46	145.35
24	140.31	140.21	140.12	140.02	139.93	139.83	139.74	139.64	139.55	139.45
25	134.81	134.73	134.64	134.55	134.46	134.37	134.29	134.20	134.11	134.02
26	129.72	129.64	129.56	129.48	129.40	129.31	129.23	129.15	129.07	128.99
27	125.01	124.93	124.86	124.78	124.71	124.63	124.55	124.47	124.40	124.32
28	120.62	120.55	120.48	120.41	120.34	120.27	120.20	120.13	120.06	119.99
29	116.52	116.45	116.39	116.32	116.26	116.19	116.13	116.06	116.00	115.93
30	112.71	112.65	112.59	112.52	112.46	112.40	112.34	112.28	112.22	112.16

TABLE V.—*continued.*

True Angle.	40″	41″	42″	43″	44″	45″	46″	47″	48″	49″
1′	2062.62	2042.2	2022.1	2002.54	1983.28	1964.4	1945.85	1927.68	1909.82	1892.31
2	1289.13	1281.13	1273.22	1265.41	1257.7	1250.06	1242.55	1235.10	1227.75	1220.47
3	937.55	933.27	929.15	924.94	920.81	916.72	912.66	908.64	904.65	900.72
4	736.65	734.03	731.43	728.83	726.27	723.72	721.19	718.69	716.18	713.71
5	606.65	604.87	603.1	601.35	599.6	597.86	596.12	594.41	592.71	591.01
6	515.65	514.36	513.00	511.81	510.55	509.29	508.04	506.78	505.52	504.30
7	448.40	447.42	446.45	445.49	444.53	443.57	442.62	441.67	440.73	439.79
8	396.66	395.88	395.12	394.37	393.63	392.88	392.13	391.38	390.64	389.90
9	355.62	355.01	354.40	353.79	353.18	352.56	351.93	351.35	350.78	350.18
10	322.28	321.78	321.28	320.78	320.28	319.79	319.29	318.79	318.30	317.81
11	294.66	294.24	293.82	293.40	292.98	292.56	292.15	291.73	291.32	290.92
12	271.40	271.04	270.68	270.32	269.97	269.62	269.28	268.93	268.59	268.23
13	251.54	251.24	250.93	250.62	250.32	250.02	249.71	249.41	249.11	248.81
14	234.38	234.11	233.84	233.57	233.31	233.05	232.79	232.53	232.27	232.01
15	219.43	219.19	218.96	218.72	218.49	218.26	218.03	217.80	217.57	217.34
16	206.26	206.05	205.85	205.64	205.44	205.23	205.03	204.82	204.62	204.41
17	194.58	194.40	194.22	194.03	193.85	193.67	193.49	193.31	193.13	192.95
18	184.16	183.99	183.83	183.67	183.51	183.34	183.18	183.01	182.85	182.69
19	174.79	174.64	174.49	174.34	174.20	174.05	173.91	173.76	173.62	173.47
20	166.34	166.20	166.07	165.94	165.81	165.67	165.54	165.41	165.28	165.14
21	158.66	158.54	158.42	158.29	158.17	158.05	157.93	157.81	157.69	157.57
22	151.66	151.54	151.43	151.32	151.21	151.10	150.99	150.88	150.77	150.66
23	145.25	145.14	145.04	144.94	144.84	144.74	144.64	144.54	144.44	144.34
24	139.36	139.26	139.17	139.09	138.99	138.89	138.80	138.70	138.61	138.52
25	133.93	133.94	133.86	133.67	133.59	133.50	133.42	133.33	133.25	133.16
26	128.91	128.82	128.74	128.66	128.58	128.49	128.41	128.33	128.25	128.18
27	124.25	124.17	124.10	124.02	123.95	123.88	123.80	123.72	123.65	123.58
28	119.92	119.85	119.78	119.71	119.64	119.57	119.50	119.43	119.36	119.29
29	115.87	115.80	115.74	115.67	115.61	115.54	115.48	115.42	115.36	115.29
30	112.10	112.04	111.98	111.91	111.85	111.79	111.73	111.67	111.61	111.55

TABLE V.—*continued.*

True Angle.	50″	51″	52″	53″	54″	55″	56″	57″	58″	59″
1′	1875.11	1858.21	1841.62	1825.32	1809.3	1793.6	1778.12	1762.92	1747.95	1733.29
2	1213.3	1206.2	1199.2	1192.24	1185.42	1178.64	1171.93	1165.3	1158.77	1152.30
3	896.8	892.9	889.06	885.24	881.46	877.72	873.97	870.30	866.65	863.02
4	711.25	708.8	706.37	703.96	701.57	699.18	696.81	694.49	692.15	689.83
5	589.32	587.64	585.96	584.30	582 65	581.02	579.38	577.76	575.15	574.55
6	503.08	501.85	500.63	499.42	498.22	497.02	495.82	494.63	493.45	492.27
7	438.86	437.92	436.98	436.07	435.15	434.24	433.32	432.42	431.51	430.61
8	389.17	388.44	387.71	386.98	386.25	385.54	384.81	384.10	383.39	382.67
9	349.59	848.99	348.41	347.82	347.25	346.66	346.08	345.49	344.92	344.34
10	317 32	316.83	316.35	315.85	315.38	314.90	314.42	313.94	313.47	312.99
11	290.51	290.07	289.68	289.28	288.88	288.47	288.07	287.67	287.27	286.87
12	267.87	267.52	267.18	266.83	266.49	266.15	265.81	265.46	265.12	264.78
13	248.51	248.21	247.91	247.61	247.31	247.02	246.72	246.42	246.13	245.83
14	231.75	231.49	231.23	230.97	230.72	230.47	230.22	229.96	229.70	229.44
15	217.12	216.89	216.66	216.43	216.21	215.98	215.75	215.52	215.30	215.08
16	204.21	204.00	203.80	203.60	203.40	203.21	203.01	202.81	202.61	202.41
17	192.77	192.59	192.41	192.23	192.05	191.87	191.69	191.51	191.33	191.15
18	182.53	182.37	182.21	182.05	181.89	181.73	181.57	181.41	181.25	181.09
19	173.33	173.18	173.04	172.89	172.75	172.60	172.46	172.31	172.17	172.03
20	165.01	164.88	164.75	164.61	164.48	164.35	164.22	164.09	163.96	163.83
21	157.45	157.33	157.21	157.09	156.97	156.85	156.73	156.61	156.49	156.37
22	150.55	150.44	150.33	150.22	150.11	150.01	149.90	149.79	149.68	149.57
23	144.24	144.14	144.04	143.94	143.84	143.74	143.64	143.54	143.44	143.34
24	138.43	138.33	138.24	138.15	138.06	137.96	137.87	137.78	137.69	137.60
25	133.07	132.98	132.90	132.81	132.73	132.64	132.56	132.47	132.39	132.31
26	128.10	128.03	127.95	127.87	127.79	127.71	127.63	127.56	127.48	127.41
27	123.51	123.43	123.36	123.28	123.21	123.13	123.06	122.98	122.91	122.84
28	119.22	119.16	119.09	119.02	118.95	118.88	118.81	118.74	118.67	118.60
29	115.23	115.17	115.11	115.04	114.98	114.91	114 85	114.78	114.72	114.66
30	111.49	111.43	111.37	111.31	111.25	111.19	111.13	111.07	111.01	110.95

Conſtruction and Uſe of the Tables.—We have already explained the conſtruction and uſe of Tables I. and II., which are required to be adapted to the particular teleſcope with which any given micrometer is uſed; and we have alſo explained how the value of a ſingle diviſion, or turn of a ſcrew, is aſcertained by means of the ſun's diameter: but this method gives a derivative rather than an original independent value to the micrometrical ſcale; for if the ſun's diameter be not truly given in the Nautical Almanac (and the late Dr. Maſkelyne had reaſon to alter it in the lateſt years of his life), the error of this meaſure will be introduced into the ſcale derived from it; Table III. is therefore inſerted, as affording the ready means of obtaining an independent ſcale from actual terreſtrial meaſurement. We have already ſhewn how the table of corrections is conſtructed in this table; and the reader will have no difficulty in taking out the proper numbers, as corrections to be added to the true angle, in order to convert it into the apparent or meaſured angle, if he be careful to take the minutes of the given angle from the left-hand vertical column, and the ſeconds from the horizontal line at the top; for in every inſtance, the meeting of the two columns will contain the additive quantity that is to be applied to the true angle, in order to obtain what the teleſcope will give when the value of its ſcale is once duly aſſigned. For inſtance, ſuppoſe the true angle $14' \, 20''$, where $14'$ is taken at the ſide, and $20''$ at the top, the junction of the two columns gives $+ \, 6''.28$, which ſhews that this quantity muſt be added to $14' \, 20''$, the true angle, to make $14' \, 26''.28$, the apparent angle, as meaſured by a teleſcope of 63.5 inches focal length. If now this angle, reduced into ſeconds, be divided by the turns of the ſcrew, or diviſions on any ſcale uſed as a micrometrical ſcale, the quotient will be the value in ſeconds of one turn, or diviſion, as the caſe may be, provided the angle in queſtion be that which a true yard actually ſubtends at a known diſtance. For example, when a yard of 36 exact inches was erected at the diſtance of 190.98 yards, the micrometer of Troughton, attached to Tulley's 63.5 inch teleſcope, meaſured it by 34.78 revolutions of its ſcrew; and by Table V. the true angle, read as in Table III. at the ſide and top, correſponding to this diſtance, is $18' \, 0''$; the additive quantity belonging to this angle, as taken from Table III., is $+ \, 9''.89$; and therefore the apparent angle, if meaſured by the ſaid teleſcope, would be $18' \, 9''.89$; therefore $\frac{18' \, 9''.89}{34.78} = 31''.33$ is the value of one revolution of the ſcrew, which is very nearly the ſame as was determined from the ſun, and before tabulated. This coincidence of the celeſtial and terreſtrial meaſures affords a convincing proof that the ſcale has been duly appreciated.

We have ſaid, that this table of corrections, and alſo the following one, which we ſhall explain preſently, are computed excluſively for a teleſcope of 63.5 inches focus, being that which is repreſented, with a Troughton's micrometer attached, in *fig.* 6. of *Plate* XXIX.; and that each different teleſcope ought to have its own tables of corrections correſponding to its focal length, which limitation is required by the theorem on which we have grounded our calculations. But as the *diſtance*, which is the varying term, is the ſame for all teleſcopes, we find that in practice the corrections of any other teleſcope will be ſo nearly proportionate to their reſpective focal lengths, that they may be taken exactly as ſuch, without any ſenſible error; that is, the error ariſing from the table of corrections will be always as ſmall as the error of obſervation in ordinary teleſcopes, unleſs the diſtance be very ſmall, and its correction conſequently great. On this account, Table III., and alſo Table IV., which, it will be ſeen, is derived from it, like Table V., may be conſidered as *general* tables, admitting of proportional parts of their whole corrections to be taken as ſuitable corrections for teleſcopes of other dimenſions. This conſideration is of great importance, with reſpect to the general utility of our tables of correction; and therefore the reader ſhall not depend ſolely on the authority of our bare aſſertion. We have already computed the correction for a teleſcope of 63.5 inches focal length, to be added when the true angle is $34' \, 59''.4$, or diſtance 100 yards, and found it $37''.68$; let us ſee what it will be with the ſame data, when the teleſcope has juſt one half of the ſaid focal length: here we have $\frac{1.764}{2} = .882$ of a yard for the focal length; then $\frac{.882 \times .882}{100 - 882} = \frac{.77924}{99.118} = .00785 = e$, the elongation of the focus, and $\frac{.882 \times .00785 \times 34'.99}{.882} = 35'.3$, or $35' \, 18''$ for the apparent angle, from which, if we ſubtract $34' \, 59''.4$, the true angle, the difference $18''.6$ will be the correſponding correction, which differs only a quarter of a ſecond from $\frac{37''.68}{2}$, or half the correction of the teleſcope of double dimenſions. Beyond 100 yards diſtance, the error, ſmall as it is, will continue to diminiſh as the diſtance increaſes, and a ſmaller diſtance will ſeldom require to be meaſured in this way. The accuracy of this concluſion has been ſtill farther corroborated by actual experiment: a graduated ſtaff was placed erect at a diſtance, by meaſurement of a Troughton's chain of five-feet links, of 261.9 yards, and the two teleſcopes of 63.5 and 45.75 inches focal length, were tried againſt each other thus; a yard by the firſt was found, with Troughton's micrometer, to be equal to 25.33 turns; and by the ſecond, with the ſame inſtrument, to be 18.19; the true angle belonging to this diſtance by Table V. is $13' \, 7''.54$; and the correction for the larger teleſcope by Table III. $+ \, 5''.25$; therefore, taking $\frac{45.75}{63.5}$ or .72 of $5''.25 = 3''.8$ for the correction of the ſmaller teleſcope, we have the following values of the reſpective ſcales; *viz.* $\frac{13' \, 7''.54 + 5''.25}{25.33} = 31''.2984$, &c. and $\frac{13' \, 7''.54 + 3''.8}{18.19} = 43''.504$, which values accord very nearly with thoſe that had been previouſly determined by a ſeries of ſolar meaſures, and the latter of them exactly, as far as to the third place in the decimal figures.

Table IV. is the table to be uſed with Table V. for finding, firſt the true angle from the apparent one, and then the true diſtance at once from this true angle: its corrections are arranged ſomewhat differently from thoſe in Table III., and have an oppoſite ſign, but are borrowed from Table III. in ſuch way, that by means of a little tranſpoſition, the terms of one may be converted into thoſe of the other; as, for example, at the apparent angle $18' \, 40''$, in Table IV., the correction is $- \, 10''.4$, and the true angle conſequently $18' \, 29''.6$; and at $18' \, 30''$, the neareſt numbers for the true angle in Table III., the correction is $+ \, 10''.44$, which makes its correſponding apparent angle $18' \, 40''.44$. In the former of theſe two tables, the correction is calculated to the hundredth part of a ſecond; it being that from which the ſcale has its value appreciated; but in the latter, it was deemed convenient to leave out the hundredth parts, as being

being beyond the powers of the telescope, or rather of the human eye, when a single observation is taken.

Before Table V. was constructed, it was found by plane trigonometry, that one yard will subtend an angle of one minute at 3437.7 yards distance; and, as the distance decreases in the same ratio in which the angle increases, the table was made by a continual reduction of this number into halves, thirds, fourths, &c. as far as to 30′, and all the intermediate seconds from 1′ to 30′, were inserted with their corresponding distances. For instance, at the true angle of 18′ 30″, the true distance is 185.82 yards; it being always understood, that the measured angle is subtended by an exact yard placed at right angles to the line of sight, in either a vertical or horizontal position, and that the correction taken from Table IV. has been applied to the measured or apparent angle. If two yards should be used as the opposed object at a great distance, then *half* the angle only must be taken; but if half a yard only be used at small distances, then *double* the angle will be proper; and should the distance be within 110.95 yards, the smallest distance contained in the table; in which case the angle will exceed 30′: the distance belonging to *half* the angle will always be *double* the distance required. Suppose the angle 33′; then half of this is 16′ 30″, and the double number 208.34; consequently 104.17 yards will be the corresponding distance; and thus the table will extend to any short distance, by taking a given portion of the measured angle, when reduced to the true one, and by using the same portion of the corresponding distance, provided the angle do not exceed 60′, which is the limit of Table IV., and which is as much as a telescope magnifying only 30 times will usually take into the field of view.

In order to exemplify the use of these new tables, and at the same time to prove their accuracy, we obtained from Mr. Troughton a couple of staves, having each a sliding yard of brass, cut into notches for decimal divisions of a yard, which are capable of being seen at a distance, with an apparatus for placing them perpendicular in any given situation: on the 8th of October 1816, one of these staves was fixed in a perpendicular position at an unknown distance on level ground, and the following measures were taken of the angle subtended by a yard, by Troughton's micrometer successively adapted to each of the four telescopes, thus:

With telescope	30.15 in.	24.59 revol. =	27′ 2″.9	(by Tables I. and II.)	− 10″.4	(by Table IV.)	= 26′ 52″.5
	45.75 in.	37.53 revol. =	27 10.5	- - -	− 15.6	- -	= 26 54.9
	63.5 in.	52.25 revol. =	27 15.43	- - -	− 21.85	- -	= 26 53.58
	118.8 in.	98.52 revol. =	27 35.1	- - -	− 41.0	- -	= 26 54.1
							4)215.08
						Average	= 26 53.77

By Table V. the distance corresponding to this angle is 127.81 yards, and by measurement of a good chain, it was afterwards found to be 5.808 × 22 = 127.776 yards, the difference or error being only .034 of a yard, or something less than an inch and a half. During the observations, the sun was obscured by clouds, and the object viewed had no vibratory motion, which is a circumstance essential to be attended to.

With Dollond's divided object-glass applied to the telescope of 45.75, the measure was 2 in. 11 div. 19 ver., or 1294 of the vernier, which, multiplied by 1″.24, the solar value of unity, gave the measured angle only 26′ 44″.56; but on examining the ratio in which the focus elongates at different distances, we found that the divergence of the rays was lessened so much, in passing through the divided object-glass, before they entered the achromatic object-glass, that the table of corrections would be of no use for this arrangement of two separate object-glasses.

On the 16th of the same month the graduated staff was erected at a greater unknown distance, and the following measures were taken by Troughton's micrometer, as before, *viz.*

With telescope	45.75 in.	27.59 revol. =	20′ 0″.1	− 8″.6 (correction)	= 19′ 51″.5
	63.5 in.	38.48 revol. =	20 4.4	− 12 - -	= 19 52.4
					2)103.9
				Average	= 19 51.95

to which angle the corresponding distance by Table V. is 173.0 yards; and the subsequent measure by the chain accurately repeated was 172.92 yards, in which determination the error was .08 of a yard, or 2.88 inches only.

From these operations we are persuaded that a good telescope, with a Troughton's micrometer, will determine distances, by simple inspection, when within the eighth part of a mile, with more accuracy than is usually done by a surveyor's chain or measuring-wheel; and, consequently, if both a backward and forward view be taken from one station, situated near the middle of a line joining two graduated staves, a *quarter of a mile* may be so determined at *one station* in the space of two or three minutes after the station is taken. But it may be said, why not take a quarter of a mile at one sight, since the power of a good telescope will command a small object at this distance? To which we answer, that the error arising from distance may be considered rather as a geometrical than an optical error: our experiments have convinced us that a small angle may be measured by Troughton's micrometer, when the thickness of the spider's line is allowed for, (*viz.* $\frac{6}{100}$th of a turn of the screw in our micrometer,) so accurately, that the error of observation in favourable weather will seldom exceed *one second;* but the error in distance, corresponding to an error of one second in the measured angle, increases in the duplicate ratio of the distance, and consequently becomes too considerable to be admissible beyond a limited distance; for instance, at the distance of 220 yards, or the eighth of a mile, an error of 1″ in the angle subtended by a yard produces only an error of 0.23 of a yard in distance; but at 440 yards, or a quarter of a mile, the error in distance corresponding to the same error in the angle is 0.92; that is, at twice the distance the geometrical error is four times augmented; which circumstance limits

limits the distance at which micrometrical measurements in longimetry can be usefully employed at one station. What may be called the *optical* error, or that which arises from want of parallelism in the rays of light on entering the object-glass, and is allowed for in our fourth table, on the contrary, decreases with an increase of distance, and very nearly in a sub-duplicate ratio; so that the correction arising out of this optical error becomes insensible at no very great distance in telescopes of ordinary dimensions: for instance, at 220 yards, or its angle 15′ 38″, the correction is — 7″.4 by our Table IV.; but at 440, or its angle 7′ 49″, the correction diminishes to 1″.9, or nearly a fourth of the former at double the distance. Hence there is a peculiar distance at which every separate telescope will have its optical error or correction reduced to 1″, or quantity of probable error of observation, beyond which distance the tabulated corrections may be disregarded in ordinary operations. With the telescope of 63.5 inches focus, the correction will be less than 1″ at 590 yards distance; with that of 45.75 inches, at 537; and with that of 30.15 inches, at 430, the distance continuing to diminish with the diminishing length of the focus of each object-glass, but not in the same ratio; consequently, when the telescope is very short, and its power small, the optical error may be altogether disregarded, wherever such telescope can be of any real use; because, in all probability, this error will be less than the error of observation arising from want of power.

TELESCOPE *Shell*, in *Conchology*, the name of a species of turbo, with plane, striated, and numerous spires.

TELESCOPICAL STARS, such as are not visible to the naked eye, but discoverable only by the help of a telescope. See STAR.

All stars less than that of the sixth magnitude are telescopic to a middling eye.

TELESE, in *Geography*, a town of Naples, in Lavora, the see of a bishop, who resides at Cerreto; 18 miles E.N.E. of Capua. N. lat. 41° 12′. E. long. 14° 32′.

TELESIA, or TELESSIA, in *Ancient Geography*, a town of Italy, in Samnium.

TELESIA, in *Mineralogy*. See CORUNDUM.

TELESIO, BERNARDINO, in *Biography*, a modern philosopher, the descendant of an illustrious family at Cosenza, in Naples, was born in the year 1508 or 1509. Having received the early part of his education under an uncle at Milan, he accompanied him to Rome in 1525, and shared in the calamities which attended the sack and pillage of that city. At Padua, whither he afterwards removed, he applied himself with diligence to the study of mathematics and philosophy. Returning again to Rome, he formed an intimate acquaintance with several persons of distinguished character, and so much ingratiated himself with pope Pius IV. that he was offered the archbishopric of Cosenza, which he declined for himself and obtained for his brother. From Rome he retired to his native country, where he married in advanced age, and for a short time became professor of philosophy in the university of Naples. However, the place of his more constant residence was Cosenza, and here he established an academy called Cosentina. He passed the remainder of his life under the patronage of several persons of distinction, particularly Ferdinand, duke of Nocera; but afflicted by the assassination of one of his sons, and by the calumnies circulated against his school of philosophy, he terminated his life in the year 1588. Telesio distinguished himself by his opposition to the physics of Aristotle, and employed mathematical principles in explaining the laws of nature. These were first divulged in a work printed at Rome in 1565, entitled "De Rerum Natura juxta propria principia, Lib. II." and enlarged to nine books in an edition printed at Naples in 1586. The same system was maintained in other treatises, under the titles of "De his quæ in Aere fiunt, et de Terræ Motibus;" "De Mari;" "De Colorum Genere," &c. His system was in its essence the doctrine of Parmenides, who taught, that the first principles in nature, by means of which all natural phenomena are produced, are cold and heat. (See PARMENIDES and ELEATIC.) Telesio's theory is thus developed: "Matter, which is in itself incapable of action, and admits neither of increase nor diminution, is acted upon by two contrary incorporeal principles, heat and cold. From the perpetual opposition of these, arise the several forms of nature: the prevalence of cold in the lower regions producing the earth and terrestrial bodies, and that of heat in the superior regions, the heavens and celestial bodies. All the changes of natural bodies are owing to this conflict; and according to the degree in which each principle prevails, are the different degrees of density, resistance, capacity, moisture, dryness, &c. which are found in different substances." This system is founded on the fanciful conversion of mere attributes and properties into substantial principles. For lord Bacon observes, that Telesio, no less than Plato and Aristotle, places abstract notions at the basis of his system, and produces his world of real beings from non-entities. This eminent philosopher, however, characterises him as a lover of truth and a benefactor to science; and one who prepared the way for subsequent improvements. After his death, his writings, as containing "innovations," were put into the Index Expurgatorius of the Inquisition. His philosophy, nevertheless, had many advocates, among whom was Campanella; and his works were republished at Venice, in 1590, by Antonio Persio, who wrote a compendium of his philosophy in the vernacular tongue. Telesio's style was more polished than that of other philosophers of his time; and he intermixed some Latin verses of considerable eloquence. Brucker by Enfield.

TELESPHORUS, in *Mythology*, a deity invoked by the Greeks for health, together with Esculapius and Hygeia. The figures of these three divinities occur on several medals; and on some we have Telesphorus with Esculapius alone, and on others with Hygeia.

The figure of Telesphorus is invariably the same, *viz.* that of an infant clothed with a sort of cloak without sleeves, which enfolds its arms, descends below the knees, and has a kind of hood or cowl covering its head.

Montfaucon has given a particular description of this deity, the worship of which is supposed to have passed from Epidaurus to Rome, with that of Esculapius.

TELETÆ, among the *Ancients*, were solemn rites performed in honour of Isis.

TELETZKOI-OZERO, in *Geography*. See ALTIN.

TELETZKOI *Mountain*, deriving its name from the lake Teletzkoi-ozero, one of the greatest eminences of the Altay mountains (see ALTAI), and from which the river Oby issues. It forms, with its lofty summits, the boundary between Siberia and the Soongarey, strikes its powerful ridges down between the lake and the Katunia; and after having turned round the east side and the lake, unites with the Kunetzkoi mountains. This division is one of the greatest, but at the same time the coldest and most inaccessible, of all the Altaian ore-mountains; hence it is, that its quality and contents are little known. This, however, is certain, that very powerful granite and porphyry mountains are in its range, and that the earth near and upon it yields jasper, flint breccia, hornschistus, white (probably saline) chalk-stone, coloured marble, black schistus, marle, sand-stone, and in these thefe there are iron, argentaceous copper, and lead ores, naphtha, afphaltus, &c. The mountains to the right of the Katunia feem to be particularly rich in ores.

TELEUTES, or Telengutes, a tribe of Tartars, who are fuppofed to have derived their name from the lake Telegul in the Altay mountains. They are alfo denominated by the Ruffians the white Kalmucks, becaufe they formerly lived among the Soongarians. Abulgafi reckons them among the Mongolian races; but as their fpeech is manifeftly a corrupt Tartarian, their origin may more confiftently be derived from that nation. In the year 1609 they did homage for the firft time to the Ruffian empire; but it was not till towards the middle of the 17th century, when fome ftems of them removed higher up the Tom, that they became properly fubjects of Ruffia: the greater part of them, however, remained with the Kalmucks. The former dwelt partly in the Tomfkoi diftrict of the Tobolfkian, partly in the Kufnetfkian circle of the government of Kolhyvan; and their number is fo fmall, that they only reckon about 500 males.

TELFS, a town of the county of Tyrol, near the Inn; 15 miles W.S.W. of Infpruck.

TELGEN, a town of Sweden, in Sudermanland, on the lake Mæler; 15 miles S.W. of Stockholm.

TELGET, a town of Germany, in the bifhopric of Munfter; 5 miles E.S.E. of Munfter.

TELGHIOURAN, a town of Afiatic Turkey, in the government of Diarbekir; 30 miles S. of Diarbekir.

TELHEIM, a town of the duchy of Wurzburg; 7 miles S.S.W. of Schweinfurt.

TELHEIRO, a town of Portugal, in the province of Beira; 6 miles S.W. of Pinhel.

TELICA, a volcano of Mexico, near Tecoantepeque.

TELICARDIOS, in *Natural Hiftory*, the name given by fome authors to a ftone found in the fhape of a heart. It owes this figure to its having been found in the fhell of fome large bivalve of the cockle kind; and is more ufually known among authors under the name of bucardites.

TELIGUL, or Telegul, in *Geography*, a lake of Ruffia, in the Altay mountains, about 120 miles in circumference. N. lat. 43° 12′. E. long. 64° 14′.

TELIPHANO, in *Botany*, a name ufed by fome authors for the doronicum, or leopard's bane.

TELL, William, in *Biography*, a celebrated Swifs, was an inhabitant of middle rank of Burgeln, in the canton of Uri, and fon-in-law of Walter Furft. In 1307 he engaged in the confpiracy againft the Auftrian tyranny. Gefler, the German bailiff, fufpecting a plot, artfully contrived a fcheme for afcertaining the extent of fubmiffion to the Auftrian yoke. Accordingly he fet up a hat upon a pole, and commanded that obeyfance fhould be paid to it. Tell refifted the command; and, as tradition reports, the arbitrary bailiff ordered him to fhoot with an arrow at an apple placed on the head of his fon. He cleft the apple without hurting the child; and being obferved to have another arrow, he was interrogated what he intended to do with it. He unhefitatingly replied, that if he had wounded his fon, the other fhaft fhould have been directed to the bailiff's heart. This bold declaration caufed him to be imprifoned. Of this fact there is no doubt; though the incident of the arrow and apple may be fabulous, as it is applied by Saxo Grammaticus to a Dane at an earlier period. The bailiff took Tell with him acrofs the lake of Lucern, defigning to convey him to another canton. In the paffage, a ftorm arofe; and the veffel being in danger, the fetters of Tell who was known to be a fkilful boatman, were taken off, and the helm was committed to his hands. Availing himfelf of this circumftance, he fteered to a rock and made his efcape. Gefler on landing met with his fate from an arrow of Tell, who afterwards retired to Stauffacher in the canton of Schweitz; and on the following new-year's day, all the Auftrian governors were feized and difmiffed from the country; and this circumftance is faid to be the commencement of Swifs freedom. Tell's death is fuppofed to have been occafioned by an inundation at Burgeln in the year 1354. His grateful countrymen erected a rude chapel to his honour on the fpot where he refided, and another upon the rock on which he landed. His pofterity, however, funk into oblivion, without any permanent diftinction; the laft who bore his name died in 1684, and the laft of the female line in 1720. Coxe. Muller. Gen. Biog.

TELLA Pashnum, in *Natural Hiftory*, a name given by the people of the Eaft Indies to a kind of white arfenic, or rat's-bane, found native among them.

It is well known to be a fatal poifon, and ufed to deftroy vermin. It lies in the cliffs of rivers among ftrata of ftone in large white irregular lumps; when held to the fire, it emits copious fumes, fmelling ftrongly of garlic and fulphur, but it does not readily melt or run.

Tella *Sagrum*, a name given by the natives of the Eaft Indies to a kind of earth which they ufe externally to dry up ulcers, and internally in cafes of coughs and colds. It is of the nature of the finer clays, and is found at the bottom of fome of their rivers.

TELLEGROD, in *Geography*, a morafs on the borders of Norway and Lapland, which cannot be croffed without much apprehenfion of danger. During winter it is frozen to the depth of feveral yards, and does not thaw till the fummer is far advanced. The furface may appear dry and folid, but as the heat ftill penetrates downwards, the icy floor which fupports it, foftening and melting, bends and trembles under the fhock of preffure, and at laft gives way, fo that horfes, carriages, and paffengers—all fink into the abyfs. Near the mouth of the Fiord, or firth, a bed of clay-marle is feen diftinctly mixed with fmall fhells. Appearances of a like kind occur along the fouthern fhores of Norway, and the fact is the more remarkable, fince no foffile fhells have been ever found in the interior of the country. This marle, however, is only a local formation, and refts on the fundamental gneifs.

TELLER, an officer in the exchequer, of whom there are four: whofe bufinefs is to receive all monies due to the crown, and thereupon to throw down a bill through a pipe into the tally-court, where it is received by the auditor's clerks, who attend there to write the words of the faid bill upon a tally, and then deliver it to be entered by the clerk of the pells, or his clerk.

The tally is then fplit or cloven by the two deputy chamberlains, who have their feals; and while the fenior deputy reads the one part, the junior examines the other part with the other two clerks.

The tellers' places are in the king's gift, and they have befides their chief clerk or deputy, and other clerks for the difpatch of bufinefs.

Teller, Marcus, in *Biography*, a prieft and mufical compofer in the church of St. Gervais, in Maeftricht, publifhed in 1726, his firft work at Augfburg, under the title of "Mufica facra ftylo plane Italico et Chromatico pro Compofitionis amatoribus, complectens IX Motetta brevia de Tempore, et II Miffas folemnes, &c." His fecond work was pofthumous, and publifhed likewife under the folemn title of "Mufica facra," confifting of four maffes and four motets, for four voices, two violins, tenor, baffoon, and a baffo continuo, or figured bafe.

Teller, Florian, an eminent dramatic compofer of the mufic of grand opera ballets. In 1763 he compofed mufic for the ballet of Orpheus and Euridice, for the duke

duke of Wurtemburg's theatre at Stuttgard; and the year after, for his highness's birth-day, that of Noverre's grand ballet called "The Triumph of Neptune." The ballet music of this composer superseded that of Lulli and Rameau at Paris; and in our opera, the music of the *ballets historiques*, and chaconnes danced by Mad. Heinel and Vestris, was chiefly the production of Teller.

TELLES, in *Geography*, a sea-port of Africa, in the kingdom of Fez, on the coast of the Mediterranean; the harbour is small but safe, and the bottom good; 120 miles E.S.E. of Tangiers.

TELLICHERY, a city of Hindoostan, on the coast of Malabar, belonging to the English, and defended by lines. It was long besieged by the forces of Hyder Ali; but in the year 1782 the troops were defeated, the camp taken, and the general wounded and made prisoner by the British, under the command of major Abingdon. The situation of the town is beautiful and healthy: pepper is the great article of trade, and cardamoms; 48 miles N.N.W. of Calicut. N. lat. 11° 15′. E. long. 75° 20′.

TELLICO, a town of the state of Tennessee, with a block-house; 50 miles S.W. of Knoxville. N. lat. 35° 37′. E. long. 84° 18′.

TELLIER, Michael, in *Biography*, a distinguished Jesuit, was born in 1643, near Pire, in Lower Normandy. He studied at the Jesuits' college at Caen, and entered into the society at eighteen years of age. Having for some time taught the schools, he was directed by his superiors to prepare an edition of Quintus Curtius, "in usum Delphini," which was printed in 1678. He was afterwards selected, with other eminent brethren, to establish at the Jesuits' college at Paris a society of learned men, who might retrieve the honour of the body; but his views were directed to other objects, and he became a zealous controversialist in the subjects of dispute between the Jesuits and other orders. Accordingly, in 1687, he published "Defense des Nouveaux Chretiens et des Missionaires de la Chine, du Japon, et des Indes," which was attacked by Arnauld in his "Morale Pratique," and was announced to the holy office: and sentence of condemnation was averted by a promise that Tellier should come to Rome, and make alterations in his work. This prepared the way for numerous publications; in consequence of which Tellier gained increasing reputation, and was advanced to the offices of revisor, rector, and provincial. Upon the death of F. la Chaise in 1709, he was chosen, in competition with another candidate, and in consequence of an assumed air of modesty, to succeed him as confessor to the king. But whatever modesty he might assume to serve a present purpose, he had little true humility. Ardent, unsympathizing, and despotic, he was hated by his brethren over whom he tyrannized, in the most unwarrantable manner. Fontenelle, who well knew his disposition and character, hearing of his appointment, said, "The Jansenists have sinned." His first act was the demolition of the famous house of Port Royal, which he razed to its foundation; he then forced upon the nation and the magistrates the bull Unigenitus; and he proceeded with such violence, that the Jesuits themselves said, "Father le Tellier drives us at such a rate that he will overturn us." Tellier's conduct brought disgrace on the society, and was ultimately the chief occasion of its abolition. On the death of Louis XIV. he was exiled, first to Amiens, and afterwards to La Flêche, where he died in 1719, at the age of seventy-six. The morals of Tellier were regular; and though some persons suspected him of hypocrisy, others have with greater probability believed, that he was actuated by real zeal for the principles which he had adopted. He was a man of literature, wrote many works, and was a member of the Academy of Belles Lettres. Nouv. Dict. D'Alembert's Hist. of the Jesuits.

TELLIGT, in *Geography*, a town of Germany, in the bishopric of Munster, with a rich abbey, on the Ems; 3 miles from Munster.

TELLIGUO Mountains, or *Iron Mountains*. See Iron *Mountains*.

TELLINA, in the Linnæan system of *Conchology*, a distinct genus of the class of Vermes, and order of Testacea. For the characters of this genus, see Conchology. Gmelin enumerates ninety-one species.

TELLINGANA, in *Geography*, a province of Hindoostan, now called Golconda.

TELLINGSTEDE, a town of the duchy of Holstein; 11 miles S.E. of Lunden.

TELLIPOLI, a town on the N. coast of the island of Ceylon; 9 miles N. of Jaffnapatam.

TELLO, a town on the W. coast of the island of Celebes, and capital of a small kingdom, once united to Macassar. S. lat. 5°. E. long. 120° 2′.—Also, a town on the W. coast of the island of Lombock. S. lat. 8° 24′. E. long. 115° 45′.

Tello *Laugue*, a town on the W. coast of Sumatra. N. lat. 0° 51′. E. long. 98° 21′.

Tello *Point*, a cape on the W. coast of Sumatra. S. lat. 1° 50′. E. long. 100° 31′.

TELLONIUM. See Thelonium.

TELLONUM, in *Ancient Geography*, a place of Gaul, in Aquitania, near the sea-coast, S.E. of Burdigala.

TELLOW, in *Geography*, a town of Brandenburg, in the Middle Mark, famous for its turnips; 10 miles S. of Berlin. N. lat. 52° 23′. E. long. 13° 15′.

TELLUDOPIN, a town of the island of Celebes, in Buggess bay. S. lat. 2° 35′.

TELLURE, in *Agriculture*. See Tiller.

TELLURIUM, in *Mineralogy*, a metal discovered by Klaproth, combined with gold and silver, in the ores from the bannat of Temeswar, and in the Farzebay mountains in Transylvania. The ores of this metal are denominated *native tellurium*, *graphic tellurium*, *yellow tellurium*, and *black tellurium ore*.

Native Tellurium; Gedigen Sylvan, Werner.—The colour is intermediate between tin and silver white, and sometimes inclines to steel-grey. This ore is found massive and disseminated; it is said sometimes to occur crystallized in four-sided prisms; it occurs also in small granular concretions. It yields to the knife, and is rather brittle. The specific gravity, according to Klaproth, is 6.15. Before the blow-pipe, native tellurium melts easily before ignition; it burns with a greenish flame, and is entirely volatilized in a dense white vapour, which has the acrid odour of horse-radish. When exposed to a low heat, it is converted into a yellowish or blackish oxyd: by an increase of temperature it forms a dark brown or black glass, in which gold grains are interspersed: at a still higher heat the oxyd is entirely volatilized. The constituent parts are, according to Klaproth,

Tellurium - - - -	92.55
Iron - - - - -	7.20
Gold - - - - -	.25

The proportion of gold is however variable. In one variety of native tellurium, Klaproth found 9 parts in the 100 of gold. Native tellurium occurs in veins with quartz and lithomarge. It is known, in the older works on mineralogy, by the name of *aurum problematicum*, *aurum paradoxicum*, and *white gold ore*.

Graphic Tellurium; Tellure natif graphique, Haüy.—This is worked as an ore of gold at Offenbanya, in Transylvania,

where

where it has hitherto only been found. It is so called, from the particular appearance formed by the aggregation of the crystals; it occurs in veins in porphyry. The colour of graphic tellurium is steel-grey, which is sometimes variously tarnished by exposure to the air: it is also found white, yellow, or lead-grey. It has a shining metallic lustre. It occurs massive, disseminated in leaves, and crystallized in small compressed hexahedral prisms, either with or without tetrahedral summits, and generally arranged in rows on the surface of quartz. There are frequently other prisms attached to the extremities of the former, at right angles with them, giving the whole row an appearance of Persepolitan characters. The planes of the crystals are smooth. "The massive variety, which is very rare, occurs in granular distinct concretions." (Jameson's Min.) It is soft, brittle, and frangible, and yields a lead-grey streak. The specific gravity is 5.723. Before the blow-pipe it burns with a green flame, and is volatilized. The constituent parts, according to Klaproth, are

Tellurium - - - - - -	60
Gold - - - - - - -	30
Silver - - - - - - -	10

Yellow Tellurium Ore.—The colour of this ore is silver-white, passing into yellowish or brass-white and grey. It occurs in grains, and in minute compressed four-sided prisms, with a lamellar structure and bright metallic lustre: it also occurs massive and reticulated: it is soft and somewhat sectile: the specific gravity is 10.878. The constituent parts, according to Klaproth, are

Tellurium - - - - -	44.75
Gold - - - - - -	26.75
Lead - - - - - -	19.5
Silver - - - - - -	8.5
Sulphur - - - - - -	5

This ore, which is worked for the gold and silver it contains, has hitherto been found only at Nagyag, in Transylvania. It occurs in small irregular veins in porpbyry. The most frequent vein-stones are brown spar and quartz: it is sometimes associated with red manganese ore, sulphuret of manganese, native arsenic, plumose antimony, and native gold.

Black Tellurium Ore; Nagyagerz, Werner.—The colour of this ore is between iron-black and dark lead-grey. It occurs massive and in leaves, and also crystallized, in the following forms; oblique four-sided tables, rectangular four-sided tables, six and eight-sided tables, and in acute octohedrons acuminated at the summit. It has a splendent metallic lustre, a more or less curved lamellar structure, with joints on cleavage in one direction. It yields easily to the knife, and is sectile: the thin laminæ are flexible: it stains slightly when rubbed in the fingers. The specific gravity is 8.919. This ore melts very easily before the blow-pipe; the sulphur and tellurium are volatilized; a blackish round-coloured globule remains, which, on being melted with borax, yields a globule which consists of gold alloyed with silver; the slag which remains tinges borax violet-blue. Its constituent parts, according to Klaproth, are

Tellurium - - - - - -	32.2
Lead - - - - - - -	54.0
Gold - - - - - - -	9.0
Silver - - - - - - -	0.5
Copper - - - - - - -	1.3
Sulphur - - - - - - -	3.0

This ore is found associated with the preceding ore of tellurium. An ore of tellurium has lately been discovered in Norway by Esmark. An account of the mines where tellurium is obtained, was published by M. Stutz in the new Memoirs of the Society of Naturalists at Berlin, vol. ii. 1799, and by Esmark, entitled "An Account of a Mineralogical Journey through Hungary, Transylvania, and the Bannat," in the Neuen Bergmannischen Journal, vols. i. and ii. Dr. Clarke, in the 4th vol. of his Travels, has also recently given a description of the tellurium mines, from which we shall briefly extract the most interesting particulars at the close of the present article.

Analysis of the Ores of Tellurium.—These ores are worked for the gold and silver they contain; and the tellurium with which they are combined being extremely volatile at a low degree of heat, this metal was lost in the process of extraction, and was for a long time supposed to be antimony. Muller first suspected that it was a new metal. Bergmann made several experiments upon it, but left the question undecided.

Klaproth, in 1798, read an account of the discovery of this new metal in the public sitting of the Royal Academy of Sciences at Berlin.

The process of extracting the metal from native tellurium is as follows. Six parts of muriatic acid are poured on the crude ore, which has been previously separated as much as possible from its matrix, and mechanically divided. Heat is applied, and three parts of nitric acid are added by degrees. A violent effervescence takes place. By this process the metallic portion of the ore is dissolved, leaving the matrix, which is principally quartz, behind. In the next place, the filtered solution is carefully diluted with as much water as it will bear without being rendered turbid. Caustic potash or soda is added, until the precipitate which is first produced disappears, and only a dark-brown slimy residue remains.

Decant the solution, setting the residuum apart for subsequent examination: it consists of iron and gold. To the alkaline solution add muriatic acid, until it be saturated, most accurately observing the point of saturation. A copious white precipitate ensues, which in a raised temperature falls to the bottom of the vessel in the form of a heavy powder. It is then collected, and washed with equal parts of water and spirits of wine, and dried in a gentle warmth. This is the oxyd of tellurium. To reduce it to a metallic form, it should be heated in a small glass retort along with one-twelfth of its weight of charcoal, or it may be previously moistened with oil. Adapt a receiver to the retort, and let heat be applied till the powder be brought to a state of ignition. Small metallic drops will be seen lining the upper part of the retort, which fall down separately, and are succeeded by others. On refrigeration, the reduced metal (excepting some few metallic drops on the shoulder of the retort) is found fused, with a clean splendent surface, which is most frequently crystalline. At the moment the reduction takes place, a quantity of carbonic acid gas is suddenly generated, carrying along with it some particles of the mixture, which it deposits in the receiver. The other ores of tellurium being worked as gold ore; for their analysis, see GOLD.

Tellurium in the pure reguline state was first obtained by Klaproth, who has given the following description of it: it is of a tin-white colour, verging to lead-grey; it has a very high metallic splendour, and a foliated structure; the surfaces of the fragments are very brilliant. When cooling slowly after fusion, it assumes a crystalline surface. It is very brittle, and easily reduced to powder. Among all the known fusible metals, except the metalline alkalies or earths, tellurium possesses the least specific gravity, being only 6.185.

Tellurium melts sooner than antimony, when exposed to the same degree of heat, but later than lead. It inflames upon charcoal before the blowpipe with a violence resembling detonation, and with a vivid light-blue flame, which on the edges has a greenish tinge. By the continued action of the blowpipe, it is entirely dissipated in a greyish-white vapour, and emits a smell like that of scraped radish.

Tellurium amalgamates very imperfectly with mercury, even when heat is applied. It combines with fulphur in equal proportions when fufed in a gentle heat, and forms a lead-coloured ftriated fubftance. With nitric acid, tellurium yields a limpid colourlefs folution, which is not rendered turbid by water. In the concentrated folution, very light, flender, needle-fhaped cryftals are formed, which commonly affume a dendritical arrangement. Muriatic acid, on the addition of a little nitric acid, affords a fimilar clear folution of this metal. This faturated folution is decompofed by the mere addition of water, which throws down a white powder, but this is again diffolved on adding more water.

The powder thrown down is not a pure oxyd of tellurium, as it is combined with a fmall quantity of muriatic acid. If tellurium be expofed to one hundred times its weight of concentrated fulphuric acid, the acid gradually acquires a tinge of a fine deep amethyftine red. This colour is deftroyed by the addition of water, and by heat.

Carbonated and pure alkalies precipitate tellurium in the form of a white oxyd, combined with water or an hydrate. This is rediffolved by an excefs of alkali. Alkaline fulphurets throw down a dark-brown or blackifh precipitate. Tincture of galls produces a flocculent yellow precipitate. The folutions of this metal in acids are not decompofed by pruffiate of potafh, a property which tellurium poffeffes in common with gold, platina, iridium, ofmium, rhodium, and antimony. Zinc and iron precipitate tellurium from its folution in acids, in the metallic ftate, in the fhape of blackifh flocculi, which acquire a metallic luftre by trituration. Phofphorus is gradually coated with metallic laminæ in a muriatic folution of tellurium.

Oxyd of tellurium on charcoal is reduced with brifk effervefcence, and afterwards volatilized; but if heated in a fmall glafs retort it fufes, and on refrigeration exhibits a ftraw-yellow colour and a ftriated texture. Some of thefe properties of pure metallic tellurium are common to native tellurium. Since the firft difcovery of this metal by Klaproth, it has been further afcertained, that it combines with chlorine in the proportion of 100 parts of tellurium with 90.5 of chlorine. Tellurium forms two diftinct compounds with hydrogen, the one of which is folid, and the other gafeous. The firft is formed by making tellurium the negative furface in water in the Galvanic circuit; by this a brown powder is produced, which is a folid hydruret of tellurium. The fecond is formed by acting with dilute fulphuric acid upon the alloy of tellurium and potaffium, by which a peculiar gas is produced, having a fmell refembling that of fulphuretted hydrogen. It is abforbed by water, and a claret-coloured folution refults, which by expofure to the air becomes brown, and depofits tellurium. After being wafhed with a fmall quantity of water, this gas does not affect vegetable blue colours. It burns with a blueifh flame, depofiting oxyd of tellurium, and unites with alkalies. It precipitates moft metallic folutions, and is itfelf inftantly decompofed by chlorine gas. It may be called telluretted hydrogen gas.

Tellurium is one of thofe metals whofe oxyds poffefs the characters of acids, and form diftinct claffes of falts. The falts formed by a combination of a bafe with the oxyd of tellurium, are called by Berzelius *tellurets*.

Tellurium, according to Klaproth, combines with oxygen in the proportion of 100 parts of the metal with 20.5 of oxygen; but Berzelius determines the proportions to be 100 tellurium and 27.83 oxygen.

This metal has not hitherto been applied to any ufeful purpofe in the arts, which may probably be attributed to its fcarcity, and the comparative recentnefs of its difcovery.

Tellurium Mines.—" The mine of Nagyag is diftant about 15 miles from Deva, in the bannat of Temefwar: it is fituated in the heights of the mountains, lying on the north fide of the river Moros. After croffing the river, we began to climb thefe heights. The roads were not bad, but almoft the whole journey to Nagyag was up a fteep afcent. We were five hours, although drawn by four horfes in a light car, before we reached the fmall town where the mine has been opened.

" As Tranfylvania is the only country in the whole world where tellurium has been difcovered, our curiofity was greatly excited to view the Nagyag mine. At laft the profpect opened upon us with great boldnefs of fcenery quite among the fummits of this mountainous region, and in a manner highly picturefque and ftriking. The fituation of the mine was diftinguifhed by an immenfe heap of difcarded minerals thrown out in working it.

" The whole village of Nagyag has been undermined: the works are not only carried on upon a grand and extenfive fcale, but they are conducted with a degree of neatnefs, for which the Germans have long been famous in mining. Some fpecimens of tellurium are fo exceedingly rich in gold, that in the fale of them for the crown, it is neceffary to weigh them, and to eftimate the price according to the quantity of gold they contain. This kind of ore is always kept locked up in private warehoufes. The common ore lies expofed in heaps, at which the workmen are bufily employed in preparing the ore for ftamping.

" When the mine was firft difcovered, the mountains around it were covered with forefts, which have fince been cut down to fupply the mines with timber. The difcovery of the mine is thus related on the refpectable authority of baron Boon, in his letter to profeffor Feber. ' A Wallachian, whofe name was Armenian John, came to my father, then poffeffed of a rich filver mine at Cuertes, telling him, that as he conftantly obferved flames iffuing from and playing upon a fiffure in the Nagyag foreft, he was of opinion that rich ore might be hid under ground. My father was fortunate enough to liften to the poor man's tale; and accordingly he drove a gallery in the ground which the Wallachian had pointed out. The works went on fome years without fuccefs, and my father had refolved to give them up. However, he made a laft drift towards the fiffure, and there he difcovered the black and lamellated gold ores, which were at firft looked upon as iron glimmer, but proved, when affayed, to be, what they really are, rich gold ores." Travels through the Bannat, Lond. 1799.

" Other veins were afterwards difcovered running parallel to each other from north to fouth, and dipping from weft to eaft. When Boon vifited Nagyag, the mine had only been worked to the depth of 60 fathoms. Its depth is now 150 fathoms. The mountains are entirely compofed of porphyry, covered with red clay or red flate and fandftone. The veins break off as foon as they reach the red flate. Thefe veins contain with the ore, felfpar and fat quartz. There is alfo found here a very rich kind of ore, which is finely woven into the texture of a reddifh felfpar. Among the rich ores, native filver occurs mixed with gold. Another variety is called by the miners *cotton* ore; it confifts of little native filvery gold grains in tellurium, adhering to an argillaceous matrix. All the femi-metals at Nagyag are found, when carefully analyfed, to contain gold. According to Boon, the tellurium mines in the courfe of 20 years yielded above 4,000,000 florins in gold and filver. At the time of our arrival it had been worked 60 years, and was equally productive."

TELLUS, Terra, ⊖, in *Aftronomy*. See Earth.

TELMARA, in *Ancient Geography*, a town of Afia Minor, in Caria.

TELMEEN,

TELMEEN, in *Geography*, a town of Africa, in the country of Sahara, anciently called Almæna; 50 miles W. of Gabs.

TELMES, a town of Morocco; 15 miles from Safi.

TELMISSUS, in *Ancient Geography*, a name given to three towns in Afia Minor, one at the diftance of 60 ftadia from Halicarnaffus, in Lycia; fituated at the S.E. part of the gulf of Glaucus, $2\frac{1}{4}$ leagues N.E. of the promontory Telmeffus, and nearly S.W. of the mouth of the river Glaucus. Its inhabitants were famous for their fkill in augury: this town had a very fine theatre:—the fecond was in Caria, and the third in Pifidia.—Alfo, a mountain of Afia Minor, in Lycia.

TELO MARTIUS, a port of Gallia Narbonnenfis. See TOULON.

TELOBIS, a town of Spain, in the Tarragonefe, belonging to the Jaccetani. Ptol.

TELOBO, in *Geography*, a fmall ifland in the Eaft Indian fea, near the weft coaft of Gilolo. S. lat. 1° 6'. E. long. 127° 15'.

TELON, a name given by the chemifts to fire.

TELONÆ, τελωναι, among the Athenians, farmers of the public revenues: for the feverity with which they were handled, in cafe they failed, fee Potter, Archæol. Græc. lib. i. c. 14. tom. i. p. 81.

TELONIUM. See THELONIUM.

TELONIUS, SALTO, in *Ancient Geography*, a river of Italy, in the country of the Sabines. It fprang towards the S. of Carfeoli, and ran N. to difcharge itfelf into the Velinus.

TELOPEA, in *Botany*, from τηλωπος, *confpicuous at a diftance*, a name very fuitable to this magnificent fhrub, with its fine fcarlet flowers.—Brown Tr. of Linn. Soc. v. 10. 197. Prodr. Nov. Holl. v. 1. 388. Ait. Hort. Kew. v. 1. 212.—Our *Embothrium fpeciofiffimum*, with *E. truncatum* of Labill. Nov. Holl. v. 1. 32. t. 44, conftitute this genus. See EMBOTHRIUM, from which we are unwilling to feparate them, for the reafons given under OREOCALLIS. The extremely clofe natural affinity, and great refemblance, of thefe plants to each other, makes us miftruft even the technical character of the lateral *ftigma* (omitted indeed in Hort. Kew.), fuppofing that organ to be really terminal in *Embothrium*, which on a careful infpection we find reafon to doubt. The efficient part of the ftigma in *E. coccineum* is certainly oblique. We wifh to learn, rather than to dictate, but we cannot confide implicitly in the moft able guide.

TELOS, PISCOPIA, in *Ancient Geography*, an ifland of the Archipelago, fituated S.E. of the ifle of Cos, and N.W. of that of Rhodes. Pliny fays that it was celebrated for its perfumes.

TELPAH, in *Geography*, a town of Hindooftan, in Bahar; 40 miles S.S.W. of Patna.

TELPHUSSA, in *Ancient Geography*, a town of the Peloponnefus, in Arcadia, upon an eminence, at fome diftance from the river Ladon, S.E. of Trophæa. A temple of Ceres was fituated near this town, in which fhe was honoured under the name of Lufia.

TELUMNUM, a town of Aquitanic Gaul, on the route from Aquæ Tarbellicæ to Burdigala, between Cæquofa and Salamacum. Anton. Itin. This is the fame with Tellonum.

TELWARAH, in *Geography*, a town of Hindooftan, in Agimere; 25 miles N. of Buddakano.

TEMA, a town of Africa, in the kingdom of Ningo, on the Gold Coaft.

TEMACHIS, in *Natural Hiftory*, the name of a genus of foffils, of the clafs of the gypfums; the characters of which are thefe: it is of a fofter fubftance than many of the other genera, and of a very bright and glittering hue. The name is derived from the Greek τεμαχος, *fruftulum*, a fmall irregular fragment; the bodies of this genus being compofed of an affemblage of multitudes of irregular flaky fragments, as are all the gypfums; but no genus of them fo vifibly as thefe. Hill. See GYPSUM.

TEMALA, NEGRAIS, in *Ancient Geography*, a maritime town of India, on the weftern coaft beyond the Ganges, S. of Berabonna, where the coaft turns towards the E. at the W. mouth of the river Sabaracus.—Alfo, a river of India, the mouth of which was near Berabonna, and the promontory of Temala.

TEMAN, in *Commerce*, the name of a dry meafure at Mocha, in Arabia, containing 40 meemedas or kellas, and weighing in rice 168 lbs. avoirdupois.

TEMANIK, in *Geography*, a town of Perfia, in the province of Kerman; 25 miles S. of Maftih.

TEMAPARA, in *Zoology*, the name of a peculiar fpecies of lizard, called alfo *tejuguacu*.

It approaches much to the nature of the iguana, but is black, fpotted with white.

TEMBA, in *Geography*, a province of the kingdom of Angola.

TEMBARE, a town on the weft coaft of the ifland of Celebes. S. lat. 1° 27'. E. long. 119° 20'.

TEMBASA, in *Ancient Geography*, a celebrated town of Greece, in the Peloponnefus. Pliny.

TEMBEN, in *Geography*, a town of Abyffinia; 100 miles E.S.E. of Siré.

TEMBLEQUE, a town of Spain, in New Caftile; 13 miles E.S.E. of Toledo.

TEMBRIUM, or TYMBRIUM, in *Ancient Geography*, a town of Afia, in Phrygia.

TEMBROGIUS, a river of Afia, in Phrygia, which ran into the Sangarius.

TEMBRUS, a town of the ifland of Cyprus.

TEMBUL, in *Botany*, a name ufed by fome authors for the plant called betel.

TEMDE, in *Geography*, a river of England, which runs into the Severn, 2 miles above Ludlow.

TEMDEGUE KIAMEN, a poft of Chinefe Tartary; 10 miles S.E. of Tcitcicar.

TEME, or TEAM, a river of England, which rifes in the county of Radnor, and runs into the Severn, 2 miles below Worcefter.

TEMEH, a town of Egypt, on the left bank of the Nile; 9 miles N. of Tahta.

TEMEH *Iffebag*, a town of Egypt; 12 miles N. of Fayoum.

TEMELET, a town of Morocco; 70 miles W.S.W. of Morocco.

TEMELO, in *Ichthyology*, a name ufed by fome for the fifh called in Englifh the *grayling*, and in fome places the *umber*.

TEMEN, in *Geography*, a town of Arabia, in the province of Nedsjed; 80 miles S.S.E. of Jamama.

TEMENDEFUST, or METAFUST, a town of Algiers; 10 miles E. of Algiers.

TEMENEH, a town of Afiatic Turkey, in Natolia; 52 miles W.N.W. of Sinob.

TEMENI, a town of the ifland of Candia; 6 miles S. of Candy.

TEMENI *Porta*, in *Ancient Geography*, a fmall town of Afia Minor, in Lydia.

TEMENIA, a town of Afia, in Phrygia, on the confines of Lycaonia.

TEMENIUM, a fortrefs of the Peloponnefus, on the confines of the Argolide. Here were two temples, one dedicated to Neptune, and another to Venus.

TEMERICUS AGER, a fmall country of Gallia Narbonnenfis, towards the fource of the Rhine.

TEMES, in *Geography*, a river of Hungary, which rifes in the fouth-eaft part of the mountains, and runs into the Danube, oppofite Belgrade.

TEMESA, in *Ancient Geography*, a town of Italy, in Brutium, called Tempfa or Temfa in the time of Strabo.

TEMESCAMANG, in *Geography*, the principal of thofe lakes in Lower Canada formed by the Utawas and its contributory ftreams, which lake has always been a trading port, and which may be faid to continue, by a fucceffion of rivers and lakes, upwards of 50 leagues from the Forks, paffing near the waters of the lake Abbitiby, in N. lat. 48° 30′, which is received by the Moofe river, that difcharges itfelf into James bay. Mackenzie's Travels.

TEMESCHU, a town of New Mexico, in the province of Mayo; 160 miles E.N.E. of Santa Cruz.

TEMESVAR, or Temeswar, a town of Hungary. This is an important fortrefs, fituated on the river Beg, which forms a morafs round it, and is ftrongly fortified. It is the capital of a bannat, the refidence of a governor, and the fee of a Greek bifhop. It was taken by prince Eugene in 1716; and by the peace of Paffarowitz was, with the whole bannat, confirmed to the houfe of Auftria; fince which time it has been almoft wholly rebuilt. It is large and populous; the ftreets broad and well paved. The fortrefs is a caftle with walls nine feet thick, and requires a garrifon of 14,000 men. It contains about 443 fquare German miles, with a population of about 450,000 inhabitants; 52 miles E.N.E. of Belgrade. N. lat. 45° 49′. E. long. 21°.

TEMIN, in *Commerce*, a money of account in Algiers, equivalent to 2 carubes, or 29 afpers. See Coin.

TEMISCHBERG, in *Geography*, a fortrefs of Ruffia, in the government of Caucafus; 60 miles W. of Stavropol.

TEMISSAH, or Temmissa, a large town of Africa, in the province of Fezzan, diftant from Mourzouk, its capital, in an E.N.E. direction, about 120 miles. Here the caravan of pilgrims from Bornou and Nigritia, which takes its departure from Mourzouk about the end of October, or beginning of November, and travels by the way of Cairo to Mecca, arrives in the evening of the feventh day, and ufually provides the ftores of corn and dates, and dried meat, that are requifite for its dreary paffage.

TEMISVAR. See Baba.

TEMITZ, a town of Bohemia, in the circle of Chrudim; 18 miles N.W. of Chrudim.

TEMLOWKA, a town of Algiers, anciently called "Sigus;" 24 miles S.E. of Conftantina.

TEMMA, a town of Africa, on the Gold Coaft. N. lat. 5° 45′. W. long. 0° 55′.

TEMMELISSUS, in *Ancient Geography*, a town of Afia, in Syria, on the route from Celecoma to Lariffa, between Chalcida and Apamea. Anton. Itin.

TEMMES, in *Geography*, a town of Sweden, in the government of Ulea; 20 miles S. of Ulea.

TEMNIKOV, a town of Ruffia, in the government of Tambov; 116 miles N.N.E. of Tambov. N. lat. 54° 28′. E. long. 43° 14′.

TEMNOS, in *Ancient Geography*, a town of Afia Minor, in Ionia, at the mouth and north of the river Hermus. It did not fubfift in the time of Pliny.

TEMOEL, in *Geography*, a town on the weft coaft of the ifland of Celebes. S. lat. 0° 5′. E. long. 119° 35′.

TEMORIS, a town of New Mexico, in the province of Culiacan; 70 miles N.N.E. of Culiacan.

TEMOSOSHI, a town of New Mexico, in the province of Hiaqui; 130 miles E. of Riochico.

TEMPATLAHOAC, in *Ornithology*, the name of a broad-billed bird of the Weft Indies, defcribed by Nieremberg; and by him efteemed a fpecies of duck. It is a variety of the *anas clypeata*. See Duck.

It is of the fize of the common duck; is common on the lakes of Mexico, and is a good eatable bird. Ray.

TEMPE′, in *Ancient Geography*, a celebrated valley of Theffaly, between the mountains Offa and Olympus. Ælian, Pliny, and Strabo reprefent it as 40 ftadia in length, along the middle of which lay the courfe of the river Peneus, which feparated Theffaly from Macedonia. Tempé, according to Livy, was the name given to the wood or foreft, which, though not dangerous, was difficult for an army to pafs, becaufe of two defiles five miles in length; and the river Peneus made a terrifying noife in paffing through this deep valley. Tempé, it is faid, is derived from the Greek τεμπη; in the plural, fignifying wood. Tempé, at its entrance, has a large village, which has been long famous for the accomplifhments of its inhabitants, and for the great trade they carry on with Vienna and the interior of Europe.

Tempé, in *Commerce*. See Stampe.

TEMPELBURG, in *Geography*, a town of Hinder Pomerania; 19 miles W. of New Stettin. N. lat. 53° 29′. E. long. 16° 12′.

TEMPER, in a *Phyfical Senfe*. See Man.

Temper *of a Horfe*, the difpofition of the animal, which fhould be carefully attended to while he is young, as well as in the purchafe.

Temper, in a *Mufical Senfe*. See Temperament, in *Mufic*.

Temper, in a *Mechanical Senfe*. See Tempering.

TEMPERAMENT, Temperamentum, *Temperature*, in *Phyfiology*. See Man.

Temperament, *Temperamento*, in *Mufic*, generally denotes a rectifying or amending of the falfe or imperfect concords, by transferring to them part of the beauty of the perfect ones.

The degrees of the octave, which may be called its *elements*, as being the fmalleft intervals into which it is refolvable, are two greater femitones, two lefs tones, and three greater tones.

Now the different fituation of thefe elements, with refpect to each other, occafions that intervals or concords of the fame name, as thirds, fourths, &c. do not confift of the fame degrees or elements, though there be always the fame number of them: but one fourth, for inftance, is agreeable and perfect, and another not.

To mend thefe imperfect concords, the muficians have bethought themfelves to *temper*, *i. e.* give them part of the agreeablenefs of perfect ones. In order to this, they take a medium between the two, and this they call a *temperament*; which neceffarily produces a new divifion of the octave, or, which amounts to the fame, new elements.

For inftance, whereas naturally its elements are the greater femitone, and the greater and lefs tone; they take a middle tone formed of the greater and the lefs: and the only elements now are the greater femitone, and this mean tone, which renders the five intervals that are tones equal, and thofe that are femitones lefs unequal to thefe.

One might alfo divide each of the five tones of the octave into femitones, which, joined to the two it naturally has, would make twelve: in which cafe, the whole octave would be divided into twelve equal parts, which would be mean femitones.

It is eafy to form various other kinds of temperaments: all the difficulty is to find fuch as are free from two great inconveniencies, *i. e.* which do not alter either all the concords too much, or, at leaft, fome of them.

All fuch divifions of the octave are called *tempered* or *temperative fyftem*.

The temperament does, indeed, according to the definition above given, and confidered in one view, correct fome falfe concords,

concords, yet, in other reſpects, it ſpoils and falſifies both perfect and imperfect concords, and renders diſcords more harſh than they would otherwiſe be, if the intervals were juſtly taken. To explain this, we muſt conſider that all the intervals are founded on the primary proportions ariſing from the numbers 2, 3, and 5, that is, if we do not exceed the compaſs of an octave, $\frac{1}{2}$, $\frac{2}{3}$, and $\frac{4}{5}$. See INTERVAL.

The nearer we come in practice to the true intervals, the more perfect the melody and harmony will be; and it is certain, that the human voice, and ſome inſtruments, as violins, &c. which have no ſtops nor frets, will execute muſic to a great degree of exactneſs; but the caſe is not the ſame with fixed or fretted inſtruments, as harpſichords, organs, lutes, viols, &c. Accuracy is here impoſſible, unleſs we would content ourſelves with always playing in the ſame key, without any tranſition or tranſpoſition whatſoever. In this caſe, indeed, the harpſichord or organ might vie with the accuracy of the voice or violin. For inſtance: if we were to compoſe or play in the key of C, then we might make the ſeveral intervals of that key to be in the following true proportions, 1, $\frac{9}{8}$, $\frac{10}{9}$, $\frac{16}{15}$, $\frac{9}{8}$, $\frac{10}{9}$, $\frac{9}{8}$, $\frac{16}{15}$, that is, in whole numbers, $\left\{\begin{matrix} C & D & E & F & G & A & B & C \\ 24 & 27 & 30 & 32 & 36 & 40 & 45 & 48 \end{matrix}\right\}$ and the inſtrument tuned in this manner, would perform any piece of muſic in C, juſtly compoſed, with great beauty and exactneſs; taking for granted, that every key, fundamental note, or ſound, ought to have its true fifth and fourth, and that theſe ought alſo to have their true fifths and thirds.

Now this being premiſed, it will preſently appear, that in making any tranſpoſition or tranſition from C, we ſhall find ſome falſe concord. Thus, for inſtance, if we proceed to G, and conſider it as a key, or fundamental ſound, we ſhall have the following ſeries of numbers for the octave of G, *viz.* $\left\{\begin{matrix} G & A & B & C & D & E & F & g \\ 36 & 40 & 45 & 48 & 54 & 60 & 64 & 72 \end{matrix}\right\}$

But here the interval between 40 and 54 is falſe, being a comma too much, for the ſecond of a key muſt make a true fifth with the fifth of the ſame key. In like manner, if we were to proceed from C to A, as a new key, we ſhould find the following ſeries for the octave of A, $\left\{\begin{matrix} A & B & C & D & E & F & G & a \\ 40 & 45 & 48 & 54 & 60 & 64 & 72 & 80 \end{matrix}\right\}$ where the interval between A 40 and its fourth D 54 is falſe, being too great by a comma. If any other tranſition were examined, we ſhall always find ſome note falſe; as in F, the ſixth would be redundant by a comma; and in D, the fifth would be deficient by a comma. All which ſhews the impoſſibility of truth and exactneſs of muſic on fixed inſtruments. Yet as theſe inſtruments have their uſe and convenience in ſome reſpects, it was proper to endeavour to find out a method of making them tolerable. It has been obſerved under the article INTERVAL, that the tone major exceeds the tone minor by a comma. Their difference is neceſſary for the truth and perfection of muſic; but yet if theſe tones were rendered equal, the ear would not be offended. And this has ſuggeſted the means of tempering fixed inſtruments. If we were to make all tones equal to the tone major, as ſome imagine the ancients did, then we ſhould find the ditonus, or third, exceeding a true third major by one comma, which would be intolerable. In like manner, if all tones were to be minor, we ſhould have thirds major defective by a comma, which would alſo be intolerable, not to mention other falſe intervals that muſt neceſſarily ariſe from ſuch a ſuppoſition.

Suppoſing then one tone increaſed, and the others diminiſhed by half a comma, we ſhould have our thirds major remain perfect. But ſtill it would be neceſſary to examine what fifths this ſuppoſition would give. Now it is evident that a tone major added to an octave, makes juſt two fifths, thus $\frac{3}{2} \times \frac{3}{2} = \frac{9}{4} = \frac{2}{1} \times \frac{9}{8}$. But the tone here added is a tone major, and the tone we have aſſumed is a temperate tone deficient from the tone major by half a comma; hence the ſum of the two fifths, on this ſuppoſition, will fall ſhort of the truth by half a comma, and conſequently one fifth will be deficient a quarter of a comma. Which difference, although it be ſenſible, yet experience ſhews, that fifths ſo diminiſhed are tolerable.

This temperament is what is called the common or vulgar temperament, and conſiſts, as has been ſaid, in diminiſhing the fifth by a quarter of a comma, in preſerving the third major perfect, and dividing it into two equal tones. Which being ſuppoſed, it follows that the fourth muſt exceed the truth by a quarter of a comma; that the third minor will be deficient by the ſame quantity; that the ſixth minor will be perfect, and the ſixth major redundant by a quarter of a comma; and laſtly, that the ſemitone major will exceed the truth by a quarter of a comma. If we introduce chromatic notes, or flats and ſharps, the ſemitone minor will alſo exceed the truth by a quarter of a comma, and conſequently the difference between the two ſemitones, or the dieſis enharmonica, will be preſerved.

If then we had a harpſichord or organ, with each feint or half note divided, we ſhould have the following notes or ſounds, *viz.* C C♯, D♭, D, D♯, E♭, E, F♯, G♭, G, G♯, A♭, A, A♯, B♭, B, c, in the compaſs of an octave. Yet this ſyſtem of notes, numerous as they ſeem, would not be ſufficient for all tranſitions and tranſpoſitions. For though a piece of muſic tranſpoſed to any of the natural keys C, D, E, F, G, A, B, and to the flats, as E♭ and B♭, and ſome others, would do well; yet, in tranſpoſing to ſharps, as to C♯, we ſhould not find a true third major, unleſs we introduced E♯. And even in flats, as A♭ and E♭, we ſhould not find a true third major in deſcending, or a ſixth minor in aſcending, unleſs we introduced F♭ and C♭. And in like manner, tranſpoſitions to G♯ and E♭ would oblige us to introduce B♯ and C♭. Nor would even this ſuffice, for if neceſſity required a tranſpoſition from the key of C to that of D♯, we ſhould not find a true third major without introducing F♯♯ and c. So that at laſt we ſhall come to a temperate ſyſtem, where, in aſcending, the notes C, D, F, G, A, would each have its ſharp and double ſharp, and the notes B and E each a ſingle ſharp. In deſcending, the notes E, D, B, A, G, would each have their flat and double flat, and the notes F and C each a ſingle flat. And thus the octave would be divided into 31 intervals, whoſe deſignations are

C D♭♭ C♯ D♭ C♯♯ D E♭♭ D♯ E♭ D♯♯
1 2 3 4 5 6 7 8 9 10
E F♭ E♯ F G♭♭ F♯ G♭ F♯♯ G
11 12 13 14 15 16 17 18 19
A♭♭ G♯ A♭♭ G♯♯ A B♭♭ A♯ B♭
20 21 22 23 24 25 26 27
A♯♯ B C B♯ C.
28 29 30 31

Where the letters C, D, E, F, G, A, B, ſignify the common diatonic notes: thoſe marked with a ſingle ♯ or ♭ are the chromatic; and thoſe marked with a double ♯♯ or ♭♭ are enharmonic notes: ſo called, becauſe the interval between them and the next diatonic note is an enharmonic dieſis; for which reaſon, the notes E♯, F♭, and B♯, C♭, are alſo enharmonic.

But even in this diviſion of the octave, all the notes would not have a third major in aſcending and deſcending: thus, for inſtance, D♯♯ has no third major; for this would be F♯♯♯, which is not in the ſcale, nor can any number of additional notes ſuffice in all caſes. But this inconvenience is eaſily remedied, and the ſyſtem conſiderably improved, by making all the thirty-one intervals equal. We have already obſerved, that in the

the common temperament, the femitones major and minor exceed the truth by a quarter of a comma, and that the enharmonic diefis is preferved true. Hence it follows, that the hyperoche, or difference between the chromatic and enharmonic diefis; for example, the interval between Fb and E✻, or Dbb and C✻, &c. will alfo exceed the truth by a quarter of a comma. Now the hyperoche, by our table under INTERVAL, is equal to 1.37695, to which adding a quarter of a comma = 0.25000, we have 1.62695, which differs from the enharmonic diefis 1.90917 only by 0.28222, or about $\frac{2}{7}$ of a comma. Neglecting this fmall difference, let us fuppofe all the thirty-one intervals of the octave equal, it will follow that tranfpofitions to all the notes of the fyftem, whether diatonic, chromatic, or enharmonic, will be equally good, and differ only in pitch or tone, as they ought, but not in accuracy, which muft next be examined.

The divifion of the octave into thirty-one parts may be conveniently done by logarithms. Under the article INTERVAL, I find the logarithm of the octave = 55.79763 commas; confequently each diefis, or divifion of the octave, = 1.79992 comma; hence the fifth, being 18 diefes, will be 32.399 commas. Now the true fifths being 32.640, the fifth confequently in this temperament is deficient by 0.241 parts of a comma, which is lefs than a quarter of a comma by $\frac{1}{110}$ part; and therefore this fifth will, ftrictly fpeaking, be better than that of the vulgar temperament by $\frac{1}{110}$ of the comma; but this is infenfible. Next, proceeding to examine the third, we fhall find it equal to 10 diefes or divifions, that is, 17.999 commas; and the true third major being 17.963 commas, the difference is 0.036, that is, about $\frac{1}{28}$ of a comma. Now as the ear can bear a fifth, altered by a quarter of a comma, it will much more eafily bear the alteration of $\frac{1}{28}$ of a comma in a third major. Again, in this temperament the third minor is indeed, ftrictly fpeaking, worfe than in the vulgar, which differs from the truth but a quarter of a comma, whereas here it differs by about $\frac{1}{27}$ of a comma more; but then this difference is infenfible.

Thus we have been led from the confideration of the vulgar temperament, to the invention of the temperament which divides the octave into 31 equal intervals, commonly called Huygens's temperament. This great mathematician was, indeed, the firft who gave a diftinct account of it, and fhewed its ufe and accuracy. But here, as in many other inventions, we find the hint of the thing much older than the true knowledge of it. See Huygenii Opera omnia, vol. i. p. 748, 749, edit. 1. Lugd. Batav. 1724.

The divifion of the octave into 31 parts was invented in Italy about 300 years ago, by Don Nicola Vincentino. The title of his book is "L'Antica Mufica Riddotta alla Moderna Prattica, &c." Roma, 1555. fol.; and an inftrument, called *archicembalo*, was made upon this fcheme, as Salinas informs us, who at the fame time condemns it, as very difagreeable in practice. But this could be owing to nothing but its not being tuned according to the intention of the inventor. For if all the thirds major of this inftrument were made perfect, and the fifths diminifhed by a quarter of a comma, it is evident that the inftrument would be equally exact with any tuned according to the vulgar temperament, and would fuffice for tranfpofitions to any diatonic or chromatic notes, though not to all the enharmonic, as D✻✻, &c. becaufe we fhould not find its third major. And if the inftrument were tuned according to M. Huygens's fcheme, of making all the divifions equal, it would then have all the 31 keys equally good, and very near the truth. See Salinas, lib. iii. The title of his work is "Francifci Salinæ Burgenfis de Mufica Libri Septem," Salmanticæ, 1577, fol. Merfennus's work is intitled "Harmonicorum, Libri XII. authore F. M. Merfenno Minimo, Lutetiæ Parifiorum," 1648, fol. He publifhed another book before this, the title of which is "Harmonie Univerfelle, contenant la Theorie et la Pratique de la Mufique," Paris, 1636, fol. 2 vols.

Hence it is plain, Salinas and Merfennus had not fufficiently examined this matter.

The ufe of this temperament of M. Huygens deferves to be introduced into the practice of mufic, as it will facilitate the execution of all the genera of mufic, whether diatonic, chromatic, or enharmonic; nor does the multiplicity of its parts render it impracticable, the author affuring us that he had a harpfichord made at Paris with fuch divifions, which was approved of and imitated by fome able muficians. Merfennus alfo gives a fcheme for this purpofe; and Salinas fays he faw and played upon fuch an inftrument. See alfo Don Vincentino before cited, lib. v. p. 99, &c.

M. Huygens, to facilitate the tuning of inftruments with fuch divifions, has given us a table of the parts of an octave, according to his fyftem, together with their logarithms. The table is as follows:

The divifion of the octave into 31 equal parts.					The divifion of the octave according to the common temperament.
I.	II.	III.	IV.	V.	VI.
N. 97106450					
4.6989700043	50000	Ut²	C²	50000	4.6989700043
4.7086806493	51131				
4.7183912943	52278				
4.7281019393	53469	Si	Bˣ	53499	4.7283474859
4.7378125843	54678				
4.7475232293	55914	Sa	B	55902	4.7474250108
4.7572338743	57179	*	*	57243	4.7577249674
4.7669445193	58471				
4.7766551643	59794	La	A	59814	4.7768024924
4.7863658093	61146				
4.7960764543	62528	*	*	62500	4.7958800173
4.8057870993	63942	Solˣ	Gˣ	64000	4.8061799740
4.8154677443	65388				
4.8252083893	68666	Sol	G	66874	4.8252574989
4.8349190343	68378				
4.8446296793	69924				
4.8543403243	71506	Fa	Fˣ	71554	4.8546349804
4.8040509693	74122				
4.8737616143	74776	Fa	F	74767	4.8737125054
4.8834722593	76467				
4.8931829043	78197				
4.9028935493	79964	Mi	E	80000	4.9030899870
4.9126041943	81772				
4.9223148393	83621	Ma	Eb	83592	4.9221675119
4.9320254843	85512	*	*	85599	4.9324674685
4.9417361293	87445				
4.9514467743	89422	Re	D	89443	4.9515949935
4.9611574193	91444				
4.9708680643	93512	*	*	93459	4.9706225184
4.9805787093	95627	Utˣ	Cˣ	95702	4.9809224750
4.9902893543	97789				
4.9999999993	100000	Ut	C	100000	5.0000000000

The fecond column of this table contains the numbers expreffing the length of chords making 31 equal divifions, the longeft, anfwering to C, being fuppofed to be divided into 100,000 parts.

In the third column are the fyllables by which the notes are ufually named in France; and the afterifc * fhews fome enharmonic notes, of which that near *fol* is moft neceffary.

In the fourth column are the letters commonly ufed to denote the found of the octave.

The

The numbers of the second column were found by means of those in the first, which are their respective logarithms; and these were found by dividing 0.30102999566, the logarithm of 2, by 31. The quotient 97106450 is marked N, and being continually added to the logarithm of 50000, that is, to 4.6989700043, gives all the logarithms of the first column to the greatest 4.9999999993, which being extremely near to 5.0000000000, the logarithm of 100000, shews the operation to have been rightly performed.

The fifth column shews the lengths of the chords in the common temperament; and the sixth column contains their respective logarithms. Vide Huygenii Opera, vol. i. p. 752, 753.

The learned author of this temperament has not given the notes answering to all the divisions of the octave; but that may easily be supplied from what has been said above when we derived this temperament from the consideration of the common.

As Huygens has not given the names of all the intervals that occur in his temperate scale, we shall here insert them in the octave, from C to *c*, with their respective measures in the commas, and tenths of a comma

Intervals.		Names.	Measures.
From C to	Dbb	1. Diminished second, extreme flat second, or enharmonic diesis.	1.8
	C※	2. Semitone minor, or chromatic diesis.	3.6
	Db	3. Flat second, or semitone major.	5.4
	C※※	4. Double semitone minor.	7.2
	D	5. Second, or tone.	9.0
	Ebb	6. Diminished third, or extreme flat third.	10.8
	D※	7. Superfluous second.	12.6
	Eb	8. Third minor, or flat third.	14.4
	D※※	9. Extreme superfluous second.	16.2
	E	10. Third major, or sharp third.	18.0
	Fb	11. Diminished fourth.	19.8
	E※	12. Superfluous third.	21.6
	F	13. Fourth.	23.4
	Gbb	14. Extreme diminished fifth.	25.2
	F※	15. False fourth, or tritonus.	27.0
	Gb	16. False fifth, or semidiapente.	28.8
	F※※	17. Extreme superfluous fourth.	30.6
	G	18. Fifth.	32.4
	Abb	19. Diminished sixth, or extreme flat sixth.	34.2
	G※	20. Superfluous fifth.	36.0
	Ab	21. Flat sixth, or sixth minor.	37.8
	G※※	22. Extreme superfluous fifth.	39.6
	A	23. Sharp sixth, or sixth major.	41.4
	Bbb	24. Diminished seventh, or extreme flat seventh.	43.2
	A※	25. Superfluous sixth.	45.0
	Bb	26. Flat seventh, or seventh minor.	46.8
	A※※	27. Extreme superfluous sixth.	48.6
	B	28. Sharp seventh, or seventh major.	50.4
	*c*b	29. Diminished octave.	52.2
	B※	30. Superfluous seventh.	54.0
	c	31. Octave.	55.8

The temperate diesis enharmonica of Huygens being 1.8 comma, nearly, which is easily remembered, the measure of any interval in the octave may be found by multiplying it by the number denoting the place of that interval. Thus the sixth minor, being the twenty-first interval, will be = 1.8 × 21 = 37.8. The octave, being the thirty-first, will be = 31 × 1.8 = 55.8, which does not differ from the truth by more than 0.00237, that is, not by $\frac{1}{100}$ of a comma, and therefore perfectly insensible. See INTERVAL.

All the intervals in the foregoing table, either have received names, or at least might receive them, from a perfect analogy to the names in use among practical musicians; but many of these intervals are as yet unheard of among practitioners. Perhaps, if all the genera of ancient music were restored, every interval here mentioned might be of use, either in melody or harmony, and thereby greatly add to the variety of composition.

We have already mentioned the advantages of M. Huygens's system; but its excellency will better appear by comparing it with the schemes of others. We may distinguish and name the different temperaments by the number of equal parts into which the octave is supposed to be divided. The temperaments that occur in books are temperaments of 12, 19, 31, 43, 50, 53, and 55 parts, of which in order.

The temperament of 12 parts is founded on the supposition that the semitones major and minor may be made equal. Hence the octave will be divided into 12 equal semitones, seven of which will make the 5th, four the 3d, and three the 3d minor.

The temperament of 19 parts goes upon the supposition that the semitone major is the double of the semitone minor. Hence the tone will be 3, and the third major 6. The diesis enharmonica will be 1, and consequently the octave, being three thirds major and a diesis, will be 19. The fifth contains 11 parts. The harpsichord, in this scheme, will have every feint cut in two, one for the sharp of the lower note, and the other for the flat of the higher. Between B and C, and between E and F, will be interposed keys, which must serve for the sharps of B and E, and the flats of C and F respectively.

The temperament of 31 parts is M. Huygens's, already described: here the semitones are as 3 to 2. The third major is 10, and the fifth 18.

The temperament of 43 is M. Sauveur's, and by him very fully described in the Memoirs of the Royal Academy of Sciences, A.D. 1701, 1702. He supposes the proportion of the semitones to be as 4 to 3. Hence his tone is 7, the third major 14, the fifth 25, and the octave 43. What musical foundation this learned gentleman went upon in the investigation of this temperament, is not known: but it seems liable to insuperable difficulties; for here the diesis enharmonica is but the half of the difference between it and the chromatic diesis: whereas, in truth, this difference, instead of being double of, is really less than the enharmonic diesis, as was long ago objected to him by Mr. Hensling, and appears from the table under INTERVAL. Miscel. Berolin. tom. i. p. 285, 286.

Besides, his enharmonic diesis falls greatly short of the truth, being but 1.27 of a comma, which is an error of 0.64, or nearly $\frac{2}{3}$ of a comma. Whereas, in M. Huygens's temperament, the error of the diesis is almost insensible, being but $\frac{1}{10}$ of a comma. Nor are the practical advantages of M. Sauveur's system any ways comparable to Huygens's. His fifth is indeed, strictly speaking, better; but so little, that the difference is not sensible, not being $\frac{1}{7}$ of a comma. On the other hand, his thirds are sensibly worse, the major being $\frac{1}{5}$, and the minor $\frac{2}{5}$ of a comma falſe. Whereas Huygens's third major does not differ ſenſibly from the truth, and the minor has no ſenſible difference from the third minor deficient by $\frac{1}{4}$ of a comma of the common temperament, which ought to be deemed the limit of the diminution of concords. If we add to this, that the much greater number of parts in M. Sauveur's octave, makes it much more intricate than M. Huygens's, and that theſe parts would be falſe or uſeleſs, even ſuppoſing the enharmonic genus reſtored, no muſician will long heſitate which he ought to prefer.

The temperament of 50 parts is propoſed by Mr. Henſling in the Miſcellan. Berolin. above cited: he takes the proportion of the ſemitone as 5 to 3: hence his tone is 8, the third major 16, the fifth 29, and the octave 50. The third major and fifth in this ſyſtem will be worſe than Huygens's, though the third minor be a little better. The third major is here leſs than the true, and the fifth deficient by more than $\frac{1}{4}$ of a comma, which is a fault, not to mention the inconveniency ariſing from dividing the octave into 50 parts; beſides, 5 : 3, the proportion of the ſemitones here aſſumed, although expreſſed in greater numbers, is not ſo near the truth as M. Huygens's of 3 : 2. See RATIO.

The temperament of 53 parts is mentioned by Merſennus. Here the tones will be unequal, 9 being the tone major, and 8 the minor. Hence the third major will be 17, and the fifth 31, which laſt does not differ from the truth by above $\frac{1}{131}$ part of a comma. The third minor is alſo more perfect than in M. Huygens's ſyſtem. But the multiplicity of parts in the octave of this ſyſtem renders it too intricate; and the diſtinction of tones major and minor upon fixed inſtruments is impracticable.

The laſt temperament we have to mention is that of 55 parts, which M. Sauveur calls the temperament of practical muſicians. Its foundation lies in aſſuming the proportion of the ſemitones as 5 to 4; ſo that the tone will be 9, the third 18, and the fifth 32. The fifth in this ſyſtem, as in that which makes the ſemitones equal, is nearer the truth than M. Huygens's, but this advantage is not $\frac{1}{15}$ of a comma; and on the other hand, the thirds, both major and minor, are here greatly miſtuned, as will appear by the annexed table, exhibiting the thirds and fifths of theſe ſeveral temperaments, as alſo the thirds and fifths of the common temperament, and two mentioned by Salinas, marked 1ſt Salin. 2d Salin. The letter V. ſtands for the fifth; III. for the third major; and 3. for the third minor. The fifths are all deficient, but the thirds are ſometimes leſs than the true; the firſt are marked +, the others −.

Temperaments.	V. Com.	Error.	III. Com.	Error.	3 Com.	Error.
Of 12 parts	32.549	0.091	18.599	0.636 +	12.950	0.727 −
19	32.304	0.336	17.620	0.343 −	14.684	0.004 +
31	32.399	0.241	17.999	0.036 +	14.400	0.277 −
43	32.440	0.200	18.167	0.204 +	14.273	0.404 −
50	32.363	0.277	17.855	0.108 −	14.508	0.169 −
53	32.637	0.000	17.897	0.066 −	14.740	0.063 +
55	32.464	0.176	18.261	0.298 −	14.203	0.474 −
Com. Temp.	32.390	0.250	17.963	0.000	14.427	0.250 −
1ſt Salin.	32.307	0.333	17.630	0.333 −	14.677	0.000
2d Salin.	32.354	0.286	17.520	0.143 −	14.434	0.143 −
True Scale.	32.640	0.000	17.063	0.000	14.607	0.000

Temperaments formed by the diviſion of the octave into equal parts, may be called geometrical temperaments. The common, and the two mentioned by Salinas, do not proceed upon this foundation; the intention of the firſt inventors not having been to make tranſpoſitions to every note of the ſyſtem equally good; but only to make the moſt uſual tranſitions in the courſe of a piece of muſic tolerable. Hence the parts of the octave, in their ſuppoſition, were not all equal.

The common temperament, as we have ſaid, preſerves the third major perfect. The firſt of Salinas preſerves the third minor perfect. In the ſecond of Salinas, the ſemitone minor is perfect. The foundation of his firſt temperament is making the temperate tone equal to the tone minor and $\frac{1}{3}$ of a comma, or the tone major leſs $\frac{2}{3}$ of a comma. Hence his fifth and third major will be deficient by $\frac{1}{3}$ of a comma; and the third minor conſequently will be true. The ground of his ſecond ſcheme is, to add $\frac{2}{7}$ of a comma to the tone minor, or take $\frac{4}{7}$ from the tone major for his temperate tone. Hence the fifth will be deficient by $\frac{1}{7}$ of a comma, and the thirds major and minor each deficient by $\frac{1}{7}$ of a comma. Conſequently, the ſemitone, being their difference, will be preſerved.

As to Mr. Salmon's ſcale in the Philoſophical Tranſactions, there is nothing true in it, but the diatonic ſcale of C. His ſcale for A is falſe, the fourth being erroneous by a comma: moſt of his ſemitones are likewiſe falſe. In ſhort, it can neither be conſidered as a true ſcale, nor as a temperament.

Before we cloſe this article, it may be proper to add a few words about the method of invention of the foregoing geometrical temperaments. M. Huygens having had the hint of a diviſion of the octave into 31 parts, had nothing farther to do but to examine it by logarithms. But ſuppoſing no ſuch hint had been given, he might have inveſtigated it directly, by the method laid down by himſelf, and alſo by Dr. Wallis and Mr. Cotes, for approximating to the value of given ratios in ſmaller numbers. We have given Mr. Cotes's method under RATIO. The application of that method to the preſent purpoſe is thus: the ratio of the octave to the third major is 55.79763 to 17.96282, and the approximating ratios will be,

1. Greater than the true 28 : 9, 87 : 28, &c.
2. Leſs than the true 3 : 1, 31 : 10, 59 : 19, 205 : 66, &c.

The ratios greater than the true muſt all be rejected; becauſe they give the third major leſs than true, and conſequently the tone (its half) deficient by above $\frac{1}{4}$ of a comma; which gives the fifth deficient above $\frac{1}{4}$ of a comma: but this ought not to be. The firſt of the ratios leſs than true is 3 : 1, or 12 : 4, which is the temperament of 12 parts before deſcribed, and too inaccurate. The next is 31 : 10, or M. Huygens's. The reſt divide the octave into too many parts.

The ſame may be alſo found thus: the ratio of the octave to to the common temperate fifth, deficient by $\frac{1}{4}$ of a comma, is 56.79763 to 32.38952. The approximating ratios to which are,

1. Greater than the true 2 : 1, 7 : 4, 19 : 11, 50 : 29, &c.
2. Lefs than the true 1 : 1, 3 : 2, 5 : 3, 12 : 7, 31 : 18, 205 : 119. Where we have the temperaments of 12, 19, 31, and 50 parts, before examined.

And here all ratios greater than the true ought to be rejected, becaufe they give the fifth lefs than true, that is, in this cafe, deficient by more than $\frac{1}{4}$ of a comma.

If we inveftigate the approximating ratios to the ratio of the femitones major and minor, or 5.19529 to 3.28612, we fhall have the ratios 1 : 1, 2 : 1, 2 : 2, 5 : 3, which refpectively give the temperaments of 12, 19, 31, and 50 parts, before defcribed.

Again, inveftigating the approximating ratios of the fifth to the third major, we fhall find 7 : 4, 9 : 5, 11 : 6, 29 : 16, which will alfo give the temperaments 12, 19, 31, 50, as before.

Laftly, the approximated ratios of the octave to the true fifth are 12 : 7 and 53 : 31 greater than the true; the others being of no ufe, fince the fifth muft neceffarily be diminifhed. Here we find the temperament of 53 parts. As to the temperaments of 43 and 55, being deftitute of any mufical foundation, it is no wonder they do not appear by this method of inveftigation.

M. Huygens, in his Cofmotheoros, fays that the tone or pitch of the voice cannot be preferved, unlefs the confonants be tempered, fo as to deviate a little from the higheft perfection. For the proof of this affertion, he brings a melody confifting of the following founds, C, F, D, G, C; where, if the intervals were to be fung perfect, by taking the interval from C to F a true fourth afcending, from F to D a third minor defcending, from D to G a true fourth afcending, and laftly, from G to C a true fifth defcending, we fhould fall a comma below the C from whence we began. Therefore, if we were to repeat this feries of notes nine times, we fhould at laft fall near a tone major below our firft found.

M. Huygens's folution of this difficulty is, that we remember the note from whence we fet out, and return to it by a fecret temperament, thereby finging the intervals a little imperfect; which, he fays, will be found neceffary in almoft all fongs or melodies.

A like difficulty is mentioned in the Memoirs of the Royal Academy of Sciences; and is there urged for the neceffity of a temperament, even for finging in the fame key. And M. Huygens's folution of the difficulty is there approved of. Ann. 1707, p. 264.

But the folution of thefe learned gentlemen is, as yet, far from being decifive. No experiment has yet been brought to fhew that the human voice fings tempered notes; not even when accompanied by tempered inftruments. It feems to us, on the contrary, that an exercifed voice, guided by a good ear, fings true, even though accompanied by a miftuned inftrument, as harpfichords moft frequently are, efpecially in tranfpofed keys. And were thefe inftruments always as well tuned as art could make them, yet their tones would be equal; and it feems evident to the ear, that the human voice finging naturally two tones in fucceffion, as C, D, E, never makes them equal: and cannot, without great difficulty, and by means of a variation of harmony, be brought to make them equal.

Another folution, therefore, of M. Huygens's difficulty, muft be fought for. The truth feems to be, that the fecond of the key muft be the true tone major above the key and therefore the third between the fecond and fourth of the key muft be fung deficient by a comma. Thus in the key of C, from C to D will be a tone major = $\frac{9}{8}$, and from D to F will be a deficient third = $\frac{32}{27}$. See INTERVAL.

M. Huygens's melody, therefore, will ftand as follows:

$$\left\{\begin{matrix} C & & F & & D & & G & & C \\ \frac{4}{3} & \times & \frac{27}{32} & \times & \frac{4}{3} & \times & \frac{2}{3} & = & 1 \end{matrix}\right\}$$

And the voice would fing the interval F, D, juft as if the note E had been interpofed; in which cafe the notes would be

$$\left\{\begin{matrix} C & & F & & E & & D & & G & & C \\ \frac{4}{3} & \times & \frac{15}{16} & \times & \frac{9}{10} & \times & \frac{4}{3} & \times & \frac{2}{3} & = & 1 \end{matrix}\right\}$$

Thefe notes all come within the diatonic fcale of C; and the voice naturally falls upon the note from whence it fet out. The fame anfwer will hold in the example mentioned in the Memoirs of the Academy of Sciences; where the intervals ♭B, G, E, C occur. And here the interval from ♭B to G fhould be taken = $\frac{27}{32} = \frac{15}{16} \times \frac{9}{10}$, as in the former example; and for the fame reafon, the key being F.

There feems, therefore, no repugnancy between the practice and theory of mufic, while the melody is confined to one key; but it muft be owned, that in tranfitions from key to key, efpecially where feveral parts are to make harmony with each other, there ftill remain difficulties, not mentioned by M. Huygens, or any other writer we know of, which might deferve a farther examination.

We muft not omit mentioning, that the learned Dr. Smith, in his Harmonics, has not only carried the theory of temperaments far beyond all the authors that preceded him; but has fhewn how to tune an inftrument according to any propofed temperament, by the ear only, which is certainly a moft ingenious difcovery.

This learned author prefers what he calls the temperament of equal harmony, which differs infenfibly from the divifion of the octave into fifty parts, to all others; and infifts, that it labours under the feweft defects, and is of all others the moft agreeable in practice. In the fyftem of equal harmony, the temperaments of the fifth, third major and third minor, are refpectively $\frac{5}{18}$ and $\frac{7}{18}$ and $\frac{2}{18}$ of a comma lefs than the truth.

It would be impoffible here to do juftice to the learned author's reafonings on this fubject; we fhall only add, that he eftablifhes, contrary to the common opinion, that the lefs fimple confonances, generally fpeaking, will not bear fo great temperaments as the fimpler confonances.

Dr. Smith mentions a temperament communicated to him by the ingenious Mr. Harrifon, which confifts in making the proportion between the octave and third major equal to that of the circumference of a circle to its diameter. In this temperament the third major is diminifhed by $\frac{3}{5}$ of a comma, but the third minor is very near the truth, and extremely beautiful.

A late author feems to think the divifion of the octave into thirty-one parts, not to be of modern invention, but neceffarily implied in the doctrine of the ancients. At firft fight, it would feem as if the ancients made but twenty-four diefes or divifions in the octave, *viz.* ten to each fourth, and four to the tone; which (the octave being equal to two fourths and a tone) gives twenty-four diefes to the octave. But the author juft quoted contends, that this divifion is to be underftood only in one tenfion, that is, either afcending or defcending; but that, accurately fpeaking, if we confider all the diefes, or divifions of the fourth, both afcending and defcending, we fhall find thirteen; five to each tone, and three to the femitone major; and confequently thirty-one divifions in the octave. Thefe, indeed, are not all naturally equal; but if we make them fo, we fhall ſhall have a temperament known by the moderns under the name of Huygens's temperament. Dr. Pepuſch, in Phil. Tranſ. N° 481. p. 273. See the article Diesis.

Such was the hiſtory and theory of temperament about half a century ago. But as our keyed and wind inſtruments have extended their compaſs and powers, and all the ancient laws of relative modulation are diſregarded by modern compoſers, moſt practical muſicians incline to equal harmony, in which all the keys participate of the imperfection of the ſcale when the octave is confined to twelve ſemitones, of which every one occaſionally ſerves for two or three different purpoſes. As the note A natural, for inſtance, is ſometimes B double flat, and ſometimes G double ſharp, E natural is obliged to officiate for D double ſharp, and ſometimes for F flat.

There are, however, theoriſts who calculate, but never liſten, and who think temperament an abomination, a deadly ſin againſt Pythagoras and his *triple progreſſion*. Now as it is generally agreed that the ancients had no ſimultaneous harmony, or muſic in parts, and allowed of no conſonances but the uniſon, octave, 4th, and 5th, they did wiſely to make them as perfect as poſſible; but ſince the invention of counterpoint, and new inſtruments of fixt tones by keys, frets, and additional ventages, which furniſh but twelve ſemitones, whereas thirty-one different ſounds are wanting to ſupply two diſtinct ſounds for ſynonimous notes, ſuch as A ※ and B b, C ※ D b, D ※ E b, &c. temperament, though it a little diminiſhes the perfection of certain notes, the whole inſtrument is bettered by it, and rendered equally fit for all keys. Every concord, except the uniſon and octave, has a latitude, and allows of *bearings* without offending the ear. A perfect 5th makes an intolerable major 3d below it. And as the 3d, though called an imperfect concord, is the moſt grateful and pleaſing of all the concords when perfect; contrapuntiſts do wiſely to allow tuners to rob 4ths and 5ths of a little of that perfection which they can ſpare without injury, for the good of the whole. If the learned harmoniſt, the abbé Rouſſier, is living, this relaxation of Pythagorean diſcipline, and want of due reſpect for the *triple progreſſion*, will, we fear, diſturb and render him ſomewhat intemperate in cenſuring our *abſurdity*.

We have always regarded muſic as an object for the ear, and wiſh to make it as pleaſing to that ſenſe as poſſible; and have been ſo long accuſtomed to tempered ſcales, as to receive more pain than pleaſure from muſic performed on an inſtrument tuned by perfect 5ths throughout, that is, by the *triple progreſſion*. We ſhall, however, preſcribe no excluſive method of tempering the ſcale; as almoſt every man who tunes his own inſtrument has a ſyſtem of his own: we ſhall only obſerve, that the greateſt muſicians in the courſe of their lives have often changed their method. In our cathedrals and pariſh-churches in general, where the natural keys are made as perfect as poſſible, at the expence of A b, D b, F ※, and C ※, keys that have never been admitted within the pale of the church, organiſts that hear little other muſic, are extremely offended by equal participation of the ſcales, when the pure harmony of their favourite keys is deformed by temperament: and thoſe accuſtomed to the levelling ſyſtem of equal harmony, on the contrary, hold the *wolf* in as much abhorrence, as they would the deſtructive wolf in the Gevauden. At preſent, our tuners mitigate the extremes of equal and unequal temperament, by favouring the natural keys, and making the extraneous or tranſpoſed keys ſomewhat leſs perfect; but devoting the *wolf* to total deſtruction.

It is imagined by many, that the character of keys, particularly the minor, depends on the imperfection of the ſcales, occaſioned by unequal temperament: as F minor is plaintive, E b ſolemn, and E ※ brilliant. But though the difference between the pitch of E b and E ※, D ※ and E b, is but half a note, whatever may be the general pitch of the inſtrument, whether half a note too high, or half a note too low, theſe keys ſtill retain their character, it ſhould ſeem not from the tuning or elevation of the general ſyſtem, but from ſomething for which we are unable to account. See Music, and Sound.

TEMPERATE Zone. See Zone.

TEMPERATURE, in general, denotes the degree of free caloric which a body appears to poſſeſs when compared with other bodies; or, in other words, the ſtate of a body in relation to its capability of producing in other bodies the effects ariſing from the preſence of free caloric. Sir Humphrey Davy defines temperature to be "the power bodies poſſeſs of communicating or receiving heat, or the energy of repulſion." But this definition appears to us to be a little ambiguous, for temperature is not a term indicative of a poſitive faculty in bodies, as this definition may be underſtood to mean; but, as before obſerved, is merely a relative term, expreſſive of the degree in which bodies, in conformity to the grand law of the equal diſtribution of free caloric, can affect, or be affected by other bodies of a lower or higher temperature, that is, poſſeſſing more or leſs free caloric than themſelves.

There are two means of meaſuring the temperature of bodies, namely, by our ſenſations, or by the different degrees of expanſion produced in bodies on being ſubjected to different degrees of free caloric. The firſt of theſe, from various obvious cauſes, is ſo imperfect and limited, that no dependence can be placed upon it as a meaſure of temperature. The ſecond is much more regular and extenſive, and is, therefore, always at preſent employed. "When two bodies produce the ſame increaſe or diminution of volume in a third body, to which they are equally applied, they are ſaid to be of the ſame temperature; and any body is ſaid to be at a higher or lower temperature, as it produces a greater or leſs expanſion in another body with which it is in contact." Inſtruments founded upon the principle of the expanſion of bodies by heat, and deſtined to meaſure degrees of temperature, are called *thermometers*, or, when the temperature is very high, *pyrometers;* which ſee. Under the ſame heads alſo the important queſtion is diſcuſſed, how far the expanſion of bodies by heat is to be conſidered as an indication of their real temperature. See alſo Caloric.

Temperature *of the Atmoſphere*. See Atmosphere.

Temperature *of Climate*. See Climate.

Temperature *of the Earth*, is that degree of ſenſible heat which exiſts on the ſurface, or in the interior of the ſolid part of the globe. The temperature of the atmoſphere is frequently deſcribed as the ſame with the temperature of the earth, from which it is eſſentially diſtinct. The ſenſible heat of the atmoſphere varies with the latitude, the ſeaſon, and the elevation of the place in which the obſervation is made. The ſuperficial temperature of the earth varies alſo with the latitude and the ſeaſon, and in a ſtill greater degree if the land be dry; but the internal temperature of the earth appears to be permanent in each place throughout the whole year. At a certain depth under the ſurface, the thermometer always indicates the ſame degree of heat; and the difference between the permanent internal temperature in different latitudes, is much leſs than that which exiſts at the ſurface. The depth at which the thermometer remains ſtationary about latitude 52°, is 80 feet: nearer to the equator,

equator, or the poles, a greater depth would be neceſſary to obtain the permanent temperature. At ſtill greater depths, probably, the temperature under each degree of latitude is the ſame all over the globe, except in the vicinity of volcanic fires.

M. Volney, in his travels through North America, ſpeaking of the temperature of the earth, endeavours to oppoſe the opinion of its permanent internal temperature. Setting out from lake Superior, he ſays, and proceeding weſt to the Stoney mountains, and travelling north as far as latitude 72°, the country now well known to the Canadian traveller, diſplays a climate that for ſeverity of cold can be compared only to Siberia. From latitude 46°, the earth is frozen during the whole year. At ſeveral trading poſts between latitude 50° and 56°, it was found impoſſible to have wells. Mr. Shaw had attempted to dig one at the poſt of St. Auguſtin, about forty miles from the mountains; but though it was in the month of July, the ground was frozen at the depth of three feet from the ſurface, and as it grew harder he was obliged to give up the attempt. He relates alſo an account of Mr. Robſon, an Engliſh engineer, who attempted to ſink a well at Prince of Wales's fort, latitude 59°, in the month of September. He firſt found thirty-ſix inches of earth thawed by the preceding warm weather, then a ſtratum of eight inches frozen as hard as a ſtone; under this a ſtratum of ſandy friable earth, froſty and very dry, in which his borer could find no water. The celebrated traveller Ledyard, ſays Volney, affirms, that at Yakutſk, not ſo high as latitude 62°, wells of water cannot be obtained, becauſe it is found by experiment that water freezes at the depth of ſixty feet. From theſe circumſtances, M. Volney would infer that the internal part of the earth is in a conſtant ſtate of congelation. Some of the above obſervations, we believe, were inaccurately made; and it has been too haſtily determined, that the earth is frozen during the whole year in North America, even in latitude 46°; for this is not the caſe 11° further north. We have been favoured with the following ſtatement from an intelligent medical gentleman, who was ſome years reſident in Hudſon's Bay. "On digging a well at York fort, Hudſon's Bay, latitude 57° 7′, in the beginning of October, the following circumſtances were remarked. About thirty inches from the ſurface, a bed of frozen earth, about twelve inches thick, was met with: below was a bed of looſe ſandy clay, about half a yard thick, which was ſucceeded by a bed of the ſame clay, rendered perfectly hard and ſolid by froſt. Sinking lower, ſimilar beds of frozen and looſe earth were found, alternating with each other; the frozen beds, however, conſtantly decreaſing in thickneſs, though not regularly, and at a certain depth they ſeemed to diſappear entirely. Theſe frozen ſtrata are conſidered by the inhabitants as indications of the ſeverity of the preceding winters, each ſtratum being ſuppoſed, with much probability, to be formed in different years, and to be travelling downward until they are thawed by the internal temperature of the earth. The proceſs by which they ſink down may be explained, on the ſuppoſition that the upper ſurface is diminiſhing by heat during ſummer, and the under ſurface increaſing by the congelation of moiſture in contact with it. Another circumſtance, which took place in the ſame latitude, may ſerve to elucidate the obſervation of Ledyard, that the water was conſtantly frozen at ſixty feet under the ſurface at Yakutſk." A well had been ſunk which yielded a plentiful ſupply of water during the firſt ſummer; but the water, being expoſed to the air, froze during the next winter, and remained frozen ever after, being too far below the ſurface to be thawed. Hence it appears that water exiſts unfrozen at a moderate depth under the ſurface in the coldeſt climates, when it has no communication with the external air. The effect of the ſummer heat in the ſame latitude extends about ſeventeen inches under the ſurface, where the ground has been ſhaded; but where it has been expoſed to the ſun, the ſurface is thawed to the depth of three feet. From the ſmall depth to which the ſolar heat penetrates, we may infer that the water below is kept in a fluid ſtate by the internal heat of the globe. It has been generally ſuppoſed, that the permanent temperature of each latitude is the ſame nearly as the mean annual temperature of the atmoſphere, and that this is indicated by the temperature of ſprings or deep wells; but the temperature of ſprings will vary with that of the ſtrata near the ſurface through which they run. (See TEMPERATURE *of Springs*.) It is to be regretted that more numerous obſervations have not been made on the temperature of deep mines. From obſervations recently made in Cornwall, it appears that the temperature increaſes with the depth, at leaſt in ſome of the mines, and in the loweſt it was not leſs than 70°. This may, perhaps, be owing to the chemical changes which are taking place; for it appears, from the evidence of the overſeers of the mines, in reply to certain queries propoſed by the Royal Geological Society of Cornwall, that the water is found conſtantly warmer in the vicinity of veins of copper-ore, than it is in the vicinity of tin-ore: the former veins are in general worked to a greater depth than the latter. It remains to be aſcertained whether this increaſe of temperature be owing to chemical cauſes, or is invariable at the ſame diſtance from the ſurface. The decompoſition of pyrites in copper veins would ſeem to point out a cauſe for the increaſed temperature in their vicinity; it is evident, however, that it is not derived from the ſolar rays. It ſeems reaſonable to believe, from what we at preſent know of the internal temperature of the earth, that there exiſts a permanent ſource of heat within the globe, though we are unacquainted with the cauſes by which it is generated. We are equally ignorant of the cauſes by which light is generated on the ſurface of the ſun: one operation is not more ſurpriſing or inexplicable than the other; nor is the difficulty removed, by ſuppoſing the ſun to be ſurrounded with a luminous atmoſphere. Some philoſophers have maintained the opinion, that the earth has been conſtantly growing colder ſince the period when it was firſt inhabited, and that the organic remains of elephants and other animals, (ſuppoſed to be ſimilar to thoſe of tropical climates,) which are found in Siberia, offer a demonſtrative proof, that the arctic regions once enjoyed the temperature of the torrid zone. It has ſince been aſcertained, by the elaborate reſearches of M. Cuvier, that theſe animals were not of the ſame ſpecies as the African or Aſiatic elephant. A moſt convincing proof of this was afforded by the entire body of one of theſe elephants, which was diſcovered imbedded in ice near the mouth of a river in the north of Siberia, by a Tunguſian fiſherman, in the year 1799. It firſt preſented a ſhapeleſs maſs projecting from an ice-bank. Two years afterwards he could diſtinctly ſee that it was the body of an enormous animal; the entire flank and one of its tuſks had become diſengaged from the ice. In 1803, the ice beginning to melt earlier than uſual, the whole body was diſengaged, and fell from the ice-bank on the ſandy ſhore. In 1806, Mr. Adams went to examine this animal, which ſtill remained on the ſand, but its body was much mutilated. The ſkin was extremely thick and heavy, and as much of it remained as required the exertions of ten men to carry away. More than thirty pounds of the hair and briſtles of the animal were collected. Some of this

this hair was presented to the Museum of Natural History in Paris. It consists of three distinct kinds. The one is stiff black bristles, a foot or more in length; another kind is a coarse flexible hair, of a reddish-brown colour; the third kind is a coarse wool, which grew among the roots of the long hair. These afford undeniable proof, that this animal belonged to a race of elephants inhabiting a cold region, and was not fitted to dwell in the torrid zone. This animal was a male, and had a long mane on its neck. The bones were all perfect. As the only proof offered for the refrigeration of the earth was the former existence of tropical animals in northern latitudes, and as this can no longer be maintained, we have reason to believe that the general temperature of the globe is stationary, though the climate of particular countries may vary at different periods, from cultivation, the destruction of large forests, or other local causes.

Though the annual changes in the temperature of the climate affect the surface only to a small comparative depth, yet the continued effect of the annual mean temperature, considered as a permanent cause, may be sufficient to keep the internal temperature of the earth stationary, in each latitude, at a still greater depth. Hence we find that the internal temperature of the earth, and the mean temperature of the atmosphere, are nearly, but not exactly, the same; for in all northern countries, the mean temperature of the earth is higher than that of the air, and the difference, according to the observations of Dr. Wahlenberg, fellow of the Royal Society of Stockholm, appears to increase as we advance northward, or as the cold of the winter becomes more severe. This would also seem to give additional confirmation to the opinion, that there is a permanent source of heat within the globe itself. The following table shews the rate at which the temperature varies according to the latitude.

	Latitude.	Temp. of the Earth.	Mean Temp. of the Atmosphere.
Berlin - - -	52.5°	49.28°	46.4°
Carlstrom - -	56.25	47.3	42.03
Upsala - - -	60.	43.70	33.38
Umen - - -	64.	37.22	
Degeforts - -	64.25	36.68	

The observations were made on springs which threw up a large quantity of water at a permanent degree of temperature in all seasons. It is to be regretted that we have not a series of observations made with equal care in southern latitudes. M. Volney states, in his "Travels in America," that the mean temperature of wells forty-five feet deep was as under:

	Fahr.
Charlestown - - - - -	63°
Virginia - - - - - -	57
Philadelphia - - - -	53
Massachusetts - - - -	49
Vermont - - - - - -	44

This depth is too small, to give the true mean temperature of the earth; and the observations can only be regarded as approximations to the truth. On the same authority it is stated, that the temperature of the earth, to a considerable depth under the torrid zone, is 14° Reaumur, or 63° Fahrenheit.

In the southern parts of England, the mean temperature, taken from permanent springs, is about 48°; at Edinburgh, 45°; in the north of Ireland, 48°; and at Paris, 51°.

For the temperature of the atmosphere, see ATMOSPHERE, where the mean temperature in different latitudes is given. Mr. Humboldt has lately published a botanical account of the new genera and species of plants discovered in the tropical regions of America, with many interesting observations on the temperature, as affecting the growth of plants. The plants of the torrid zone extend farther through the southern temperate zone than through the northern, owing to the greater influence of the ocean in the southern hemisphere, in moderating the rigour of winter; the ocean bearing a much greater proportion to the surface on the south, than on the north side of the equator. In estimating the climate suited for the growth of particular plants, the mean temperature will not afford a correct standard; for though the mean temperature of the year, in the middle latitudes of North America, be the same as it is in Europe, 7° further north, the temperature of different seasons in these same latitudes by no means agrees. The winters are colder, and the summers hotter, in North America than in Europe. In Philadelphia the summer is as hot as at Rome or Montpellier, while the winter corresponds with that at Vienna. At Quebec the summer is warmer than at Paris, but the winter colder than at St. Petersburgh. In the north of China there is a still greater difference between the heat and cold, than in North America.

In North America, as far as latitude 48°, the summers are four centigrade degrees, or about 7° Fahrenheit, hotter than in the corresponding latitude in Europe. Between the tropics, the mean annual temperature is the same as on the old continent, which may be seen in the following table, expressed in degrees of the centigrade thermometer.

Old Continent.		*New Continent.*	
Senegambia	26.5°	Cumana	27.7°
Madras	26.9	Antilles	27.5
Batavia	25.2	Vera Cruz	25.6
Mantilla	25.6	Havannah	25.6

Twenty-five degrees correspond with seventy-seven degrees of Fahrenheit.

Though the plants of the torrid zone extend farther through the southern temperate zone than through the northern, as we have before stated; yet to a certain distance from the line, the temperature appears to be less on the south than on the north side. Rio Janeiro and Havannah are nearly at the same distance from the equator; but the mean temperature of the summer and winter months in each is as under:

Rio Janeiro.		*Havannah.*	
June	20.0°	December	22.1°
July	21.2	January	21.2
January	26.2	July	28.5
February	27.0	August	28.8

On the coast of Peru, the temperature is diminished by the perpetual cloudiness of the sky, and by a strong sea current setting in from Cape Horn. From the tropic to 34° of south latitude, the mean temperature of the southern hemisphere scarcely differs from that of the northern. Between latitude 34° and 57°, there is a greater difference between the temperatures of summer than of winter: the winters in the southern hemisphere are not colder, but the summers are considerably more so than in the northern hemisphere. In south latitude 48°, the summer temperature is the same as the winter temperature of Toulon, Cadiz, and Rome.

The higher we ascend above the level of the sea, and the farther we advance from the equator, the greater is the difference

ference between the temperature of different feafons of the year. The following table exhibits the temperature between the hotteft and coldeft months, in different latitudes.

	Lat.	Cent. Therm.
Cumana - - -	10.27°	2.4°
Vera Cruz - -	19.11	2.6
Havannah - -	23. 8	7.4
Natches - - -	31.28	17.4
Philadelphia - -	39.56	24.6
Quebec - - -	46.47	33
Nain - - -	57.00	35

In the temperate zone, as we advance northwards, the coldnefs of the winter increafes at a much greater rate than the heat of the fummer diminifhes. Thus at Enonlekis, in latitude 68° 30′, the temperature of July is as hot as that of Edinburgh. Between the tropics, the temperature at no feafon of the year equals that of the fea-fhore; but in the temperate zone, the upper currents of air are fometimes warmer than the lower, during the winter months; and the thermometer, on the fummits of hills, is occafionally three or four degrees higher than in the plains. Hence in the temperate zone, we find the fame plants frequently on low and elevated fituations; but this is never the cafe between the tropics. In the temperate zone on the old continent, when the mean heat of the month is as under, the following plants bloffom:

Fahr.
42°, the Amygdalis perfica,
47, the Prunus domeftica,
52, the Betula alba.

The reafon why plants vegetate with greater rapidity in Lapland and Norway than farther fouth, is owing to the increment of temperature being much greater, and to the temperature of the earth in winter being feveral degrees above that of the air.

From obfervations made in different latitudes, it appears that 1000 fathoms of altitude occafion a diminution of temperature equal to 23° of Fahrenheit; 50 fathoms being nearly equal to half a degree. Mountains 1000 fathoms in height, at 46° of latitude, have the mean temperature of Lapland; and mountains of the fame height between the tropics enjoy the temperature of Sicily.

The following table by Humboldt exhibits the moft remarkable circumftances refpecting the temperature in the three zones. The temperature is taken according to the centigrade thermometer. The fathom 6 French feet, or 6.39453 Englifh feet.

	Torrid Zone.		Temperate Zone.			Frigid Zone.
	Andes, Quito, Lat. 0°.	Mountains of Mexico, Lat. 20°.	Caucafus, Lat. 42½°.	Pyrenées, Lat. 42¾°.	Alps, Lat. 45½° to 46°.	Lapland, Lat. 67° to 70°.
Inferior limit of perpetual fnow - -	2460 fa.	2350 fa.	1650 fa.	1400 fa.	1370 fa.	550 fa.
Mean annual heat at that height - - -	$1\frac{1}{2}°$	- -	- -	$-3\frac{1}{2}°$	$-4°$	$-6°$
Mean heat of winter, ditto	$1\frac{1}{3}°$	- -	- -	- -	$-10°$	$-20\frac{1}{2}°$
Mean heat of Aug. ditto	$1\frac{3}{4}°$	- -	- -	- -	$+6°$	$+9\frac{1}{2}°$
Diftance between trees and fnow - -	600 fa.	350 fa.	650 fa.	230 fa.	450 fa.	300 fa.
Upper limit of trees -	1800 fa.	2000 fa.	1000 fa.	1170 fa.	920 fa.	250 fa.
Laft fpecies of trees towards the fnow -	Efcalonia alftonia.	Pinus occident.	Betula alba.	Pinus rubra. P. uncin.	Piuus abies.	Betula alba.
Upper limit of the Ericineæ - - -	Befariæ. 1600 fa.	- -	Rhodod. caucas. 1380 fa.	- -	Rhodod. ferrug. 1170 fa.	Rhodod. laponicum. 480 fa.
Diftance between the fnow and corn -	800 fa.	- -	630 fa.	- -	700 fa.	450 fa.

In the feventh volume of the Tranfactions of the Royal Society of Edinburgh, Dr. John Murray has publifhed a paper on the diffufion of heat on the furface of the earth; in which he attempts to prove, from the nature of caloric, that the temperature of the earth is conftantly increafing from the folar rays, and that this temperature is becoming more equal in different parts of the earth. The atmofphere, he contends, conveys no heat into unlimited fpace; our planet, in relation to the difcharge of caloric from it, is bounded as it were by a wall of iron-conducting matter. He admits, however, that a fmall portion of heat may be loft by radiation: thus, at the hotter parts of the earth's furface, there may be fome emiffion of caloric by radiation; but this, he fays, cannot be equal to the quantity communicated by the folar rays: for of the heat derived from the latter fource, a portion is abforbed by the earth, and conveyed to the interior, as is apparent from the decreafing temperature, as we recede from the furface to a certain depth; and another portion is carried off by the afcending current of heated air, and conveyed to colder regions, where it is abforbed. Thus, even from thoſe parts of the ſurface of the earth where the circumſtances are moſt favourable to radiation, the quantity radiated cannot be equal to the quantity received from the ſolar rays. Over the whole earth the diffuſion muſt be ſtill greater; and inſtead of the concluſion, that the planet diſcharges its exceſs of heat by radiation, there is every reaſon to draw the oppoſite concluſion, that part of the heat which it receives from the ſun is retained. He further infers, that the temperature of the globe muſt riſe, from the mode in which heat is communicated to it by the ſun; and at the ſame time, as it advances, muſt become more equal over the whole ſurface. And this riſe has its limits. There cannot be either unlimited increaſe of heat, or unlimited refrigeration; but the final reſult will be a ſtate of permanence and uniformity, the continuance of which is ſecured by the very circumſtance, that if it is deviated from, this deviation muſt correct itſelf by an increaſe of radiation from the hotter parts, or from an increaſed abſorption of caloric by the colder parts of the globe. According to this theory, in proceſs of time, the equatorial and polar parts of the globe will arrive at the ſame degree of temperature, which will remain ſtationary, as there will be no circulation of heated air or water to the poles. To this reaſoning we conceive it may be objected, that it aſſumes, without ſufficient grounds, that caloric cannot paſs from the earth into unlimited ſpace, and that the ſolar heat does not become latent by chemical union with terreſtrial ſubſtances. It aſſumes alſo, that caloric is a diſtinct ſpecific ſubſtance; an opinion which is denied by ſome of the moſt eminent philoſophers. Nor have we, perhaps, any evidence to prove that the temperature of the earth has changed ſince the earlieſt records of hiſtory, if we except the local changes which reſult from drainage and cultivation. It is well known that the climate of Europe is materially changed ſince the periods of ancient hiſtory, when the Danube was annually frozen, and would admit the paſſage of armies over the ice. The climate of the United States of America has alſo undergone a material change during the laſt century. Both theſe local changes have been produced by the ſame cauſe, the deſtruction of extenſive woods, and the progreſs of agriculture; but, independently of local cauſes, we have no data to infer that the temperature of the globe is increaſing or diminiſhing.

TEMPERATURE *of the Sea*. The temperature of the ſea near the ſurface is affected by the changes of temperature of the atmoſphere, and by the currents which traverſe it. The currents which flow from the equatorial to the polar regions, ſerve to equalize the heat of different latitudes. This is remarkably the caſe with the current called the Gulf ſtream, which paſſes by the ſhores of Mexico, Louiſiana, and Florida, and round the point of the peninſula, under the ſhelter and protection of the Bahama iſlands, which break the efforts of the ocean and the current of the trade wind. This ſtream, on entering the ocean, preſerves its water by the velocity of its current, and may be further diſtinguiſhed by its colour and temperature. The temperature is from eleven to twenty-two degrees higher than that of the ocean. From the Floridas to Newfoundland the current continues increaſing in breadth, and diminiſhing in velocity. Some experiments made by Mr. Jonathan Williams, give the difference of temperature between the Atlantic ocean and the Gulf ſtream as under, December, 1789.

	Fahr.
Soundings in ſhoal-water, on the coaſt, - -	47°
A little before entering the ſtream, - -	60
In the ſtream, - - - -	70
Before reaching Newfoundland, in the ſtream, -	66
At Newfoundland, out of the ſtream, - -	54
Beyond the banks, in the open ſea, - -	60
On approaching the coaſt of England, -	48°
Capt. Billings, in 1791, found the temperature of the ſea on the coaſt of America, - -	61
In the water of the Gulf ſtream, - -	77

In winter, Mr. Williams found the variation between the Gulf ſtream and the ocean 23°; the difference, as might be expected, being leſs in ſummer than in winter. Theſe inquiries have aſcertained another fact, from whence navigators may derive ſome advantage; for by examining the temperature of the ſea in different places, it has been found that the water is colder in proportion to its ſhallowneſs; and hence may be derived an indication of the approach to land, or to a ſhoal. Out of the reach of currents, a difference always exiſts between the temperature of the ſurface and the lower parts of the ſea. In northern latitudes, the ſurface is ſometimes warmer and ſometimes colder than the lower parts; but near the equator, the temperature of the ſurface may be expected to be invariably warmer than at great depths. In all probability, the temperature of the ſea is permanent in each degree of latitude, at a certain depth. Capt. Ellis let down a ſea-gage in N. lat. 25° 13′. W. long. 25° 12′. He found the ſea ſalter and colder in proportion to the depth, till the gage had deſcended 3900 feet, when the mercury in the thermometer came up at 53°; but the water did not grow colder, though he let down the gage 1400 feet lower. At the ſurface of the ſea, the thermometer ſtood at 64°.

From the experiments of Capt. Douglas, near the coaſts of Lapland and Norway, of which an account is given in the 60th volume of the Philoſophical Tranſactions, the following differences were obſerved between the temperature of the ſea at the ſurface, and at certain depths.

Temperature at the Surface.		Depth in Fathoms.	Temperature.
May 12, lat. 70° 40′,	36° Fahr.	78 to 87	39°
May 17, nearly the ſame,	37	86 to 90	39
May 22, lat. 70° 32′,	37	80	39
June 29, lat. 70° 54′,	44	98	40
July 7, lat. 70° 45′,	46	70 at the bottom.	44
July 8, lat. 68° 43′, 12 leagues from the iſland of Lofoot, Norland, - -	47	100 260 not at the bottom.	46 52
July 9, lat. 65° 25′, 20 or 25 leagues from the coaſt of Norway, - -	48	100 210 at the bottom.	46 48
July 10, lat. 64° 40′, about 30 leagues from the coaſt, -	52	75 141 at the ground.	45 46

From

From the above obfervations it appears, that though the fea at a moderate depth was cooler than at the furface during the fummer months in northern latitudes, yet at ftill greater depths the temperature increafed, and at the depth of 260 fathoms was 52° in July, when the furface was only 47°. Now this depth being below the immediate effects of the folar rays, the temperature could only be derived from that of the globe itfelf, which appears to be fufficient to preferve the fea many degrees above the freezing point at the depth of 300 fathoms. Indeed, the temperature of the fea near the tropics, in lat. 25° 13′, at the depth of 650 fathoms, appears to be the fame as the temperature of the fea in lat. 68° 43′, at little more than one-third of that depth, as may be feen by comparing the obfervations of Capt. Ellis with that of Capt. Douglas. We have hence alfo ftrong grounds for believing, that at a certain depth, the temperature of the fea is permanent, and is the fame in every degree of latitude from the equator to the pole, though the depth may vary at which this permanent temperature would be found.

The mean annual temperature of the ftandard fituation in every latitude, as deduced by Mr. Kirwan from the Atlantic and Pacific oceans, is given under the article *Temperature of the* ATMOSPHERE. But fome exceptions to this ftandard, not there noticed, deferve to be mentioned here.

That part of the Pacific ocean which lies between N. lat. 52° and 66°, is only about 45 miles broad at its northern extremity, and 1300 miles at its fouthern. It is, therefore, reafonable to conclude with Mr. Kirwan, that its temperature will be confiderably influenced by the furrounding high land, as well as by the many bleak iflands fcattered through it. Mr. K. fuppofes, that from thefe circumftances the temperature is fully four or five degrees below the ftandard. Small feas furrounded by land are ufually rendered, from this circumftance, at leaft in temperate and cold climates, warmer in fummer and colder in winter than the ftandard ocean: the gulf of Bothnia, for inftance, is ftated to be generally frozen in winter, but in fummer to be fometimes heated to 70°. The German ocean is above three degrees colder in winter, and five degrees warmer in fummer, than the Atlantic. The Mediterranean fea is, for the greater part of its extent, warmer both in fummer and winter than the Atlantic, which therefore flows into it. The Black fea is colder than the Mediterranean, and flows into it.

Thefe obfervations apply chiefly to the furface of the ocean: from experiments that have been made it appears, that at confiderable depths the temperature is much lower than at the furface, and that the deeper we go, the lower it becomes; fo that fome fuppofe that, at very great depths, the water always exifts in a ftate of ice. See Kirwan's "Eftimate of the Temperature of different Climates;" alfo his "Effay on the Variation of the Atmofphere."

TEMPERATURE *of Springs.* Thofe common fprings which throw up a confiderable quantity of water during the whole year, have generally a permanent temperature, or nearly fo; and this is fuppofed to reprefent the mean temperature of the earth in each latitude; but there are other fprings which have a much higher permanent temperature, and fome which throw up their waters at a boiling heat. The following is the permanent temperature of fome of the more celebrated warm fprings in Europe.

	Fahr.
Matlock, - - - -	66°
Buxton, - - - -	82
Briftol, - - - -	74
Bath, - - - -	112 / 116
Vichy, - - - -	120
Carlfbad, - - - -	165°
Aix, - - - -	143
Borfet, - - - -	132
Bareges, - - - -	120

The Geyfers or boiling fountains in Iceland, in the Azores, and in various parts of the world, have a conftant temperature of 212°. The fource of heat, in fome of the latter fprings, is evidently fubterranean fire, as all thofe iflands are of volcanic origin, and are the feats of active volcanoes at the prefent day. It is obferved of other warm fprings, that they generally rife in the vicinity of volcanic or bafaltic rocks. This is the cafe with the warm fprings of Matlock and Buxton. Rocks of bafaltic amygdaloid extend through the high peak of Derbyfhire, where thefe fprings are fituated. Rocks of bafaltic amygdaloid, having a ftill more near refemblance to volcanic lava, extend from Worford bridge, in Gloucefterfhire, in a direction fouthward, and, in all probability, are continued under the furface to Bath and Briftol. According to Humboldt, hot fprings rife from granite and rocks denominated primary, in various parts of South America; and, from the permanent high temperature of warm fprings, we may infer that the fource of heat is fituated deep beneath the furface, and far below thofe caufes which can change the temperature. It has been contended by fome perfons, that the high temperature of warm fprings arifes from the decompofition of pyritous ftrata; but if this were the cafe, the waters would be ftrongly impregnated with fulphate of iron and other mineral matters, which is not the fact; the temperature would alfo decreafe as the pyritic matter became exhaufted, of which we have an analogous illuftration in the faline fprings of Cheltenham and Gloucefter. Thefe fprings rife in a deep ftratum of blue clay, called *lias*, (fee STRATA *of England*,) which abounds in pyrites, and in animal remains; and it is found by experience, that the faline impregnation is greateft when the wells are firft opened, and that the ftrength of the waters gradually declines; on which account, the proprietors are under the neceffity of finking frefh wells to obtain water of the requifite faline ftrength. This might be expected; for as the water percolates through fiffures in the clay, the faline matter in its vicinity is gradually wafhed away. But if the whole bed were in a ftate approaching to ignition, from the decompofition of pyrites, the faline impregnation would be conftantly fupplied to the fprings; for we cannot fuppofe any quantity of pyritous matter to exift equal to heat a whole ftratum by decompofition, without, at the fame time, generating fuch an abundance of faline matter as muft faturate the waters which percolate through it. We are hence led to infer that the fource of heat in warm fprings is fubterranean fire, and as thefe fprings have not been obferved to diminifh in temperature for a period of nearly two thoufand years, we may further infer the great depth at which this fource of heat is fituated, an inference which is warranted by the connection which volcanoes in diftant parts of the world appear to have with each other. (See VOLCANO.) It may be afked, if the fource of heat in warm fprings be fubterranean fire, why are they not all of the fame degree of temperature? To this it may be replied, that, in fome inftances, the warm fprings may be intermixed with cold fprings near the furface; and in other inftances, after rifing to a certain height, they may run in an horizontal direction for a confiderable diftance among the upper ftrata, and thus be gradually cooled. The caufe which can raife up water from vaft depths, muft be fought for in the expanfive power of fteam, and elaftic vapours generated by heat, which we know by experience to be fully adequate to the effect.

Temperature *for Plants*, in *Gardening*, the ſtate of heat in which it is neceſſary to keep particular ſorts of them, in order to their ſtriking or taking root, their healthy growth, and their ſucceeding in the beſt and moſt proper manner. The ſtate or degrees of heat, or the temperature, in all ſuch caſes, muſt be regulated and directed by the nature of the plants, their culture, and the ſituations in which they are grown. For thoſe in hot-houſes and ſtoves, the temperature, in thoſe of the dry ſtove kind, ſhould moſtly be from about fifty to ſeventy degrees, according to the natures, habits, and manners of growth of the plants; and in thoſe of the moiſt ſtove kind, from about ſixty to ninety degrees, as the nature of the beds and plants may be. Plants in conſervatories are kept at various temperatures between thoſe of the firſt kind of the above ſtoves and that of the common open air. And in greenhouſes, nearly ſimilar temperatures are conſtantly to be preſerved, in order to the raiſing, and to the growth of ſuch plants, in the moſt ſuitable and beſt manner.

It is always of great utility and importance to keep the temperatures as ſteady as poſſible, whatever its ſtate may be, in the growth of all theſe ſorts of tender plants.

The temperatures, or ſtates of heat for particular plants, are moſtly given under their proper heads, in deſcribing their culture.

Temperature *of Milk for Cheeſe*, in *Rural Economy*, the degree of heat which is the moſt proper in milk for the purpoſe of making cheeſe. From ſome experiments which have been lately made upon the ſubject, this temperature would ſeem to be about the middle point between that of ſummer and blood heat; or, perhaps, ſomewhere about ninety degrees of Fahrenheit's ſcale may give the average degree of warmth which is moſt proper and neceſſary in the buſineſs.

TEMPERING, in the *Mechanic Arts*, the preparing of ſteel and iron, ſo as to render them more compact, hard, and firm; or even more ſoft and pliant; according to their reſpective occaſions.

Theſe metals are tempered by plunging them, while red-hot, into ſome liquor prepared for the occaſion: ſometimes pure water is uſed for that purpoſe: our lockſmiths, &c. ſcarcely uſe any other.

When an inſtrument has been properly hardened, it is neceſſary to give it a certain degree of ſoftneſs, in order to adapt it for the purpoſe to which it is to be applied. With this view, it ſhould be heated again to a certain point, uſually determined by its colour, and then inſtantly plunged into cold water. This is called "letting it down to the proper temper." It has been a queſtion of difficult ſolution, how the water acts in hardening iron and ſteel. It is well known, ſays Mr. Parkes, in his "Chemical Eſſays," (vol. iv.), that the hotter any piece of iron is made, and the more quickly it is cooled, the harder it will become in its texture; and he ſuggeſts that this may be owing to the loſs of its *latent* heat. In confirmation of this conjecture he alleges, that iron and ſteel are generally allowed to owe their malleability to their latent heat.

A compoſition of divers juices, liquors, &c. has ſometimes been uſed; which is various according to the opinion and experience of the workman: as vinegar, mouſe-ear water, nettle or Spaniſh radiſh-water, the water oozing from broken glaſſes, ſuet, ſalt, oil, ſoot, diſtilled wine, ſal ammoniac, urine, &c. But theſe methods are now generally abandoned. Mr. Stodart, a very ingenious and ſcientific cutler in London, ſays, (as Mr. Nicholſon informs us, Journal, vol. iv. 4to.) that one of his workmen makes up his charcoal fire with ſhavings of leather, finding that this is effectual in preventing the tools from cracking in the proceſs of hardening; and he ſays, that he has found no advantage from the uſe of ſalt in the water.

To harden and temper Engliſh, Flemiſh, and Swediſh ſteel, you muſt give them a pretty high heat; then ſuddenly quench them in water to make them hard; but Spaniſh and Venetian ſteel will need only a blood-red heat before they be quenched.

In conſequence of this operation, all the qualities of ſteel are changed; ſo that from being very ductile and ſoft, it becomes ſo hard and ſtiff, that it is no longer capable of being cut by the file, but is itſelf capable of cutting or piercing very hard bodies, and that it does not yield to the hammer, but may be ſooner broken in pieces than extended. It becomes alſo ſonorous, brittle, very elaſtic, and capable of acquiring the moſt beautiful poliſh. This hardneſs and ductility of ſteel may be diverſified by varying the temper. The hotter the ſteel is when tempered, and the colder the water into which it is plunged, the greater hardneſs it acquires, but at the ſame time it becomes ſo much more brittle. The coldneſs of the water may be increaſed by diſſolving ſalts in it: obſerving that water is always colder while the ſalts continue diſſolving; and that the ſteel will cool ſooner by being ſtirred about or placed in a ſtream, ſo as to come in contact with water not already made warm. On the contrary, the leſs hot the ſteel is when tempered, and the hotter the water is in which it is tempered, the leſs hard it becomes, and alſo the greater ductility it retains: and the proper degree of heat is always relative to the uſe for which the tools made of the ſteel are intended.

If the ſteel be too hard or brittle for an edged tool, &c. let it down by rubbing a piece of grindſtone or whetſtone hard upon the work, to take off the black ſcurf: then brighten, or heat it in the fire: and as it grows hotter, you will ſee the colour change by degrees, in the manner and by the gradations ſtated under the article Cutlery.

Saw-makers temper their tools by rubbing them over with ſuet or other greaſe, and then heating them gradually till the temperature of each tool is ſufficiently raiſed to ſet fire to the greaſe of itſelf and occaſion it to blaze. They are thought to acquire in this mode of treatment a temper equal to that which would be obtained by heating them in the uſual way, till they became of a deep blue. This operation, which is practiſed at Sheffield, is called "blazing." For the method of tempering files, in which the great deſideratum is to blend tenacity with hardneſs, ſee File.

In the year 1789, Mr. David Hartley took out a patent for a method of tempering ſteel by the aid of a pyrometer or thermometer applied near to the ſurface of the article, and at the ſame time recommended the uſe of heated oil, in which (he ſays) many dozens of razors or other tools might be tempered at once with the utmoſt facility, and the various degrees of heat neceſſary for different purpoſes might ſpeedily be determined by experiment. (See Nicholſon's Journal, vol. i. 4to.) An improvement of this principle has been ſince ſuggeſted by Mr. Parkes (Chem. Eſſ. vol. iv.) by providing a bath of oil or of ſome kind of fuſible metal for the tempering of every ſpecies of edged tool, which contrivance would, in his opinion, give to this operation a greater degree of certainty, than has ever been experienced by thoſe who have conducted ſuch manufactories. See Tilting.

Steel is uſually ſold tempered, becauſe in many manufactures, the cuſtom is to temper it as ſoon as it is made, probably that the purchaſers of it may be better able to judge of its quality. When this ſteel is to be uſed, it muſt be untempered by heating it more or leſs, and letting it cool

cool ſlowly, that it may be extended, filed, and receive the neceſſary form: after which every workman tempers it again in his own way.

M. Berthoud, in his treatiſe on marine clocks, recommends hardening the ſteel-balance wheel, by daubing it over with ſoot (of wood) moiſtened with urine, putting it into a ſmall box of thin iron-plate, and covering it over with the ſame compoſition. This box with its contents is to be heated to a blood-red, and then the wheel taken out ſuddenly and quenched.

Mr. Harriſon and M. Berthoud ſeem to agree upon the whole, that the balance-ſpring of time-pieces ſhould be hardened and tempered after it has been coiled up in its proper form; and not tempered firſt and coiled up afterwards, as is the practice in making the main-ſpring. Some curious workmen, in order to equally temper ſmall ſteel inſtruments, employ melted lead as an intermedium. A plate of iron floats upon the melted lead, and receives from it, in all its parts, an equal heat: the pieces of ſteel laid upon this plate, acquire all at once the ſame degree of heat, and are at once quenched in water; the blue or other colours, which they ſucceſſively aſſume, affording ſure marks of the proper points of heat at which they are to be quenched, according to the different degrees of hardneſs required in them. Lewis's Com. Phil. Techn. p. 32.

For the method of tempering ſteel bars for artificial magnets, practiſed by Mr. Canton, ſee *Artificial* MAGNET.

The ancients appear to ſome to have had a better method of tempering than any of the moderns are acquainted with; witneſs their works in porphyry; a ſtone ſo hard, that ſcarcely any of our tools make any impreſſion upon it.

TEMPERING *of Land*, in *Agriculture*, a term ſignifying the preparing it for a crop, eſpecially of wheat. It is a term in much uſe in Norfolk. It implies all the various operations that may be undertaken in this intention.

TEMPEST, TEMPESTAS, a ſtorm or violent commotion of the air, with or without rain, hail, ſnow, &c.

TEMPEST, in *Mythology*, a deity among the Romans, concerning whom we merely know, that Marcellus, as an acknowledgment for having eſcaped a ſtorm, with which he was overtaken at ſea, between the iſlands of Corſica and Sardinia, built a temple to her without the Porta Capena.

TEMPESTA, ANTONIO, in *Biography*, was an ingenious deſigner and painter, born at Florence in 1555, and was initiated in the art by Santi di Titi; afterwards he ſtudied under another artiſt, whoſe name was Stradanus. Tempeſta was gifted with a brilliant and powerful imagination, not, however, of the moſt correct or exalted kind. His favourite ſubjects were battles, ſieges, cavalcades, huntings, proceſſions, &c.; all of which he arranged and deſigned in a novel and rich ſtyle, and executed with uncommon ſpirit and energy. He was employed by Gregory XIII. in the Vatican, which he adorned with groteſque inventions, and ſome few hiſtorical productions. He was alſo employed by the marcheſe Juſtiniani in decorating his palace; and in ſeveral of the churches of Rome, Tempeſta's paintings may be found.

He not only exerciſed his genius and time with the pencil, but devoted much of both to the etching needle; having left behind him nearly 1800 plates of different kinds, and of very conſiderable merit. He died in 1630, aged 75.

TEMPIE, in *Geography*, a town of the iſland of Sardinia; 25 miles E. of Caſtello Arragoneſe.—Alſo, a town of Mexico, in the province of Guadalajara; 500 miles N.W. of Mexico.

TEMPLARS, TEMPLERS, or *Knights of the Temple*, a religious military order, firſt eſtabliſhed at Jeruſalem, in favour of pilgrims travelling to the Holy Land.

The original of this order, the firſt military one in the world, is this: in 1118, ſome pious and noble perſons devoted themſelves to the ſervice of God, in the preſence of the patriarch of Jeruſalem; promiſing to live in perpetual chaſtity, obedience, and poverty, after the manner of canons.

The two principal perſons were Hugo de Paganis, and Geoffry of St. Omers. Baldwin II. then king of Jeruſalem, gave them an apartment in his palace, near the temple at Jeruſalem, not far from the ſepulchre of our Saviour; whence their denomination *Templars*.

Soon afterwards, the canons of the temple gave them a piece of ground near the ſaid temple, on which to build regular houſes; and the king, the lords, the patriarch, and the prelates, each gave them ſomewhat out of their revenue for food and cloaths.

Their firſt undertaking, and what they had firſt in view at their inſtitution, was, to guard the highway againſt robbers, &c. chiefly for the ſafety of pilgrims and croiſes.

The principal articles of their rule were: that they ſhould hear the holy office throughout every day; or that, when their military duties ſhould prevent this, they ſhould ſupply it by a certain number of pater noſters: that they ſhould abſtain from fleſh four days in the week, and on Fridays from eggs and milk-meats: that each knight might have three horſes, and one eſquire: and that they ſhould neither hunt nor fowl.

In the year 1228, this order acquired ſtability, by being confirmed in the council of Troyes, and ſubjected to a rule of diſcipline drawn up by St. Bernard.

In every nation they had a particular governor, called *maſter of the temple*, or of the *militia of the temple*. Their grand-maſter had his reſidence at Paris.

The order of Templars flouriſhed for ſome time, and acquired by the valour of its knights immenſe riches, and an eminent degree of military renown: but as their proſperity increaſed, their vices were multiplied, and their arrogance, luxury, and cruelty, roſe at laſt to ſuch a monſtrous height, that their privileges were revoked, and their order ſuppreſſed with the moſt terrible circumſtances of infamy and ſeverity. Their accuſers were two of their own body, and their chief proſecutor Philip the Fair, of France, who addreſſed his complaints to Clement V. The pope, though at firſt unwilling to proceed againſt them, was under the neceſſity of complying with the king's deſire, ſo that, in the year 1307, upon an appointed day, and for ſome time afterwards, all the knights, who were diſperſed throughout Europe, were ſeized and impriſoned. Such of them as refuſed to confeſs the enormities of which they were accuſed, were put to death; and thoſe who, by tortures and promiſes, were induced to acknowledge the truth of what was laid to their charge, obtained their liberty. In 1312, the whole order was ſuppreſſed by the council of Vienne. A part of the rich revenues they poſſeſſed was beſtowed upon other orders, eſpecially on the knights of St. John, now of Malta, and the reſt confiſcated to the reſpective treaſuries of the ſovereign princes in whoſe dominions their poſſeſſions lay.—The knights Templars, in order to juſtify the ſeverity with which they were treated, were charged with apoſtacy to the Saracens, and holding correſpondence with them; with inſulting the majeſty of God; turning into deriſion the Goſpel of Chriſt; and trampling upon the obligation of all laws, human and divine. Candidates, it is ſaid, upon admiſſion to this order, were commanded to ſpit, in token of contempt, upon an image of Chriſt, and after admiſſion, to worſhip either a

cat,

cat, or a wooden head crowned with gold. It is farther affirmed, that, among them, the odious and unnatural act of sodomy was a matter of obligation; and they are charged with other crimes too horrible to be mentioned, or even imagined. However, though there be reason to believe that in this order, as well as others of the same period, there were shocking examples of impiety and profligacy; yet that the whole order was thus enormously corrupt, is so far from being proved, that the contrary may be concluded even from the acts and records, yet extant, of the tribunals before which they were tried and examined. If to this we add, that many of the accusations advanced against them flatly contradict each other, and that many members of this unfortunate order solemnly avowed their innocence, while languishing under the severest tortures, and even with their dying breath; it would seem probable, that king Philip set on foot this bloody tragedy, with a view to gratify his avarice, and glut his resentment against the Templars, and especially against their grand-master, who had highly offended him. The principal cause of this invincible hatred against them was, that in his quarrel with Boniface VIII. the knights espoused the cause of the pope, and furnished him with money to carry on the war. Mosheim's Eccl. Hist. vol. iii. ed. 8vo. Bower's Hist. of the Popes, vol. vi. p. 393.

TEMPLE, Templum, a public building erected in honour of some deity, either true or false; and in which the people meet to pay religious worship to the same.

The word is formed from the Latin *templum*, which some derive from the Greek τεμενος, signifying the same thing; and others from τεμνω, *abscindo*, *I cut off*, *I separate*, because a temple is a place separated from common uses; others, with more probability, derive it from the old Latin word *templare*, *to contemplate*. It is certain the ancient augurs gave the name *templa* to those parts of the heavens which were marked out for the observation of the flight of birds. Their formula was this: *Templa tesqua sunto.*

Temples were originally all open, and hence received their name. See Phil. Trans. N° 471. sect. 5. where we have an account of the ancient temple in Ireland of the same sort as our famous Stonehenge.

The word *templum*, in its primary sense among the old Romans, signified nothing more than a place set apart, and consecrated by the augurs, whether enclosed or open; in the city, or in the fields.

Clemens Alexandrinus and Eusebius refer the origin of temples to the sepulchres built for the dead. This notion has been lately illustrated and confirmed by a variety of testimonies by Mr. Farmer, in his Treatise on the Worship of Human Spirits, p. 373, &c. Herodotus, Lucian, and Strabo, will have the Egyptians to have been the first who built temples to the gods; and from them the custom was propagated to the Assyrians, comprehending under this appellation Phœnicia, Syria, and other countries. From Egypt and Phœnicia it passed to Greece with the colonies, and from Greece to Rome. The first erected in Greece is ascribed to Deucalion by Apollonius (Argonaut. lib. iii.) and the first in Italy to Janus.

In antiquity we meet with many people who would not build any temples to their gods, for fear of confining them to too narrow bounds. They performed their sacrifices in all places indifferently, from a persuasion, that the whole world is the temple of God, and that he required no other. This was the doctrine of the magi, followed by the Persians, the Scythians, the Numidians, and many other nations mentioned by Herodotus, lib. i. Strabo, lib. xv. and Cicero, in his second oration against Verres.

The Persians, who worshipped the sun, believed it would wrong his power, to enclose *him* in the walls of a temple, who had the whole world for his habitation; and hence, when Xerxes ravaged Greece, the magi exhorted him to destroy all the temples he met with.

The Sicyonians would build no temples to their goddess Coronis; nor the Athenians, for the like reason, erect any statue to Clemency, who, they said, was to live in the hearts of men, not within stone walls.

The Bithynians had no temples but the mountains to worship on; nor had the ancient Germans any other but the woods.

Even some philosophers have blamed the use and building of temples, particularly Diogenes, Zeno, and his followers the Stoics. But it may be said, that if God hath no need of temples, men have need of places to meet in for the public offices of religion: accordingly, temples may be traced back even unto the remotest antiquity. See Hospinian, de Origine Templorum.

The Romans had several kinds of temples; of which those built by the kings, &c. consecrated by the augurs, and in which the exercise of religion was regularly performed, were called, by way of eminence, *templa*, temples. Those that were not consecrated were called *ædes*. The little temples, that were covered or roofed, they called *ædiculæ*; those open, *sacella*. Some other edifices, consecrated to particular mysteries of religion, they called *fana* and *delubra*.

All these kinds of temples, Vitruvius tells us, had other particular denominations, according to the form and manner of their construction; as will be hereafter specified. Indeed, the Romans out-did all nations with regard to temples: they not only built temples to their gods, to their virtues, to their diseases, &c. but also to their emperors, and that in their life-time; instances of which we meet with in medals, inscriptions, and other monuments. Horace compliments Augustus hereupon, and sets him above Hercules, and all the heroes of fable; in that those were only admitted into temples after their death, whereas Augustus had his temples and altars while living.

> "Præsenti tibi maturos largimur honores;
> Jurandasque tuum per nomen ponimus aras."
> Epist. ad Aug.

Suetonius, on this occasion, gives an instance of the modesty of that emperor, who would allow of no temples being erected to him in the city; and even in the provinces, where he knew it was usual to raise temples to the very proconsuls, refused any but those erected in the name of Rome as well as his own. Vide Suet. in Octav. cap. 52.

Whenever a temple was to be erected, the aruspices were consulted as to the scite of it, and the time when the construction of it was to commence. The spot assigned to it was carefully purified, and it was encircled with fillets and garlands. The vestals, accompanied with young boys and girls, washed the ground with water, and the priest expiated it by a solemn sacrifice. Then he touched the foundation-stone, and bound it with a fillet; and the people, animated with extraordinary zeal, threw it in thither with some pieces of money, or metal which had not passed through the furnace. When the edifice was finished, it was consecrated with a variety of ceremonies, in which the priest, or, in his absence, some of his college, presided. Some of these temples were not to be built within the precincts of cities, but without the walls, as those of Mars, Vulcan, and Venus, for reasons particularly assigned by Vitruvius. The temples were held in great veneration; and, in some cases, they were a sanctuary for criminals and debtors. Within they were very

very much adorned; particularly with coftly ftatues of their gods and great men, and a great variety of votive offerings.

The moft celebrated of the ancient temples among the Pagans were the following: *viz.* the temple of Belus (fee BELUS and BABYLON); the temple of Vulcan at Memphis, the magnificence and extent of which are highly extolled by Herodotus; the temple of Jupiter at Thebes or Diofpolis; that of Andera at Hermunthis; that of Proteus at Memphis; that of Minerva at Sais; the temple of Diana at Ephefus (fee DIANA); the temple of Apollo in the city of Miletus, which, as well as that of Diana, was of the Ionic order; the temple of Eleufis, built in honour of Ceres and Proferpine, capable of containing 30,000 perfons; the temple of Jupiter Olympius at Athens, of the Corinthian order; and the temple of Apollo at Delphi, fo famous for its oracles, and for the rich prefents with which it was enriched (fee DELPHI); the temple of Jupiter, which contained his admirable ftatue. The architect of the temple was Libo, a native of the country: its height from the area to the roof was 68 feet, its breadth 95, and its length 230. The throne and ftatue of the god, for we cannot enumerate other fplendid ornaments, were the mafter-piece of Phidias; and antiquity produced nothing fo magnificent nor fo finifhed. The ftatue, of an immenfe height, was of gold and ivory, fo artificially blended, that it could not be beheld but with aftonifhment. The god wore upon his head a crown, which refembled the olive-leaf to perfection: in his right hand he held a victory, likewife of gold and ivory; and in his left a fceptre of exquifite tafte, refulgent with all forts of metals, and fupporting an eagle. The fhoes and mantle of the god were of gold; and upon the mantle were all forts of animals and flowers engraved. The throne was all fparkling with gold and precious ftones. The ivory and ebony, the animals there reprefented, and feveral other ornaments, by their affemblage, formed a delightful variety. At the four corners of the throne were as many Victories, that feemed to be joining hands for a dance, befides two others that were at Jupiter's feet. The feet of the throne, on the fore-fide, were adorned with fphinxes, who were plucking the tender infants from the bofom of the Theban mothers; and underneath were to be feen Apollo and Diana, wounding Niobe's children to death with their arrows. Four crofs bars that were at the feet of the throne, and went from one end to the other, were adorned with a great rumber of figures extremely beautiful: upon one were reprefented feven conquerors at the Olympic games; upon another appeared Hercules, ready to engage with the Amazons, and the number of combatants on either fide was twenty-nine. Befides the feet of the throne, there were likewife pillars to fupport it. In fine, a great balluftrade, painted and adorned with figures, railed in the whole work. Panænus, an able painter of that time, had reprefented there, with inimitable art, Atlas bearing the heavens upon his fhoulders, and Hercules in an attitude ftooping to eafe him of the load: Thefeus and Pirithous, the combat of Hercules with the lion of Nemea, Ajax offering violence to Caffandra, Hippodamia with her mother, Prometheus in chains, and a thoufand other fubjects of fabulous hiftory. In the moft elevated place of the throne, above the head of the god, were the Graces and Hours, of each three in number. The pedeftal which fupported this pile, was equally adorned with the reft. There Phidias had engraved upon gold, on the one fide, the Sun guiding his chariot; on the other, Jupiter and Juno, the Graces, Mercury, and Vefta. There Venus appeared rifing out of the bofom of the fea, and Cupid receiving her; while Pitho, or the goddefs of perfuafion, was prefenting her with a crown. There alfo appeared Apollo and Diana, Minerva and Hercules. At the bottom of the pedeftal, you might have feen Amphitrité and Neptune, and Diana or the moon, who appeared mounted on horfeback. In fine, a woollen veil, of a purple dye, and magnificently embroidered, the prefent of king Antiochus, hung from top to bottom. The throne and ftatue reached from the pavement, which was of the fineft marble, to the roof.

Italy abounded with temples as much as Greece; feveral of which were remarkable for their fingularity or magnificence. Rome was full of temples: fome of the moft remarkable for their origin, materials, ftructure, or ufe, were the following: *viz.* the temple of Apollo, built by Auguftus, in honour of his favourite deity Apollo, after his victory at Actium, upon mount Palatine. Its ftructure was very magnificent; it was built of the fineft marble of Claros, and embellifhed, both within and without, with the richeft ornaments. Its gates were of ivory, enriched with baffo-relievos, reprefenting the Gauls, when they were thrown headlong from the top of the Capitol by T. Manlius. In the frontifpiece was a chariot of the fun, of maffy gold, crowned with rays fo refplendent that they dazzled the eyes of beholders. Within the temple was a marble ftatue of Apollo, made by Scopas, and alfo a coloffal one of brafs, 50 feet high; together with a candleftick in the form of a tree, whofe branches were covered with clufters of lamps refembling fruit. Upon thefe branches the poets ufed to hang their poems, which they offered up to Apollo, as Horace informs us, ep. 3. l. 1. To this temple, dedicated to the "god of arts," was very properly annexed a noble library.—The temple of Bacchus, fituated without the walls of Rome, is now the church of St. Conftantia, fupported on the infide by twenty-four noble pillars of granite. Its ancient mofaic ceiling, and the old window by which light was let in from the roof, ftill remain. Behind the prefent altar ftands an antique urn of porphyry, of large dimenfions; and on each fide of the altar, a finely wrought antique candleftick of marble.—Here was the temple of the goddefs Bona, who was Dryas, the wife of Faunus, diftinguifhed by her exemplary chaftity. The Roman ladies facrificed to her in the night, in a little chapel, into which the men were not allowed to enter, nor were they permitted to be prefent at her facrifices. It was for the violation of this rule, that Cicero profecuted the debauched Clodius. (See his article.)—The temple of Diana was feated on mount Aventine. It was built in the reign of Servius Tullius, at the joint expence of the Romans and Latins, for the purpofe of their meeting annually to offer a facrifice, in commemoration of the league made between the two nations.—The firft temple of Faith is faid to have been erected by Numa, who taught the Romans to worfhip this goddefs, and thus to be reminded, that the moft facred oath they could take was to fwear by their *faith* or *veracity*. His intention was to render their promifes, without writings or witneffes, as firm and certain as contracts made and fworn to with the greateft formalities; and in this he fucceeded to his wifh. Polybius bears this honourable teftimony to the Romans, that they inviolably kept their *faith*, that is, their word, without having occafion for witneffes or fecurities; whereas nothing could bind the Greeks to their promifes.—The temple of Honour was built by Mutius, by order of Marius, and might be reckoned among the nobleft buildings in ancient Rome, if the materials, which were ftone, had correfponded to the greatnefs of the defign. It was remarkable for this circumftance, that the entrance of it was dedicated to Virtue, and the reft to Honour; and that it had no pofticum, or back-door, as other temples had; thus intimating, that we muft not only pafs through virtue to attain to honour, but that honour is alſo obliged to repaſs through virtue, that is, to perſevere in it, and acquire more of it.—The temple of Janus. The Romans built, at different times, three temples to Janus; for an account of which, ſee Janus.—The temple of Jupiter the Preſerver was one of the ſixty temples that ſtood upon the Capitoline hill. Jupiter Cuſtos was repreſented in it, holding his thunder with one hand, and a dart with the other, and the figure of the emperor was under his thunder, to ſhew that he was under Jupiter's protection; or elſe engraved, lying upon a globe, and holding an image of victory, with the eagle at his feet, and theſe words, "Jovi Conſervatori Auguſtorum noſtrorum."—The temple of Jupiter Optimus Maximus, or Jupiter Capitolinus, was moſt commonly called the *Capitol;* which ſee.—The temple of Liberty was built upon mount Aventine, on the ſpot where Cicero's houſe once ſtood, enriched with ſeveral braſs pillars, and many fine ſtatues.—The temple of Mars ſtood on the declivity of the Capitoline hill. In this temple were kept the eagles and other military enſigns of the Romans, and alſo the chariot in which Cæſar had triumphed.—The temple of Peace was begun by the emperor Claudius, and finiſhed by Veſpaſian, who embelliſhed it with paintings and ſtatues of the greateſt maſters, and alſo depoſited in it all the ſpoils and riches taken by his ſon Titus in the temple of Jeruſalem. It was burnt in the reign of Commodus.—The temple of Jupiter the Avenger was the *Pantheon;* which ſee. To the temples already enumerated, we might add thoſe of Antoninus and Fauſtina, of Auguſtus, of Auguſtus and Bacchus, of the Muſes, of Ceres, of Claudius Cæſar, of Concord, of Fame, of the Flavian family, of Faunus, of Fever, of Trajan and Neptune, of Happineſs, of Faith and Jupiter the Preſerver, of Flora, of Bad Fortune, of the eldeſt or firſt-born Fortune, of Public Fortune, of Virile or Courageous Fortune, of Hercules, of Juno, of Juno Moneta, of Juno Soſpita, the giver or preſerver of health, of queen Juno, of Jupiter Feretrius, of Jupiter Stator, of Jupiter Tonans or the Thunderer, of Jupiter the Conqueror, of Liber, an epithet of Bacchus, of the Mother of the gods, of Mercury, of Minerva, of the goddeſs Nenia, of Ops and Saturn, of the Penates or Houſehold gods, of Reſt, of Quirinus, of Romulus and Remus, of Saturn, of Serapis, of the Sun, of the Sun and Moon, of the god Sylvanus, of Tellus or the Earth, of Venus, of Venus and Cupid, of Venus Erycina, of Venus Erycina and the Mind, of Venus Verticordiæ, of Vertumnus, of Veſta, and many others, which, great and ſmall, amounted to upwards of one thouſand.

Temple, *Jewiſh*, at *Jeruſalem*, was an edifice erected much after the model of the tabernacle, but in a much more magnificent and expenſive manner. According to the opinion of ſome, there were three different temples: the firſt built by David and Solomon on mount Moriah, which was part of mount Sion; the ſecond, by Zerubbabel and Joſhua the high prieſt; and the third by Herod. This laſt, however, the Jews will not allow to be a new temple, but only the ſecond repaired or rebuilt. The expence of building Solomon's temple was prodigious: the gold and ſilver employed for this purpoſe amounted to upwards of eight hundred millions ſterling (1 Chron. xxii. 14. xxix. 4. 6, 7.), which, ſays Dr. Prideaux, was ſufficient to have built the whole temple with ſolid ſilver. But as the book of Chronicles was written after the return from the Babyloniſh captivity, it is probable that the Jews might compute by the Babyloniſh talent, which was little more than half the Moſaic talent, or perhaps by the Syriac talent, which was but one-fifth of the Babyloniſh; and thus the whole quantity of gold and ſilver would be reduced to a comparatively moderate quantity, and yet ſufficient for the purpoſe.

Joſephus (lib. vii. xiv. ii.) acquaints us, that the two firſt ſums were only one-tenth part of what is expreſſed in the preſent Hebrew; and Dr. Kennicott (State of the Hebrew Text, vol. ii. p. 355.) thinks it probable, that a cipher was added to them both in ſome very ancient Hebrew copy.

This temple was ſurrounded, except at the front or eaſt end, with three ſtories of chambers, each five cubits ſquare, which reached to half the height of the temple; and the front was graced with a magnificent portico, which roſe to the height of a hundred and twenty cubits. It was plundered by Nebuchadnezzar king of Babylon, and at length deſtroyed, after it had ſtood, according to Joſephus, four hundred and ſeventy years, ſix months, and ten days, from its dedication. Others, however, as Calviſius and Scaliger, reduce the number of years to four hundred and twenty-ſeven, or four hundred and twenty-eight; and Uſher, to four hundred and twenty-four years, three months, and eight days.

The ſecond temple was built by the Jews, after their return from the Babyloniſh captivity, under the direction and influence of Zerubbabel their governor, and of Joſhua the high prieſt, with the leave and encouragement of Cyrus the Perſian emperor, to whom Judæa was now become a tributary kingdom. According to the Jews, this temple was deſtitute of five remarkable appendages, which were the chief glory of the firſt temple; *viz.* the ark and mercy-ſeat, the Schechinah, the holy fire on the altar, which had been firſt kindled from heaven, the urim and thummim, and the ſpirit of prophecy. This temple was plundered and profaned by Antiochus Epiphanes, who alſo cauſed the public worſhip in it to ceaſe; and afterwards purified by Judas Maccabæns, who reſtored the divine worſhip: and after having ſtood five hundred years, rebuilt by Herod, with a magnificence approaching to that of Solomon's. Tacitus calls it *immenſæ opulentiæ templum;* and Joſephus ſays, it was the moſt aſtoniſhing ſtructure he had ever ſeen, as well on account of its architecture as its magnitude, and likewiſe the richneſs and magnificence of its various parts, and the reputation of its ſacred appurtenances. This temple, which Herod began to build about ſixteen years before the birth of Chriſt, and ſo far completed in nine years and a half, as to be fit for divine ſervice, was at length deſtroyed by the Romans on the ſame month and day of the month, on which Solomon's temple was deſtroyed by the Babylonians.

The Jewiſh temple itſelf conſiſted of the portico, the ſanctuary, and the holy of holies; and it was ornamented with ſpacious courts, making a ſquare of half a mile in circumference. The firſt court was called the court of the Gentiles, becauſe they were allowed to come into it, but no farther. Within this was a leſs court, into which none but Iſraelites might enter, divided into the court of the women; and the inner court, in which the temple and altar ſtood, and into which the prieſts and all male Iſraelites might enter.

Temple, in *Architecture*. The ancient temples were diſtinguiſhed, with regard to their conſtruction, into various kinds: as,

Temple *in antæ*, *Ædes in antis*. Theſe, according to Vitruvius, were the moſt ſimple of all temples, having only angular pilaſters, called *antæ*, or *paraſtatæ*, at the corners, and two Tuſcan columns, on each ſide of the doors.

Temple, *Tetraſtyle*, or ſimply *tetraſtyle*, was a temple that had four columns in front, and as many behind. Such was the temple of Fortuna Virilis at Rome.

Temple, *Proſtyle*, that which had only columns in its front,

front, or fore-fide. As that of Ceres at Eleufis, in Greece.

Temple, *Amphyproftyle*, or *double proftyle*, that which had columns both before and behind, and which was alfo tetraftyle.

Temple, *Periptere*, that which had four rows of infulated columns around, and was exhaftyle, *i. e.* had fix columns in front; as the temple of Honour at Rome. See Periptere.

Temple, *Diptere*, that which had two wings, and two rows of columns around, and was alfo octoftyle, or had eight columns in front; as that of Diana at Ephefus.

Temple, *Pfeudo-diptere*. See Pseudo-*diptere*.

Temple, *Hypæthros*. See Hypæthros.

Temple, *Monoptere*. See Monoptere.

Temples, among us, denote two inns of court, thus called, becaufe anciently the dwelling-houfe of the knights Templars.

At the fuppreffion of that order they were purchafed by fome profeffors of the common law, and converted into hofpitia, or inns of courts.

They are called the *Inner* and *Middle Temple*, in relation to Effex-houfe, which was alfo a part of the houfe of the Templars, and called the *Outer Temple*, becaufe fituate without Temple-Bar.

In the *Middle Temple*, during the time of the Templars, the king's treafure was kept: as was alfo that of the kings of France in the houfe of the Templars at Paris.

The chief officer was the mafter of the Temple, who was fummoned to parliament in 49 Hen. III. And from him the chief minifter of the Temple church is ftill called *Mafter of the Temple*.

Temple, *Sir* William, in *Biography*, a ftatefman and mifcellaneous writer, was the fon of fir John Temple, mafter of the rolls in Ireland in the reign of Charles I. and II., and author of a Hiftory of the Irifh Rebellion, and born in London in the year 1628. Having finifhed his courfe of claffical education, he was entered, at the age of feventeen, at Emanuel college, in the univerfity of Cambridge, under the tuition of the learned Cudworth. Being defigned for public life, his principal attention at the univerfity was engaged by the ftudy of the modern languages, French and Spanifh; and at the age of twenty, he was fent to finifh his education by travelling on the continent. After fpending fix years in this way, he returned home in 1654, and married the daughter of fir Peter Ofborn, of Chickfand, Bedfordfhire, with whom he became acquainted during his foreign travels. Declining to accept any office under Cromwell, he refided with his father in Ireland, and devoted his time to the ftudy of hiftory and philofophy. At the Reftoration he became a member of the Irifh Convention; and in the Irifh parliament of the year 1661, he was returned as a reprefentative of the county of Carlow, and in 1662 was nominated one of the commiffioners from that parliament to the king. At this time he removed with his family to England; and having faithfully executed a fecret commiffion to the bifhop of Munfter, with which he was entrufted in 1665, he was appointed in the following year refident at the court of Bruffels, and raifed by patent to the rank of a baronet. During the reign of Charles II. he was concerned in a variety of negociations. After the peace of Breda, (July 10, 1667,) fir William went over to Holland, and formed an intimate acquaintance and friendfhip with De Wit, a man frank and open, and of the fame generous and enlarged fentiments with himfelf; and in confequence of the negociations of thefe two able ftatefmen, a defenfive alliance was concluded between Holland and England. Sweden acceded to the confederacy: and thus was formed the triple league, which was generally regarded with equal furprife and approbation. In the conduct of this bufinefs, Temple acquired great honour; but to all the compliments that were paid to him on the occafion, he modeftly replied, that to remove things from their centre, or proper element, required force and labour; but that of themfelves they eafily returned to it. The French monarch and the court of Spain were equally difpleafed; but in the treaty at Aix-la-Chapelle, where Temple appeared as ambaffador extraordinary and mediator, on behalf of England, his addrefs prevailed; the Spanifh minifter complied with the conditions propofed; and the peace between the contending powers was figned in May, 1668. In confequence of this event, fir William was nominated ambaffador to the States-General, and taking up his refidence at the Hague in the month of Auguft of this year, he maintained his intimacy with De Wit, and was alfo on familiar terms with William, prince of Orange, who had then attained the age of eighteen years. But this triple alliance was of fhort duration. The corruption and intrigues of the Englifh court produced a recall of Temple in the year 1669, and when it was propofed to him to return and make way for a breach with Holland, he declined, much to his honour, engaging in hoftility againft a country to which he was attached, and retired from public bufinefs to his feat at Sheen, near Richmond. Here he employed himfelf in the improvement of his manfion, and in the cultivation of his garden; and alfo in writing his "Obfervations on the United Provinces," and a part of his "Mifcellanea." When the war with the Dutch became unpopular through the nation, and the court and its minifters were under a neceffity of bringing it to a termination, fir William Temple was called out of his retirement to negociate with the Spanifh minifter in London: and when the feparate peace with Holland was concluded, he was requefted in the next year, 1674, to undertake the office of ambaffador to the States-General, for the purpofe of negociating a general peace. Before his acceptance of this office, he obtained an audience of the king, with a view of ftating to his majefty the pernicious politics of the Cabal miniftry, and the neceffity of popular meafures for regaining the confidence of the nation. The negociations for peace were commenced at Nimeguen, whither he removed from the Hague in 1676: and during their flow progrefs, he availed himfelf of the opportunity thus afforded him for accomplifhing the popular meafure of the marriage of the prince of Orange to the duke of York's eldeft daughter, which took place in 1677. On another occafion, when the French manifefted their intention of retaining the Spanifh towns, which were to be furrendered by treaty, Temple was difpatched to the Hague to concert effectual meafures with the States for bringing the French to terms; and in fix days he concluded a treaty, July 1678, by which England was bound to declare war againft the French if the towns were not evacuated within the interval of fixteen days; but fo feeble and fluctuating were the Englifh councils, that before the ratification of the projected treaty, peace was figned at Nimeguen, and France was fecured in the poffeffion of a great part of its conquefts.

In 1679 Temple was recalled from the Hague, in order to be appointed one of the fecretaries of ftate; but perceiving the violence of parties, and the prevalence of difcontent, he recommended a council of thirty perfons, which was to be compofed, together with the minifters of the crown, of perfons poffeffing influence and credit in both houfes of parliament. But divifions occurred which prevented the falutary effects of fuch a meafure. Projects of limitation or exclufion were the fubjects of warm difcuffion in parliament.

To

To thele meafures Temple was adverfe; and his laft act in parliament, as member for the univerfity of Cambridge, was to carry from the council the king's final anfwer to the addrefs of the Commons, never to confent to the exclufion of his brother: other members had previoufly declined this difagreeable fervice. When the king, in January 1681, diffolved the parliament without the advice of his privy council, Temple boldly remonftrated againft the meafure; and at length, wearied with the faction and mifgovernment which he had witneffed, he declined the offered return for the univerfity to the new parliament, and retired to Sheen, conveying from thence a meffage to the king, "that he would pafs the reft of his life as good a fubject as any in his kingdom, but would never more meddle with public affairs." The king replied to the meffage, that he bore him no refentment; but his name was expunged from the council. The remainder of his life was fpent in retirement and feclufion from all public bufinefs; and it is faid, that he interfered fo little in political matters, as not to know the defign of the prince of Orange to engage in the expedition that terminated in the revolution, and to be the laft perfon who gave credit to his landing. After James's abdication, however, he waited on the prince at Windfor, and prefented to him his fon. King William urged upon him the acceptance of the office of fecretary of ftate; but he maintained his purpofe of living in retirement. His fon was appointed fecretary at war; but in the week in which he affumed the office, he was feized with melancholy, and threw himfelf into the Thames. His reflection on this afflictive event was that which his Stoic philofophy alone could have dictated: "a wife man might difpofe of himfelf, and render his life as fhort as he pleafed." In his ftate of retirement, he admitted Swift to be his companion, as we have already mentioned under Swift's article. King William occafionally vifited him, and confidentially confulted him on feveral important affairs. In 1694 he loft his wife; and finking gradually under increafing infirmities, occafioned by repeated fits of the gout, his life was terminated at Moor park, in January 1698, in his 70th year. The greateft part of his fortune was bequeathed to the daughters of his unfortunate fon by a French lady, under the exprefs condition that they fhould not marry Frenchmen.

Sir William Temple ranks high as a ftatefman, and alfo as a patriot, who well underftood and zealoufly purfued his country's intereft. His foibles, without giving them a worfe appellation, were impatience with thofe whom he difliked, warmth in difpute, and a fhare of vanity and conceit; but he was fubftantially, fays his biographer, a worthy man in the various relations of life. To outward forms of religion he paid little regard; but his letter to the countefs of Effex is no lefs pious than eloquent: fo that we can fcarcely admit the charge of atheifm with which he is reproached by bifhop Burnet. As a writer, he ranks among the moft eminent and popular of his time. His "Obfervations upon the United Provinces of the Netherlands" were printed in 1672, and deferve the attention of the politician and philofopher: his "Mifcellanea" are lively and entertaining, if not profound. His "Memoirs" elucidate the hiftory of the times. His "Introduction to the Hiftory of England" was publifhed in 1695. His "Letters," in 3 vols., which relate to public tranfactions, were publifhed after his death by Swift. "All fir William Temple's writings," fays one of his biographers, "difplay much acquaintance both with books and men, and are entirely free from the licentioufnefs fo prevalent in that age. Their ftyle is negligent and incorrect, but agreeable, refembling that of eafy and polite converfation." Hume's Hift. vol. vii. 8vo. Biog. Brit. Gen. Biog. Account of his Life, &c. prefixed to the folio edition of his Works, in 2 vols. Lond. 1720.

Sir William Temple did not efcape the lafh of criticifm, and fuch was his vanity or irritability, or perhaps a compofition of both, that his indignation was roufed, and he expreffed himfelf in the following terms: "The criticks are a race of fcholars I am very little acquainted with; having always efteemed them but little brokers, who, having no ftock of their own, fet up and trade with that of other men, buying here and felling there, and commonly abufing both fides, to make out a little paltry gain, either of money or credit, for themfelves, and care not at whofe coft." In another place he fays, "there is, I think, no fort of talent fo defpicable, as that of fuch common criticks, who can at beft pretend to value themfelves by difcovering the defaults of other men, rather than any worth or merit of their own:—a fort of levellers, that will needs equal the beft and richeft of the country, not by improving their own eftates, but reducing thofe of their neighbours, and making them appear as mean and wretched as themfelves."

Temple, in *Geography*, a town of the province of Maine, in the county of Kennebeck, containing 482 inhabitants.—Alfo, a townfhip of New Hampfhire, in the county of Hillfborough, containing 941 inhabitants; 70 miles W. of Portfmouth.

Temple, *Le*, a town of France, in the department of the Lot and Garonne; 7 miles W. of Villeneuve d'Agen.

Temple *Bay*, a bay on the N.E. coaft of New Holland, to the S. of Cape Grenville.—Alfo, a bay on the E. coaft of Labrador. N. lat. 52° 25′. W. long. 55° 50′.

TEMPLEMORE, (*i. e. the Great Church*,) a poft-town of the county of Tipperary, Ireland, where there was formerly held a fair for wool, which lafted feveral days. It is 75 miles S.W. from Dublin.

TEMPLE PATRICK, (*i. e. Patrick's Church*,) a poft-town of the county of Antrim, Ireland, on the river Six-mile-water; $4\frac{1}{2}$ miles E. by S. from Antrim, on the road to Belfaft.

TEMPLERS. See Templars.

TEMPLES, in *Anatomy*. See Tempora.

TEMPLETON, in *Geography*, a town of America, in the ftate of Maffachufetts, and county of Worcefter, containing 1203 inhabitants.

TEMPLETONIA, in *Botany*, is dedicated by Mr. R. Brown, to the honour of John Templeton, efq. of Orange Grove, near Belfaft, a gentleman whofe enquiries have much enriched our knowledge of Irifh plants, and whofe name confequently often appears in the pages of the *Flora Britannica* and *Englifh Botany*.—Brown in Ait. Hort. Kew. v. 4. 269.—Clafs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminofæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, fimple, bell-fhaped, with five rather unequal fegments in the limb, permanent. *Cor.* papilionaceous, of five petals. Standard elliptical, afcending, entire. Wings nearly the length of the ftandard, linear-oblong, obtufe, with a fmall tooth near the bafe at their upper edge. Keel a little fhorter than the wings, oblong, flightly curved, of two half-ovate petals, cohering near the extremity, with fhort claws. *Stam.* Filaments ten, all combined into one tube for more than half their length, feparate above, afcending, five alternate ones rather the fhorteft; anthers uniform, fmall, oblong, incumbent. *Pift.* Germen ftalked, linear-awlfhaped; ftyle awlfhaped, afcending; ftigma capitate. *Peric.* Legume ftalked, linear-oblong, compreffed, obliquely pointed, of one cell and two valves. *Seeds* eight or ten, oval, polifhed, the fcar of each bordered with a prominent creft.

Eff. Ch. Calyx fimple, with five rather unequal teeth. Keel

Keel oblong. Stamens all connected. Anthers uniform. Legume stalked, compressed. Seeds numerous, crested.

1. T. *retusa*. Wedge-leaved Templetonia. Ait. n. 1. (Rafnia retusa; Venten. Malmaif. t. 53.)—Gathered by Mr. Brown, on the south-west coast of New Holland, from whence seeds were sent to England by Mr. Peter Good, in 1803. This is a greenhouse shrub, flowering in spring and summer. *Stem* about a yard high, with straight, angular, smooth, leafy branches. *Leaves* about an inch and half long, alternate, on short stalks, spreading, entire, emarginate, smooth. *Stipulas* in pairs, small, oval, deciduous. *Flowers* lateral, axillary, solitary, on simple stalks, which are rather shorter than the leaves. *Calyx* destitute of the imbricated appendages which make a principal part of the character of the neighbouring genus SCOTTIA. (See that article.) *Petals* near an inch long, of a deep crimson. *Legume* two inches long, and half an inch broad, slightly tumid where each seed is lodged.

TEMPLEUVE *en Pesvele*, in *Geography*, a town of France, in the department of the North; 7 miles S.S.E. of Lille.

TEMPLIN, a town of Germany, in the Ucker Mark of Brandenburg, situated between the Bodensee and Dolgensee. In the year 1735, this place was totally consumed by fire, but has been rebuilt to very great advantage; its streets being now broad and straight, and its houses uniform, exclusive of a spacious market-place in it, which forms a regular quadrangle, insomuch that at present it is one of the most beautiful towns in all the Mark. It carries on a very large trade in timber, which is greatly promoted by means of a canal, newly made. In 1806 it was taken by the French, under the duke of Berg; and the prince of Hohenloe, who had retired hither after the battle of Jena, was made prisoner; 15 miles S.W. of Prenzlow. N. lat. 53° 5'. E. long. 13° 34'.

TEMPLUM SOSTRATI, the name of a kind of surgical bandage described by Galen. He also describes another, under the name of *templum parvum Apollonii Tyrii*.

TEMPO, Ital., time, or measure, in *Music*.

TEMPO *Ordinario*, usual time.

TEMPO *di Gavotta*, gavot time. See GAVOTTA.

TEMPO *di Minuetto*, minuet time.

A TEMPO, or *à tempo primo*, after a pause, or *rallentando*, or *ad libitum*, implies a return to the first time in which a movement is begun; and in recitative, where, in general, no time is kept, *à tempo*, in an accompanied recitative, implies a regular time.

TEMPOAL, in *Geography*, a town of Mexico, in the province of Guasteca; 50 miles S.E. of St. Yago de los Valles.

TEMPORA, in *Anatomy*, the anterior and lateral parts of the head, where the skull is covered by the temporal muscles: the temples in common language. See CRANIUM.

TEMPORAL, TEMPORALIS, a term frequently used for *secular*. In which sense it stands opposed to *ecclesiastical*.

Pope Boniface wrote to Philip the Fair of France, that he was subject to him, both in spirituals and temporals.

At present, all the doctors on this side the Alps own the supremacy of kings in temporals.

TEMPORAL *Action*. See ACTION.

TEMPORAL *Augment*. See AUGMENT.

TEMPORALIS, TEMPORAL, in *Anatomy*, an epithet applied to various parts about the temples; these are a superficial, a middle, and two deep-seated temporal arteries; a temporal bone on each side of the head; a temporal vein; a temporal muscle; and temporal nerves. See the respective articles.

TEMPORALITIES, or TEMPORALTIES, the temporal revenues of an ecclesiastic; particularly such lands, tenements, or lay-fees, tithes, &c. as have been annexed to bishops' sees by our kings, or other persons of high rank in the kingdom. See REVENUE.

The temporalities of a bishop, &c. stand opposed to his spiritualities. See VACATION.

The canonists on the other side of the Alps, anciently gave the pope a power over the temporalities of kings. Yet pope Clement V. owned frankly, that his predecessor Boniface VIII. had exceeded the just bounds of his authority, in meddling with the temporalities of the king of France. Fevret.

TEMPORALIUM CUSTOS. See CUSTOS and VACATION.

TEMPORALIUM *Restitutione*. See RESTITUTIONE.

TEMPORARY FORTIFICATION. See FORTIFICATION.

TEMPORARY *Hours*. See HOUR.

TEMPOREGIATO, in the *Italian Music*, sometimes signifies, that the musicians who accompany the voice, or the person who beats time, should prolong some particular part thereof, to give the actor or singer room to express the passion he is to represent, or to introduce some graces, by way of ornament to the piece.

TEMPOREGIATO is also used in a different sense, for *à tempo*, or *à tempo giusto*.

TEMPORUM OSSA, in *Anatomy*, two bones of the cranium. See CRANIUM.

TEMPSCHE, in *Geography*, a town of France, in the department of the Scheld; 10 miles S.W. of Antwerp.

TEMPTATION, TENTATIO, in *Theology*, an induction or solicitation to evil, whether arising from the world, the flesh, or the devil.

Our Saviour's temptation, previous to the commencement of his public ministry, has been a subject of discussion and controversy among learned divines.

The evangelical account of this transaction may be found in Matt. iv. 1—11. Mark, i. 12, 13. Luke, iv. 1—12. It has generally been supposed, that the evangelical history of our Lord's temptation is to be understood as a narrative of outward transactions: that the devil tempted Christ in person, appeared to him in a visible form, spoke to him with an audible voice, and removed him corporeally from one place to another; and it must be allowed that these suppositions are warranted by the literal interpretation of the history. Nevertheless, this interpretation is liable to a variety of objections. It is unsuitable to the sagacity and policy of the evil spirit. Why, it has been suggested, should the devil assault our blessed Lord at all, and what advantage could he expect to gain over him; more especially when he came to him in person, and appeared before him in a visible form, and under his own proper character, proposing and urging temptations which could proceed only from an evil being? In order to evade this difficulty, some writers, as archbishop Secker and Dr. Chandler, have conjectured that the devil appeared *not as himself*, but under the assumed resemblance of a good angel; and others have supposed that he appeared to Christ in the form of a man. But the history furnishes no ground for these conjectures, and they are equally inconsistent with the temptations themselves, considered in their own nature; nor can it be pretended that Christ was ignorant by whom the several temptations, and particularly the third of them, was proposed; for in his reply, he calls him Satan. Besides, this transaction, according to the literal interpretation of its history, was very ill calculated to promote either the honour of of Chrift, or the inftruction and confolation of his difciples. This objection is ftrengthened, when we confider, that Chrift muft have yielded voluntarily to the mere motion and inftigation of the devil, and have been acceffary to his own difhonour, danger, and temptation. His character muft have been rather degraded than exalted. The temptations prefented to Chrift were fuch in their own nature as could not afford evidence or exercife of his obedience, nor of courfe fuitable confolation or ufeful inftruction to his followers, under real and powerful trials. Moreover, it has been objected to the common opinion, that it afcribes to the devil the performance of the greateft miracles, and of things not only preternatural, but abfurd and impoffible, for fuch we muft regard his fhewing Chrift all the kingdoms of the world from an exceedingly high mountain, and alfo whatever conftitutes the glory and grandeur of its kingdoms. If we are under a neceffity of deviating from a literal, and of adopting a figurative interpretation of the tranfaction recorded in this hiftory, we are warranted in fo doing by other inftances of a fimilar kind, that occur in the facred writings. Thefe writings relate things as actually done, which neverthelefs were only tranfacted in a vifion. Cafes of this kind frequently occur in fcripture; for which we might refer to Genefis, xxxii. 30. Hofea, i. and iii. Jeremiah, xiii. xxv. xxvii. Ezekiel, iii. iv. v. St. Paul calls his "being caught up into the third heaven" and "into Paradife, a vifion and revelation of the Lord." (2 Cor. xii. 1—4.) In conformity to thefe general principles, fome writers of eminene have proceeded in forming their judgment concerning the temptations of Chrift; and conftrained by fuch objections as we have already briefly ftated, they have abandoned the opinion that thefe temptations are to be underftood as outward tranfactions, inafmuch as the things themfelves were improbable, and even impracticable in their own nature; and inafmuch as the real performance could anfwer no valuable purpofe. Calvin allows, in his note on Matt. iv. 5, that feveral circumftances in this hiftory agreed beft to a vifion; and the generality of later writers have admitted, that the devil's fhewing to Chrift all the kingdoms of the world, and all their glory, in a moment of time, was done by fome fictitious fcenery, from a perfuafion, that it could not be done in any other way. Hence it has been argued by others, that if *one* of the temptations were prefented to Chrift in vifion only, why might not the *two others* be prefented to him in the fame manner. Adverting to the hiftory itfelf, it is alleged, that the text, inftead of pofitively and exprefsly afferting that the temptation of Chrift was a real outward tranfaction, contains clear intimations, and even direct affertions of the contrary. Thus, in the paffage relating to the exhibition of the kingdoms of the world, and all their glory, in one view, and in a fingle point of view, the evangelift is not fpeaking of the real fight of all thefe objects; but he muft defign to be underftood of what was inftantaneoufly exhibited to the mind. Other plain intimations occur, that Chrift's temptation is not to be underftood as an outward tranfaction; and it is alleged by the advocates of this opinion, that all the evangelifts who have mentioned this affair, do, in exprefs terms, affirm that it paffed *fpiritually*, and in *vifion*, or that it was merely an ideal or mental reprefentation.

Some of thofe biblical critics, who confider this hiftory as a recital of vifionary reprefentations, maintain that thefe vifions were framed by the devil, and that the temptations are to be afcribed to his immediate agency: thus denying the power of Satan over the body of Chrift, and granting him a nobler empire, a fovereign influence over the mind. Some have indeed fuppofed that Chrift's temptation was nothing more than a bare *meditation* of our Lord upon fuch trials as might poffibly be propofed by the great tempter of mankind. But it is needlefs to make any obfervations on a view of the fubject, which is altogether unfupported by the hiftory.

Another opinion has been propofed by a very able writer, in favour of which he has adduced a variety of arguments, that have given fatisfaction to many perfons who have examined this fubject. Mr. Farmer (in his Inquiry into the Nature and Defign of Chrift's Temptation in the Wildernefs) reprefents our Lord's temptation as befalling him while he was under a prophetic vifion, of which the Spirit of God himfelf was the immediate and fole author. Accordingly he confiders the temptation of Chrift, neither as an outward tranfaction, nor diabolical delufion, but as a divine vifion. At the time when this event occurred, our Saviour was actually in the wildernefs, and therefore when the evangelift fays, that "Jefus was led up of the Spirit into the wildernefs," or as our author more literally renders the words, "then was Jefus brought (or carried) into the wildernefs by the Spirit," he intimates, that into a wildernefs our Lord feemed to himfelf to be carried, or thither he was tranfported in vifion by a prophetic divine afflatus. The expreffions ufed by the other evangelifts, Mark and Luke, are faid to confirm the explication thus given of the language of St. Matthew. Upon the whole, the meaning of the evangelifts will be, "Chrift was brought into a wildernefs (not merely under a divine direction, but) under the full influence of the prophetic Spirit, making fuitable revelations to his mind, and giving him a view particularly of his future trials." And thefe trials are defcribed as "temptations of the devil," on account of the particular mode of their being revealed, being couched under the figure of Satan coming to him, and urging temptations. Our author, proceeding to examine the proper intention of this prophetic vifion, obferves, that the feveral fcenes which it comprehends, though prefented to Chrift in the form, and capable of anfwering the end, of a prefent trial, were directly intended as a fymbolical prediction and reprefentation of the future difficulties of his office and miniftry. The firft fcene in Chrift's vifion was probationary, ferving to difcover the prefent turn and temper of his mind; and alfo prophetical, having a reference to his future miniftry, through the whole courfe of which he was preffed with the fame kind of temptations, and refifted them upon the fame principles. This part of the vifion, therefore, conveyed this general inftruction: "that Chrift, though the fon of God, was to ftruggle with the afflicting hardfhips of hunger and thirft, and all the other evils of humanity, like the loweft of the fons of men; and that he was never to exert his divine power for his own perfonal relief, under the moft preffing difficulties, or for the fupply of his moft urgent occafions; but with refignation and faith to wait for the interpofition of God in his favour." The fecond fcene of this vifion was Jerufalem, the metropolis of Judea and the feat of power; it was the temple of Jerufalem, where the Jews expected the firft appearance of their Meffiah; it was the wing of the temple, the eaftern front of it, which commanded a view of the worfhippers below. From this eminence Chrift is required to throw himfelf down, in a dependence upon the divine protection, that fo his miraculous prefervation might give evidence of his divine miffion, and induce the numerous worfhippers, who were eye-witneffes of it, to acknowledge him immediately as the Meffiah, vifibly defcending from heaven, in a manner agreeable to the expectation of the Jews. Such was the propofal, and the temptation was powerful. The principle upon which he rejected it was, in its fpirit and meaning, this: "the Scripture forbids us

to

to prefcribe to God in what inftances he fhall exert his power; and as we are not to rufh upon danger without a call, in expectation of an extraordinary deliverance; fo neither are we to dictate to divine wifdom what miracles fhall be wrought for men's conviction." As this trial bore reference to his future miniftry, we find that in exemplifying the principle now manifefted, he never needlefsly and unwarrantably expofed himfelf to danger, and then relied on a miraculous interpofition of divine power for his refcue; but he was cautious in declining hazards; avoiding what might exafperate his enemies; and even enjoining filence with regard to his miracles, when the publication of them was likely to excite envy or popular commotion, and to inflame their minds againft him. In difplaying the evidences of his divine miffion, he ftill acted upon the fame maxim, opening his commiffion, not at Jerufalem, but in Galilee. In order to avoid oftentation and offence, he kept himfelf as private as the object of his commiffion would allow; and inftead of courting the favour of the opulent and powerful, he converfed freely with all forts of people. In many other inftances which an attentive perufal of his hiftory will furnifh, his miniftry will correfpond to his prophetic vifion, in which he was tempted to a public and oftentatious difplay of his miraculous powers. In the third fcene, the propofal was inftantaneoufly rejected, and not without a mixture of juft indignation. Befides this trial of his temper, the fcene before us pre-fignified the temptation to which he would be expofed in the courfe of his future miniftry, during which he was called upon to proftitute himfelf, with all his miraculous endowments, to the fervice of Satan, for the fake of worldly honours, or for gratifying the miftaken expectations of the Jewifh people. For a farther illuftration of this fubject, we muft refer to the work already cited. See alfo archbifhop Secker's, Dr. Clarke's, Dr. Chandler's, Mr. Mafon's Sermons, on this fubject. Benfon's Hiftory of the Life of Chrift. Macknight's Truth of the Gofpel Hiftory.

TEMPTATION, *Tentatio*, in our *Ancient Law-books*, is ufed for a trial, proof, or affay. "Tentatio panis fiat bis in anno." Chart. Edw. I. See ASSAY, &c.

TEMROOK, in *Geography*, a famous ftation in the Crimea, fituated at the foot of a fmall mountain, near the northern embouchure of the Kuban. It is now a fingle hut, for the purpofe of fupplying poft-horfes. In Motraye's time, who travelled this way in December 1711, it was a place of greater importance. He defcribes it as confiderable for its commerce in hides, caviare, honey, Circaffian flaves, and horfes. He fuppofed that its caftle ftood where the ancients placed their "Petræus;" and two eminences, he fays, which are named "the point of the ifland," may have been their "Achilleum Promontorium." This, it is fuppofed, was the fituation of Cimmerium. Pallas conjectures, that Temrook may probably have been the "Cimbricus" of Strabo.

TEMS, Fr., *time*, in *Mufic;* as *à contre tems*, againft time.

TEMSENA, in *Geography*, a province of Morocco, fituated on the coaft of the Atlantic, to the S. of Sallee. This province is rich and fertile, and abounds in excellent provifions, of various kinds. Its name feems intended to fignify its falubrity, and the purity of the climate. Temfena appears to be derived from the two Arabic words *Tamam Sana*, *only a year;* as if they fhould fay, that to refide here only a year would be fufficient to infure the fickly the return of their health, and fuch, in fact, is the firm belief of the natives. Corn is very plentiful in this province; it is of a very excellent kind, and the ears frequently bear 70 grains, or more. In the forefts is found a kind of cedar, called *hazar*, of a refinous fmell; it is a hard and incorruptible wood, and the Moors employ it in building their houfes.

This and the neighbouring provinces abound in horfes and horned cattle; their flocks are numerous, and the cavalry of Temfena is the beft appointed of the empire, excepting the Black troops of the emperor, called Abeed Seedy Buharrie. The population of the diftricts of Temfena and Shawia is eftimated at 1,160,000 perfons. The males of Temfena and Shawia are a ftrong, robuft race, of a copper colour; their women poffefs much beauty, and have highly expreffive features; and the animation of the countenance is increafed by the ufe of el kokol filelly, with which they tinge their eye-lafhes and eye-brows. In thefe provinces they are fond of dyeing their hands and feet with a preparation of the herb henna, which gives them a beautiful orange-colour, and, in hot weather, imparts a pleafing coolnefs and foftnefs to the hands, by preventing, in a confiderable degree, the quicknefs of perfpiration.

TEMUS, in *Botany*, a genus which Juffieu has condefcended to adopt, by its barbarous name, from the hardly lefs barbarous information of Molina. Juff. Gen. 435.—Clafs and order, *Polyandria Digynia*. Nat. Ord. uncertain.

Eff. Ch. "Calyx three-cleft. Petals eighteen, linear, very long. Stamens twenty-fix, fhorter than the petals. Anthers globofe. Germens two. Styles two. Berry two-lobed. Seeds tunicated."—Native of Chili, where it is called *Temo*. This it feems is an evergreen *tree*, with alternate *leaves*, and ftalked terminal *flowers*.

TEMUS, in *Geography*, a river of Sardinia, which runs into the fea, 4 miles E. of Caftello Arragonefe.

TENA, a town of South America, in the province of Quito; 15 miles S. of Archidona.

TENABLE, formed from the French *tenir*, and that from the Latin *tenere*, *to hold*, in the *Military Art*, fomething that may be defended, kept, and held, againft affailants.

Tenable is little ufed, but with a negative: when a place is open on all fides, and its defences are all beaten down, it is no longer tenable. When the enemy has gained fuch an eminence, this poft is not tenable.

TENACIOUS BODIES. See TENACITY.

TENACITY, in *Natural Philofophy*, that quality of bodies by which they fuftain a confiderable preffure, or force, without breaking. Mem. Acad. Berlin, 1745, p. 47.

Tenacity is the oppofite quality to fragility, or brittlenefs.

TENACULUM, in *Surgery*, an inftrument ufed in amputation, for pulling out bleeding veffels that are to be tied by ligatures.

TENAGLIA, in *Biography*, a Roman compofer, mentioned by Pietro della Valle, as having fet the opera of "Clearco," for that city, about 1634. This feems to have been one of the firft mufical dramas performed at Rome in a public theatre.

TENAILLE, in *Fortification*, a kind of outwork, confifting of two parallel fides, with a front, in which is a re-entering angle.

In ftrictnefs, that angle, and the faces which compofe it, are the tenaille.

The tenaille is of two kinds; *fimple* and *double*.

TENAILLE, *Simple*, or *Single*, is a large outwork, confifting of two faces or fides, including a re-entering angle. See *Plate* V. *Fortification*, *fig.* 4. *lit. d.*

TENAILLE, *Double*, or *Flanked*, is a large outwork, confifting of two fimple tenailles, or three faliants, and two re-entering angles. *Fig.* 21. *lit. e.*

The great defects of tenailles are, that they take up too

 much

much room, and on that account are advantageous to the enemy; that the re-entering angle is undefended; the height of the parapet hindering the seeing down into it, so that the enemy can lodge there under covert; and the sides are not sufficiently flanked.

For these reasons, tenailles are now excluded out of fortifications by the best engineers, and never made, but where there wants time to form a horn-work.

Tenaille *of the Place*, is the front of the place, comprehended between the points of two neighbouring bastions; including the curtain, the two flanks raised on the curtain, and the two sides of the bastions which face one another.

So that the tenaille, in this sense, is the same with what is otherwise called the *face of a fortress*.

Tenaille *of the Ditch*, is a low work raised before the curtain, in the middle of the foss or ditch; the parapet of which is only two or three feet higher than the level ground of the ravelin.

There are three different sorts (*Plate* VII. *Fortification*, *fig*. 6. The first are those which are made in the direction of the lines of defence, leaving a passage of three toises between their extremities and the flanks of the bastions, and likewise another of two toises in the middle for a bridge of communication to the ravelin. The second (*fig*. 7.) are those whose faces are in the lines of defence, and sixteen toises long, besides the passage of three toises between them and the flanks of the bastions: their flanks are found by describing arcs from one shoulder of the tenaille as a centre through the other, on which are set off ten toises for the required flanks. The third sort (*fig*. 8.) comprehends those whose faces are sixteen toises, as in the second sort, and the flanks parallel to those of the bastions.

The use of tenailles, in general, is to defend the bottom of the ditch by a grazing fire, and likewise the level ground of the ravelin, and especially the ditch before the redoubt within the ravelin, which cannot be so conveniently defended from any other place. The first sort do not defend the ditch so well as the others, because they are too oblique a defence; but as they are not subject to be enfiladed, M. Vauban has generally preferred them in the fortifying of places. Those of the second sort defend the ditch much better than the first, and add a low flank to those of the bastions; but as these flanks are liable to be enfiladed, they have not been much used. This defect, however, might be remedied, by making them so as to be covered by the extremities of the parapets of the opposite ravelins, or by some other work. Those of the third sort have the same advantage with the second, and are subject to the same inconveniences; and, therefore, they may be used with the same precaution.

Tenailles are esteemed so necessary, that there is hardly any place fortified without them, and it is not without reason; for when the ditch is dry, the part behind the tenailles serves as a place of arms, from which the troops may sally, destroy the works of the enemy in the ditch, oppose their descent, and retire with safety; and the communication from the body of the place to the ravelin becomes easy and secure, which is a great advantage; for by that means the ravelin may make a much better defence, as it can be supplied with troops and necessaries at any time. And if the ditch is wet, they serve as harbours for boats, which may carry out armed men to oppose the passage over the ditch whenever they please; and the communication from the tenailles to the ravelin becomes likewise much easier than it would be without them. Muller's Elem. of Fort. p. 34. See Fortification.

The ram's-horn is a curved tenaille, raised in the foss before the flanks, and presenting its convexity to the covered way. This work seems preferable to either of the other tenailles, both on account of its simplicity, and the defence for which it is constructed.

TENAILLONS, are works constructed on each side of the ravelin, much like the lunettes: they differ, as one of the faces of a tenaillon is in the direction of the ravelin, whereas that of the lunette is perpendicular to it.

Tenaillons are constructed by producing the faces of the ravelin beyond the counterscarp of the ditch, at a distance M N (*Plate* VII. *Fortification*, *fig*. 9.) of thirty toises, and taking on the counterscarp of the great ditch fifteen toises from the re-entering angle p to q, and drawing N q; then q N M p will be the tenaillon required; its ditch is twelve toises, or the same as that of the ravelin. Sometimes there is made a retired battery, in the front of the tenaillons, as at B: this battery is ten toises from the front, to which it is parallel, and fifteen toises long. There are commonly intrenchments made in the tenaillons, such as O; their parapets are parallel to the fronts M N, or rather perpendicular to the side N q, and bisect the side q N; the ditch before this retrenchment is three toises, and there is a banquette before the parapet, next to the ditch, of about eight feet, called *berm*, serving to prevent the earth of the parapet (which seldom has any revetement) from falling into the ditch. The ravelin, before which tenaillons are constructed, must have its saliant angle much greater than the former construction makes them; otherwise the saliant angles of the tenaillons become too acute; for which reason the capital of this ravelin is made forty-five toises, and the faces terminate within three toises of the shoulders. Muller's Elem. Fort. p. 37.

A tenaillon is a work capable of affording great defence to the besiegers; as at the siege of Lisle, in 1708, where the besiegers were twice or thrice drove out of a tenaillon they had taken and retaken.

TENALA, in *Geography*, a town of Sweden, in the province of Nyland; 8 miles N.W. of Eknas.

TENANCY, a habitation, or house to live in, or a tenement or possession held of another.

Tenancy, *Entire*. See Entire.

Tenancy *in Tail*. See Fee-*Tail*.

TENANT, in *Agriculture*, a person holding land or other property of another, either by grant, lease, or otherwise. Tenants are of different kinds, according to the nature of the tenures by which they hold their lands; but, in this last respect, they properly belong to the business of the law. Tenants hold their lands or farms for very different lengths of time, in different districts, as from one year to twenty-one; but in many places they have no leases at all. The most common lengths of time are seven, nine, fourteen, nineteen, and twenty-one. Short leases are now becoming general, as those of seven, nine, and eleven years. Tenants now mostly pay all taxes, except that on property.

The proper choice of tenants is a matter of the greatest importance to the well-doing and continued prosperity and success of all sorts of landed property, of almost any that can be adopted; as where they are improperly provided, there can hardly any thing go on in the manner which it ought to do; nor can there be the best sort of management, that the case will admit of, pursued. Many things will necessarily run into complete neglect, and ruinous states of them be produced as the consequence, which might have been easily and wholly avoided, by more attention in the first selection of the tenants.

The writer of the Middlesex Agricultural Report, after inculcating the necessity and utility of tenants having good and properly regulated leafes of the lands which they hold, remarks, that the letting of farms to tenants at will, or from year to year, is a moft unwife practice, and one which fhould by all means be avoided by the proprietors of landed eftates; as fuch tenants, he contends, from the very nature of their tenures, are precluded from the poffibility of making any improvements; while they have it in their power to ruin the lands they occupy and hold. Rapacious landlords, unfkilful ftewards, and yearly tenancy, it is continued, deftroy the holders' or tenants' confidence, fmother their thoughts of improvements, and, in fhort, make bad tenants, by fetting them to contrive fome mode of occupying the lands, fo as to be able to quit them, on receiving half a year's notice, with the leaft poffible lofs to themfelves; and which can only be done, by keeping the foil continually in a poor ftate, to the evident great loffes of the proprietors, the no lefs ones of the tenants, and the ftill more difadvantages of the community in general. See LEASE, LETTING *of Farms*, and QUALIFICATIONS *of Tenants*.

The writer of the work on "Landed Property" has remarked that, on all large eftates, there are certain eftablifhed cuftoms and ufages to which the proprietors, as well as the tenants or occupiers, confider themfelves mutually amenable, although no legal contracts may fubfift between them; and that, even where imperfect leafes, or other legal agreements, exift, there is ftill, in general, much left for cuftom and ufage to determine. Thefe fixed regulations, though they may be imperfect, it is contended, fhould be ftrictly regarded by fuperintendents, until better ones are fubftituted in their place, not only for the fake of moral juftice, but as fetting an example of integrity and good faith to the tenants. Nothing of this fort fhould ever be broken through by thofe in the management of fuch properties; as tenants on all fuch are conftantly to be met with ready enough to break their ftipulated agreements, without fuch examples; and it muft be extreme folly to induce the others who are well difpofed to do the fame. On the contrary, it is but common prudence to fulfil every covenant, agreement, and promife, which may have been made, with the moft fcrupulous exactnefs, even to the meaneft cottager, in order to infpire proper confidence, and obviate much mifchief.

And befides fetting examples of thefe kinds before the tenants, they ought, it is fuppofed, to be liberalized in their minds, by good offices, and acts of kindnefs, which may be beneficial in various ways. A fpirited improving tenant fhould be refufed few reafonable demands: he fhould have advantages conferred on him, not merely as rewards for his labours in benefiting the lands, but as inducing other tenants to purfue fimilar plans, and to fhew that good managers are noticed and diftinguifhed.

The confequences of an inattention to thefe matters, which is too common in moft parts of the country, are very prejudicial; as the refufing of requefts which would equally benefit the eftate and the tenant, the ftupidly thwarting of the well-meant intentions of the beft tenants upon it, the ignorantly quarrelling with them about mere trifles, and the making no fort of difference between thofe who are improving and thofe who are ruining it, or perhaps the encouraging the latter, and oppofing the former, muft have effects of the worft kind, there can be no doubt. Such tenants as are capable of improving, are alfo capable of impoverifhing; and when difgufted by improper treatment, will be fure to harafs the lands they hold, and take the firft chance they have of removing to farms under more rational management, to the great inconvenience and difadvantage of thofe which they held before.

It is obferved in the Agricultural Survey of Gloucefterfhire, that the leafes of rack-renters there generally commence at Lady-day; and, in this cafe, in the vale, the going-off tenant holds a part of the grafs-lands to old May-day, and has likewife the going-off crop of wheat, with the ufe of the barns for the purpofe of houfing and threfhing it, till the Midfummer following. In this ufage there is, the writer thinks, great inconvenience, efpecially where the new tenant is at variance with the old one, which is not uncommonly the cafe. Each has an opportunity of diftreffing and incommoding the other in various ways. The improved fpirit of agriculture has difcovered, both to landlord and tenant, the abfurdity of this ancient cuftom; and it is gradually falling into difufe. Where an improvement has taken place, the coming-on tenant enters the preceding Michaelmas to plough the land for fpring-crops; the tenant going off at Lady-day ploughs for the wheat-crop, and often fows it. In the cafe of ploughing only, the work is paid for; and when fowed, the crop is valued at Lady-day, and paid by the coming-on tenant. The going-off tenant is alfo frequently paid for his feeds left after the laft year's crop. Under this practice, the new tenant enters on the whole of the eftate at Lady-day. And it is added, that Michaelmas takings are not uncommon; though, in one refpect, they are particularly inconvenient, as the old tenant has no time to fpend the crops of the preceding fummer on the premifes, and the new tenant is either obliged to fell his ftock at a moft unfavourable time, or purchafe fodder for the fupport of it at his new farm; a circumftance he cannot always command, and, when he can, at great lofs. But there are other takings which commence at Candlemas, which have fome inconveniences, particularly that of enabling the new tenant to "hain up" his paftures early, which is a matter of confiderable confequence; for the old tenant, going off at Lady-day, always ftocks as far as he can till the laft moment, thereby leaving the ground as bare as poffible. Nor is the mifchief of this late *haining* always compenfated by the manure left from the cattle, efpecially if the feafon has been wet, and the ground tender. Two years' care will fometimes fcarcely recover the land to a good and even turf, after having been much trodden or *poached*.

But with refpect to agreements between landlord and tenants, it has been fuggefted by fome, that for fmall farms, leafes are lefs neceffary; but a large one cannot well be let without a leafe. Upon a fmall farm, whofe land is good, a man's improvements foon come round; and if the tenant or landlord difagree, either of them is eafily accommodated; but upon a large farm it is quite otherwife. It would not be worth a man's while to fix himfelf upon a large fcale for a year or two; and it would be attended with great expence and lofs, to move from any great diftance, with large quantities of ftock, for a fhort time. Befides, the plans of improvements upon a large farm are more extenfive; and it is longer before the money laid out in them is returned, efpecially upon poor land. But undoubtedly the tenant, upon either a fmall or a large farm, ought to have a fecurity for his property; and there fhould be an agreement to allow him a proportionate recompence for every improvement by which he has raifed the land in its value, as by giving it more manure than could be made from the produce of the farm. When the manure produced upon the farm is the property of the farmer, and, by the terms of his leafe, he is obliged to fell it to the coming tenant at a fair valuation, he often endeavours to make more manure the laft year than any other, and by that means benefits the eftate; but if, on the contrary, he is not paid any thing for it, he will perhaps do every thing in his power to prevent any future improvement upon the farm, as, on fome account or another, he may fancy himfelf himſelf ill uſed upon leaving it. For all under-draining properly done, and for new buildings that were neceſſary for the farm, the tenant ought to be allowed a reward proportionate to the number of years leſs than twenty he may have had the uſe of them. He ſhould likewiſe receive an allowance for quick fences, and the planting of orchards, or of aquatics and other uſeful trees in proper places, on producing fair bills, with receipts to them, of the expences; provided he leaves the eſtate without committing any wilful waſte. The landlord who enters into ſuch a covenant with his tenant, may reaſonably expect to have his farm delivered back to him upon terms equally fair. If the tenant has committed any waſte, he ſhould be obliged to make good all damages. Now ſuch mutual conditions would do away many abſurd reſtrictions that are at preſent laid upon the tenant; as it would then be his intereſt not to injure the farm, becauſe he muſt pay for all damages wantonly done; and the landlord would have no reaſon to check the farmer's experiments and improvements, which would be a great encouragement to both ingenuity and induſtry: for gentlemen's agents are very apt, from too anxious care of the eſtates, to reſtrict tenants in ſuch a manner, that they are little better than a mill-horſe, who can go over only a particular circle of ground. It has been known that an agreement was made to lay a certain quantity of lime on land, where, if the land had been the writer's, he would have given more money than the lime coſt, that it might not be laid on.

And ſometimes, beſides many other injurious modes of culture, which the ignorance or whim of the ſteward obliges the farmer to follow, he is tied down to plough and ſow crops of corn only four years in ſix, and no turnips or clover. But the reſtricting a man from ploughing up graſs-land without leave, is certainly, it is thought, proper, till the landlord ſees what his new tenant makes of the land he does plough; but if he is induſtrious, and tills well, the writer would ſuffer him to plough every inch he choſe: as, on good arable land, it will certainly make in future a difference of from one pound to three pounds an acre in rent to the landlord. The nature and ſituation of the farm are, however, to be well conſidered before this is done.

Alſo where the duration of the term is twenty-one years, it would, it is ſuppoſed, be very proper that, three years before the leaſe expires, he ſhould be reſtricted in the rotation of his crops, ſo as to leave the farm in a proper ſtate to be profitable to the coming tenant. This would likewiſe give time for the tenant to fix himſelf elſewhere, if the landlord and he do not agree again, as well as for the landlord to make proper choice of a new tenant.

It is very common for tenants to live in a very poor way, and obtain little profit, from the want of introducing a proper ſyſtem of huſbandry upon their farms, as it is only this that can afford a full profit; therefore, the beſt methods of management his circumſtances will afford ſhould always be purſued.

There is a great variety of regulations and reſtrictions in regard to tenants, in reſpect to the times and manner of entering upon their farms, the extent and methods of breaking up and cropping the lands, the various improvements in draining, manuring, &c. the making of fences, the ſelling of hay and ſtraw, the diſpoſing of the live-ſtock at the end of leaſes, the occupying of buildings by new tenants, the felling of timber for repairs, and a vaſt number of other matters, many of which are owing to the particular ſituations and circumſtances of the lands that are to be holden by the tenants.

Tenant, or *Tenent*, *Tenens*, in *Law*, one that holds or poſſeſſes lands and tenements of ſome lord or landlord, by any kind of right, either in fee, for life, years, or at will.

The term *tenant* is uſed with divers additions. Thus, *tenant in dower*, is ſhe that poſſeſſes lands by virtue of her dower.

Tenant per Statute-Merchant, he that holds lands forfeited to him by virtue of a ſtatute. See Statute-*Merchant*.

Tenant in Frank-Marriage, is he that holds lands or tenements by virtue of a gift of them, made to him upon marriage, between him and his wife. See Frank-*Marriage*.

Tenant by Courteſy holds for his life, by reaſon of a child begotten by him of his wife, being an inheritrix, and born alive. See Courtesy.

Tenant by Elegit holds by virtue of the writ called an *elegit*.

Tenant in Mortgage holds by means of a mortgage.

Tenant by Verge, in ancient demeſne, is he who is admitted by the rod in court to lands in ancient demeſne. See Verge.

Tenant by Copy of Court-Roll, is one admitted tenant of any lands, &c. within a manor, which, time out of mind, have been demiſed according to the cuſtom of the manor. See Copyhold.

Tenant Paravail. See Paravail.

Tenant by Charter is he that holdeth by feoffment in writing, or other deed. See Charter, and Freehold.

Tenant in Capite, or *Chief*, holdeth of the king in right of his crown. See Capite.

Tenant of the King is he that holdeth of the perſon of the king.

Tenants, *Joint*, thoſe who have equal right in lands or tenements, by virtue of one title. See Joint *Tenants*.

Tenants *in Common*, thoſe who have equal right, but hold by divers titles.

Tenant, *Particular*, he that holds only for his term.

Tenant, *Sole*, is he who has no other joined with him.

Tenant *by Execution*, is he who holds by virtue of an execution upon any ſtatute, recognizance, &c.

Tenants, *Cuſtomary*. See Customary.

Tenant, *Terre*. See Terre-*Tenant*.

Tenant, *Very*. See Very.

Anciently, there were alſo *tenant by knight-ſervice*, *tenant in burgage*, *tenant in ſocage*, *tenant in frank-fee*, *tenant in villenage*. And there are ſtill *tenant in fee-ſimple*, *tenant in fee-tail*, *tenant upon ſufferance*, &c.

Tenant *in Tail after Poſſibility of Iſſue extinct*. See Tail.

Tenant *to the Præcipe*, in *Law*, is he againſt whom the writ of præcipe is to be brought in ſuing out a recovery.

Tenant, or *Tenan*, in *Heraldry*, is uſed for ſomething that ſuſtains, or holds up, the ſhield, or armoury; and is generally ſynonimous with the word *ſupporter*.

The difference which ſome authors make between the two is, that tenants are ſingle, and ſupporters double, one placed on each ſide of the ſhield. But the proper diſtinction ſeems to conſiſt in this, that tenants are human figures, and ſupporters figures of beaſts.

There are various forms of tenants, as well as of ſupporters, *viz.* angels, maids, religious, ſavages, Moors, &c.

The firſt tenants, F. Meneſtrier obſerves, were trunks, or branches of trees; to which the eſcutcheons were faſtened by ſtraps and buckles. Afterwards the knights were repreſented as holding their own eſcutcheons, which were either hung to their neck, or elſe they leaned on them.

The origin of tenants and ſupporters is, by many, referred to the ancient tournaments, in which the cavaliers had their arms borne by ſervants diſguiſed like ſavages, Moors, fabulous deities, bears, lions, &c. See Supporter.

TENA-

TENARIUM, in *Ancient Geography*. See TÆNARIUM.

TENARUS, or TÆNARUS, a mountain of the Peloponneſus, in Laconia.

TENASSERIM, in *Geography*. See SIAM.

TENATARI, in *Ancient Geography*, a people who inhabited that part of Germany which correſponds to the preſent biſhopric of Munſter.

TENBURY, in *Geography*, a market-town in the upper diviſion of the hundred of Doddington, and county of Worceſter, England, is ſituated on the weſtern border of the county, ſeparated from Shropſhire by the river Teme, at the diſtance of 21 miles N.W. by W. from Worceſter, and 134 miles in the ſame bearing from London. The manor of Tenbury, at, or ſoon after the Conqueſt, was held by Robert Fitz-Richard, who was lord of Richard's caſtle; his heir aſſumed the name of Say, in conſequence of a marriage with the heireſs of that family: the property paſt, by a ſucceſſion of heireſſes, through various families, to the Cornwalls, whoſe deſcendants are ſtill the lords of it. The town is not very extenſive, and ſtanding low, is often ſubject to floods from the rapid river Teme. A remarkable inſtance occurred Nov. 17, 1770, when a great part of the church, with its organ and monuments, were deſtroyed. The pariſh of Tenbury is three miles and a half in length, by three and a quarter in breadth; and in the year 1811 contained 308 houſes, and 1562 inhabitants. In the chancel of the church is a curious monument, repreſenting a child in armour, laid in a croſs-legged poſition. Gough, in his Sepulchral Monuments, mentions this figure, and attributes it to the ſon of "John Sturmy, the cruſader, who followed his father to the holy wars when under age."

Over the river, at the north end of the town, is a handſome ſtone bridge of ſix arches. A market is held here on Tueſdays, and there are three annual fairs. Great quantities of hops and apples are cultivated in the vicinity of the town, and conſequently much cyder is made here. The Leominſter canal, coming near the town, affords ready communication for goods, cyder, &c. to diſtant places.

About one mile and a half S.E. of Tenbury is Sutton-park, in the chapel of which are ſome old monuments of the Arundel family. Near this place is Kyre-Wyre, diſtinguiſhed for its "tall and mighty oaks," and for a neat manſion belonging to the Pytts family.—Naſh's Hiſtory, &c. of Worceſterſhire, 2 vols. folio. Beauties of England and Wales; Worceſterſhire.

TENBY, a market and borough town in the hundred of Narbeth, and county of Pembroke, South Wales, is ſituated on the ſhore of Caermarthen bay, 10 miles E. from Pembroke, and 250 miles W. from London. It occupies a rocky promontory of conſiderable elevation, ſtretching over the ſands in a ſoutherly direction, and at high water is nearly incloſed by the ſea. Here is a ſmall but commodious harbour, ſkirted on the land-ſide by a bold amphitheatre of rocks and houſes. Leland ſays, "Tinbigh town ſtondith on a main rokke, but not veri hi, and the Severn Se ſo gulfeth in about hit, that at the ful ſe almoſt the thirde part of the town is incloſid with water. The toune is ſtrongeli waullid and welle gatid, everi gate having his portcolis ex ſolido ferro. But that gate that ledith to Cairmarden ward is moſt ſemelieſt, as circulid without with an embatelid but open roſid towr, after the faſcion of the eaſt gate of Pembroke. Without this gate is a preti ſuburbe. In the middes of the town is a faire paroche chirch. The toun itſelf lakkith freſch water, wherfore utuntur importata." And again, "Ther is a ſinus and a peere made for ſhyppes. The towne is very welthe by marchaundyce; but yt is not very bygge, having but one paroche chyrche. One thing is to be marveled at. There is no welle yn the towne, as yt is ſaide, wherby they be forced to fech theyr water at S. John's without the towne." The wall, which once ſurrounded the town, is yet in ſome places nearly entire. The principal improvement of theſe walls is aſcribed to queen Elizabeth, in whoſe time Tenby was a flouriſhing place. The ſtreets are now in general good, though, on account of the nature of the ground, in ſome inſtances inconveniently narrow and ſteep. They contain a large proportion of very reſpectable houſes, occupied by ſubſtantial tradeſmen and merchants, or by perſons of independent fortunes. The want of water was an inconvenience under which the town long laboured: but by the recommendation and exertions of ſir William Paxton, the town is now furniſhed, at a trifling charge, with an exhauſtleſs ſupply of this neceſſary article. Tenby is one of the contributory boroughs joined with Pembroke in the return of a repreſentative to parliament. The corporation conſiſts of a mayor, aldermen, and common-councilmen, a chamberlain, town-clerk, two ſheriffs or bailiffs, two ſergeants at mace, and twelve conſtables. The town is divided into two diſtricts, which are denominated the In-liberties, and the Out-liberties. The former diviſion is ſubject to the juriſdiction of the magiſtrates of the borough; the latter to that of the county magiſtrates. The preſent extent of the town is not conſiderable, the number of houſes being eſtimated, in the year 1811, at 265, and the population at 1176. It is apparent, however, from the number of ruinated buildings and foundations to be ſeen in the outſkirts, that formerly it muſt have ſpread over a larger ſpace than it now occupies, and contained a much more numerous population. Two weekly markets are held on Wedneſday and Saturday, and five fairs annually. Tenby ſeems to have derived its earlieſt importance from its fiſheries. But when the country fell under the power of the Anglo-Norman invaders, and this diſtrict became inhabited by the Flemiſh ſettlers, its local advantages for commercial objects of greater conſequence were ſeen and appreciated. The harbour was improved for the convenience of ſhipping, and the population of the town and its vicinity was engaged in a woollen manufactory on an extenſive ſcale. The commercial ſpirit thus awakened, procured for the inhabitants numerous privileges and charters from their lords, and from ſucceſſive monarchs. The importance of Tenby, however, has ſunk far below its former rank: its manufactories have diſappeared, and its chief trade at preſent is created by the coal raiſed in its neighbourhood, which is here ſhipped off for other parts of the coaſt, and for the Engliſh markets. The conſequence which the town has loſt in this reſpect ſeems likely to be compenſated by its rapidly advancing reputation as a bathing-place. It poſſeſſes many natural attractions for viſitors; and peculiar advantages in point of convenience have been recently provided. Among theſe, the foremoſt rank muſt be aſſigned to the baths lately erected by ſir William Paxton; in which all accommodations for health and pleaſure are combined. The church of Tenby is ſituated in the middle of the town; it is a ſpacious edifice, compriſing a nave and two ſide aiſles: at the weſt end is a large ſquare tower, ſurmounted by a lofty ſpire. The monaſtic eſtabliſhments of Tenby were an hoſpital, or free chapel of St. John the Baptiſt, a convent of Carmelite friars, founded in 1399, and called St. Mary's college, and an hoſpital or lazar-houſe, dedicated to St. Mary Magdalen. Here was an ancient caſtle, of which there are yet conſiderable remains, though moſtly in a very dilapidated ſtate. The only portions now ſtanding that indicate its former ſtrength are a baſtion and ſquare tower: the reſt of the buildings exhibit the air of a ſplendid manſion rather than

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of a military fortrefs. The fituation of this caftle was admirably formed for defence: it occupied the extreme point of the promontory, and was fecured by inacceffible rocks on every fide, except that facing the town, which was ftrengthened by bold fortifications.

On the coaft at Tenby are fome infulated rocks of romantic appearance, which exhibit curious excavations. Some of them are acceffible on foot at low water: this is the cafe with the ifland of St. Catherine, off the Caftle Point, which in one direction has been perforated quite through by the repeated action of the tides. The principal of thefe iflands is *Caldey*, fituated about two miles from the main land. It is about a mile in length, and half a mile wide, and is eftimated to comprife about fix hundred acres of furface, of which nearly a third is in cultivation. Here was a priory, founded, as is fuppofed, by Robert, the fon of Martin de Turribus. The tower of the priory church, furmounted by a ftone fpire, is yet ftanding, and many of the conventual buildings have been converted into offices, and attached to a handfome modern edifice.

Near the coaft, to the eaftward of Tenby, are feveral refpectable gentlemen's refidences, fome of them of ancient date. Among thefe are Cilgetty, formerly inhabited by the Canon family; Hen-Gaftell, (the old caftle,) the property of Thomas Stokes, efq.; Merrixton, the feat of Charles Swan, efq.; Bonville Court, an ancient manfion of the Bonvilles; and Eare Wear, now called Amroth Caftle, the refidence of captain Ackland; and on the road from Narbeth is Begelty Hall, the feat of James Child, efq.—Beauties of England and Wales, vol. xviii. Pembrokefhire, by T. Rees. Hiftorical Tour through Pembrokefhire, 4to. 1810, by R. Fenton, efq. Account of Tenby, illuftrated with etchings, 4to. 1812, by Charles Norris, efq.

TENCE, a town of France, in the department of the Upper Loire; 12 miles S.E. of Moniftrol.

TENCH, in *Ichthyology*, the Englifh name of the *tinca* of the modern authors, the *fullo* and *gnapheus* of the ancients.

It is, according to the Artedian and Linnæan fyftem, a fpecies of the cyprinus, and is diftinguifhed by Artedi by the name of the blackifh, mucous, or flimy *cyprinus* (which fee), with the end of the tail even. See *Tench* Fishing.

Tench's *Ifland*, in *Geography*, an ifland in the Pacific ocean, fo called by Lieut. Ball, commander of the Supply, returning from Norfolk ifland to England in the year 1790. The ifland cannot be more than two miles in circumference: it is low, but entirely covered with trees, many of which are the cocoa-nut; there were likewife others of a large fize. Thefe trees reached to the margin of a very fine fandy beach, which entirely furrounds the ifland. A great number of canoes were lying on the beach; and, it is fuppofed, there cannot be lefs than a thoufand inhabitants on the ifland. The natives who were in the canoes were ftout and healthy-looking men; their fkin was perfectly fmooth, and free from any diforder: they were quite naked, and of a copper colour; their hair refembled that of the New Hollanders. Some of their beards reached as low as the navel, and there was an appearance of much art being ufed in forming them into long ringlets: fo that it fhould feem as if the prevailing fafhion on this ifland was that of keeping the beard well combed, curled, and oiled. Two or three of the men had fomething like a bead or bone fufpended to a ftring, which was faftened round the neck. S. lat. 1° 39′. E. long. 150° 31′.

TENCOA, a town of Mexico, in the province of Honduras; 110 miles W. of Comayagua. N. lat. 14° 48′. W. long. 90° 22′.

TENCZA, a town of Auftrian Poland; 13 miles W. of Cracow.

TEND, in our *Old Writers*, feems to fignify as much as tender, or offer; as to tend or traverfe an averment, &c.

TENDA, in *Geography*, a town of Africa, or rather feveral towns clofe together, the capital of a country of the fame name, on the right bank of the Gambia, fituated to the fouth-weft of Bondou, and fouth-eaft of Woolly. N. lat. 13° 2′. W. long. 11° 55′.—Alfo, a town of France, in the department of the Maritime Alps; late capital of a county to which it gave name, annexed to Piedmont, fituated at the union of the Roia and Brogna. It has only one parifh church, which is a beautiful ftructure, a caftle walled round and flanked with towers, on a rock, which commands the environs of the town. In the 16th century, it came to the duke of Savoy. The foil is not fertile, being on all fides furrounded by the Alps; it yields, however, good pafturage and timber; the rivers alfo furnifh the inhabitants with excellent trout; 22 miles N.E. of Nice.

TENDE, *Col de*, the moft remarkable paffage through the Maritime Alps. See Alps.

TENDEBA, in *Ancient Geography*, a town of Afia Minor, in Caria.

TENDEBAR, in *Geography*, a town of Africa, in the kingdom of Kaen. N. lat. 13° 15′. W. long. 15° 57′.

TENDER, in a *legal fenfe*, fignifies as much as to offer, or endeavour, the performance of any thing, in order to fave the penalty, or forfeiture, incurred by non-performance.

Thus, to tender rent, is to offer it at the time and place when and where it ought to have been paid; which will fave the condition of that time, though the landlord refufe to accept it.

Tender, in *Sea Language*, is a veffel attending on fome other larger and more confiderable one. It is employed in the king's fervice on various occafions; as to receive volunteers and impreffed men, and to convey them to a diftant place; to attend on fhips of war or fquadrons; and to carry intelligence or orders from one place to another, &c.

Tender *Plants*, in *Gardening* and *Agriculture*, all fuch as are too delicate and tender in their nature and habits to ftand, or be raifed, grown, or produced in the climate of this country, without artificial protection or affiftance, until they have been fufficiently inured to, and hardened, and habituated againft the effects of it. It has indeed been obferved by fir Jofeph Banks, in a paper containing fome hints concerning the proper mode of inuring plants of this kind to this climate, inferted in the firft volume of the "Tranfactions of the Horticultural Society" of London, that, refpectable and ufeful as every branch of the horticultural art certainly is, no one is more interefting to the public, or more likely to prove advantageous to thofe who may be fo fortunate as to fucceed in it, than that of inuring plants, natives of warmer climates, to bear, without covering, the ungenial fprings, the chilly fummers, and the rigorous winters, by which, efpecially for fome years paft, we have been perpetually vifited. Many attempts have, it is faid, been made in this line, and feveral valuable fhrubs, that ufed to be kept in our ftoves, are now to be feen in the open gardens; there is, however, fome reafon, it is thought, to believe, that every one of thefe was originally the native of a cold climate, though introduced to us through the medium of a warm one; as the gold-tree, aucuba japonica, the montan, pæonia frutefcens, and feveral others, have been in our times.

In the cafe of annuals, however, it is thought probable that much has been done by our anceftors, and fomething by the prefent generation; but it muft be remembered, it is faid, that all that is required in the cafe of an annual, is to enable it to ripen its fruit in a comparatively cold fummer, after which, we know that the hardeft froft has no power to injure

injure the ſeed, though expoſed in the open air to its ſevereſt influence; but a perennial has to encounter froſts with its buds and annual ſhoots, that have ſometimes been ſo ſevere with us, as to rend aſunder the trunks of our indigenous foreſt-trees, as ſtated by Miller.

It is ſuggeſted as probable, that wheat, our principal food corn at preſent, did not bring its ſeed to perfection in this climate, until hardened to it by repeated ſowings. A few years ago, ſome ſpring-wheat from Guzerat was, it is ſaid, ſown with barley in a ſmall cultivated field: it roſe, eared, and bloſſomed, with a healthy appearance, but many ears were, when ripe, wholly without corn, and few brought more than three or four grains to perfection.

In the year 1791, ſome ſeeds of zizania aquatica were, it is ſaid, procured from Canada, and ſown in a pond at Spring-Grove, near Hounſlow; they grew, and produced ſtrong plants, which ripened their ſeeds; and thoſe ſeeds vegetated in the ſucceeding ſpring, but the plants they produced were weak, ſlender, not half ſo tall as thoſe of the firſt generation, and grew in the ſhalloweſt water only; but the ſeeds of theſe plants produced others the next year ſenſibly ſtronger than their parents of the ſecond year. In this manner the plants proceeded, ſpringing up every year from the ſeeds of the preceding one, every year becoming viſibly ſtronger and larger, and riſing from deeper parts of the pond, until the year 1804, when ſeveral of the plants were, it is ſaid, ſix feet in height, and the whole pond was in every part covered with them, as thick as wheat grows on a well-managed field.

Here, it is thought, we have an experiment which proves that an annual plant, ſcarcely able to endure the ungenial ſummer of this country, has become, in fourteen generations, as ſtrong and as vigorous as our indigenous plants are, and as perfect in all its parts as in its native climate and ſituation.

It is ſuggeſted too in the above paper, that the ſettlement lately made at New Holland gives a large ſcope for experiments of this kind: many plants have been brought from thence which endure our climate with very little protection, and ſome of theſe arrive at puberty at an early period: we have already three, it is ſaid, from the ſouth point of Van Diemen's iſland, where the climate cannot be wholly without froſt; mimoſa verticillata, encalyptus hirſuta and obliqua.

In contributing ſtill further to the elucidation and accompliſhment of this new, very uſeful, and important object of the above arts, the account which has been given by Dr. Macculloch, of ſome delicate plants which are cultivated in the open air in the iſland of Guernſey, with the hints on the means of naturalizing tender exotics, inſerted in the firſt volume of the "Memoirs of the Caledonian Horticultural Society," may alſo be found highly uſeful and intereſting.

It is certain, it is conceived, that neither the thermometric ſtate of a given country, nor any meteorological condition which we have yet been able to obſerve, is competent to explain the peculiar affection of plants for particular regions of the earth. The obſervations of M. Ramond, in the "Annales du Muſeum," which have been tranſlated by Mr. Saliſbury, ſhew this, it is ſaid, in a ſtriking point of view. From theſe we ſee the perſevering regularity with which certain plants affect peculiar elevations, apparently unconnected with the nature of the ſoil, but bearing a relation alone to particular ſtates of the atmoſphere, which we have no means of appreciating. Similar facts are familiar to botaniſts in our own country, in the very limited zones of elevation affected by our alpine plants.

It is ſtated farther, that an economical object which depends on this property of plants remains yet to be noticed. This, which is ſtill more in our power, is probably of more conſequence than either of thoſe mentioned above; what is meant is the perfect naturalization of the vine. It is well known, that from many of the ordinary varieties cultivated in this country, we can always inſure a crop of grapes, but not always a crop of ripe ones. From two or three of theſe, the chance of ripening out of doors is conſiderable; from many others, it is hopeleſs. It is not improbable, that by ſucceſſive ſowings of ſeeds, other varieties might be produced, ſtill more certain of ripening than thoſe which ſucceed beſt with us, *viz.* the miller and the ſweetwater. We ſhould thus acquire poſſeſſion of an article of cultivation of great importance, by which a uſeful addition would be made to the agricultural proceeds of land in particular ſituations, and by which we ſhould be enabled to fabricate wines of a quality ſufficiently good to compete with thoſe of foreign growth.

A ſtill more important object is, it is thought, the perfect naturalization of the potatoe, an effect as yet but very partially obtained, notwithſtanding the length of time during which this valuable root has been a ſubject of cultivation. It is certain that this imperfect naturalization has been the reſult of the common practice of propagating by the tubers, to the almoſt total neglect of the ſeeds. It is true that ſeeds have been occaſionally ſown, and new varieties thus produced; but the experiment has ſtopped in the firſt ſtage, having been always undertaken for the mere purpoſe of producing theſe varieties, without any regard to that much more important object, the production of a plant ſufficiently hardy to bear at leaſt the firſt froſts of winter. In the ſouthern parts of our iſland, it is not a deſideratum of much importance, it is ſaid, as the tubers are in general fully formed before the plant is killed by the froſt; but in the northern parts it is an object of great conſequence, the plant being frequently killed long before the roots have attained maturity. In the Highlands of Scotland, in particular, where a froſt will frequently occur early in September, the crop is often prematurely deſtroyed, and the uſes of this vegetable are in conſequence materially limited. It is plain, that it would be neceſſary to ſow the ſeeds of ſucceſſive generations many times before the requiſite degree of hardineſs could be expected, and that the proceſs would demand both patience and time. Yet if it ſhould require more of theſe than we can expect from the ordinary cultivator, it is an experiment which we may at leaſt recommend to thoſe public bodies, which ſo laudably exert themſelves in ameliorating the agriculture and horticulture of this country. The difficulty of procuring ſeeds from ſeedling plants, could doubtleſs, it is thought, be obviated, in ſome meaſure, by depriving the young plant of its tubers, and thus compelling it to direct its energies to the other and more common mode of propagation, with which nature has provided all plants.

The writer cannot, however, conclude the ſuggeſtions in reſpect to this object or ſpeculation, without noticing a formidable objection which ſtands in the way of our attempts to naturalize particular plants. In every caſe where the uſeful varieties have been the reſult of cultivation in a warmer climate from a baſe and uſeleſs parent, it is to be feared, it is ſaid, that the proceſs followed in naturalization, would again throw the plant back to its original ſtate. This objection applies, it is ſuppoſed, chiefly to thoſe fruits, ſuch as the peach, the apple, and the grape, which, in their preſent cultivated ſtate, are almoſt entirely the produce of art. For this reaſon, it is not improbable, that all attempts to naturalıze the grape to a cold climate may fail; yet the trial deſerves, it is ſaid, to be made. The caſe does not apply equally to the potatoe. The original plant appears to be valuable, independent of any artificial character, and would conſequently admit of a change, tending even to ſome degree of deterioration, before it was materially injured in its properties.

TENDERING, a name given to the ſoft tops of deer's horns, when they begin to ſhoot forth.

TENDING, in *Sea Language*, denotes the movement by which a ſhip turns or ſwings round her anchor in a tideway at the beginning of the flood or ebb. Thus, if the flood ſets northerly, it is evident that the ſhip, unleſs when moored head and ſtern, will fall into the line of the current, turning her head to the ſouthward, and *vice verſâ*. This tranſition from one ſituation to the other is called tending or ſwinging. Falconer.

TENDINOSUM CENTRUM. See CENTRUM.

TENDON, TENDO, in *Anatomy*, the hard, inſenſible cords, by means of which muſcular fibres are attached to bones. See MUSCLE, after the deſcription of the muſcular ſyſtem of animal life; and FIBROUS *Syſtem*.

TENDO *Achillis*, the powerful tendon belonging to the muſcles of the calf of the leg, placed juſt above the heel; ſo named in alluſion to the fable, in which Thetis is ſaid to have held her ſon, Achilles, by this part, when ſhe dipped him in the Styx. See GASTROCNEMIUS.

TENDON *of Achilles*, *Ruptured*. When the tendo Achillis is unfortunately cut, or ruptured, as it may be in conſequence of a violent exertion, or ſpaſm of the muſcles, of which it is a continuation, the uſe of the leg is immediately loſt; and unleſs the part be afterwards ſucceſsfully united, the patient muſt remain a cripple for life.

The ancient ſurgeons ſeem not to have been well acquainted with the rupture of the tendo Achillis, which they probably might miſtake for a ſprain, or ſome other complaint. In caſes in which this part had been cut, they recommended approximating the ſeparated portions, and maintaining them in contact by means of a ſuture.

When the ruptured tendo Achillis was afterwards better underſtood, the plan which we have juſt now mentioned was ſtill continued, the integuments being divided for the purpoſe of bringing the tendon into view. But that ſuch a painful mode is altogether uſeleſs and wrong, it is ſcarcely neceſſary for us at the preſent day to obſerve.

The ſuperficial ſituation of the tendo Achillis always makes the nature of the accident eaſy of diſcovery, and it is only when there is a conſiderable degree of ſwelling (which is very rare), that the caſe can be at all difficult to underſtand. When the tendon has been cut through, which is not an ordinary thing, the diviſion of the ſkin brings the ends of the ſinew into view. When the tendon has been ruptured, the patient hears a ſound, like that of the ſmack of a whip, at the moment of the occurrence. In whatſoever way the part has been divided, there is a ſudden incapacity, or, at leaſt, an extreme difficulty of ſtanding and walking. Hence the patient falls down, and cannot get up again. Beſides theſe ſymptoms, there is a very palpable depreſſion between the ends of the tendon, which depreſſion is increaſed when the foot is bent, and diminiſhed, or even quite removed, when the foot is extended. The patient can ſpontaneouſly bend his foot, none of the flexor muſcles being intereſted. The power of extending the foot is ſtill poſſible, as the peronei muſcles, the tibialis poſticus, and long flexors, remain perfect, and may perform this motion. Œuvres Chirurgicales de Deſault par Bichat, tom. i.

The indications are to bring the ends of the divided part together, and to keep them ſo, until they have become firmly united. The firſt object is eaſily fulfilled by putting the foot in a ſtate of complete extenſion; the ſecond, namely, that of keeping the ends of the tendon in contact, is more difficult.

In order to have a right comprehenſion of the indications, we ſhould conſider what keeps the ends of the tendon from being in contact. The flexion of the foot has this effect on the lower portion; the contraction of the gaſtrocnemius and ſoleus on the upper one. The indications then are to put the foot in an unalterable ſtate of extenſion, and to counteract the action of the above muſcles.

The action of the muſcles may be oppoſed: 1. By keeping theſe powers in a continual ſtate of relaxation. For this purpoſe, the leg muſt be kept half bent upon the thigh. 2. By applying methodical preſſure to the muſcles; methodical, becauſe it is to operate on the fleſhy portion of the muſcles, and not on the tendon, the ends of which being depreſſed by it, would be ſeparated from each other, and, inſtead of growing together, would unite to the adjacent parts. The preſſure ſhould alſo operate ſo as to prevent the ends of the tendon from inclining either to the right or left.

This kind of preſſure, which the bandage ought to make, ſeems to have eſcaped the attention of all authors. Who cannot ſee, however, that the action of the muſcles being by this means reſiſted, the upper end of the tendon will not have ſuch a tendency to be drawn upward, and ſeparated from the lower one? Œuvres Chirurgicales de Deſault par Bichat, tom. i.

The famous Petit ſeems entitled to the honour of having firſt deviſed the plan of treating the ruptured, or divided tendo Achillis, by keeping the leg and foot in a particular poſture, with the aid of an apparatus. Seeing that the extenſion of the foot brought the ends of the tendon into contact, it occurred to him that ſuch extenſion ſhould be maintained during the whole of the treatment, in order to bring about a permanent union. This happy idea, the ſimplicity of which ſhould have rendered it obvious to all practitioners, once having originated, became the common baſis, on which have been founded all the numerous methods of cure, which have been ſince recommended. Deſault par Bichat.

The celebrated Dr. Alexander Monro, profeſſor of anatomy at Edinburgh, happened to rupture his tendo Achillis. When the accident took place, he heard a loud crack, as if he had ſuddenly broke a nut with his heel, and he experienced a ſenſation, as if the heel of his ſhoe had made a hole in the floor. This ſenſation, he ſays, has alſo been obſerved by others, though ſome have complained of a ſmart ſtroke, like what would be produced by a ſtone or cane. Immediately ſuſpecting what had happened, the doctor extended his left foot, in which the occurrence had taken place, as ſtrongly as he could with his right hand, while with the left he preſſed the muſcles of the calf downward, ſo as to bring the ends of the broken tendon as near together as poſſible. In this poſition he ſat, until two ſurgeons came to his aſſiſtance. They applied compreſſes, and a bent board to the upper part of the foot, and fore part of the leg, both which they kept, as nearly as poſſible, in a ſtraight line, by a tight bandage, made with a long roller. But as this mode of dreſſing ſoon became very uneaſy, it was changed for the following one. A foot-ſock or ſlipper was made of double quilted ticking, from the heel of which a belt or ſtrap projected, of ſufficient length to come up over the calf of the leg. A ſtrong piece of the ſame materials was prepared, of ſufficient breadth to ſurround the calf, and this was faſtened with lacings. On the back part of this was a buckle, through which the ſtrap of the foot-ſock was paſſed, ſo that the foot could be extended, and the calf brought down at pleaſure. The leg and foot were wrapt up in ſoft flannel, fumigated with benzoin, and the bandage was kept on day and night, the belt being made tighter when the doctor was about to go to ſleep, and looſened when he was awake, and on his guard. For a fortnight he did not move his foot and leg at all, but was conveyed in a chair on caſtors from one part of the room to another. After this he began to move the ankle-joint, but in ſuch a gentle manner, as not to give any pain. The degree of motion was gradually increaſed, as the tendon became capable of bearing it, care being taken to ſtop, when the motion began to create uneaſineſs. The affected limb was moved in this way, for half an hour at a time. In a few days, the hollow between the ſeparated ends of the tendon became imperceptible, though the part continued ſoft much longer. It became, however, gradually thicker and harder, until a knot was at laſt formed in it, apparently of a cartilaginous nature. Though this was at firſt as large as a middling plum, and gradually became ſofter and ſmaller, yet it did not diſappear entirely. Having occaſion to go out ſix weeks after the accident, the doctor put on a pair of ſhoes, with heels two inches high, and contrived a ſteel machine to keep his foot in the proper poſition. This machine, however, he afterwards changed for another, made of the ſame materials as the former. It was not till five months after the accident, that he thought proper to lay aſide all aſſiſtance, and to put the ſtrength of the tendon to a trial. See Monro's Works, p. 661.

It ſeems unneceſſary to enumerate the various plans deviſed ſince the time of Petit. Suffice it to ſtate, that both in a wound and rupture of the tendo Achillis, the ancient method of uſing a ſuture, for keeping the ends of the tendon in contact, is at preſent quite exploded, and poſition of the limb is the grand agent by which the cure is now univerſally accompliſhed. The following was Default's method, which, though it was expreſsly deſigned to fulfil all the above-mentioned indications, may not after all be a more valuable practical plan, than the one adopted by Dr. Monro. After the ends of the tendon had been brought into contact, by moderate flexion of the knee, and complete extenſion of the foot, Default uſed to fill up the hollows on each ſide of the tendon with ſoft lint and compreſſes. The roller applied to the limb made as much preſſure on theſe compreſſes as on the tendon, and hence this part could not be depreſſed too much againſt the ſubjacent parts. Default next took a compreſs, about two inches broad, and long enough to reach from the toes to the middle of the thigh, and placed it under the foot, over the back of the leg, and the lower part of the thigh. He then began to apply a few circles of a roller round the end of the foot, ſo as to fix the lower extremity of the longitudinal compreſs. After covering the whole foot with the roller, he uſed to make the bandage deſcribe the figure of 8, paſſing it under the foot, and acroſs the place where the tendon was ruptured, and the method was finiſhed by encircling the limb upward with the roller, as far as the upper end of the longitudinal compreſs. Default par Bichat.

Certainly this plan ſeems to anſwer every object, and may be worthy of being adopted in this country. The continued preſſure on the muſcles of the calf, by which their action is materially reſiſted, is too much diſregarded by the generality of Engliſh ſurgeons. Conſult Monro's Works Encyclopédie Méthodique, article *Achille, tendon d'*; and Mémoire ſur la Diviſion du Tendon d'Achille, in Œuvres Chirurgicales de Default par Bichat, tom. i. p. 306. Cooper's Dict. of Practical Surgery.

Tendons, *Shooting of the*, *Subſultus tendinum*, in *Medicine*, a ſlight and repeated convulſive twitching of the muſcles, which occurs in the latter ſtages of low fevers; and, as it indicates great debility, and a very morbid condition of the brain or common ſenſorium, it is uſually reckoned among the dangerous ſymptoms of fever. See Fever, and Typhus.

Tendon, in the *Manege*, a ſort of griſtle that ſurrounds one part of the horſe's foot, and is ſeated between the hoof and the coffin-bone, near the coronet. When a horſe has a quitter-bone, the matter that gathers between the coffin-bone and the hoof ſpoils the tendon, and makes it black; and the cure of ſuch a quitter-bone conſiſts in cutting and extirpating the tendon.

TENDREMENT, Fr. in *Muſic*, tenderly, equal to *con tenerezza*, Ital. See Con *Affetto*, and Affettuoso.

TENDRIL, in *Botany* and *Vegetable Phyſiology*. See Cirrus.

TENDUCCI, Ferdinando, in *Biography*, an opera-ſinger in ſoprano, born at Sienna, whence he at firſt aſſumed the name of Seneſino, on account of the celebrity of a ſinger of that city, in the early part of the laſt century; though neither his voice nor ſtyle of ſinging at all reſembled that of the great ſinger and actor, Franciſco Bernardo detto Seneſino, whoſe voice was a rich and full contralto, and in whoſe ſinging and acting there were more of grandeur and dignity than tenderneſs and expreſſion, which characterized Tenducci's ſtyle; and whoſe voice was a high ſoprano of a clear ſilvery tone, which by great pains he had rendered very flexible; but he had formed himſelf more on Caffarelli's ſtyle than on that of Seneſino.

He arrived in England, as ſecond man, in 1758, when Potenza was principal. The firſt notice he obtained was in a cantabile air, ſet by Caffarelli for himſelf, in a fine ſtyle of grand pathetic, ſuch as ſix years after, Manzoli's fine adagio in Ezio, "Caro mio bene addio," was compoſed in by Peſcetti.

It was in 1759, during the reign of Cocchi's "Ciro riconoſciuto," that he became a favourite of the public; for though a young performer, and only ſecond in rank under Potenza, he had a much better voice and manner of ſinging than the performer to whom he gave precedence.

In 1760 he went to Scotland, and we hear no more of him till 1763, when he returned to London, and performed the principal man's part in Dr. Arne's Artaxerxes, of which the ſucceſs was greatly owing to his talents.

At this period, Bach and Abel eſtabliſhed a weekly ſubſcription concert in Hanover-ſquare, which was better patronized and longer ſupported than perhaps any one had ever been in this country, having continued full twenty years with uninterrupted proſperity, at which, during the chief part of the time, Tenducci was the principal ſinger.

In 1770 he ſucceeded Guadagni as firſt man at the great opera, performing that year with the Graſſi in "Corroe," and the next year in "Semiramide riconoſciuta."

In 1764 he went to Ireland, where he and Miſs Brent performed together in Artaxerxes.

In 1765 an Italian opera was performed in Dublin, in which he and the Cremonini ſung principal parts in Mithridates, in the principal cities of that country.

Some time after he returned to London, and was engaged at the opera, where, in 1785, he revived Gluck's Orfeo.

Such is the outline of his profeſſional career in public. The events of his private life are ſtill more varied.

He had not been long in England before he was thrown into

into the king's bench for debt, where he embelliſhed that reſidence by his talents, and amuſed its inhabitants. He was, however, allowed to attend evening concerts elſewhere, attended by a *garde du corps*. But on theſe occaſions, a Jewiſh lady, his patroneſs, carried him in her carriage to the performance, and conducted him ſafe back with his attendant to his limited reſidence; where, during a part of the time, he had the honour of Dr. Smollet for his neighbour.

In Scotland he ſung at the Edinburgh concerts, and gave leſſons in ſinging; by which occupation he improved his own talents ſo much, that he returned to London a much better ſinger than when he left it. So true is the obſervation of Ariſtotle, that no art or ſcience is well learned but by *teaching*, when it is neceſſary to give reaſons for what in private practice is done mechanically.

In Ireland he married a lady of conſiderable fortune, who was enchanted by his talents.

In Italy, whither he carried this lady, he was unmarried, the laws of that country forbidding conjugal union to caſtrati. And on his application to the pope for a diſpenſation, it was refuſed; though the petitioner ſaid that his reaſon for marrying was, the operation in his youth not having been completely performed: "why then," ſays his holineſs, "let it be done more effectually;" and he was obliged to ſeparate himſelf from his tender ſpouſe, and ſhe to conſole herſelf with a more efficient huſband.

When he quitted the ſtage, he employed his whole time in teaching to ſing; had many ſcholars, and a good method of inſtruction; giving to his pupils, in Engliſh, a ſet of axioms or rules of ſtudy and practice tranſlated from the Italian, drawn up, as he ſaid, by himſelf; but which, after his deceaſe, were found in the Solfeggi of Aprile.

Notwithſtanding the great number of his ſcholars, his income was inſufficient to keep him out of debt, or even the king's bench, without the ingenious expedient of becoming a bankrupt, by which he defrauded all his creditors, and died inſolvent, being, as has been reported, buried at the expence of his countrymen, who made a collection for that purpoſe at the Orange coffee-houſe. But from better authority, we have been informed that he died at Genoa.

Tenducci had much profeſſional merit; but as to probity, honour, and ideas of right and wrong, they never ſeem to have extended further than convenience and perſonal ſafety.

TENDUNCULO, in *Geography*, a river of Africa, which runs into the Indian ſea, S. lat. 19° 20′.

TENEA, in *Ancient Geography*, a town of Corinth, on the frontiers of Sicyonia, S. of Epicria. It pretended to derive its foundation from the Trojans made priſoners in the iſle of Tenedos, and brought into this country by Agamemnon. Apollo was much honoured here.

TENEBRÆ, DARKNESS, in the *Romiſh Church*, a ſervice performed on the Wedneſday, Thurſday, and Friday before Eaſter, in commemoration of the agony of our Saviour in the garden; and the darkneſs that overſpread the earth at the time of his crucifixion.

TENEBRIO, in *Entomology*, a genus of the Coleoptera order of inſects, the generic character of which is, that the antennæ are moniliform, with the laſt joint rounded; the thorax plano-convex, margined; the head exſerted, and wing-ſheaths ſtiffiſh.

In the inſects of this genus the body is oblong-oval, and in moſt ſpecies ſomewhat pointed at the extremity. Several ſpecies are alſo deſtitute of wings. This is a numerous genus, and is divided by Fabricius and others into ſeveral diſtinct genera, under the appellations of Pimelia, Bleps, Aturnus, &c. In Gmelin's edition of Linnæus it comprehends 63 ſpecies. The European ſpecies are denoted by an aſteriſc.

A. *Six filiform Feelers; anterior Legs formed for digging, palmate-dentated; including the* Scaritæ *of Fabricius and Pallas.*

Species.

COMPLANATUS. Black, with a ſubquadrate thorax, and ſmooth ſhells or wing-ſheaths; of a large ſize. Found at Cayenne.

MARGINATUS. Black, with a ſubquadrate thorax; ſulcated ſhells; blue margin. Found at Cayenne.

GIGANTEUS. Black, with ſulcated mandibles, and ſmooth ſhells. Found in Africa; nearly allied to the next ſpecies, but thrice as large.

SUBTERRANEUS. Black, with the fore-part of the head ſulcated, and ſtriated ſhells.

CYANEUS. Blue, very ſmooth; antennæ and feet black. Found in New Holland.

* FOSSOR. Pitchy. Found in ſand-hills, which it perforates.

* CURSOR. Brown; oblong thorax; five angles denticulated. Found as the former.

ARABS. Black; ſerrated thorax; antennæ and feet teſtaceous. Found in the Eaſt.

MINUTUS. Black; thorax margined; antennæ clavated, and feet pitchy. Found in Sweden; and twice as large in Saxony.

COLLARIS. Black, with ſhells punctate-ſtriated, and head brown; antennæ and feet pitchy; the anterior ſpinous. Found at Berlin.

BUCEPHALUS. Wholly brown, punctated; eyes black. Found in India.

B. *With unequal filiform Feelers.*

ATRATUS. Wholly black, ſmooth. Found in Egypt.

C. *With four Feelers; the anterior ſubclavate; the poſterior filiform; the* Tenebriones *of Fabricius, and* Mylarides *of Pallas.*

LAMINATUS. Black; thorax ſubquadrate, ſmooth; ſhells ſulcated; anterior legs incurvated at the apex, and ferruginous lamina acute. Found in India; the largeſt of the genus.

GIGAS. Black; ſhell ſtriated; thorax ſmooth. Found in Surinam.

PUNCTATULUS. Black; thorax quadrate; margin ſubdenticulate; ſhells ſtriate-punctated. Found in India; of a large ſize.

SERRATUS. Black, ſmooth; ſhells ſtriated; poſterior legs ſtriated. Found in Sierra Leone.

* MOLITOR. Wholly black; thighs anterior thicker:—an inſect often ſeen in houſes, one of the ſmaller kinds, proceeding from a larva commonly known by the name of meal-worm, from its being ſo frequently found in flour, &c.; it is of a yellowiſh-white colour, about an inch long, ſlender-bodied, and of a highly poliſhed ſurface, and is conſidered as the favourite food of the nightingale, in its captive ſtate, and ſaid to remain two years before it changes into a chryſalis.

LURIDUS. Black, with brown feet. Found in Braſil.

CHALYBEUS. Violet, with feet and antennæ pitchy. Found in Guinea.

MAURITANICUS. Black, beneath pitchy; margins of the

the thorax anterior and poſterior angulated. Found in Algiers.

Variegatus. Oblong, with varied brown and cinereous. Found in Africa.

Abbreviatus. Ovate, black, with ſhell ſtriated, and head tuberculated. Found in India.

Capensis. Ovate, black; ſhell ſtriated; anterior legs dentated-ſpinous. Found at the Cape of Good Hope.

Cornutus. The margins of the double-horned thorax crenated, and the angles projecting. Found in Smyrna.

Sanguinipes. Black, with antennæ and feet ſanguineous. Found in New Holland.

Buprestoides. Black; oval, thorax margined; the connate ſhells ſmooth. Found at the Cape of Good Hope.

Dermestoides. Black; thorax oval, margined; ſhells ſtriated. Found in Saxony.

Culinaris. Ferruginous; ſhells ſtriated; ſhield emarginated. Found in Spain and Sweden.

Barbarus. Black, very ſmooth; thorax orbiculated; the ſhield of the head on the fore-part, with the margin elevated. Found in Mauritania.

* Erraticus. Black; the antennæ, ſuborbiculate thorax, and ſhells ferruginous; brown at the apex.

Pallens. Palely teſtaceous; thorax tranſverſe. Found of a ſmall ſize at the Cape of Good Hope.

Ferrugineus. Ferruginous, with ſhells ſtriated teſtaceous. Found in Africa.

* Villosus. Brown, cinereous-villoſe, ſhells ſmooth and ferruginous.

* Caraboides. Black; thorax oval, margined; ſhells ſtriated.

Brunnipes. Black, ſmooth; ſhells ſtriated; antennæ and feet ferruginous. Found at Dreſden.

Lævigatus. Oblong, black, with ſmoothiſh ſhells. Found in Africa, of a leſs ſize than the molitor.

Gibbosus. Subovate; wholly braſſy, ſhells gibbous-convex; the very fine ſtriæ crenulated. Found in Braſil.

Spinimanus. Thorax margined, ſmooth, ſhells very ſmooth; poſterior obtuſe; fore-legs produced with a very ſtrong arched ſpine. Found in Southern Ruſſia.

Uncinus. Apterous, black; thorax margined, ſubequal; ſhells ſtriated-punctated and angulate; thighs anterior, clavated, very large, biuncinate. Found in Spain.

Piceus. Depreſſed, black; beneath pitchy; ſhells ſtriated. Found in Saxony.

Cylindricus. Very black; thorax with elevated points; antennæ brown; the tarſi beneath yellow-haired. Found at Berlin.

Montanus. Wholly black; ſhells opaque. Found in Hungary.

Tristis. Black, ſub-opaque, varied with excavated points. Found in Carniola.

Pomonæ. Above pitchy, beneath black; ſhells with five elevated ſtriæ. Found in Carniola.

Capreæ. Black; points impreſſed on the thorax and ſhells teſtaceous. Found in Carniola and Switzerland.

Flavus. Yellow, with black eyes. Found in Carniola.

Æstivus. Black; feelers and feet yellow. Found in Denmark.

Striatus. Black; the abdomen beneath denſely ſtriated. Found in Denmark.

Festinans. Wholly black, ſmooth; thorax ferruginous.

Globosus. Black; thorax globoſe; two rough lines elevated. Found in Siberia.

Incurvatus. Wholly pitchy; ſhells ſtriated acroſs the middle. As the laſt.

Ovatus. Ovate, blackiſh-brown; ſhells with eight ſtriæ, ſmooth.

Rotundatus. Black, wholly ſmooth: the coleoptra rotundata.

Subvillosus. Wholly ferruginous, ſubvilloſe.

Glaber. Wholly ferruginous, ſmooth. The four laſt found in France.

* Lignarius. Thorax with two cavities; ſhells violet or red; antennæ and feet ferruginous.

Lardarius. Oblong, yellow-fulvous; eyes black; ſhells with punctated ſtriæ. Found in Belgium.

* Curvipes. Ovate, pitchy; ſhells punctated-ſtriate; thighs crenated; the hinder beneath ciliated.

* Bicolor. Ovate; ſhells ſtriated; above black; the antennæ beneath and feet ferruginous.

* Ater. Black; antennæ ferruginous.

* Lunatus. Black; depreſſed thorax lunated; ſhells ſtriated; feet ferruginous.

* Hispidus. Black, rough; ſhells ſtriated; a ſpot at the baſe on both ſides red; the antennæ and legs red.

* Glaber. Ferruginous; head and thorax ſmooth, and ſhells black; theſe ſtriated; mouth ferruginous; feet livid.

Tenebrio *Mortiſagus*, a ſpecies of the *Pimelia*, (which ſee,) in the Gmelinian edition of the Linnæan ſyſtem, thus deſcribed by Dr. Shaw. It is a coal-black inſect, meaſuring about an inch in length, of rather ſlow motion, and diſtinguiſhed by the remarkably pointed appearance of the wing-ſheaths, which at their extremities project a little beyond the abdomen; they are alſo perfectly connate or undivided, forming a complete covering to the body, and being carried over the ſides to ſome diſtance beneath, and the inſect is totally deſtitute of real or under wings. It is uſually found in dark neglected places, beneath boards, in cellars, &c. and if handled, eſpecially if cruſhed, diffuſes a very unpleaſant ſmell.

TENEBRIUM, in *Ancient Geography*, a promontory of Spain, belonging to the Ilercaones. Ptol. It lay S. of the mouth of the river Iberus.

TENEDOS, in *Geography*, an iſland of the Grecian Archipelago, near the coaſt of Aſia, and very near the Troade. This iſland has been ſucceſſively celebrated by Homer and Virgil. The latter thus deſcribes it:

> "Eſt in conſpectu Tenedos, notiſſima famâ
> Inſula, dives opum, Priami dum regna manebant;
> Nunc tantum ſinus et ſtatio maleſida carinis."

According to Diodorus Siculus, it had anciently been called Leucophris; but when Tenes or Tennes built a town upon it, he called it Tenedos. Bochart, however, derives its name from the Phœnician word Tin-edum, red clay, which was found here, and uſed for making earthen-ware. Pauſanias ſays, that this iſland, which was ſituated within ſight of the city of Troy, became miſerable after the capture of that city, and was obliged to ſurrender to its neighbours, who had built Alexandria upon the ruins of Troy. It was one of the firſt conqueſts of the Perſians, who made themſelves maſters of it, after having defeated the Ionians at the iſle of Lada. It took part with the Athenians againſt the Lacedæmonians, when an admiral of the latter people ravaged it, and drew from it contributions. The Romans had poſſeſſion of it, and Verres pillaged the temple, and carried away the ſtatue of Tennes, the ſuppoſed founder of the town. Strabo repreſents it as 24 ſtadia in circumference, and places it at the diſtance of 11 ſtadia from the continent; but Pliny ſtates this diſtance to be 12 miles. Olivier computes the diſtance to be nearly 3000 toiſes: and he ſays, that the town is at the diſtance of about five leagues from

from the entrance of the Hellefpont. This pofition has always rendered Tenedos important. Veffels bound to Conftantinople find fhelter in the ports of this ifland, or fafe anchorage in the roads, when the winds are contrary and the weather bad. The emperor Juftinian eftablifhed in this ifland a magazine for receiving cargoes of corn tranfported from Egypt, 180 feet long, 90 broad, and proportionally high. During the troubles of the Greek empire, Tenedos fuftained many viciffitudes. It was for many years a place of rendezvous for pirates. Scantily peopled and ill defended, it paffed betimes under the Ottoman domination. The caliph Othman feized it in the year 1302, and in the poffeffion of it, he was enabled to fubdue the other iflands of the Archipelago. During the minority of Mahomet IV. the Venetians retook it after the complete defeat of the Turkifh fleet in the ftrait by the admiral Mocenigo, in 1656: but in the following year, the admiral having been killed in a fecond engagement, the Venetian fleet retired, and this ifland fell again under the power of the Turks, who have preferved it without interruption till the prefent day. The harbour is fmall, and can only receive merchant veffels: it is formed by a jetty even with the water's edge, and a tongue of land, on which is conftructed the citadel that defends the entrance, and can at moft fecure it againft being furprifed by a privateer. The town is built in form of a femicircle, in a valley, and on the declivity of two hills: its population is from 5000 to 6000 fouls, judging from its extent, and from the number of perfons who pay the karatch. Its inhabitants, who are Turks and Greeks in equal numbers, are almoft all occupied in the culture of the lands, few of them being mariners. The ifland is under the adminiftration of a waiwode or governor, an aga commandant of the citadel, and a cadi or judge. The defenders of the town are 200 or 300 janizaries. The town is commanded by a pyramidal mountain of fmall elevation, that feems to have been formed by the action of a volcano, the traces of which are difcoverable. In the environs is found a granite remarkable for pieces, of various fizes, of felfpar cryftallized. On the right of the mountain, in paffing from the town towards the W., is a fandy plain, far from fertile, and almoft entirely covered with vines. The hills, in general, are naked, dry, and little fufceptible of culture. Thofe on the fouth of the town are calcareous; and the rock is more or lefs chalky and loaded with fea-fhells.

Tenedos produces little corn, fruit, or herbage. The vine is the only article of wealth of this country, and its culture the principal occupation of the inhabitants. Mufcadel wine is made in confiderable quantities. From Tenedos are annually exported upwards of 600,000 okes of wine, producing to the farmer more than 30,000 piaftres. This wine paffes to Conftantinople, Smyrna, and Ruffia. This ifland alfo exports a fmall quantity of brandy. The climate of Tenedos is more temperate than that of the Dardanelles: it feldom freezes here, and the fummer heats are moderated by the N.N.E. wind, which blows regularly during the day. The houfes have terraces of flat roofs. The Greek inhabitants are lefs gay than thofe of the other ifland: in the ftreets they are filent and melancholy, avoiding through fear the attention of the Turks; but when they can indulge themfelves in mirth without danger, they furrender themfelves to a fort of extravagant joy and delirium. The coaft of Troy is frequently the theatre of their orgies and the field of their pleafures: thither they repair on the occafion of a wedding or of a feftival, and there, under the fhade of a planetree or oak, they pafs the whole day in dancing, finging, eating and drinking. The females, however, are kept within the bounds of decorum, and might be compared, from their features and their fhape, to the moft beautiful models which antiquity has tranfmitted to us. N. lat. 39° 53′. E. long. 26°. Sonnini. Olivier.

TENELLA, τενελλα, in *Ancient Mufic*. As fome conquerors at the Olympic games were not fo fortunate as to have poets for their friends, or fo rich as to be able to purchafe odes on their particular victories, which were rated very high by bards of the firft clafs; in honour of fuch, the old hymn to Hercules, of Archilochus, was fung by the friends of the conquerors only, if they could not afford to engage a band of profeffed muficians. The fcholiaft on Pindar's ninth Olympic tells us, that to fupply the want of a citharædift, Archilochus framed a word in imitation of the found of a cithara, which word (*Tenella*, Τενελλα), when there happened to be no mufician prefent, the leader of the chorus chanted forth, and was anfwered by the reft of the chorus, in the words of the hymn, Ω Καλλινικε, χαιρε, *O glorious Victor, hail!* at every comma, or paufe of which, this burden was again repeated.

TENEMBER, in *Geography*, an ifland in the Eaft Indian fea, 12 miles long and 3 broad. S. lat. 6° 50′. E. long. 132° 45′.

TENEMENT, Tenancy, in *Law*, a houfe or lands, depending on a manor, or lordfhip; or a fee, or farm held of a fuperior lord, and which he may recall, when the term or condition is expired.

Tenement, *Frank*, is any lands, houfe, office, or the like, in which a man has eftate for life, or in fee.

Tenement, *Bafe*, is where a man holds lands, &c. at the will of the lord.

Yet Kitchin, Briton, &c. make frank tenement and bafe tenement oppofites; on which footing, frank tenement fhould be where the tenant is at liberty to quit it when he pleafes.

TENEMENTARY Lands, among our anceftors, were the outlands of manors, which the Saxon thanes, or nobles, let out to tenants under arbitrary rents and fervices.

TENEMENTIS Legatis, in *Law*, a writ which lies in London, and other places, where the cuftom is to devife tenements by laft will as well as perfonal goods and chattels, for the hearing of any caufe relating to them.

TENEN, or Knin, in *Geography*, a town of Dalmatia, fituated on the borders of Bofnia, and the fee of a bifhop; 48 miles S. of Bihacs.

TENENDUM, in *Law*, is a claufe in a deed, in which the tenure of the land is created and limited. The office of a tenendum is to limit and appoint the tenure to the land which is held, and how, and of whom it is held. The tenendum feems now to be incorporated with the *habendum*, for we fay, to have and to hold, in which claufe the eftate is limited, &c.

TENENTES Nativi. See Nativi.

TENENTIBUS *in Affifa non Onerandis*, in *Law*, a writ which lies for him to whom a diffeifor has made over land, of which he diffeifed another; requiring that he be not difturbed in affize, for the damages awarded, if the diffeifor have wherewithal to fatisfy them.

TENEREZZA, tendernefs, feeling, equivalent to the French term *tendrement*.

TENERIA, in *Geography*, a town of the ifland of Cuba; 45 miles N.W. of Villa del Principe.

TENERIFFE, one of the Canary iflands, the fecond in dignity, but the firft probably with regard to wealth and fertility. It is about 70 miles in length, and its mean breadth is about 22 miles: its furface contains 1540 fquare miles, having, at an average, about 45 perfons to the fquare mile,

mile. The number of acres is 985,600, which, upon an average, allots about 10 acres to every individual in it; the number of inhabitants being calculated to be nearly 100,000. Of thefe there is annually a confiderable migration to the Spanifh colonies in South America. The poor of Teneriffe are eafily perfuaded to migrate, as the proprietors of the land do not give them fufficient employment throughout the year; and they have not the refource of manufactures, except a trifling one in filk, chiefly ftockings. The price of labour is under a fhilling a day; and, befide corn and roots, the principal food of the common people is confined to cod-fifh, caught on the neighbouring coaft of Africa, or imported from North America. This ifland was formerly called Nivaria, which appellation it derived from the circle of fnow that furrounded the peak of Tenda, now called the peak of Teneriffe; which name was given to it, as it is faid, by the inhabitants of Palma ifland, in whofe language *tener* fignifies fnow, and *effe* a mountain. The figure of this ifland is triangular, as it extends into three capes, the neareft being about 80 leagues or more from the coaft of Africa. The hiftorical celebrity of this ifland has been very much owing to its *Peak*, elevated to a confiderable height from a bafe lying a little to the S.W. of its centre. Of its height we have various ftatements by different writers, who have afcended to its fummit. Dr. Heberden, whofe obfervations in afcending it are publifhed in the Phil. Tranf. vol. xlvii. makes its height above the level of the fea to be 2566 fathoms, or 15,396 Englifh feet; and he fays that this meafure was confirmed by two fubfequent obfervations by himfelf, and another made by Mr. Croffe, the conful. Neverthelefs, chevalier de Borda, who meafured the height of this mountain in Auguft 1776, makes it to be only 1931 French toifes, or 12,340 Englifh feet. Mr. Johnftone, a merchant of Madeira, being on board fhip in the offing of Orotava, took the angles made by a line from the horizon to the fummit of the Peak, at two different fpots, and meafuring the diftance between them by the log, determined the perpendicular height of the Peak to be 2023 Englifh fathoms, being nearly the fame as Chev. de Borda had calculated from a bafe meafured upon land. From the comparative obfervations of Monf. de Borda's barometers, upon the Peak, and by the fea-fide, the mountain's height came within two fathoms of the geometrical meafurement. The Hon. Grey Bennet, who made a journey to the top of the Peak in 1810, ftates its height to be about 12,500 feet. M. de Lemanon and Monges, on the 26th of Auguft 1785, afcended the Peak, and ftating its elevation above the level of the fea to be near 1900 toifes, made fome chemical experiments, in order to compare the phenomena at that height with thofe which occur in our laboratories. They obferve, that the crater of the Peak is a perfect folfatara or laboratory of fulphur; its diameter being about 50 toifes by 40, rifing with a fteep and rapid afcent from W. to E. On the edges of the crater, and particularly towards the loweft part, are feveral apertures or vents, exhaling watery and fulphuric acid vapours, the heat of which raifed the thermometer from 9° to 34°. The interior of the crater is covered with yellow, red, and white clay, and fragments of lava partly decompofed. Under thefe were found beautiful cryftals of fulphur, forming rhomboidal octohedra, fome of which were an inch thick. The fteam exhaled from the apertures was pure water, not at all acid. The evaporation of liquids, and the cold thus produced, were very confiderable. The action of the acids on metals, earths, and alkalies was flow, and the bubbles that efcaped during the effervefcence were much larger than ufual. The production of vitriols afforded a fingular phenomenon. That of iron inftantly affumed a fine violet colour, and that of copper precipitated with a very vivid hue. The fmell and ftrength of liquors appeared not to have loft any thing at this elevation, and the volatile alkali, ether, and alcohol, retained the fame ftrength. Several experiments were made with a view of afcertaining the nature of the vapours exhaled from the crater, and whether they contained inflammable air, fixed air, or marine acid. From thefe he concluded that no fixed air exhaled from the crater, and alfo that the atmofpheric air refting upon it contains very little, and that the inflammable vapours and fulphuric acid gas alone are confiderable, and indeed perceivable. The atmofpheric electricity was confiderable and pofitive. Many new varieties of volcanic fchorls were difcovered. See La Peroufe's Voyage, vol. ii. p. 226, &c.

Dr. Heberden gave fir Jofeph Banks fome falt which he collected on the top of the mountain, where it is found in large quantities, and which he fuppofed to be the true natrum, or nitrum, of the ancients. Although the vortex appears fharp, and of the exact refemblance of a cone, yet it is flat for the extent of an acre of ground, in the centre of which is a dreadful volcano, which frequently breaks out into flames, fo violent as to fhake the whole ifland with an incredible force. Smoke conftantly iffues from the mountain, near its fummit, but no eruption has occurred fince the year 1704, when the port of Garrachica was deftroyed, and the harbour filled by the lava. The ifland of Teneriffe is divided in the middle by a ridge of mountains, which have been compared to the roof of a church, the Peak forming the fpire or fteeple in the centre. An author well acquainted with the ifland fays, that if you divide it into twelve parts, ten of thefe confift of rocks, woody and inacceffible mountains and vineyards; and yet, from the fmall remainder of arable ground, he has feen 250,000 hanackes of wheat, befides immenfe quantities of rye and barley, produced. The greateft part of the ifland is volcanic, and all its rocks are lava. Mr. Bennet (Tranf. of the Geological Society, vol. ii.) conceives, that formerly a very large crater, 12 miles in diameter, exifted, the fides of which, under the name of Las Foldas, may be ftill traced a great way. The crater at the top of the Peak is but fmall, and fomewhat in activity. The lavas vary in their appearance: fome are compofed of hornblende and felfpar, without any foreign body; thefe are porphyritic: fome are compofed of green-ftone, and contain olivin, augite, and zeolites: fome are bafaltic; thefe decompofe the fooneft, and conftitute the moft fertile foil: there are alfo pumice in abundance, tufa afhes, and a lava refembling obfidian. Every circumftance, it is faid, argued in favour of a volcanic formation, except the form of the mountains, whofe irregular ridges, declivities, and afcents, appeared very different from thofe exhibited by volcanic mountains. In the plain beyond Laguna, on the Orotava fide, the foil was not in the leaft volcanic, but compofed of fine mould, or virgin earth; a mixture of clay, vegetable earth, and fand. Hollows, 30 feet deep, left dry by rivulets, exhibit no volcanic appearance. Immediately under the fuperficial foil was a layer of deep loam, next, one of tough clay, and all below was an irregular mixture of clay and fand. Elfewhere the hills confifted of indurated clay, and clay and iron, without any marks of the action of fire. In the whole ifland, there is no pure flint or fand-ftone. Its mountains are of two forts; one, evidently volcanic; the other, primary and compofed of indurated clay, or of clay and calx of iron. In the low plains are layers of loofe and foft argillaceous earth. (See Dr. Gillan's remarks in the 1ft vol. of the Embaffy to China, p. 118—120.) Although the people live on fcanty and coarfe fare, they are not much fubject to difeafe, and inftances of longevity, even to 100 years,

years, are said not to be rare amongst them. The air is dry and pure. The variations of the thermometer seldom exceed 14°, from 68° to 82°, in the inhabited part of the island. (See GUANCHES.) To the eastward of Santa Cruz, says Mr. Anderson (Cook's Third Voyage, vol. i. p. 22. &c.) the island appears perfectly barren. Ridges of hills run towards the sea, between which ridges are deep vallies, terminating at mountains or hills that run across and are higher than the former. Those that run towards the sea are marked by impressions on their sides, which make these appear as a succession of conic hills, with their tops very rugged. The higher ones that run across are more uniform in their appearance. The basis of the hills is a heavy, compact, blueish stone, mixed with some shining particles; and on the surface, large masses of red friable earth, or stone, are scattered about. The little earth, that appeared here and there, was a blackish mould. There were likewise some pieces of slag, one of which, from its weight, and smooth surface, seemed almost wholly metalline. The mouldering state of these hills is, without doubt, owing to the perpetual action of the sun, which calcines their surface.. "After walking about three miles," says Mr. Anderson, "I found no alteration in the appearance of the lower hills, which produce great quantities of the euphorbia Canariensis. I met with nothing else growing there, but two or three small shrubs, and a few fig-trees near the bottom of the valley. Most of the laborious work in this island is performed by mules, horses being to appearance scarce, and chiefly reserved for the use of the officers: they are of a small size, but well shaped and spirited. Oxen are also employed to drag their casks along, upon a large clumsy piece of wood. In my walks and excursions I saw some hawks, parrots, which are natives of the island, the sea-swallow or tern, sea-gulls, partridges, wagtails, swallows, martins, blackbirds, and Canary birds in large flocks. There are also lizards of the common, and another sort; some insects, as locusts; and three or four sorts of dragon-flies." Mr. Anderson was informed that a shrub is common here, agreeing exactly with the description given by Tournefort and Linnæus of the tea shrub, as growing in China and Japan. Another botanical curiosity, mentioned by him, is what they call the impregnated lemon. It is a perfect and distinct lemon, inclosed within another, differing from the outer one only in being a little more globular. The leaves of the tree that produces this sort, are much longer than those of the common one; and it was represented to him as being crooked, and not equal in beauty. Mr. Anderson learnt also, that a certain sort of grape growing here is reckoned an excellent remedy in phthisical complaints; and the air and climate in general are remarkably healthful, and particularly adapted to give relief in such diseases. This he endeavoured to account for by its being always possible to procure a different temperature of the air, by residing at different heights in the island: and he expressed his surprize that the English physicians had never thought of sending their consumptive patients to Teneriffe, instead of Nice or Lisbon. They reckon that 40,000 pipes of wine are annually made, the greatest part of which is either consumed in the island, or made into brandy, and sent to the Spanish West Indies and North America.

In the Embassy to China (vol. i.) the quantity of wine, consisting principally of white wine, said to be exported from Teneriffe, is about 25,000 pipes annually made in the island. Part is sent to South America: and the English take off a considerable quantity in return for manufactures; and the North Americans in payment of corn, staves, horses and tobacco, which last article is contraband and smuggled. Tobacco or snuff is in universal use; and that which is legally imported is sold at so high a price, that the temptation to smuggling is irresistible. The royal monopoly extends even to orchilla or archil, a substance used in dyeing. Formerly there was made at Teneriffe a great quantity of Canary sack, which the French call "vin de Malvasia," and we, corruptly after them, name Malmsey (from Malvasia, a town in the Morea, famous for such luscious wine.) In the 17th century, and still later, much of this was imported into England, and little wine is now made there except that described by Capt. Cook, and which he compares with Madeira, the latter being as much superior to the former, as strong beer is to small. But the great difference of price is a recommendation of it. Besides wine, which is the chief produce of the island, beef may be had at a moderate price. The oxen are small and bony, and the meat lean. Hogs, sheep, goats, and poultry, may also be bought at a moderate rate: and fruits, such as grapes, figs, pears, mulberries, plantains, and musk melons, are in great plenty. Their pumpkins, onions, and potatoes, are also very good of their kind. The Indian corn, which is their produce, and also their fruits and roots, may be had at a very reasonable rate. They have no plentiful supply of fish from the adjoining sea; but a considerable fishery is carried on by their vessels upon the coast of Barbary; and the produce of it sells at a reasonable price. Capt. Cook says that he found Teneriffe to be a more eligible place than Madeira for ships bound on long voyages to touch at. At Teneriffe they make a little silk; but unless we reckon the filtering-stones, brought in great numbers from Grand Canary, the wine is the only considerable article of the foreign commerce of Teneriffe. None of the race of inhabitants found here when the Spaniards discovered the Canaries, now remain a distinct people, having intermarried with the Spanish settlers; but their descendants are known from their being remarkably tall, large-boned, and strong. The men are in general of a tawny colour, and the women have a pale complexion, entirely destitute of that bloom which distinguishes our northern beauties. The Spanish custom of wearing black clothes continues amongst them; but the men seem more indifferent about this, and in some measure dress like the French. According to Capt. Cook, the peak of Teneriffe is situated in N. lat. 28° 18′, and upon this supposition its longitude will be

$$\text{By}\begin{cases}\text{The time-keepers} & 17^\circ\ 0'\ 30'' \\ \text{Lunar observations} & 16\ \ 30\ \ 20 \\ \text{Mr. Varila} \quad - & 16\ \ 46\ \ \ 0\end{cases}\text{West.}$$

But if its latitude be 28° 12′ 54″, as in Maskelyne's British Mariner's Guide, its longitude will be 13′ 30″ more westerly. The variation (August 1776) by a mean of all Capt. Cook's compasses was found to be 14° 41′ 20″ W. The dip of the N. end of the needle was 61° 52′ 30″.

TENERIFFE, a town of South America, in the government of the Caraccas, and province of St. Martha; 80 miles S.S.W. of St. Martha. N. lat. 10° 2′. W. long. 74° 30′.

TENESMUS, in *Medicine*, an incessant and urgent desire to go to stool, while the evacuations are exceedingly scanty, of a mucous or bloody appearance, and are attended with scarcely any relief of the distressing sensation which preceded them. It may be brought on by any cause which excites excessive irritation in the rectum, either directly, or by sympathy with neighbouring organs, such as the bladder, uterus, prostate gland, or urethra. Thus it is frequently a symptom of a stone in the bladder, of inflammation of the neck of that organ, of fistula, of gonorrhœa virulenta, and also of pregnancy. In its most acute form, tenesmus more commonly

commonly occurs as a consequence of disease affecting the intestines themselves, and more especially of dysentery: it is also frequently excited by ascarides, or hæmorrhoidal tumours within the rectum. See DYSENTERY.

The treatment of this affection must of course be adapted to the nature of the irritation which has occasioned it; and the removal of the irritating cause will generally be followed by the cessation of the effect. When this, however, cannot be accomplished, the introduction of opium as a suppository into the rectum, or united with a starch glyster, will often procure essential relief.

TENESSEE, in *Geography*. See TENNESSEE.

TENESUR, a town of Egypt, on the west branch of the Nile; 3 miles S. of Amrus.

TENET, a particular opinion, dogma, or doctrine, professedly held by some divine, philosopher, &c.

The distinguishing tenets of the several sects in religion, and philosophy, see under the names of the sects themselves.

TENEZ, or TENES, in *Geography*. See TENNIS.

TENEZA, a town of Morocco; 43 miles W.S.W. of Morocco.

TENGA, in *Botany*, a name by which some authors have called the cocoa-nut tree, or palma indica nucifera of other writers.

TE-NGAN, in *Geography*, a city of China, of the first rank, in Hou-quang; 550 miles S. of Peking. N. lat. 31° 20'. E. long. 113° 17'.

TENGAPATAM, a town of Hindoostan, on the sea-coast, in the country of Travancore; 20 miles S.W. of Travancore.

TENGI, a town of Persia, in the province of Schirvan; 25 miles N. of Scamachie.

TENGILO, a river of Lapland, which falls into the Tornea, which, as well as the lake and mountain of Niemi, has been celebrated by Maupertuis for picturesque beauty.

TENGIS, a lake of Independent Tartary, about 140 miles in length by half that breadth, being the largest lake in Asia after the seas of Aral and Baikal. It is also called Balkash or Palcatè. This lake, with two others that are very considerable, belong to the Kalmucks subject to China.

TENGMO, a small island on the E. side of the gulf of Bothnia. N. lat. 63° 10'. E. long. 21° 52'.

TENG-TCHOUEN, a city of China, of the second rank, in Yun-nan; 1182 miles S.W. of Peking. N. lat. 26° 2'. E. long. 99° 49'.

TENGZEGZET. See TENZEGZET.

TENIA. See TÆNIA.

TENIERS, DAVID, the elder, in *Biography*, was born at Antwerp in 1582. He received his education in painting in the school of Rubens, and under that great artist's immediate tuition, obtained the mode of preparing his grounds, and managing his materials. Intending to continue the study of historic painting, he went to Rome; but there abandoned it, and attached himself to his countryman, Adam Elsheimer, under whom he continued for six years to study landscape, and from him most probably acquired the neatness of pencilling for which his works are esteemed.

On his return to his native country, he blended the styles of both his masters, and employed the compound in a novel and ingenious manner, upon subjects original and at the same time agreeable; such as merry-makings, both interior and at the doors of cabarets; rural sports, cattle, sheep, and those who tended them; numerous groups and grotesque combinations; such as the temptation of St. Anthony, &c. For pictures of these kinds, he was fortunate enough to find admirers and purchasers; and they would still have been the theme of admiration, had not his son, following the same track, have proved how possible it was to proceed infinitely farther. He died in 1649, aged sixty-seven.

TENIERS, DAVID, the younger, son of the foregoing artist, was born at Antwerp in 1610, and was initiated in the art of painting by his father; but he afterwards became a disciple of Adrian Brauwer, and is also said to have had the happiness and honour of receiving instructions from Rubens. The subjects and the style he adopted were, as we have said, the same with those employed by his father; but with a more fertile imagination, he produced compositions infinitely more varied and ingenious, with colouring and effect more vivid and engaging, more rich and transparent; and with a facility of execution perfectly enchanting. It is true they seldom exhibit much research of character or expression; what there may be of those qualities, was more probably a fortunate hit, than any result of meditation or intention. In this respect Jan Stein, and our own Wilkie, have as much the superiority over Teniers, as he possesses by the power of his execution.

At the first display of his powers he was not so successful as he merited, but it was not long that he lay neglected: the archduke Leopold being made acquainted with his merits, immediately distinguished him by his patronage; appointed him his principal painter; honoured him by making him a gentleman of his bed-chamber; presented him with a chain of gold, to which his portrait was affixed; and gave him the superintendance of his gallery of pictures, which contained works of the most distinguished masters of the Italian and Flemish schools. Of this gallery, Teniers made several pictures, in which he imitated the manners of the various masters so successfully, as to obtain the name of the Proteus of painting. He also amused himself by making compositions in the styles of different painters of renown, as Titian, Tintoretto, the Bassans, Rubens, &c.; and in their execution endeavoured to imitate the touch of those great men. These imitations are generally known under the name of pasticcios, and have frequently been mistaken for originals, and sold as such.

These were the amusements or indulgencies of idle fancy; his fame rests for more full and honourable support upon his original productions in his own proper style. He was a constant and faithful observer of nature; and in his favourite subjects, village festivals, fairs, and merry-makings, he has exhibited, with a most engaging freedom, the manners and characters of his countrymen. That he might conveniently mingle with the scenes he chose to represent, he established himself in the village of Perk, between Antwerp and Mechlin, and there, with a painter's eye, he observed the undisguised impulse of the natural character of the lower class among the people, and has left many beautiful and pleasing remembrances of occurrences uninteresting, nay sometimes disgusting in themselves, but rendered engaging by his delightful mode of representing them. One peculiar charm there is to be found in the best pictures of Teniers, more perfectly obtained than in the works of other artists, and that is, the complete effect of atmosphere, silvery, pure, and natural; Claude de Lorraine himself does not surpass him; and this truth, though yielded on simple materials, in scenes flat and insipid in their forms, yet makes amends for their natural want of interest by its truth and simplicity.

In the interior of apartments, of the cottage, the cabaret, the guard-room, or chemist's laboratory, he is not less admirable by his clearness and precision than in his exteriors. He surpassed Ostade in his knowledge of perspective, and in his freedom, as much as he is excelled by the latter in truth of of tone and completion of character. His pencil is exceedingly light and dexterous; and by continual practice upon the same system, he had acquired a promptness almost unparalleled. This freedom of execution enabled him to paint an immense number of pictures: it was not unusual for him to finish a picture in a day; and he used jocosely to observe, that to contain all the pictures he had painted, it would be necessary to have a gallery two leagues long. He not unfrequently assisted the landscape painters of his day, by putting figures into their pictures; and many works of Artois, Van Uden, Breughel, and many others, owe an increased value to this circumstance. His works are numerous in the collections of this country, and still bear very high prices. Teniers lived to the advanced age of eighty-four, and died at Brussels in 1694.

He had a younger brother named Abraham, who also painted the same kind of subjects in the same style, and from this circumstance his works are sometimes mistaken for those of David, though they are much inferior in taste and execution.

TENINE, in *Geography*, a town of South America, in the province of Tucuman; 20 miles S.W. of St. Yago del Estero.

TENIS, a lake of Russian Tartary, 60 miles in circumference. N. lat. 53° 20′. E. long. 74° 4′.

TENISON, Thomas, in *Biography*, archbishop of Canterbury, was the son of the Rev. John Tenison, rector of Mundesley, in Norfolk, and born in the year 1636. He received his university education at Benet college, Cambridge, of which he became a fellow in 1662. Having officiated for some time as a tutor in his college, he was presented in 1665 to the cure of St. Andrew the Great in Cambridge, and continued his attention to his parochial duty during the plague. In 1667 he became chaplain to the earl of Manchester, and obtained a rectory at Huntingdonshire. His first publication appeared in 1670, and was entitled "The Creed of Mr. Hobbes examined, in a feigned Conference between him and a Student in Divinity." In 1674 he was chosen principal minister to the church of St. Peter's Mancroft, Norwich; and in 1678 he published a "Discourse of Idolatry," and in 1679 "Baconiana," or some pieces of the great lord Verulam, with a general account of his writings. As he was one of the royal chaplains in 1680, he graduated D.D., and was presented by the king to the vicarage of St. Martin's-in-the-Fields, London. As an antagonist to popery, the apprehension of which was then very prevalent, he wrote several works against it, and also against Socinianism; and whilst he was guarding the church against those whom he conceived to be its enemies, he acquired still greater honour by liberal benefactions to the poor, and by laying the foundation of an endowed school and public library, which he afterwards completed. He blended gravity with moderation to such a degree, as to command general esteem; and accordingly he was selected by the unfortunate duke of Monmouth to prepare him for his execution. He also conducted himself with so much prudence at court, that he is said to have had a personal interest even with James II. In the reign of William he avowed himself a friend to the dissenters and toleration; and after his promotion to the archdeaconry of London, he was appointed one of the commissioners for reviewing the Litany, with a view to the comprehension of the Separatists. He thus recommended himself to queen Mary, and by her interest he obtained the see of Lincoln, in 1691. Within three years he was unexpectedly advanced to the archiepiscopal see of Canterbury, more on account of his moderate and pacific principles, than for any pre-eminence to which he had attained among men of letters or theologians. He attended queen Mary on her death-bed; and incurred the severe animadversions of the deprived bishop Ken, for not having reminded her majesty of her culpable want of duty to her father, by consenting to wear a crown which rightfully belonged to him. His conduct during the reign of king William was uniformly consistent with his principles, and both were so pleasing to his majesty, that he distinguished the prelate by many tokens of respect and confidence. In the reign of queen Anne, he was not, as we may naturally imagine, much regarded; more especially as he retained his just ideas of toleration, and resisted, though not without a share of obloquy, some of the high-church measures which were then countenanced. Nevertheless he displayed on various occasions his attachment to the established church, as well as his habitual bounty to the indigent. His last public act was the coronation of George I.; and afterwards sinking under the decay of advanced age, he closed his life at Lambeth, December 1715, in the seventy-ninth year of his age. As he left no issue, he bequeathed a considerable part of his property to charitable purposes. His character was uniformly respectable; and his conduct in difficult times was irreproachable and exemplary. Biog. Brit. Gen. Biog.

TENMENTALE, or Tenmantale, in our *Ancient Customs*, originally signifies the number of ten men, which number, in the time of the English Saxons, was called a decennary; and ten decennaries made what we call an hundred.

These ten men were bound for each other to preserve the public peace; and if any of them was found guilty of a breach of it, the other nine were either to make satisfaction, or to bring the criminal before the king.

Tenmentale was also used for a duty, or tribute, paid to the king, consisting of two shillings for each ploughland; probably thus called, because each person of the decennary was bound to see it paid.

TENNA, in *Geography*, a river which rises in the Apennines, and crossing the marquisate of Ancona, runs into the Adriatic, about 4 miles E.N.E. of Fermo.

TENNE', Tenny, or *Tawney*, in *Heraldry*, a bright colour, made of red and yellow mixed; sometimes also called *brusk*, and expressed in engraving by diagonal lines drawn from the dexter to the sinister side of the shield, traversed by perpendicular lines from the chief; and marked with the letter T.

In the coats of all below the degree of nobles, it is called *tenny;* but, in those of nobles, it is called *hyacinth;* and, in princes' coats, the *dragon's head.*

TENNEAH, in *Geography*, a town of Bengal; 35 miles N. of Midnapour.

TENNEBERG, a mountain of Saxony, in the principality of Gotha; 4 miles S.W. of Gotha.

TENNELIE'RES, a town of France, in the department of the Aube; 4 miles E. of Troyes.

TENNESSEE, one of the United States of America, situated between 35° and 36° 30′ N. lat., and 4° 26′ and 13° 5′ W. long. from Washington. It is bounded on the north by Kentucky and part of Virginia, on the south by Georgia and the Mississippi territory, on the east by North Carolina, and on the west by Missouri territory. Its extent from north to south is 102 miles, and from east to west 420 miles. Its area is 40,000 square miles, or 25,600,000 acres. The Indian claim has been extinguished in two portions of this country, the eastern and the western, comprehending one-third part of the state. The former is bounded north by Virginia, from the south-east corner of Kentucky, to the north-west of North Carolina; easterly by North Carolina;

Carolina; westerly by Cumberland mountain, Emery's river, &c.; and southerly by a line marked from place to place, as a continuation of the Cherokee boundary. The western tract, thus purchased of the Indians, lies on Cumberland river, and is bounded north by Kentucky; easterly by a line running from the north-east to the south-west; and south and west by a line of several thousand angles, run according to the Tennessee Ridge, which separates the waters of the Cumberland from those of the Tennessee river. The general course of this ridge-line is first westerly, and then north-westerly; which, imagining the zigzag reduced into two straight lines, makes the figure of the tract a trapezium. The longest side is that adjoining Kentucky, the length of which, ascertained by measurement, is nearly 160 miles. The length of the easterly side is about 90 miles. The eastern is generally called the Holston settlement, and the western the Cumberland settlement, from those two prime rivers, which traverse the countries respectively. Between these settlements lies a spacious wilderness, which the Cherokees claim and traverse in hunting, and which, from one limit of their claim to the other, as the road goes, is about 70 miles wide.

This state, as it was erected and organized in 1796, is divided into three districts. The eastern settlement is divided into two districts, Washington the eastern district, and Hamilton the middle district. The western settlement is the third or Mero district. The number of counties, &c. may be seen in the following topographical table.

East Tennessee.

Counties.	No. Inhabitants.	Chief Towns.
Anderson - - -	3959	
Bledsoe - - -	8839	Marysville.
Blount - - -	3259	Maryville.
Campbell - - -	2668	
Carter - - -	4190	Elizabethtown.
Claiborne - - -	4798	Tazewell.
Cocke - - -	5154	Newport.
Granger - - -	6397	Rutledge.
Greene - - -	9713	Greenville.
Hawkins - - -	7643	Rogersville.
Jefferson - - -	7309	Dandridge.
Knox - - -	10171	Knoxville.
Rhea - - -	2504	Washington.
Roano - - -	5581	Kingston.
Sevier - - -	4595	Sevierville.
Sullivan - - -	6847	Blountsville.
Washington - -	7740	Jonesborough.
	101367	

West Tennessee.

Bedford - - -	8242	Shelbyville.
Davidson - - -	15608	Nashville.
Dickson - - -	4516	
Franklin - - -	5730	Winchester.
Giles - - -	4546	Pulaski.
Hickman - - -	2583	
Humphrey - -	1511	
Jackson - - -	5401	Williamson.
Lincoln - - -	6104	Fayetteville.
Montgomery - -	8021	Clarkesville.
Maury - - -	10359	Columbia.
Overton - - -	5643	Monroe.
Carry forward -	78264	
Brought forward -	78264	
Robertson - -	7270	Springfield.
Rutherford - -	10265	Jefferson.
Summer - - -	13792	Gallatin.
Smith - - -	11649	Dixon's Springs
Stuart - - -	4262	
Wilson - - -	11952	Lebanon.
Williamson - -	13153	Franklin.
White - - -	4028	Sparta.
Warren - - -	5725	M'Minville.
	160360	

The following counties have been laid out since the last census was taken:

Greenville,
Wayne.

The eastern part of this state is mountainous, the middle part hilly, and the western part mostly level. The climate among the mountains is said to be delightful; in the middle part, temperate and agreeable; in the western part, hot in summer, and mild in winter. The diseases to which the adult inhabitants have been most liable are pleurisies, rheumatisms, and rarely agues and fevers; but, upon the whole, the inhabitants are generally healthy, and this salubrity of the state has been partly attributed to its having few stagnant waters. The principal rivers of this state are the Cumberland, the Holstein or Holston, the Tennessee, the Clinch, the Notachuckey or Nolichucky, the French Broad, the Hiwassee, the Duck, the Redfoot, the Obian or Oby, the Forked Deer, and the Wolf. The chief of these rivers are described under their appropriate names. The mountains in this state are numerous; some of them, particularly the *Cumberland* (which see), or Great Laurel Ridge, are the most stupendous piles in the United States. Stone, Yellow, Iron, Bald, Smoky, and Unaka mountains adjoin each other, and form, in a direction nearly north-east and south-west, the eastern boundary of the state. In these mountains are innumerable caverns and cascades. North-west from these, and separated from each other by vallies from 5 to 15 miles wide, rise Bay's mountain, Copper Ridge, Clinch mountain, Powell's mountain, and Welling's Ridge. The four last terminate north of the Tennessee river, and these, as well as the others, are branches of Virginia mountains. They are all encircled by vallies, which open channels for rivers and roads for passage. Although the soil on the mountains is poor, that of the vallies is fertile; improving in the middle of the state, and in the western part becoming rich. It produces cotton, which is the staple commodity, and the principal article of export, tobacco, indigo, Indian corn, hemp, flax, rice, wheat, rye, oats, barley, and all kinds of vegetables in high perfection. The trees and plants found in this state are poplar, hickory, black and white walnut, all kinds of oaks, buck-eye, beech, sycamore, black and honey locust, ash, hornbeam, elm, mulberry, cherry, dogwood, sassafras, papaw, cucumber-tree, coffee-tree, and the sugar-tree. In the eastern district is a species of pitch-pine, useful for boards, timber, and tar. The under-growth, in many places, and especially in low grounds, is cane, some of which is upwards of 20 feet high, and so thick as to prevent any other plant growing: there are also Virginia and Seneca snake-root, ginseng, Carolina pink, angelica, senna, lobelia, Indian physic, spice-wood, wild plum, crab-apple, haws, hazel-nuts, sweet anise, red bud ginger, spikenard, wild hop and grape vines. The glades are covered with wild rye, wild oats, clover, buffalografs, ftrawberries, and pea vines. On the hills, at the heads of rivers, and in fome high cliffs of Cumberland, are found majeftic red cedars; many of thefe trees are four feet in diameter, and forty feet clear of limbs. The commerce of this ftate is much facilitated by the rivers Tenneffee and Cumberland, and their refpective branches. Both thefe rivers empty into the Ohio, fhortly after they pafs the north boundary of the ftate. As the waters of the Cumberland from Nafhville, and of the Tenneffee from the Mufcle Shoals to the Ohio, are navigable to the Ohio and Miffifippi, the people of courfe, who live in this or the adjacent country, have the fame advantages of water conveyance for trade, as thofe who live on the Ohio or Miffifippi, to New Orleans or elfewhere. Befides, there is another probable avenue through which trade will be carried on with this and the adjacent country, which is from Mobile, up the waters of the Mobile river as far as it is navigable; thence by a land carriage, of about 50 miles at moft, to Ocochappo creek, which empties into the Tenneffee at the lower end of the Mufcle fhoals. The mouth of this creek is the centre of a piece of ground, the diameter of which is five miles, ceded by the fouthern Indians at the treaty of Hopewell, on Keeowee, to the United States, for the eftablifhment of trading pofts. The iron works of Tenneffee are large and numerous. The minerals of this country are iron-ore, limeftone, coal, copperas, alum, nitre, lead, and fome filver. Mineral fprings, ftrongly impregnated with fulphur, are found in various parts of the country. On the waters of French Broad river is a fine, large, clear, medicinal, warm fpring, the beneficial effects of which have been experienced by many perfons who have reforted to it from the Carolinas, Georgia, and northern parts of Virginia. Salt is manufactured in confiderable quantity, particularly on the north fork of Holfton. Some herds of the bifon are ftill found on the branches of the Cumberland river, though multitudes of them have been wantonly deftroyed. The ftag is occafionally found among the mountains; deer are fcarce; bears, panthers, wild cats, and wolves, ftill remain. Beavers, mufk-rats, and otters, are plentiful in the upper branches of Cumberland and Kentucky rivers. Racoons, foxes, opoffums, and fquirrels abound; as do alfo pheafants, partridges, pigeons, fwans, wild turkies, ducks, and geefe; as well as bald eagles, parroquets, loons, cranes, and buzzards. The rivers are well ftocked with all kinds of frefh-water fifh.

The chief towns of Tenneffee are *Knoxville*, *Nafhville*, and *Jonefborough;* which fee refpectively.

The prevailing denomination of Chriftians in this ftate is compofed of Prefbyterians, intermixed with Baptifts, Methodifts, and Friends. With a view to mental and moral improvement, feveral fchools and colleges are eftablifhed in this ftate. Three colleges are eftablifhed, one in Knox, one in Wafhington, and one in Greene county.

By the conftitution of this ftate, which was formed and ratified at Knoxville, February 6, 1796, the legiflative authority is vefted in a general affembly, confifting of a fenate and houfe of reprefentatives. The number of reprefentatives is to be fixed once in feven years, by the legiflature, according to the number of taxable inhabitants, who are to be numbered feptennially; the number of reprefentatives not to exceed twenty-fix, until the taxable inhabitants fhall be 40,000. The fenators are never to be lefs than one third, nor more than one half the number of the reprefentatives, and are to be chofen upon principles fimilar to thofe for the choice of reprefentatives. The election for members of both houfes is biennial. The executive power of the ftate is vefted in a governor, chofen by the electors of the members of the legiflature: he is appointed biennially, and is commander-in-chief of the army and navy, except in the fervice of the United States. Every freeman of 21 years of age, poffeffing a freehold in the county, and having been an inhabitant of the ftate for fix months preceding, may vote for the members of the legiflature. The houfe of reprefentatives has the fole power of impeaching, and the fenate of trying impeachments. The judicial power is vefted in courts of law and equity. County officers are fheriffs, coroners, truftees, and conftables. Military officers are to be elected by perfons fubject to military duty. Minifters of the gofpel are not eligible to a feat in the legiflature. No perfon who denies the exiftence of God, or a future ftate, can hold any civil office. The oath of allegiance and of office is to be taken by perfons holding any office of truft or profit.

In the character of the inhabitants there is nothing peculiarly difcriminating; but, in general, a great fimplicity of manners prevails. Among the curiofities of the country we may reckon its numerous caves; and on the Enchanted mountain there are on feveral rocks impreffions refembling the tracks of turkies, bears, horfes, and human beings, the latter having uniformly fix toes each. Befides thefe, there are many other fanciful figures. The Indian tribes within and in the vicinity of this ftate are the *Cherokees* and *Chickafaws;* which fee refpectively.

The country now called Tenneffee was included in the fecond charter granted by king Charles II. to the proprietors of Carolina; and in a fubfequent divifion, it conftituted a part of North Carolina. In 1754, at the commencement of the French war, not more than fifty families had fettled here, who were either deftroyed, or driven away by the Indians before the clofe of the following year. It remained uninhabited till 1765, when the fettlement of it commenced; and in 1773, (fuch was the rapid acceffion of emigrants,) the country as far weftward as the long ifland of Holfton, an extent of more than 120 miles in length from eaft to weft, was well peopled. In 1789, after fome preparatory meafures, the territory was ceded by the North Carolina legiflature, on certain conditions, to the United States. In 1790, February 25, congrefs paffed an act, accepting this ceffion; and, by another act, paffed May 26, 1790, provided for its government under the title of "The Territory of the United States of America fouth of the River Ohio." On the 8th of June following, the prefident of the United States, by and with the advice and confent of the fenate, appointed the Hon. William Blount, efq. a citizen of North Carolina, governor in and over the faid territory; in which office he continued during the territorial government, and was prefident of the convention that formed the conftitution under the title of "The Conftitution of the State of Tenneffee," of which we have given an abftract. The peace of the citizens of this territory has been difturbed many years paft, by Indian wars, or incurfions from the favages for the purpofes of murder and plunder: they are now at peace. In the year 1796, this territory was in due form erected into an independent ftate, making the fixteenth in the Union. Morfe. Melifh.

TENNESSEE *Ridge*, the moft confiderable range of mountains in the ftate of Tenneffee, feparating the ftreams which run to the Cumberland and Tenneffee rivers. In fome parts it rifes into abrupt hills, but in others admits of good roads. See CUMBERLAND *Mountain*.

TENNESSEE, called by the French Cherokee, and abfurdly by others the Hogohege river, is the largeft branch of the Ohio: it is 600 yards wide at its mouth. It rifes in the mountains of Virginia, N. lat. 37°; and purfues a courfe of about 1000 miles fouth and fouth-weft, nearly to

N. lat. 34°, receiving from both fides a number of large tributary ftreams. It then wheels about to the north, in a circuitous courfe, and mingles with the Ohio, nearly 60 miles from its mouth. From its entrance into the Ohio to the Mufcle fhoals, 250 miles, the current is very gentle, and the river deep enough, at all feafons, for the largeft row boats. The Mufcle fhoals are about 20 miles in length. The bed of the river in this diftance confifts of broken ftones, eafily removed; and the navigation will admit of much improvement. At thefe fhoals the river fpreads to the width of three miles, and forms a number of iflands, and is of difficult paffage, except when there is a fwell in the river. From this place to the "Whirl," or "Suck," where the river breaks through the Great Ridge, or Cumberland mountain, is 250 miles, the navigation all the way excellent. The Whirl, as it is called, is in about N. lat. 35°. It is reckoned a greater curiofity than the burfting of the Patowmack through the Blue Ridge. The river, which a few miles above is half a mile wide, is here compreffed to the width of about 70 yards. Juft as it enters the mountain, a large rock projects from the northern fhore, in an oblique direction, which renders the bed of the river ftill narrower, and caufes a fudden bend: the water of the river is of courfe thrown with great rapidity againft the fouthern fhore, whence it rebounds around the point of the rock, and produces the whirl, which is about 80 yards in circumference. Boats pafs the whirl without danger or difficulty. Such is the fituation of the fhore, that boats afcending the river may be towed up. In lefs than a mile below the whirl, the river fpreads into its common width, and except the Mufcle fhoals, already mentioned, flows beautiful and placid, till it mingles with the Ohio. Six miles above the whirl are the Chiccamogga towns, on the banks of the river, and of a large creek of the fame name.

TENNIS, a paftime, or well-known game at ball, introduced among our anceftors about the year 1222, the fixth year of Henry III., by perfons of fuperior rank and family, who erected courts or oblong edifices for the performance of this exercife. Some have afcribed the etymology of the word *tennis* to the French language, and accordingly have derived the game from France. But the word *tenez* does not afford fufficient evidence of its French origin. For the holding or keeping poffeffion of the ball is no part of the game; for, during the play, the ball is in continual motion, or paffing from one to another. Others feek the etymology of the name and the origin of the game in a place in France called Tennois, (or, by a change of one letter, Sennois, in the diftrict of Champagne,) where balls were firft made, and the game, as it is faid, firft introduced.

TENNIS, in *Geography*, the ruins of a town of Egypt, fituated on an ifland in a lake of the fame name; once a large city, built by the Romans, on the feite of a more ancient Egyptian town; 28 miles S.E. of Damietta. N. lat. 31° 2'. E. long. 32° 14'.

TENNIS, a lake of Egypt, 55 miles long, and about feven wide, which reaches from Damietta to Tineh, feparated only by a narrow tongue from the Mediterranean.

TENNIS, or *Tnifs*, a fea-port of Algiers, in the province of Tremecen, at the mouth of a river which runs into the Mediterranean oppofite a fmall ifland. Some geographers fuppofe this to be the ancient Jol, or Julia Cæfarea. Before the Turkifh conquefts, it was the metropolis of one of the petty royalties of this country; though a few miferable hovels are all that remains of it at prefent. Tennis has been long famous for the many loads of corn that are fhipped off from thence to Chriftendom; but the anchoring ground (for a harbour it cannot be called) that lies before it, being too much expofed to the north and weft winds, is the occafion that veffels are frequently caft away, unlefs they meet with calm weather. The Moors have a tradition, that the Tenniffians were formerly in fuch reputation for forcery and witchcraft, that Pharaoh fent for the wifeft amongft them to difpute miracles with Mofes. It is certain that they are the greateft cheats in this country, and are to be as little trufted to as their road; 24 miles W. of Sherfhell. N. lat. 36° 33'. E. long. 1° 10'.

TENNOLTEI, a town of Thibet; 63 miles N.E. of Harachar Hotun.

TENO, a river of Norway, which runs into the fea, 56 miles W.N.W. of Wardhuys.

TENON, in *Building*, &c. the fquare end of a piece of wood, or metal, diminifhed by one-third of its thicknefs, to be received into a hole in another piece, called the *mortife*, for the jointing or faftening the two together.

Among joiners, &c. the tenon is made in various forms, fquare, dove-tailed, for double mortifes, &c.

Vitruvius calls the tenons, *cardines;* dove-tailed tenons he calls *fubfcudes*, or *fecuriculæ*.

TENON-*Saw*. See SAW.

TENOR, TENOUR, the purport or contents, or tranfcript, of a writing, or inftrument in law, &c.

Warrants iffued for the confirmation of fentences, exprefs, that they fhall be executed according to their form and tenor. —It was impoffible to retain fo long a fpeech word for word, but the fubftance, or the tenor, is this.

TENOR, *Tenore*, Ital., in *Vocal Mufic*, implies the natural pitch or *tenour* of a man's voice in finging. In the vocal mufic of Italy, France, and Germany, there are three feveral tenor clefs in ufe at prefent: the *foprano* on the firft line, for the higheft part; the *contralto* on the third line, for the counter-tenor part; and the *alto tenore* on the fourth line, for the tenor part. (See CLEF.) In old mufic of the 15th, 16th, and 17th centuries, a tenor clef, called the *mezzo foprano*, on the fecond line, and even on the fifth line, frequently occurs, inftead of the *baritono*, or F clef, on the third line.

In inftrumental mufic, the tenor clef on the third line is ufed for the *alto viola*, and fimply *viola*, or tenor part. The tenor clef on the fourth line frequently occurs in violoncello parts and harpfichord leffons of the early part of the laft century; but at prefent, the high notes in the violoncello part, and in the bafe of pieces for the piano forte, are more frequently written in the treble clef.

TENOR, or *Tenorifta*, is alfo ufed for a perfon who fings the tenor part in concert; and alfo for an inftrument proper to play it.

TENORE *Indictamenti mittendo*, in *Law*, is a writ by which the record of an indictment, and the procefs thereupon, are called out of another court into the king's bench.

TENOS, in *Ancient Geography*, one of the iflands called Cyclades, S.E. of the ifland of Andros, and very near it, N.W. of Delos, and N.E. of Syros. All hiftorians agree in reporting that this ifland abounded with ferpents, whence it took the name of Ophiuffa, and in Greece that of the viper, or Tænia. It is faid that the inhabitants muft have abandoned it on this account, if Neptune had not refcued it from them. In confequence of this deliverance, they erected a magnificent temple to his honour, in a wood near the town of Tenos, and here they celebrated feafts in commemoration of him. This temple had very extenfive rights of afylum, which were afterwards regulated by Tiberius. The ifland was alfo called Hydraffa, on account of its waters. The town of the fame name was fituated near the fea, in the S.W.

S.W. part of the iſland. See Tino.—Alſo, a town of Greece, in Theſſaly.

TENOUR. See Tenor.

TENSA, in *Geography*, a river of Louiſiana, which forms with the Waſhita and bayou Long, an iſland of an oval ſhape, about 50 miles in circumference. Immediately above this iſland, there is another, called Sicilly iſland, about 30 miles in circumference. At the lower end of Sicilly iſland, the bayou Tenſa ſpreads into a lake of 15 or 20 miles in length, and nearly parallel with the Miſſiſippi. The Tenſa lake receives two conſiderable ſtreams, the river Aux Boeufs, and the bayou Maſçon.

TENSE, Time, in *Grammar*, an inflexion of verbs, by which they are made to ſignify, or diſtinguiſh, the circumſtance of time of the thing they affirm or attribute.

The affirmations made by verbs are different as to point of time; ſince we may affirm a thing *is*, or *was*, or *will be*: hence a neceſſity of a ſet of inflexions, to denote thoſe ſeveral times; which inflexions our Engliſh grammarians call by a barbarous word, *tenſes*; from the French *temps*: moſt other languages call them ſimply *times*.

There are but three ſimple tenſes; the *preſent*, as, *I love*, *amo*; the *preter*, *preterite*, or *paſt*, as, *I have loved*, *amavi*; and the *future*, as, *I will love*, *amabo*.

But, in regard that in the preter tenſe one may either expreſs the thing as juſt done or paſt, or indefinitely and barely that it was done: hence, in moſt languages, ariſe two kinds of preterite; the one *definitive*, marking the thing to be preciſely done; as, *I have written*, *I have ſaid*: and the other *indefinite*, or *aoriſt*, denoting a thing done indeterminately; as, *I wrote*, *I went*.

The *future* tenſe admits alſo of the ſame variety.

Beſides the three ſimple tenſes, others have been invented, called *compound* tenſes; expreſſing the relation of the ſimple ones to each other.—The firſt expreſſes the relation of the *paſt* to the *preſent*, and is called the *preterimperfect* tenſe, becauſe it does not mark the thing ſimply and properly, as done, but as imperfect, and preſent with reſpect to another thing paſt; as, *I was at ſupper when he entered; cum intravit, cœnabam.*

The ſecond compound tenſe marks the time paſt doubly, and is therefore called the *pluſquamperfect* tenſe; as, *I had ſupped; cœnaveram.*

The third compound tenſe denotes the future with reſpect to the paſt; as, *I ſhall have ſupped; cœnavero.*

The ſeveral tenſes, or times, it is to be obſerved, are properly denoted in the Greek and Latin by particular inflexions; in the Engliſh, French, and other modern tongues, the auxiliary verbs *to be*, and *to have*, *être* and *avoir*, are called in. As to the Oriental languages, they have only two ſimple tenſes, the *paſt* and *future*, without any diſtinctions of imperfect, more than perfect, &c.; but this renders thoſe languages ſubject to abundance of ambiguities, from which others are free.

The ingenious Mr. Harris, in his Hermes, p. 119, &c. propoſes the following theory of tenſes. The tenſes, he ſays, are uſed to mark preſent, paſt, and future time; either indefinitely, without reference to any beginning, middle, or end; or elſe definitely, in reference to ſuch diſtinctions. If indefinitely, then we have three tenſes, an aoriſt of the preſent, an aoriſt of the paſt, and an aoriſt of the future. If definitely, then we have three tenſes to mark the beginnings of theſe three times; three to denote their middle; and three to denote their ends: in all, nine. The three firſt of theſe tenſes he calls the inceptive preſent, the inceptive paſt, and the inceptive future. The three next, the middle preſent, the middle paſt, and the middle future. And the three laſt, the completive preſent, the completive paſt, and the completive future. Thus the tenſes in their natural number appear to be twelve; three to denote time abſolute, and nine to denote it under its reſpective diſtinctions. The following examples will illuſtrate the application and uſe of each tenſe. Aoriſt of the preſent, γραφω, *ſcribo*, *I write*; aoriſt of the paſt, ἔγραψα, *ſcripſi*, *I wrote*; aoriſt of the future, γραψω, *ſcribam*, *I ſhall write*. Inceptive preſent, μέλλω γραφειν, *ſcripturus ſum*, *I am going to write*; middle or extended preſent, τυγχανω γράφων, *ſcribo*, or *ſcribens ſum*, *I am writing*; completive preſent, γέγραφα, *ſcripſi*, *I have written*. Inceptive paſt, ἐμελλον γράφειν, *ſcripturus eram*, *I was beginning to write*; middle or extended paſt, ἔγραφον, or ἐτυγχανον γράφων, *ſcribebam*, *I was writing*; completive paſt, ἐγεγράφειν, *ſcripſeram*, *I had done writing*. Inceptive future, μελλήσω γράφειν, *ſcripturus ero*, *I ſhall be beginning to write*; middle or extended future, ἔσομαι γράφων, *ſcribens ero*, *I ſhall be writing*; completive future, *ſcripſero*, *I ſhall have done writing*. The author has particularly ſhewn what traces are diſcoverable in favour of this ſyſtem, either in languages themſelves, or in thoſe authors who have written upon this part of grammar, or in the nature and reaſon of things. Dr. Ward enumerates ſeven tenſes; *viz.* the preſent, paſt, and future imperfect; the paſt indefinite; the preſent, paſt, and future imperfect. See his Four Eſſays upon the Engliſh Language, p. 84.

TENSIFT, in *Geography*. See Tansift.

TENSION, Tensio, the ſtate of a thing bent, or the effort made to bend it.

Animals only ſuſtain and move themſelves by the tenſion of their muſcles and nerves. A chord or ſtring gives an acuter or deeper ſound, as it is in a greater or leſs degree of tenſion.

Tension, *Tenſio*, Τασις, in the *Ancient Muſic*, was uſed to ſignify any pitch of ſound, whether produced by intenſion or remiſſion. Vide Ariſtoxen. p. 10. 13. edit. Meibom.

Ariſtoxenus obſerves, there are five things to be conſidered about ſounds, *viz.* τασις, tenſion; ἐπιτασις, intenſion; ἀνεσις, remiſſion; οξυτης, acumen; and βαρυτης, gravitas.

TENSITES, in *Geography*, a mountain of Africa, in the empire of Morocco, on the borders of Sugulmeſſa; 60 miles E. of Morocco.

TENSOR, in *Anatomy*, a name given to different muſcles.

Tensor *Palati*, a muſcle of the ſoft palate. See Deglutition.

Tensor *Tympani*, a muſcle of the internal ear. See Ear.

Tensor *Vaginæ femoris*; *muſculus faſciæ latæ*; is an elongated and flattened muſcle, narrow above, and becoming conſiderably broader below, ſituated at the upper and outer part of the thigh, and extending from the anterior ſuperior ſpine of the ilium, to a ſhort diſtance below the great trochanter. It is covered by a thin layer of the faſcia; and it lies upon the rectus cruris, the vaſtus externus, and a ſmall part of the gluteus medius and minimus, ſeparated from them by a thin production of faſcia, and by copious cellular tiſſue. Its front edge is parallel, above, with the outer margin of the ſartorius: below, they are parted by an interval, occupied by the rectus anterior. The poſterior edge is connected above to the gluteus medius; being ſeparated from it below by cellular tiſſue. The upper extremity is attached to the anterior ſuperior ſpine of the os innominatum, between the ſartorius and the gluteus medius. The muſcle, which is here narrow, paſſes obliquely downwards and outwards, growing conſiderably broader and thinner, and terminates below the great trochanter, at the angle of ſeparation of the two layers of the faſcia, between which it is ſituated: this angle is its point

point of infertion. Its upper attachment is by means of a tendon, from which the fibres run to the fafcia.

It will bend the thigh on the pelvis; or carry it outwards; or rotate it inwards. When the thigh is fixed, it will incline the pelvis on that limb.

TENSTADT, in *Geography*, a town of Saxony, in Thuringia; 11 miles N.W. of Erfurt.

TENT, Tabernacle, a pavilion, or portable lodge, under which to fhelter, in the open field, from the injuries of the weather. See Tabernacle.

The word is formed from the Latin, *tentorium*, of *tendo*, *I ftretch*; in regard tents are ufually made of canvas, ftretched out, and fuftained by poles, with cords and pegs.

Armies encamp under tents: thefe are made of canvas, and are of various fizes. A captain's tent and marquée is generally $10\frac{1}{2}$ feet broad, 14 deep, and 9 high; thofe of the fubalterns are a foot lefs; the major's and lieutenant-colonel's a foot larger; and the colonel's two feet larger. The fubalterns of foot lie two in a tent, and thofe of the horfe one. The tents of private men are $6\frac{1}{2}$ feet fquare, and 5 feet high, and accommodate five foldiers. The tents for the horfe are 7 feet broad, and 9 feet deep; they hold five men, and their horfe-accoutrements.

Tents, *Bell*, are fo called from their refemblance to a bell, and ferve to fhelter the fire-arms from rain.

To pitch the tents, is to fix them up ready for habitation, by the affiftance of a ridge-pole, two ftandards, and a number of tent-pins.

Moft of the Tartars and Arabs are wandering people, that always lodge under tents.

The Hebrews lodged forty years under tents in the defarts; which gave occafion to the Scenopegia, or feaft of tabernacles.

Tent, *Dark*. See Dark.

Tent, in *Surgery*, fignifies a roll of lint or linen, for preventing the healing of openings, from which matter, or fome other fluid, makes its efcape. Tents are alfo employed for dilating openings. There are fome tents which are made of fponge that has been compreffed into as fmall a compafs as poffible, while filled with fluid wax, and then allowed to become cold. Thefe are called *fponge-tents*, and, on becoming warm, after being introduced into parts, they have the property of fwelling in a remarkable degree. We fhall only fay further upon this fubject, that, upon the whole, tents are not fo much employed in modern as in ancient practice; and there is no doubt, that, unlefs their ufe be guided by moderation and judgment, they may do confiderable mifchief.

TENTAMOODY, in *Geography*, a town of Hindooftan, in the circar of Rajamundry; 35 miles S.E. of Rajamundry.

TENTATIVE is fometimes ufed adjectively: thus we fay, a tentative *method*, meaning a kind of unartful or indirect method, which only proceeds by trying.

Tentative is alfo ufed fubftantively, for an effay or effort, by which we try our ftrength, or found an affair, &c. to fee whether or no it will fucceed.

In the French univerfities, tentative is the firft thefis, or act, which a ftudent in the theology-fchool holds, to fhew his capacity: if he anfwers well in this, the degree of bachelor is conferred on him.

TEN-TCHEOU-FOU, or Ten-choo-foo, in *Geography*, a city of China, of the firft clafs, in the province of Chang-tong, having under its jurifdiction one city of the fecond clafs, and feven of the third. It is fituated on a rifing ground, and fortified by a ftrong wall round it, and defended by a numerous garrifon. The fortifications of this city include a large fpace not occupied by buildings; and when it was laid out, it muft either have been expected that it would increafe in houfes to a greater number than that of thofe who now occupy it, or the vacant fpace was allotted for military or other exercifes. The bay, or rather road, of Ten-choo-foo, is not only open to the eaft and weft, but partially fheltered towards the north by groups of fmall iflands, fcattered about at different diftances, from five miles to twice as many leagues, off the main fhore. The Mi-a-tau iflands are too diftant to break off much of either wind or fwell from that quarter. The anchoring ground confifts in great part of hard fharp rocks; and at about $1\frac{1}{4}$ mile from the fhore is a dangerous reef, covered at high water, extending nearly a mile eaft and weft, round which the water fhoals fo fuddenly as to render any approach to it very perilous. At Ten-choo-foo is conftructed a kind of dock, or bafon, for veffels to load or difcharge their cargoes. The entrance into it is between two piers, and is from 30 to 40 feet wide. The ground near the coaft of the Yellow fea is richly cultivated, and rifes in a gentle afcent, which is terminated by high, broken, and barren mountains, apparently granitical. The paffage between Ten-choo-foo and the Mi-a-tau iflands is called in the chart the ftrait of Mi-a-tau, in which ftrait the rife and fall of the tide are about feven feet. Staunton's Embaffy, &c. vol. i.

TENTER, Trier, or *Prover*, a machine ufed in the cloth manufactory, to ftretch out the pieces of cloth, ftuff, &c. or only to make them even, and fet them fquare.

It is ufually about four feet and a half high, and, for length, exceeds that of the longeft piece of cloth. It confifts of feveral long, fquare pieces of wood, placed like thofe which form the barriers of a manege; fo, however, as that the lower crofs-pieces of wood may be raifed or lowered, as is found requifite, to be fixed at any height, by means of pins. Along the crofs-pieces, both the upper and under one, are hooked nails, called *tenter-hooks*, driven in from fpace to fpace.

To put a Piece of Cloth on the Tenter.—While the piece is yet quite wet, one end is faftened to one of the ends of the tenter; then it is pulled by force of arms towards the other end, to bring it to the length required: that other end being faftened, the upper lift is hooked on to the upper crofs-piece, and the loweft lift to the loweft crofs-piece, which is afterwards lowered by force, till the piece have its defired breadth. Being thus well ftretched, both as to length and breadth, they brufh it with a ftiff hair-brufh, and thus let it dry. Then they take it off; and, till they wet it again, it will retain the length and breadth the tenter gave it.

TENTERDEN, in *Geography*, is a fmall market-town in the hundred of the fame name, in the lathe of Scray, and county of Kent, England, fituated 18 miles S.S.E. from Maidftone, and 56 miles S.E. by S. from London. N. lat. 51° 4′ 8″. E. long. 0° 41′ 8″. At a remote period it was incorporated by the name of the "barons of the town and hundred of Tenterden;" which ftyle was changed to that of the "bailiff and commonalty," by letters patent of Henry VI., who at the fame time annexed it as a member to the town and port of Rye, in Suffex, to which it is yet fubject. Queen Elizabeth, in her forty-fecond year, granted the inhabitants a new charter, by which, in the place of a bailiff, &c. the future government of the town was vefted in a mayor, twelve jurats, twelve common-council men, a chamberlain, and a town-clerk. The prefent town-hall, which is occafionally ufed as an affembly-room, was built about the year 1792; the old one having been burned by an accidental fire. The market-houfe is a fmall, mean edifice of timber, now little frequented; the market itfelf being almoft difufed, though ftill nominally held on Fridays. A large fair is annually held for the fale of cattle, wool, fhop-goods, &c. According to the returns under the population act of the year 1811, the number of inhabitants in this town was 2786, that of houfes 459. Many of the latter are refpectable buildings, occupied by perfons whofe families have derived affluence from the grazing bufinefs carried on in the neighbouring marfhes. The parifh church is a fpacious ftructure, and confifts of a nave, north aifle, and chancel, with a well-built and lofty tower at the weft end, on which is fculptured the arms of St. Auguftine's monaftery, to which foundation this church was appropriated in 1259. Befides the church, here are two places of religious worfhip for diffenters of different denominations. Dr. Harris mentions an ancient free-fchool, founded here by one of the family of Heyman of Somerfield, and records fome donations made for its fupport. The truftees are the mayor and jurats, who, according to Hafted, are fo inattentive to the charity, that not any children are now educated on this foundation.

The chapelry of Small Hithe, in Tenterden parifh, was formerly, according to traditional report, a very confiderable place, but is now reduced to a few farm-houfes and cottages. The chapel was licenfed by archbifhop Warham, in 1509, "on account of the badnefs of the roads, and the dangers which the inhabitants underwent in their way to the parifh church, from the waters being out."—Beauties of England and Wales, vol. viii. Kent, by E. W. Brayley.

TENTH, in *Englifh Hiftory*. See LAND-*Tax*.

Tenths are faid to have been firft granted under Henry II., who took advantage of the fafhionable zeal for croifades to introduce this new taxation, in order to defray the expence of a pious expedition to Paleftine, which he really or feemingly had projected againft Saladine, emperor of the Saracens; whence it was originally denominated the Saladine tenth. But afterwards fifteenths were more ufually granted than tenths.

TENTH, *Decima*. See FIRST-*Fruits*, and TITHE.

TENTHS, *Office of*, is kept in the Temple, under the direction of a receiver and his clerks.

TENTH, in *Mufic*, the octave above the third, and an octave below the feventeenth, or ftop in the organ called the tierce. The tenth is a very pleafing confonance, but inferior in fuavity to the third; for which reafon the duets at the opera, fince the principal firft man's part has been performed by a tenor, have never given the audience that exquifite pleafure which they ufed to do, when fung by two fopranos.

TENTHREDO, in *Entomology*, a genus of the Hymenoptera order of infects, the characters of which are, that the mouth has a horny, arcuated mandible, within dentated; a ftraight jaw, obtufe at the apex; a cylindric, trifid lip, with four unequal filiform feelers; the wings flat, and tumid or flightly inflated; the piercers confifting of two ferrated, fcarcely prominent laminæ; and the fcutellum with two diftant granules.

The larvæ of this genus refemble thofe of the order Lepidoptera, or real caterpillars; but are diftinguifhed from them by their more numerous feet, which are never fewer than fixteen, exclufive of the three firft or thoracic pairs. When difturbed or handled, they ufually roll themfelves into a flat fpiral. They feed, like the caterpillars of the lepidoptera, on the leaves of plants; and undergo their chryfalis ftate in a ftrong gummy cafe or envelopement, prepared in autumn, out of which, in the enfuing fpring, emerges the complete infect. The tenthredines form a numerous genus, and are divided into tribes or fections, according to the form of the antennæ. Gmelin reckons 143 fpecies.

N. B. The European fpecies are marked with a ftar *, and the Englifh with a crofs †.

Species.

A. *Antennæ clavated.*

* FEMORATA. Antennæ yellow; black body; hinder thighs largeft; the larva green, with a blueifh line on the back, and yellow at the fides.

* MARGINATA. Antennæ yellowifh at the apex; black body; the hinder fegments of the abdomen white at the margin.

LUTEA. Antennæ yellow; fegments of the abdomen moftly yellow. This infect proceeds from a large green larva, of a finely granulated furface, with a double row of black fpecks on each fide, and a dufky dorfal line bounded on each by yellow. It feeds on various fpecies of willow, alder, and beech. The parchment-like cafe in which it envelopes itfelf in autumn is of a pale yellowifh-brown colour; and the chryfalis, which is of a pale dufky or brownifh caft, exhibits the limbs of the future fly, in fize equal to a common wafp, and of a yellow colour, bound with black; the antennæ rather fhort, and ftrongly clavated.

AMERINÆ. Body cinereous; abdomen beneath red; white lip. This infect is fomewhat fmaller than the preceding: its caterpillar, like that of the former, is of a green colour, and of a finely roughened furface, powdered with numerous whitifh fpecks. Feeds on the willow.

TRISTIS. Black, with yellow antennæ, and wings brown at the apex; green larva, with an azure line on the back, black and yellow fringed.

VITELLINÆ. Abdomen above black; fides red; hinder thighs dentated; larva greenifh.

LUCORUM. Antennæ black; body villous black. Found on the beech and alder.

* FASCIATA. Black; antennæ black; primary wings with a brown band.

* SERICEA. Antennæ yellow; thorax black; abdomen braffy; larva green, with two yellow lines.

OBSCURA. Body fmooth and black. Found in the groves of Sweden.

CONNATA. Black; abdomen with yellow bands. Found on the alder.

* NITENS. Antennæ yellow; abdomen green-blueifh, fhining. Suggefted to be a variety of the fericea.

B. *Antennæ exarticulate, the outer ones thicker.*

CLAVICORNIS. Black; abdomen yellow; apex black. Found in North America.

ANNULATA. Black; abdomen yellow; hinder tarfi black, annulated with white.

* ENODIS. Antennæ fmooth; body black-blueifh; larva green, fpotted with black, a rough lateral line yellow, fharp tail.

CILIARIS. Antennæ beneath ciliated; hinder legs white. Found in Germany.

* USTULATA. Body black; abdomen blueifh; legs pale. On the canine rofe. Larva green, with two white lines; head teftaceous; obfcure band.

† CYANOCROCEA. Head and thorax bright-blue; abdomen faffron-coloured.

† ATRATA. Black; back, zone, and three arcs, yellow-greenifh.

BICOLOR. Black-blue; abdomen and bafe of the wings yellow; wings with a black band. Found in Auftria.

* MELANOCHRA. Black; abdomen yellow; a fmall black line

line on both ſides of the anus; legs and ſoles yellow; wings with a black ſpot.

* Tricolor. Head and thorax black; wings and feet brown; abdomen yellow.

* Ochropus. Head, thorax, middle of the breaſt, and apex of the hinder legs, black; abdomen and feet yellow.

C. *Antennæ pectinated.*

Cephalotes. Black; abdomen with four yellow zones or belts. Found in Germany.

† Dorsata. Whitiſh; head and back of the thorax and abdomen black.

D. *Antennæ pennated.*

* Pini. Antennæ lanceolate, and thorax ſubvillous; larva blueiſh, and yellow at the tail end.

Juniperi. Antennæ obtuſe; thorax ſmooth; larva green, pointed with black.

E. *Antennæ filiform, with from ſeven to nine Joints.*

Americana. Thorax yellow; abdomen blue; wings black. Found in Surinam.

Costalis. Black, with the rib of the wings ferruginous. Found in Germany.

Lateralis. Black; middle of the back red; ſides white. Found on the flowers of Sweden.

† Arcuata. Abdomen black; five arcs, with a band at the baſe and ſides, yellow-greeniſh.

* Rustica. Black; abdomen with three yellow belts, the hinder two interrupted; larva cinereous, with triangular brown ſpots on the back.

* Scrophulariæ. Antennæ yellow; abdomen with five yellow belts, the firſt more diſtant.

Abietis. Body black, with four ferruginous ſegments of the abdomen.

Germanica. Body black; thorax before and abdomen red. Found in the groves of Germany.

Padi. Black, with thighs and legs white.

Cynipiformis. Green-braſſy; yellow feet; hinder thighs braſſy.

Cerasi. Body black; ſcutellum and feet yellow; larva gelatinous, black.

Salicis. Body variegated. Found on the elder and willows.

Flavicornis. Yellow; head and tail black. Found in Germany and Italy.

Luteicornis. Bla k; with antennæ, mouth, baſe of the abdomen, and legs, yellow.

Mesomelas. Abdomen yellowiſh; back black; arcs yellowiſh.

Punctum Album. Body black; abdomen at the ſides white; hinder thighs red. Found in Germany.

† Blanda. Black; abdomen in the middle red; hinder thighs with a white ſpot.

Quadrimaculata. Black; hinder feet red; two ſpots at the baſe white.

* Rufipes. Body black; abdomen with two yellow belts; feet red.

* Campestris. Body black; abdomen with an unequal yellow belt; antennæ and legs yellow.

* Atra. Body black; feet red.

* Viridis. Body green; abdomen above brown.

* Ovata. Body black; thorax above red; larva greeniſh, ſprinkled with a kind of white powder.

Alni. Body black; head and thorax red.

* Cæruleſcens. Violet; abdomen yellow; wings with a brown ſpot.

* Pavida. Black; the abdomen with three ſegments, and feet ferruginous; larva green, ſprinkled with white farina; head yellow.

* Rosæ. Black; abdomen yellow, and ridge of the primary wings black; larva yellow, pointed with black.

* Bicincta. Body black; belt of the abdomen, anus, mouth, and legs yellow.

Cincta. Body black; the abdomen with a white belt; perhaps a variety of the former.

* Livida. Body black; antennæ before the apex white.

Albicornis. Black; antennæ at the apex white; legs teſtaceous; wings at the apex brown. Found in Italy.

Gonogra. Body black; knees teſtaceous. Found in Germany.

Nigra. Whole body black. Found at Upſal.

* Æthiops. Smooth, black; with the four fore-legs pale.

Rapæ. Body black; belly, feet, and ſcutellum whitiſh.

Septentrionalis. Feet poſterior, compreſſed and dilated; larva gregarious, green, ſpotted with black; yellow apices.

Opaca. Black; thorax with a ſpot on both ſides, red at the apex. Found in the gardens of Sweden.

Carbonaria. Black, with a white mouth; fore-legs teſtaceous. Found in Germany.

* Nassata. Yellow; ſcutellum and point of the wings white.

* 12-Punctata. Body black, with twelve white points.

Capreæ. Yellow; head, thorax, and abdomen above, black; wings with a yellow point.

Morio. Black; with pale feet. Found in Germany.

Annularis. Black, ſhining; antennæ white at the apex; legs ferruginous. In the gardens of Auſtria, perhaps a variety of the livida.

Ferruginea. Antennæ black, annulated with white; body ferruginous; thorax, breaſt, and vertex black. Found as the laſt.

Crassa. Black; feet and double points under the ſcutellum elevated, red. In Auſtria and Carniola.

Albicincta. Black; the belt at the baſe of the abdomen and legs with a ring milky. In Auſtria and France.

Vespiformis. Antennæ yellow; all the ſegments of the abdomen with yellow margins. In Auſtria.

Semicincta. Black; the belt of the abdomen broken behind, yellowiſh; the feet and abdomen beneath yellow. In Auſtria.

Viennensis. Black; abdomen with five yellow belts; the baſe of the antennæ fulvous. In Vienna.

Ribis. Black; legs and apophyſes of hinder thighs white at the exterior ſide. In Auſtria.

Fuliginosa. Black, with fuliginous wings. In Auſtria.

Dealbata. Black; the abdomen on both ſides marked with a white ſpot, hinder thighs clavated, yellowiſh. In Auſtria.

Alneti. Yellow; abdomen above black. In Auſtria.

Hæmatodes. Black, thorax before on both ſides red. In Auſtria.

Erythrogona. Black; the apex of the thighs and baſe of the legs red. In Auſtria and France.

Fulviventris. Black; with red and deep yellow abdomen. Found in Auſtria and Carniola.

Fulvivenia. Black; with the exterior margin of the wings fulvous, or deep yellow. Found at Vienna.

* Sulphurata. Black; antennæ ſubclavated; four fore-

fore-feet fulphureous; the hinder foles with three intermediate white joints.

* Flaveola. Antennæ fubclavated, black; bafe, mouth, fides, and five firft fegments of the abdomen and feet, yellow.

* Annulata. Yellow; antennæ fubclavated, black; apex of the thighs and foles annulated with black.

* Rubiginosa. Black; antennæ fubclavated, and bafe with feet yellow; third, fourth, and fifth fegments of the abdomen ferruginous.

* Subulata. Black; antennæ fubulate at the apex; fecond to the fifth fegments of the abdomen, as far as the hinder margin, legs and foles, yellow, and thefe annulated with black.

* Mucronata. Black, with the feven-knotted antennæ and abdomen yellow; the laft fegments from the fecond to the fourth black; the apex of the wings brown.

* Varia. Black; mouth, fcutellum, and fcutellar fpots, white; the hinder fegments of the abdomen and feet ferruginous.

* Sanguinolenta. Black; with the hinder feet fanguineous.

* Dealbata. Black; the three laft joints of the antennæ and jaws white; legs and foles yellow.

* Canescens. Grey-downy, brown, with grey wings.

* Bifasciata. Brown, with black thorax; mouth, fcutellum, and four fpots at the fcutel, white; abdomen with two interrupted yellow bands; margin of the wings and feet yellow.

* Braccata. Black, with red thighs; the bafe of the four hinder legs, and the three penultimate joints of the antennæ, white.

* Rufipes. Black; the bafe of the abdomen, with a fpot on both fides, and jaws, white; four fore-legs red.

* Melanoleuca. Black; mouth, thorax with a fmall line on both fides before the wings; a fpot on the hinder thighs; legs, the fides of the abdomen from five to feven fegments, and apex, white.

* Melanochra. Black; mouth, four fore-feet, and bafe-flexure of the hinder thighs, yellow.

* Leucopus. Black; the bafe-flexures of the thighs white; four anterior legs without, and middle of the hinder, white.

* Varicornis. Black, with red feet; fourth and fifth joints of the antennæ and hinder legs at their bafe, white.

* Obscura. Brown; with the rib of the wings as far as the fpot and feet teftaceous.

* Limbata. Black; the hinder margins of the fegments of the abdomen white; feet reddifh.

* Exalbida. Black; with feelers and four legs obfoletely white.

* Ferruginosa. Black; the antennæ ferruginous forwards; the bafe and anterior margin of the wings, the firft and fifth fegment of the abdomen, the legs and foles, white.

* Angusta. Black; body narrow and grey-downy.

* Lutescens. Black; with the abdomen beneath and feet yellow-reddifh.

* Albipes. Black; with legs and foles white.

* Flaviventris. Black; mouth white; abdomen yellow; back and apex black; feet teftaceous.

* Picea. Pitchy; anterior legs before, fpot of the hinder thighs, and bafe, white; hinder feet red; the knees and foles black.

* Fuscipes. Black; feet red; pofterior foles brown.

* Bimaculata. Pale; eyes, abdomen above the bafe, breaft and two fpots, black.

* Lata. Broad, black; the pofterior fegments of the abdomen white, from the fecond to the fifth interrupted.

* Annalicornis. Pale, the antennæ fpotted with black at the bafe; vertex of a branchy figure, eyes, and the conjugate points at the back of the thorax and abdomen, black.

* Scripta. Pitchy; mouth, and on the middle of the fore-part of the thorax the mark refembles V; the fpot on both fides the fcutellum white; two fcutellar points white; feet, and under margin of the fegments of the belly, yellow.

* Literata. Black; fegments of the abdomen from the fecond to the fifth in the back, ovated fpot on both fides and margins white; anterior feet, and four hinder legs on the fore-part, white.

* Melanorhœa. Black, with yellow abdomen; the tranfverfe fpots of the back and anus black.

* Geminata. Black, with geminated antennæ, and joints and legs pale.

* Ochrogustes. Pitchy; with the abdomen beneath and feet yellow.

* Ruficapilla. Head and thorax red; the pofterior margin of the latter and eyes black; the abdomen and feet yellow.

* Dubia. Black; thorax before red; joints whitifh.

* Pallescens. Black; mouth and feet pale.

F. *Antennæ fetaceous; many Joints.*

Erythrocephala. Body cæruleous; head red.

* Sylvatica. Body black: feet and marks of the thorax yellow.

* Nemoralis. Body black; fegments of the abdomen white at the fide.

* Cynosbati. Body black; feet ferruginous, hinder annulated with white and black.

Signata. Pale; thorax and three dorfal longitudinal fpots black. Found in Germany.

Populi. Black-blueifh; mouth, feelers, and legs yellow.

Vafra. Head black, variegated with white; feet teftaceous. Found in Sweden.

Reticulata. Wings varied with pale and brown, with elevated veins, white and reticulated. Found in Finland.

* Betulæ. Body red; thorax, anus, and eyes black; wings behind brown.

* Flava. Yellow, with the fpot on the wings ferruginous.

Hæmorrhoidalis. Black; with the anus and feet teftaceous. In Germany.

† Nemorum. Middle of the abdomen red; fcutellum and point on the wings white.

Depressa. Head and thorax black; marks yellow; abdomen and feet ferruginous. In Auftria and France.

Linearis. Black; legs, and five bands of the filiform abdomen, yellow. In Auftria.

Bipunctata. Antennæ fub-fetaceous; nine joints black, and two points of the black fcutellum white.

G. *Of doubtful Order.*

Intercus. Black; with yellow feet and fubclavated antennæ.

Rumicis. Found on the dock.

Ulmi. Found on the leaves of the wild elder.

Pruni. Found on the plum-tree.

Loniceræ. Brown, tomentofe, fhining, with fubclavated antennæ, and fubferruginous wings.

* Polygona. Black; antennæ fubclavated with eighteen knots;

knots; the hinder margin of the fegments of the abdomen from the third to the fifth yellow-greenifh; the thighs black; the face anterior at the apex and the legs yellow; the hinder at the apex black; the foles yellow; the linear abdomen compreffed.

TENTOLI, in *Geography*, a town of the ifland of Celebes, near the north extremity, on the weft coaft, which gives name to a road. N. lat. 1°.

TENTORES, among the Romans, were perfons appointed to hold the clothes of the charioteers that contended in the circus.

TENTUGAL, in *Geography*, a town of Portugal, in the province of Beira; 7 miles W.N.W. of Coimbra.

TENTYRA, or TENTYRIS, in *Ancient Geography*, a town of Egypt, and capital of a nome, which took the name of *Tentyrites*, according to Strabo, Pliny, Ptolemy, and Steph. Byz.

TENTZEL, WILLIAM-ERNEST, in *Biography*, a German antiquary and hiftorian, was born, in 1659, at Greuffen, in Thuringia, and finifhed his education at Wittemberg, directing the courfe of his ftudies to philofophy and the Oriental languages, and alfo to hiftory, both facred and profane. In 1685 he was appointed a teacher in the gymnafium at Gotha, and entrufted with the care of the duke's collection of antiquities and coins. In order to qualify himfelf for the more honourable difcharge of his duties as hiftoriographer to the houfe of Saxony of the Erneftine line, to which office he was appointed in 1696, he vifited various courts in Germany, and carried on an epiftolary correfpondence with many diftinguifhed foreigners. In 1702 he removed to Drefden, where he was made hiftoriographer to the elector of Saxony, king of Poland, by whom he was honoured with the title of counfellor; but his manners not being adapted to a court, he obtained leave to retire. What remained of his life was devoted to literary purfuits; and he died, very poor, in November 1707, in his 49th year. His works were numerous, among which we may reckon the following: *viz.* "De Phenice," Vitemb. 1682, 4to.; "De Ritu Lectionum Sacrorum," Vitemb. 1685, 4to. a work highly commended by Bayle; "Judicia Eruditorum de Symbolo Athanafiano ftudiofè collecta et inter fe collata," Francf. et Lipf. 1687, 12mo.; "Animadverfiones in Cafimiri Ordine Supplementum de Scriptoribus Ecclefiafticis," 1688, 12mo.; "Cafparis Sagittarii Hiftorici Saxonici Hiftoria Gothona plenior, &c." Jena, 1700, 4to.; "Supplementum Hiftoriæ Gothonæ," ibid. 1701, 4to.; "Supplementum Hift. Goth. fecundum," ibid. 1701, 4to.; "Saxonia Numifmatica, Pars I." Francf. et Lipf. 1705, 4to.; "Pars II." 1705. Tentzel was alfo a contributor to feveral literary journals. Gen. Biog.

TENUIROSTRÆ, in *Ornithology*, the name of a genus of fmall birds, which feed on infects, and have flender and fharp beaks; of this genus are the lark, fwallow, red-breaft, and a number of others. Ray's Ornithology.

TENUME, in *Geography*, a town of Arabia, in the province of Nedsjed; 40 miles N. of Aniza.

TENURE, in *Agriculture*, the manner in which proprietors and tenants hold their lands, &c. of their landlords, or other perfons.

It may be noticed, that the tenures of lands are extremely various in almoft every diftrict of the kingdom, being, however, chiefly *freehold*, *free-farmhold*, *copyhold*, *long-leafehold*, or *life-leafehold*, though there are many other local forts of tenures of land. The freehold is moft probably in the largeft proportion over the whole country, the copyholds in the next, and the leafehold tenures in the fmalleft extent. It has been remarked in the Shropfhire Agricultural Report, that it appears beautiful in theory, that there fhould be one rule of defcent in a kingdom only, one tenure of property, and one fcale of political rights; but that it may be doubted whether fo much uniformity is fuitable to an imperfect ftate; or at leaft to our prefent degree of improvement. At all events, irregularities that are not attended with much practical inconvenience, fhould not be pointed out as obnoxious, in a fcheme that has produced fo much pofitive happinefs, and fo much comparative good, as the conftitution of thefe kingdoms has afforded.

It is ftated too, in the Agricultural Survey of Effex, that freehold eftates are the moft valuable to the immediate proprietor, there can be no doubt; but the purchafer of a copyhold may remember, that the original purchafe is by fo much the lower; and whether he lets the occupation to a tenant, or farms and cultivates it himfelf, he may poffibly make as good intereft of his capital as if he had bought a freehold. Perhaps, alfo, its general and final utility to the public, may be nearly or quite the fame. This, the writer thinks, is certain, that copyhold eftates, whether in the hands of the proprietors or tenants, are as well cultivated as the free, excepting only in the article of timber, and even in that the difference is feldom vifible. The like may be faid of leafehold eftates, and even of thofe in mortmain.

In Hertfordfhire, where a large portion of the property is held by copyhold tenure, with a fine certain or at the will of the lord, but which fine never exceeds two years' rent, the land fells at about fix years' purchafe under the price of freehold, according to the Report of the ftate of agriculture for that diftrict. And it is further fuggefted in the latter of the two former of the above agricultural furveys, that, with regard to the tenures by which the more temporary occupiers hold their farms, they are, as already obferved, extremely various, fome upon leafes of longer or fhorter duration, fome without any leafe at all, agreeably to the tafte and pleafure of the landlord; though by far the greateft number, efpecially of thofe in the poffeffion of the fmaller proprietors, are let upon leafes of from eight or ten to twenty-one years. And it is obferved, from what has been done in Norfolk and other counties where the tenures are of more length, as from feven to twenty-one years, that the improvement of the land is much connected with the practice of fuch tenures. And it is likewife fuggefted in the Gloucefter Report on Agriculture, that it were much to be wifhed that a general rule could be adopted for the commencement and end of tenures; as it would ultimately, the writer thinks, be highly advantageous to landlords and tenants, and will probably be one refult of the labours of agricultural focieties.

Some fuppofe the freehold tenure to poffefs the moft numerous advantages, with the feweft inconveniences, of any fort of holding. But many are of opinion that fome other kinds are equal to it, or nearly fo. The forms of tenure throughout moft of the fouthern parts of England, are principally thofe of the freehold, copyhold, life-leafe, church-leafe, and college-leafe kinds, both for lives and years. In Cornwall they are for the moft part freehold, with the exception of the lands of ecclefiaftical corporations and ancient duchy land, which is equivalent to copyhold in fee, held under the duke of Cornwall, fubject to a fmall annual rent. This fort of land paffes by furrender in the duchy courts, nearly in the fame form as other copyhold lands. But the modern duchy is different from the above; the occupiers being leffees under the duke, and, in general, are purchafers of an intereft in the land during the continuance of the longeft liver of three lives, the confideration being, in part,

 a fine

a fine paid at the time of the grant, and alfo a referved rent during the continuance of the leafe.

There are three different kinds of church-leafe in this diftrict; as demifes to tenants for the longeft of three lives; the confiderations being money and referved rents; demifes to manorial tenants for three lives in the fame way; the takers having the liberty, during the whole time, to underleafe to other tenants in the manner of copyholds for three lives; and grants of leafes for twenty-one years abfolute, giving frefh leafes at the end of every feven, which is a renewal of the firft. Thefe are firft made in confideration of fines and referved rents, but in the renewals fines only.

In the fame diftrict, it has been much the cuftom, in refpect to the tenure of tenants, to grant leafes for lives, for the term of ninety-nine years, determinable on the death of the longeft liver of three lives, to be named by the taker. On the death of one of the lives named in the leafe, it was ufual for the landlords to confent to the adding a new life to the two which remained. The confideration in the primary grant was uniformly a fine in hand of from fourteen to eighteen years rent of the landed eftate, with a fmall referved rent, and fuit and fervice to the manor court; the renewal commonly a fine only of three years' rent for one life, or feven for two lives, without any alteration of the other rent.

A large proportion of the lands here are now held by the tenantry under thefe leafes or tenures, but it muft be noticed, that the number of new grants, or the renewal of old ones, is on the decreafe; and feldom takes place, unlefs under particular circumftances and motives.

The holders under thefe leafes or tenures, which are called leafeholds or fine-leafes, are conftantly fubjected to all taxes and repairs of every kind, excepting that a fmall proportion of the land-tax in fome manors is repaid the tenant, as the land-tax of the referved rent. Under the property-tax, they were rated both as proprietor and occupier, except only that the landlord was liable to the property-tax for his referved rent.

It admits of fome doubt whether this mode of leafing or holding property be more detrimental to the lord, the tenant, or the public in general; but it is certainly a very injudicious and unwife method of proceeding, as it is highly injurious to the agriculture of the county, though at firft fight the fecurity and great length of the leafes might be fuppofed to have the contrary effect. It is found, however, in practice, that the circumftance of moft of the holders under thefe leafes having not only exhaufted in their purchafe and renewal the whole of their capitals, but often confiderably more raifed on them with great difadvantage, counteracts every good that might otherwife have been expected. It is afferted that, in common, cultivators of this fort, from the want of capital and other means, as well as the fpeculative nature of all fuch tenures, are neceffarily feeble and fpiritlefs, and that they live worfe, work harder, and are more inconvenienced, than any other kind of holders of land. And that where the landlords do not renew, they are frequently fufferers from the dilapidated and exhaufted ftate of the premifes.

It is alfo remarked by Mr. Vancouver, in his Account of the Agriculture of the County of Devon, in regard to thefe kinds of life-leafe tenures, that the mifchievous confequences infeparably connected with, and refulting from, the want of agricultural knowledge in thofe who have the direction and management of fuch eftates, and who, to cover the want of the neceffary qualifications of a land agent, moft commonly advife the proprietors to grant thofe life-hold tenures fo frequently heard of in this county and South Wales, are more injurious and extenfive than is generally apprehended. The fame capital employed in the purchafe of a leafe for ninety-nine years, determinable on three lives, applied to the ftocking, cultivating, and improving a more extenfive occupation held at a fair annual rent, and under an encouraging term of years, muft, it is fuppofed, produce, in the contemplation of fuch property, very different emotions in the mind of the owner: to the occupier the refults are infinitely more advantageous; and to the public at large, a more abundant fupply is produced than can poffibly be derived from a capital employed in the purchafe of a more narrow occupation on an eventually undifturbed poffeffion of ninety-nine years. But notwithftanding, an opinion prevails with fome noblemen and others in this county, that it is better to realize at forty years' purchafe, than to fuffer the lifehold tenures to fall in without renewal. Fortunately for the future improvement and profperity of the county, the writer fays, this fpecies of tenure is become much leffened within the laft twenty years. In order to accomplifh this prepofterous object of the tenant's indolence and pride, it is obferved, he will employ his laft fhilling, and incur very heavy obligations among his friends and neighbours, to pay eighteen years' purchafe for a leafe only of that very farm, the fee of which might readily have been bought for about one-third more. Deftitute of capital, and encumbered with obligations contracted with his family and friends, the farmer enters his new occupation, depending upon cafual and agiftment ftock for the confumption of his pafture herbage. Having little or no referved rent to provide for, the efforts of himfelf and family are directed to the annual cultivation of fo much of his land as will pay the parochial and other fmall difburfements, and fupply the bare wants of the moft comfortlefs life it is poffible to conceive, leaving no brighter profpects to his offspring, than what the lapfe of ninety-nine years may do, by terminating a leafe fo injudicioufly purchafed. The fame is the cafe with thefe forts of tenures in many other diftricts of the kingdom.

There is a great number of tenures befides the above forts in the midland and more northern counties, fome of which are very curious and fingular. Tenures under the crown are likewife met with in thefe as well as moft other parts of the kingdom.

In that part of the country ufually denominated Scotland, the tenures by which lands are principally held may be claffed and confidered as thofe of fuperiority, property, and tack; the firft of which is merely nominal, and goes no farther than that of conferring the right of franchife; the fecond is a valuable tenure of land, as yielding and implying the full ufe and command of it to the fubject for all the purpofes of human life, excepting merely political power, which is attached as above, and may or may not be attached to the property; and the laft is the tenure for a term of years, by which profeffional farmers hold land from proprietors for the purpofes of agriculture. The origin of thefe forts of tenures, which feem to have been of a military or feudal nature, is more fully explained in Finlater's Agricultural Survey of the County of Peebles, to which the inquirer on this fubject is referred.

Tenure, *Tenura*, in *Law*, the manner or condition in which a tenant holds lands or tenements of his lord; or the fervices performed to the lord, in confideration of the ufe and occupancy of his lands.

The kinds of fervice, and confequently of tenures, are almoft infinite. See Service.

Thofe for lands held of the king are either *great*, or *petty fergeanty*, *in capite*, *knight's fervice*, &c.

Thofe held of the lords were very various, *bafe*, *frank*, &c. by *homage*, *focage*, &c. See Base, Frank, &c.

The

The common tenures at this day are, fee-fimple, fee-tail, by courtefy, in dower, for life, or for years, or by copy of court-roll.

TENURE, *Barons by ancient.* See BARON.

TENURE, *Difturbance of*, is a fpecies of injury which confifts in breaking that connection which fubfifts between the lord and his tenant, and to which the law pays fo high a regard, that it will not fuffer it to be wantonly diffolved by the act of a third perfon. If, therefore, there be a tenant at will of any lands or tenements, and a ftranger, either by menaces or threats, or by unlawful diftreffes, or by fraud and circumvention, or other means, contrives to drive him away, or inveigle him to leave his tenancy, this the law very juftly conftrues to be a wrong and injury to the lord; and gives him a reparation in damages againft the offender by a fpecial action on the cafe. Blackft. Com. vol. iii.

TENUTE, Ital. in *Mufic*, generally written *ten*, from the Italian verb *tenere*, to hold on, fuftain to the laft moment of a note's duration. See SOSTENUTO.

TENYA, in *Geography*, a town of Africa, in the country of Foota. N. lat. 10° 15′. W. long. 10° 25′.

TEN-YANG, a town of Corea; 73 miles E.S.E. of King-ki-tao.

TENZEGZET, a town of Algiers; 16 miles S. of Tremecen.

TENZYN, a town of Poland, in the palatinate of Cracow; 20 miles W. of Cracow.

TEOATZINCO, a town of Mexico, in the country of Tlafcala, where a bloody battle was fought between the natives and the Spaniards under Cortez; 20 miles E. of Tlafcala.

TEOLO, a town of Italy, in the Paduan; 7 miles S.S.W. of Padua.

TEOLY, a town of Hindooftan, in the circar of Gohud; 15 miles S.E. of Gwalior.

TEOMAHAL, a fmall ifland in the Sooloo Archipelago. N. lat. 6° 15′. E. long. 120° 51′.

TEONA, a fmall ifland near the weft coaft of Scotland. N. lat. 56° 47′. W. long. 5° 50′.

TEOPISCAN, a town of Mexico, in the province of Chiapa; 60 miles S.E. of Chiapa dos Efpagnols.

TEOS, in *Ancient Geography*, a town of Afia Minor, in Ionia, on the fouthern coaft of a peninfula, which became an ifland when the fea was high or much agitated. It was fituated over-againft the ifle of Samos, S.W. of Smyrna, and E. of the promontory of Coryceon. It is celebrated for having been the birth-place of Anacreon. The inhabitants were renowned for their courage: they preferred abandoning their city to living under the tyranny of the Perfians. Teos was treated with mildnefs by the Roman emperors. Bacchus had a magnificent temple here, which Vitruvius has particularly defcribed. Here alfo was held a general council for the management of all the affairs of Ionia, becaufe this city was in the centre of Ionia.—Alfo, the name of a town of Scythia.

TEOWENISTA CREEK, in *Geography*, a river of Pennfylvania, which runs into the Alleghany, about 5 miles below Hickery.

TEPAPA. See TAROATAIHETOOMO.

TEPEACA, in *Geography*, a town of Mexico, in the province of Tlafcala; 15 miles S.S.E. of Puebla de los Angelos.

TEPEGUANA, a diftrict of New Brafil, fituated on the Nazas.

TEPELLENE′, a town of Albania, the birth-place and favourite refidence of Ali, fituated on the banks of a river, which at the diftance of 60 miles from the fea appears to be as broad as the Thames at Weftminfter bridge. The ftreets of the town, containing about 400 ill-built houfes, are extremely dirty; but the palace of the vizier is very magnificent.

TEPE-MAXTLATON, in *Zoology*. See FELIS *Tigrina*.

TEPETISTAC, in *Geography*, a town of Mexico, in the province of Guadalajara; 60 miles N. of Guadalajara.

TEPETOTOTL, in *Ornithology*, the name of a Brafilian bird of the gallinaceous kind, more ufually called *mituporanga*. See CRAX *Alector*.

TEPHLIS, or TELPHIS, in *Ancient Geography*, a town of Afia, in the vicinity of Media.

TEPHRIA, in the *Natural Hiftory of the Ancients*, a name given to the grey ophites.

TEPHRICA, in *Ancient Geography*, a town of Afia, in the neighbourhood of Cilicia and Armenia.

TEPHROMANTIA, τεφρομαντεία, in *Antiquity*, a fpecies of divination, performed with afhes; for which fee Potter, Archæol. Græc. tom. i. p. 353.

TEPHROSIA, in *Botany*, from τεφρος, *afh-coloured*, in allufion probably to the hoary afpect of the herbage.—"Perf. Syn. v. 2. 329." Purfh 489. (Erebinthus; Mitchell in Ephem. Nat. Curiof. v. 8. 210?)—Clafs and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminofæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, deeply divided into five ftraight, awl-fhaped teeth; the upper ones rather the fhorteft; the loweft rather longer than the reft. *Cor.* papilionaceous. Standard recurved, large, roundifh-obovate. Wings half-obovate, obtufe, ftraight, rather fhorter than the ftandard. Keel broad, rounded, gibbous, compreffed, the length of the wings. *Stam.* Filaments ten, all firmly united along the middle into a membranous tube; the tenth feparate at the bafe, and in its upper half; all capillary and diftinct at the extremity, fomewhat unequal in length; anthers terminal, uniform, ovate-oblong. *Pift.* Germen feffile, oblong, compreffed, very hairy; ftyle awl-fhaped, angular, afcending, hairy along the back; ftigma fimple, recurved, flightly hairy. *Peric.* Legume oblong, compreffed, hairy, fomewhat falcate or afcending, of two valves and one cell. *Seeds* feveral, compreffed, kidney-fhaped, rather angular, flightly feparated from each other by thin, imperfect, membranous partitions.

Eff. Ch. Calyx with awl-fhaped, nearly equal, teeth. Stamens all connected. Legume compreffed, rather coriaceous, of one cell, with many feeds. Stigma acute.

Obf. We have taken our characters from one certain fpecies, *T. virginiana*, comparing it with authentic original fpecimens of Mitchell's *Erebinthus*, which Linnæus thought the very fame fpecies, but in this he was certainly miftaken. It appears to be Mr. Purfh's third fpecies, *T. hifpidula*; and as far as we can judge, from fpecimens that will not admit of diffection, and from Mitchell's defcription, it is moft probably of the fame genus, for Mitchell might overlook the partial union of the ftamens, even fuppofing that character to exift in his plant. If we were certain of this, his name ought, by every right, to be preferred to the more modern one of Perfoon. (See EREBINTHUS.) The genus moreover is improperly placed in the fixth fection of *Diadelphia*, while its effential character indicates that it belongs to the firft.

1. T. *virginiana*. Virginian Grey-Vetch. Purfh n. 1. (Galega virginiana; Linn. Sp. Pl. 1062, excluding Hort. Cliff. and Mitchell's fynonyms. Willd. Sp. Pl. v. 3. 1244. Ait. Hort. Kew. v. 4. 355. Cicer aftragaloides (fortè) virginianum, hirfutie pubefcens, floribus amplis fubrubentibus; Pluk. Phyt. t. 23. f. 2.)—Erect, hoary, and

and ſhaggy. Leaflets numerous, oval-oblong. Cluſter terminal, many-flowered.—In dry ſandy woods, from Canada to Florida, flowering in June and July. *Root* perennial. *Plant* about a foot high. *Flowers* very handſome, roſe-coloured and yellowiſh-white. *Purſh.* The *ſtem* is ſimple, leafy, angular, brown, clothed with hoary pubeſcence. *Leaves* alternate, nearly ſeſſile, pinnate, of from 17 to 21, not quite oppoſite, entire *leaflets*, each about an inch long, hairy on both ſides, tipped with a minute point. *Cluſter* ſolitary, various in length, compoſed of numerous large *flowers*, not unlike thoſe of a Lupine. *Calyx* denſely hairy. *Legume* an inch and a half long, pointed, linear, hairy, ſomewhat undulated, and a little curved upward, tumid where the ſeeds are lodged. Miller appears to have cultivated this plant in 1765. We have never ſeen a living ſpecimen. That we have here deſcribed was ſent by Kalm to Linnæus. The *legumes* came from Jacquin's herbarium.

2. T. *chryſophylla.* Golden-leaved Grey-Vetch. Purſh n. 2. (Galega villoſa; Michaux Boreal.-Amer. v. 2. 67? *Purſh.*)—Proſtrate, downy. Leaflets five, ſomewhat wedge-ſhaped, very obtuſe. Flower-ſtalks oppoſite to the leaves. Legume nearly ſtraight. — Gathered in Georgia by Mr. Enſlen, flowering in July and Auguſt. Perennial. *Leaflets* wedgeſhaped-obovate; ſmooth above; ſilky at the back. *Stalks* elongated, bearing about three purple *flowers.* The ſingular circumſtance of the nearly ſeſſile *leaves* gives it the appearance of a trifoliate plant, the lower pair of leaflets reſembling *ſtipulas.* Michaux's ſynonym is rendered doubtful by his not mentioning the ſmall number of *leaflets*, one of the moſt ſtriking characters. *Purſh.*

3. T. *hiſpidula.* Hiſpid Grey-Vetch. Purſh n. 3. (Galega hiſpidula; Michaux Boreal-Amer. v. 2. 68. G? ſpicata; Walt. Carol. 188. Erebinthus; Mitch. as above. Clitoria, *n.* 3; Linn. Hort. Cliff. 498, excluding the very erroneous reference to Burmann.)—Slender, diffuſe, downy. Leaflets numerous, oblong-elliptical, abrupt, pointed. Flower-ſtalks oppoſite to the leaves. Legume falcate, hiſpid. — In pine woods and on ſlate hills, from Virginia to Georgia. Perennial, flowering from July to September. *Leaflets* 13 or 15. *Stalks* elongated, bearing from three to five pale-red *flowers.* *Purſh.* Every part of this deſcription anſwers to the original ſpecimens of Mitchell's plant, but he, as well as Linnæus, ſpeaks of the tenth *ſtamen* as being really ſeparate from the reſt. We cannot from our ſpecimens determine this point. The *ſtems* are long, branched, trailing, round, and hairy. *Leaflets* with ſtrong oblique tranſverſe veins; ſometimes ſmooth above; always ſilky beneath; their length about an inch. *Bracteas* lanceolate. *Calyx* very briſtly. Perhaps the union of the tenth *ſtamen* to the reſt, which is not in the uſual mode continued quite to the baſe, even in *T. virginiana*, may exiſt leſs, or not at all, in the ſpecies before us, and yet the plants may together conſtitute one natural genus.

TEPID, in *Natural Hiſtory*, a term uſed by writers on mineral waters, to expreſs ſuch of them as have a leſs ſenſible cold than common water.

They diſtinguiſh all the medicinal ſprings into three kinds; the hot, the tepid, and the cold: but the middle term might eaſily be miſunderſtood to mean a great deal more than they expreſs by it: all that have what can be called the leaſt ſenſible warmth, are called *hot;* and the tepid are diſtinguiſhed from the abſolutely cold, only by their being leſs cold.

Some of this claſs of mineral waters, and ſome few alſo of the cold ones, have a ſharpiſh vinous taſte, which is never obſerved in any of the hot ones. This taſte is loſt on giving the waters the ſlighteſt heat, and is therefore very difficult to be gueſſed at as to its origin. It is not only found in the aluminous and vitriolate waters, but alſo in thoſe which are manifeſtly nitrous, and which abound in ſulphureous ſalts, quite different in their nature from acids. It is therefore an additional ſomewhat, quite diſtinct from the ſaline properties of the fluid, and as eaſily connected with one kind of that as with the others.

The cauſe of heat in the mineral waters remains yet wholly unknown, notwithſtanding all that has been written concerning it. It is hard to believe, that there are continual ſubterranean fires near enough the ſurface, to give a heat that preſerves itſelf in ſo great a degree to the very place of their eruptions; and it is equally hard to conceive, that there can be beds of fermenting mineral matters, ſufficient in quantity and force to have given the ſame degree of heat to waters for ſo many ages, as ſome of our hot ſprings are known to have ſubſiſted. Duclos's Exam. des Eaux Miner.

TEPIDARIUM, among the Romans, a tepid or blood-warm bath, which was joined to the cold and hot baths, and was a medium between the two; ſo that if any perſon wanted to go from the hot to the cold bath, or *vice verſâ*, he always took the tepid bath in his way.

TEPIQUE, in *Geography*, a town of Mexico, in the province of Xaliſco; 5 miles N. of Xaliſco.

TEPIRU, a town of South America, in the province of Tucuman; 18 miles N.W. of St. Yago del Eſtero.

TEPKAS, a Ruſſian ſettlement in North America, on the eaſt ſide of Beering's ſtrait. N. lat. 66°. E. long. 112° 4′.

TEPLITZ, a town of Bohemia, in the circle of Leitmeritz, celebrated for its warm baths, diſcovered in 762; 14 miles W.N.W. of Leitmeritz. — Alſo, a town of Croatia; 8 miles S. of Varaſdin.

TEPLOW, Gregory Nicolaicuitsch, in *Biography*, a Ruſſian writer, educated in a ſeminary at Novogorod, where he diſtinguiſhed himſelf by a Latin tranſlation of prince Cantemir's Satires, and a work on the geography of Ruſſia, neither of which was ever printed. In 1740 he was employed in the Academy of Sciences, and in forming a catalogue of objects contained in the Cabinet of Natural Hiſtory. He thus acquired a taſte for that ſcience, and particularly for botany; in conſequence of which he was made an adjunct of the Society in 1741, and in the following year delivered lectures on moral philoſophy, that were much approved. The empreſs Elizabeth appointed him tutor and travelling companion to her favourite, count Raſumouſky, who, on his return from his travels in 1746, was made preſident of the Academy of Sciences. Teplow then became an honorary member, directed the inſtitution in the name of the preſident, and drew up rules for its better regulation. At the time of the empreſs's death he was a counſellor of ſtate; but as he was an enemy to Peter III., he was arreſted: afterwards he was reſtored to favour; nevertheleſs, two months after his being made a member of the council of ſtate, it was diſcovered that he had joined in a conſpiracy to dethrone that unfortunate prince. After the depoſition of Peter, he publiſhed manifeſtations, in order to render him odious, and, as Buſching ſays, was the principal agent in putting him to death. For this ſervice he is ſaid to have received a reward of 20,000 rubles. The empreſs afterwards made him a privy-counſellor and member of the ſenate, and honoured him with the orders of Alexander Newſky and St. Ann. He died in March 1779; and his works, in the Ruſſian language, are, "A General View of Philoſophy;" "Inſtructions to his Son;" "A Collection of Songs, with Melodies for three Voices;" "Inſtructions for

for the Cultivation of foreign Tobacco, in Lesser Russia," distributed by order of the empress through that province, in 1763. Gen. Biog.

TEPOTI, in *Geography*, a river of Paraguay, which runs into the Paraguay.

TEPPELWODA. See TOPPLISWODA.

TEPTERE, a name originally Tartarian, and signifying a man who cannot pay his taxes, given by the Russians to a peculiar tribe formed of Finns and Tartars in the middle of the 16th century, during the dissolution of the Khazan-Tartarian empire. They established themselves at first in that part of the Ural mountains, which belongs to the government of Ufa. At present they are so much intermingled, that their origin is scarcely discernible. They are found to increase in number at every succeeding census. In the year 1762, about 34,000 of them paid the imposts.

TEPTON, in *Geography*, a town of Thibet; 30 miles N.W. of Sgigatchee.

TEPWIA, a town on the W. coast of the island of Celebes. S. lat. 1° 4'. E. long. 119° 10'.

TEQUENDAMA, a cataract near Bogota, the capital of New Granada (see BOGOTA), which, according to Bouguer, is one of the highest in the world, being 200 or 300 fathoms in height, and its fall vertical. Its real height is probably about 1320 feet. The river Funza, which is here very considerable, passes along a narrow channel, on a high table land, and is poured as from the spout of a vase, in one arch of the enormous height above specified, the noise being heard at the distance of seven leagues. This fall is received in a vast cauldron of more than a league in circumference; and the quantity of water, and violence of its descent, form a continual mass of clouds, which renders it scarcely visible in the evening; but in the morning it is more striking, being decorated with numerous rainbows according to the position of the spectator. The vast rocks which form the cauldron also excite admiration, being as regular and polished as if cut with a chissel: the surrounding heights are covered with trees, shrubs, and flowery plants, while the splendid appearance of some of the birds, and the music of others, render the cataract of Tequendama alike sublime and beautiful.

TEQUEPA, a town of Mexico, in the province of Mechoacan, on a river near the Pacific ocean; 80 miles S.E. of Zacatula. N. lat. 17° 50'. W. long. 102° 26'.

TEQUERY BAY, a bay on the south-east coast of Cuba, near Cape Cruz.

TEQUIA, a town of New Grenada; 32 miles S.W. of Pamplona.

TEQUIXQUIACATZANATL, in *Ornithology*. See GRACULA *Quiscala*.

TER, in *Geography*, a river of Spain, which rises in the county of Cerdagne, and runs into the Mediterranean, about 20 miles E. of Gerona.

TERA, a small river of Spain, which runs into the Orbega, in the province of Leon.

TERACE, in *Rural Economy*, a term provincially applied to a coarse hair sieve, for separating the inferior flour from the bran.

TERAIN, in *Geography*, a river of France, which runs into the Oise, near Creil.

TERAKACO, a peninsula on the east coast of New Zealand, of which Cape Table forms the eastern point.

TERAMNUS, in *Botany*, so called by Browne, apparently in allusion to its delicately-shaped legume, τέραμνοτης being used particularly to express the tenderness of eatable pulse: ἀτέραμνος was a weed hostile to leguminous plants.—Browne Jam. 290. Swartz Prodr. 105. Ind. Occ. 1238. t. 25. Schreb. 489. Willd. Sp. Pl. v. 3 971. Mart. Mill. Dict. v. 4.—Class and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminosæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, two-lipped, permanent; its upper lip rather the largest, divided; lower three-cleft; all the teeth acute, erect, converging. *Cor.* papilionaceous. Standard inversely heart-shaped, spreading, somewhat deflexed. Wings nearly as long, erect, approximated, rounded at the extremity. Keel very small, concealed in the calyx between the bases of the wings, and covering the stamens, separable into two petals. *Stam.* Filaments ten, all united in their lower part into one set; only five of them perfect, the five intermediate ones being minute, without anthers, and shorter; anthers five, roundish. *Pist.* Germen cylindrical, slender, downy; style none; stigma capitate, roundish. *Peric.* Legume linear, bordered, compressed, with numerous constrictions. *Seeds* several, roundish, compressed, abrupt at the summit.

Ess. Ch. Keel minute, concealed in the calyx. Stamens all connected; the five alternate ones without anthers. Stigma sessile, capitate. Calyx two-lipped. Legume linear, with many seeds.

1. T. *volubilis*. Smaller Teramnus. Swartz Ind. Occ. 1241. t. 25. Willd. n. 1, excluding all the synonyms.—Leaflets ovato-lanceolate, downy beneath.—Native of rather moist bushy alpine places, in the southern part of Jamaica. The *stem* is herbaceous, or slightly woody at the base only, from two to four feet high, twining, slender, triangular, downy, simple or divided. *Leaves* alternate, distant, stalked, each of three *leaflets*, mostly obtuse with a small point, entire, ribbed and veiny, smooth and bright-green above; downy beneath; sometimes accompanied by a pair of smaller ones at the base. Their common *footstalk* is about an inch long, channelled, downy, with a pair of minute linear *stipulas* at the base. *Clusters* axillary, slender, simple, longer than the leaves, of several small reddish-blue *flowers*, in distant couples, on short partial stalks. *Legume* an inch long, slender, hairy, its point finally hooked; the valves spiral after bursting.

2. T. *uncinatus*. Great Hooked Teramnus. Swartz Ind. Occ. 1239. Willd. n. 2. (T. n. 1; Browne Jam. 290. Dolichos uncinatus; Linn. Sp. Pl. 1019. Phaseolus hirsutus, siliquis rectis et aduncis; Plum. Ic. 215. t. 221. Ph. sylvestris minor, flore minimo, siliquis longis teretibus albâ lanugine hirsutis; Sloane Jam. v. 1. 182.)—Leaflets oblong; silky beneath; hairy above.—Native of dry bushy places, in various parts of Jamaica. The *root* is long and slender. *Stem* herbaceous, subdivided, twining, slender, triangular, its angles hairy and somewhat bordered; the base woody. *Leaflets* one and a half or two inches long; their common *stalk* an inch, or inch and a half. *Stipulas* small, downy, deciduous. *Clusters* axillary, stalked, often a span long, twice the length of the leaves, many-flowered. *Flowers* in distant pairs, small, reddish. *Legume* two inches long, straight, narrow, compressed, hairy, ending in a bluntish hooked point.

TERAMO, in *Geography*, a town of Naples, in Abruzzo Ultra; the see of a bishop, immediately under the pope; 22 miles N.N.E. of Aquila. N. lat. 42° 37'. E. long. 13° 49'.

TERANE', a town of Egypt, on the west branch of the Nile; 18 miles N.W. of Cairo. N. lat. 30° 30'. E. long. 30° 45'.

TERANO, a town of Naples, in Calabria Citra; 3 miles W. of Bisignano.

TERASARSUK, a town of East Greenland. N. lat. 59° 55'. W. long. 43°.

TERASPURG, a town of Auſtria; 2 miles N. of Egenburg.

TERATOSCOPIA, formed of τερας, *prodigy*, and σκοπεω, *I conſider*, a kind of divination by the appearance and view of monſters, prodigies, ſpectres, and phantoms.

TERBEDH, in the *Materia Medica*, a name given by Avicenna to the *turbith*, a purging drug, mentioned by all the authors of his time; but, in general, in a very confuſed manner.

Garcias tells us, that the Indians uſe it to purge phlegm, and that they add ginger to it by way of corrective; and Avicenna ſays the ſame thing of its uſe in his time.

TERBURGH, Gerard, in *Biography*, a painter of domeſtic ſcenes of exquiſite ſkill, was born at Zwoll, in the province of Overyſſel, in 1608, the ſon of a painter little known, from whom he received the rudiments of the art. He began his career as a painter of portraits in ſmall, and had acquired conſiderable reputation, when he determined upon travelling through Germany and Italy. Unengaged by the ſublimer beauties of art which the latter country offered to his view, he never changed his ſtyle, but went thence to Paris to practiſe it; and there met with conſiderable ſucceſs. From thence he returned to Holland, and was highly appreciated, and fully employed. He attended the congreſs aſſembled at Munſter in 1648, for the negociation of the treaty of peace, and there painted his celebrated picture containing portraits of the plenipotentiaries and principal perſonages aſſembled on that occaſion, which is regarded as his maſter-piece; and of which there is a print by Suyderhoef. While engaged upon this work, he was invited by count Pigorando, the Spaniſh ambaſſador at the congreſs, to viſit Spain, and went there in conſequence; where he was moſt favourably received, and much employed. The king conferred upon him the order of knighthood, and rewarded him munificently for the pictures he painted. Beſides portraits, which conſtituted the principal part of his practice, he frequently painted converſations, muſical parties, ladies at their toilettes, and domeſtic ſubjects, which he executed with a free, but rather a heavy pencil, not equal to the brilliancy of Metzu and Netſcher, but nevertheleſs exceedingly meritorious and agreeable; particularly in the cloſe imitations of his draperies. He died in 1681, at Deventer, where he ſettled on his return from Spain.

TERCERA, or Terceira, in *Geography*, one of the Azores iſlands, ſuppoſed to have derived its name from its ſtanding the third in this cluſter of iſlands in point of ſituation, though the firſt in dignity, as appears from a number of circumſtances, and particularly from its communicating its name to the reſt. This iſland is computed at 54 miles in circumference, and about 25 miles in length, by 15 in medial breadth. Its figure is almoſt circular, the coaſts high, and ſo ſurrounded with craggy rocks, that it is deemed impregnable; every acceſſible part on the coaſt being defended by ſtrong forts, heavy cannon, and a numerous and regular garriſon. The only tolerable port in the whole iſland is the harbour of Angra. The iſland of Tercera is fertile, pleaſant, and healthy: the very rocks, which elſewhere are dry and barren, produce here excellent vines, though not equal to thoſe raiſed in the Canaries and Madeira. The land yields large crops of wheat and other grain, paſture for cattle, and a prodigious variety of lemons, oranges, and all thoſe fruits peculiar to hot and cold climates, which are obſerved to be propagated to the greateſt advantage in temperate countries. Beſides Angra, there are ſeveral other towns and large villages in Tercera, with a number of forts and garriſons, under the direction of the governor, who has the power of filling up all vacancies that happen among the military officers. N. lat. 38° 45′. W. long. 27° 6′.

Tercera, a ſmall iſland in the Atlantic, near the coaſt of Sierra Leone.

TERCERO, a river of South America, which riſes in Tucuman, and joins the Salado on the borders of Paraguay.

TERCHIZ, or Tershiz. See Turshish.

TER-CHOOUZ, in *Ornithology*. See Upupa *Epops*.

TERDINA, in the *Materia Medica*, a name by which Paracelſus, and ſome other authors, have called the great garden-valerian. Ger. Emac. Ind. 2.

TERDOPIO, in *Geography*, a river of Italy, which runs into the Po, 12 miles E.S.E. of Lumello.

TEREBELLA, in *Natural Hiſtory*, a genus of the Molluſca order of Vermes; the characters of which are, the body oblong, creeping, naked, furniſhed with branchiæ at the ſides, more frequently in the tube; the mouth labiated, toothleſs, and projecting a clavated proboſcis; the tentacula or feelers about the mouth numerous, capillary, and ciliated. Gmelin enumerates eleven

Species.

Cirrata. Round, body with triple lateral pencils. Found in the ſandy bottom of the Iceland ſea.

Lapidaria. With eight cirri at the anterior parts of the body, about the mouth four. Found in the Mediterranean ſea, within the clefts of rocks.

Conchilega. Whitiſh, with numerous filiform cirri at the mouth, the upper longeſt; the branchiæ very red. Found in the ſea waſhing the coaſt of Holland.

Complanata. Depreſſed, mouth with four cirri; the lateral pencil-bearing warts of the body arranged on both ſides in a two-fold ſeries.

Carunculata. Depreſſed-quadrangular, with a fourfold ſeries of ventral pencils, and no cirri. Found in the American and Indian ſeas.

Rostrata. Tetraedrous, with a quadruple ſeries of pencils from the body, and palate elongated. Found in the Indian ſea.

Flava. Depreſſed, with thirty-ſeven branchiæ on both ſides, and bifurcated tail. Found in the Indian ſea.

Rubra. Red, depreſſed; tail terminating with two cirri; the head with two horny moveable jaws. Found in the ſea ſurrounding the iſlands of Zealand.

Aphroditois. Round, gradually attenuated backwards, below ſomewhat depreſſed with an obſolete furrow; no branchiæ in the eight firſt ſegments, in the following three ſimple, in the laſt ſenſibly greater, one being turned, pinnated. Found in the Indian ſea.

Bicornis. With a ſimple terminal two-horned diſc of the proboſcis. Found in the America ocean.

Stellata. With a perfoliated triple diſc of the proboſcis; the anterior armed with a truncated horn, radiated with prickles. Found in the American ocean.

Terebella, (dim. of *terebra*,) in *Surgery*, a trepan, or circular ſaw, for removing portions of the ſkull.

TEREBIA, in *Ancient Geography*, a town of Aſia, in the Greater Armenia, E. of the ſources of the Tigris. Ptolemy.

TEREBINTACEÆ, in *Botany*, the 94th order in Juſſieu's ſyſtem, the 12th of his 14th claſs, ſo denominated from the genus for which he chooſes to retain the old name of *Terebinthus*, but which is the *Piſtacia* of Linnæus. Many of the plants of this order abound in an eſſential oil of the nature of turpentine, or ſomething like it. The characters are as follow.

Calyx of one leaf, inferior, with a definite number of ſegments. *Petals* definite in number, (rarely wanting,) inſerted into the lower part of the calyx, alternately with its ſegments, with which they agree in number. *Stamens* either the ſame number, alternate with the petals, or twice as many, inſerted into the ſame ſpot. *Germen* ſuperior, either ſimple, or more than one, of a determinate number. When the germen is ſingle, the *ſtyle* is ſolitary, (rarely deficient,) with a ſimple or a divided *ſtigma;* when there are ſeveral germens, the ſtigmas equal them in number. *Fruit* either capſular, a berry, or a drupa, of one or more ſingle-ſeeded cells. Where there are ſeveral germens, there are as many ſtyles, or ſimple ſtigmas; and the ſame number of diſtinct ſingle-ſeeded capſules. The *ſeeds* are generally lodged in a bony nut. The *corculum* is without an *albumen*, its radicle lateral, and reflexed upon the lobes. *Stem* arboreſcent or ſhrubby. *Leaves* alternate, without *ſtipulas*, either ſimple, or ternate, or pinnate with an odd leaflet.

Section 1. *Germen ſimple. Fruit of one cell, with a ſolitary ſeed.*

This compriſes *Caſſuvium* of Juſſieu and Lamarck, which is the Linnæan *Anacardium; Anacardium* of the ſame authors, which is *Semecarpus* of Linnæus; *Mangifera; Connarus; Rhus;* and *Rourea* of Aublet, Schreber's *Robergia.*

Sect. 2. *Germen ſimple. Fruit of many cells, ſome of which are occaſionally abortive.*

Cneorum; Rumphia; Comocladia; Canarium; Icica of Aublet; *Amyris; Toddalia*, which is *Crantzia* of Schreber, *Scopolia* of Sm. Plant. Ic. (ſee SCOPOLIA); *Scinus; Spathelia; Terebinthus* of Tournefort and Juſſieu, the Linnæan *Piſtacia; Burſera; Toluifera; Tapiria* of Aublet, which is Schreber's *Jonquetia; Poupartia* of Commerſon, perhaps not different from our SPONDIAS *Mangifea;* and *Spondias* itſelf, compoſe this ſection.

Sect. 3. *Germen ſeveral. Fruit of many ſingle-ſeeded capſules.*

Here are only three genera; *Simaba* of Aublet, which is Schreber's *Zwingera; Aylanthus* of Desfontaines; and *Brucea* of L'Heritier.

Sect. 4. *Genera akin to Terebintaceæ, but differing in being furniſhed with a fleſhy albumen, which brings them near to* RHAMNI; ſee that article.

Cneſtis of Juſſieu, Lamarck Illuſtr. t. 387; *Fagara; Zanthoxylum*; and *Ptelea.*

Sect. 5. *Genera akin to Terebintaceæ, and (like the true plants of this order) deſtitute of a fleſhy albumen.*

Dodonæa; Averrhoa; and *Juglans.*

Juſſieu announces an intention of dividing this order into *Caſſuvia*, true *Terebintaceæ*, and *Zanthoxyla;* the firſt having ſimple leaves, a ſingle-ſeeded fruit, and an aſcending radicle; the ſecond generally pinnate or ternate foliage, a drupa with ſeveral ſingle-ſeeded nuts, and a deſcending radicle; and the third pinnate or ternate foliage, moſtly marked with pellucid dots; fruit of many cells or many capſules, each with ſolitary ſeeds; and a fleſhy albumen ſurrounding a ſtraight corculum. A fourth order would ariſe out of certain genera now intermixed with the reſt, but not properly coming under any of the three juſt defined, being themſelves perhaps entitled to lay the foundation of future orders, not as yet diſcovered.

TEREBINTHINA, in *Medicine, Natural Hiſtory*, &c. See TURPENTINE.

TEREBINTHUS, in *Botany*, τερμιθος of Dioſcorides. See PISTACIA and TEREBINTACEÆ.

TEREBOTIN, a word uſed by Paracelſus for the common turpentine.

TEREBRA, from τερεω, *to bore*, a trepan, or trephine. Alſo, an inſtrument called a perforator, ſuch as is contained in the generality of caſes of trephining inſtruments, and is uſed for making a hole, in which the centre pin of the trephine is to work.

TEREBRATULA, in *Natural Hiſtory*, a name given by Mr. Lhuyd and Gualtieri to ſome ſpecies of the ſmooth conchæ anomiæ, which have near the head of the ſhell a ſmall hole, which looks as if bored by art. See CONCHÆ *Anomiæ*, and SHELLS.

TERECOL, in *Geography*, a town of Hindooſtan, in Concan; 16 miles N.N.W. of Goa.

TEREDO, in *Natural Hiſtory*, a genus of the Teſtacea order of Vermes, the characters of which are, that the animal is a terebella, with two hemiſpheric calcareous valves, cut off before, and two lanceolated; the ſhell is round, flexuous, and capable of penetrating wood. Gmelin reckons three

Species.

NAVALIS. The ſhell very ſlender, cylindric and ſmooth.

UTRICULUS. Shell ſolid, cylindric and undulated.

CLAVA. Shell clavated at one end, the other curved, narrower, obtuſe, and perforated in the middle.

The head of the Teredo navalis, called by Linnæus *calamitas navium*, is well prepared by nature for the hard offices it is to undergo, being coated with a ſtrong armour, and furniſhed with a mouth like that of the leech; by which it pierces wood, as that animal does the ſkin: a little above this it has two horns, which ſeem a kind of continuation of the ſhell; the neck is as ſtrongly provided for the ſervice of the creature as the head, being furniſhed with ſeveral ſtrong muſcles; the reſt of the body is only covered by a very thin and tranſparent ſkin, through which the motion of the inteſtines is plainly ſeen by the naked eye; and by means of the microſcope, ſeveral other very remarkable particulars become viſible there.

This creature is wonderfully minute when newly excluded from the egg, and at its utmoſt bigneſs is a foot long; three or four inches are however its more frequent length.

When the bottom of a veſſel, or any other piece of wood conſtantly under water, is inhabited and injured by ever ſo great a number of theſe worms, there is no ſign of the damage to be perceived on the ſurface, nor are the creatures viſible till the outer part of the wood is cut or broken away; then their ſhelly habitations come in ſight: theſe lie ſo near the ſurface, however, as to have an eaſy communication with the water, and there is a multitude of little perforations in the very ſurface through which the inhabitant inſects throw out the extremities of their little ſhelly horns; theſe are of a reddiſh colour, and may be diſtinguiſhed by an accurate obſerver in form of ſo many red prominent points; they all are retracted on the leaſt touch, and are thrown out again as ſoon as all is quiet. From theſe points, or the ſmall apertures which give them a way out, are the cells of the teredines to be traced. They are compoſed of a pearly or ſhelly matter, which forms a long tube with various windings and turnings, which mark the abode of the creature; but which uſually neither adheres to the body of the animal nor to the wood. Theſe caſes or tubes are always more or leſs looſe in the wood, and there is ever a large ſpace within them, for the body of the animal to be ſurrounded every way with water. They are very ſmooth on the inner ſurface, and ſomewhat rougher without; and are much harder and firmer in the cells of the older and larger animals than in thoſe of the young ones.

Theſe ſhelly tubes are compoſed of ſeveral rings, or annular

nular parts; but thefe differ greatly in their length. There is an evident care in thefe creatures, never to injure one another's habitations; by this means each tubule or cafe is preferved entire, and in fuch pieces of wood as have been found eaten by them into a fort of honey-comb, there never is feen a paffage or communication between any two of the tubules, though the woody matter between them often is not thicker than a piece of writing-paper.

The vaft increafe of thefe animals, and their fhelly tubules, naturally lead to a confideration of the manner of their generation; and when we confider that each of thefe creatures is, from the time when it is produced from the egg, immediately lodged in a cell, in which it lives without the leaft poffibility of getting into that of another animal of its own kind, or receiving one of them into its own, it is not eafy to account for the propagation of the fpecies in the common way. This, however, is folved by an accurate anatomical obfervation of the animals themfelves, fince in every individual the parts of generation in both fexes, and both the femen and ovula are found. Each individual therefore evidently ferves by itfelf for the propagation of the fpecies; and this is probably very often the cafe in earth-worms, and other of the hermaphrodite animals. All the yet known kinds of thefe being foft-bodied; and probably, though they often meet one another, and copulate in pairs, yet when they have not opportunity, the parts copulate in the individual.

Eggs are found in great plenty in the bodies of thefe animals in June, and are difcharged with the water into the fea, where the far greater part of them, doubtlefs, become food for other fmall marine animals; and the few that affix themfelves to any piece of wood they are wafhed againft, hatch and get into its fubftance in the manner of their parents.

The kind of wood in which thefe worms are lodged, makes a great difference in the appearance of their cells, as they work much more fpeedily and fuccefsfully in fome kinds than in others. The fir and alder are the two kinds they feem to eat with the greateft eafe, and in which they grow to the greateft fize. In the oak they feem to make but a very flow progrefs, and ufually appear very fmall, and poorly nourifhed. The colour of their fhelly tubules is often brown in this wood; which feems plainly owing to the effect of its juices.

Poifonous ointments are alfo found to be of fome ufe in deftroying them, on rubbing over the wood: fome have thought that burning the furface was an effectual way of preferving them, but this has been found to be otherwife. The fureft method of avoiding them in particular works, is the ufing of bitter or very folid woods; the firft kind they are found never to touch, and in the other they make but flow progrefs. Mixtures of lime, fulphur, and colocynth, with pitch, for covering over the furfaces of boards, &c. have been found of fome ufe.

It feems very evident, that boards and other pieces of wood have been fubject to be eaten by thefe animals, from all times that we have any knowledge of; for the ftone called *Lapis fyringoides* is evidently no other than wood thus eaten, petrified by long lying in the earth, together with the tubules of the worms. The maffes of this with the grain of wood yet plain in them, are common in many places among fea-fhells, and other marine remains at great depths, and have evidently been brought thither in very diftant times, and before thofe changes were made in the furface of the earth of which we have no accounts in our earlieft hiftories. Sellii Hift. Natur. *Teredinis*.

TEREDON, in *Ancient Geography*, a town of Afia, in Babylonia, on an ifland which was formed by the Tigris at its mouth. (Ptol.) Dionyfius Periegetes places the town of Teredon at the mouth of the Euphrates.

TEREK, in *Geography*, a mountain of Afia, between Great and Little Bucharia.

TEREK, one of the rivers that fall into the Cafpian fea. It originates in the Caucafian mountains, runs at firft towards the W. and S., but turns afterwards entirely to the E. and in about N. lat. 44°, and E. long. 65°, difcharges itfelf into the Cafpian. It takes up in its courfe the Bakfan, the Malka, and the Soonfha, among many other mountain-brooks and rivers. Its fource lies properly in the Snow-mountains of Caucafus, on the higheft partition-ridges of the frontiers of Georgia. It is rapid in its courfe; and, in the months of July and Auguft, when the fnow melts, fwells to the height of eight or ten feet above its ufual level in autumn, winter, and fpring; overflowing its banks, and inundating the adjacent country, forming for itfelf new beds, and choaking the old with fand. In its lower courfe, as far as Kitzliar, it is almoft entirely unaccompanied by woods; farther up, to Starogladka, by a few; and thence upwards, its banks are richly garnifhed with forefts, particularly of oaks, wild fruit-trees, and a variety of others. It does not freeze over every year, though in winter it abounds with driving ice. In this feafon its water is tolerably clear, which at other times, above Kitzliar, is turbid, with earthy particles; but when taken up, it foon becomes clear, and is then bright, well-tafted, and of good quality. Below Kitzliar, the river has a lefs fall, and feparates into feveral arms, in which the parted ftream flows fo gently, that it has time to depofit its earthy particles, which alternately fill up thefe arms; fo that one or the other occafionally reprefents the main river. In the lower regions, on the fhores of the Terek, are feen vineyards, mulberry and other fruit-trees, to which fucceed falt-lakes, and fprings of the fame nature. Its bed is formed moftly of fand and clay. With regard to fifh, the Terek, as well as all its collateral rivers, is poor. Yet there are caught in it fturgeon (acipenfer fturio), beluga (acipenfer hufo), ferruga (acipenfer ftellatus, Pall.), plenty of falmon, fat-fifh (cyprinus chalcoides), carp, barbel (cyprinus barbus), fhad, pike, fudak (lucio perca), perch (perca fluviatilis), lefchtfe (cyprinus barba,) otters, beavers, tortoifes, &c.

TEREK, in *Ornithology*. See SCOLOPAX *Cinerea*.

TERELLA, in *Geography*, a town of Naples, in the Molife; 4 miles N. of Molife.

TERENCE, PUBLIUS TERENTIUS, in *Biography*, a Latin writer of comedies, was born, as it is fuppofed, at Carthage about the year of Rome 560 (B.C. 194.) Being brought to Rome as a flave, when young, he was in the fervice of a perfon named Terentius, a fenator, from whom he derived his name. The purity and politenefs of his language evince his having enjoyed the benefit of a good Roman education. After his emancipation, he was honoured with the friendfhip of feveral Romans of rank, fuch as Scipio Africanus the younger, and the younger Lelius. His comedies were founded upon the Greek model, and tranflated, either wholly or in part, from the Greek. The firft comedy which he is faid to have brought upon the ftage, was the "Andrio," reprefented in the year B.C. 166. But though this was the firft of his comedies that was acted, it appears that it was not the firft which he had written. The fix comedies of Terence that are ftill extant were exhibited at Rome from the year B.C. 166 to 160. They were heard with great applaufe; the "Eunuchus" was repeated twice in the fame day, and he is faid to have received for it 8000 fefterces (about 64*l.*) Scipio and

Lelius, as tradition reports, had a great part in the composition of Terence's comedies. Terence himself in a prologue seems tacitly to acknowledge the fact. But modern writers and critics, who have reasoned on this fact, think it very improbable. Generals and statesmen were not persons likely to possess the habit of dramatic composition, whatever previous hints or subsequent corrections they might furnish; and besides it is observed, that no writings more strongly indicate by their style and manner that they are the production of a single hand than those of Terence. After he had presented these comedies to the public he departed for Greece, and never returned to Rome. Some have accounted for this circumstance, by supposing that he perished by shipwreck; others affirm that he died in Greece, from the grief he experienced on account of the loss of his baggage and some new comedies, which he had composed, by an accident at sea.

The judgment of critics on the performances of Terence has been very different, though their real merit is said not to be of difficult estimation. It is generally allowed that he is defective in invention and originality of observation. This sufficiently appears from his having Greek manners and characters in all his plays. He was likewise a plagiarist, with regard to the sentiments, as well as to the plots and incidents of his pieces; but a very competent judge observes, "that he is justly entitled to the praise of judicious selection, happy disposition, and purity and neatness of language; and that, as a Latin writer, in a style of elegance of which there are so few examples, he was highly prized in his own times, and is invaluable in ours. Cicero, who speaks of him as a translator of Menander, applauds him as the only one who had expressed in the Latin language all the politeness and amenity of the original; and Cæsar, in some well-known lines, calls him 'the lover of pure diction;' and also by the epithet of the *halved Menander;* and his regret that Terence did not possess the *vis comica*, as well as the other excellencies of his model, points out his deficiencies." Of the numerous editions of Terence, the most esteemed are the following; *viz.* the "Variorum," Amst. and Lugd. Batav. 1686; "Bentleii," Cantab. 4to. 1726; "Westerhovii," Hag. C. 4to. 1726; "Zeunii," Lipf. 8vo. 1774; "Brunckii," Basil, 4to. 1779. Voss. Poet. Lat. Gen. Biog.

TERENJABIN, in the *Materia Medica of the Ancient Arabians*, a word used to express a kind of manna called by some *manna mastichina*, from its round globules resembling the drops of mastich, and by the physicians of many parts of the world at present, MANNA *Persicum;* which see. See farther about this drug in Philos. Trans. N° 472. vol. xliii. p. 87.

TERES LIGAMENTUM, in *Anatomy*, one of the ligaments of the hip-joint. See EXTREMITIES.

TERES *Ligamentum Uteri.* See GENERATION.

TERES *Major* and *Minor*, two muscles of the shoulder, so called, because their figure is somewhat rounded.

The *teres major* (scapulo-humerien, le grand rond) is elongated and flattened, placed at the lower and back part of the shoulder, and extending from the inferior angle of the scapula to the posterior edge of the bicipital groove of the humerus. The latissimus dorsi, the skin, and the long head of the triceps, cover it behind; in front, it is covered by the latissimus, the axillary vessels and plexus of nerves, the short head of the biceps, and the coraco-brachialis. Its upper edge corresponds first to the teres minor, then is separated from that muscle by the long head of the triceps, and lastly corresponds to the subscapularis, from which the circumflex vessel and nerve separate it. The lower edge, covered by the skin, forms, with the latissimus, the border of the axilla. The inferior or external extremity of the muscle is fixed to the external surface of the inferior angle of the scapula, and to the neighbouring part of its lower edge: thence it ascends, passing obliquely outwards, retaining nearly an uniform breadth (about three fingers) throughout; and is attached to the posterior margin of the bicipital groove. The latter attachment takes place by means of a flattened tendon, about an inch broad, which corresponds in front to that of the latissimus dorsi. There is a small bursa mucosa between its posterior surface and the humerus. It lines the bicipital groove by some fibres, which meet those of the pectoralis major. Muscular fibres arise from the outer surface and inferior angle of the scapula, from the lower portion of the inferior costa, and from a septum between this muscle and the infraspinatus; and they terminate on the tendon just described. It carries the arm backwards; depresses it when it has been raised; rotates the humerus on its axis, so as to turn the arm inwards or forwards. In conjunction with the latissimus, and pectoralis major, it will fix the arm against the side. It will pull the scapula forwards or upwards to the arm, when that is fixed.

Teres minor (petit rond) is a small elongated muscle, lying at the posterior and under part of the shoulder, extending from the inferior edge of the scapula to the external tubercle of the humerus. Covered behind by the deltoid and skin, it covers in front the edge of the scapula, the infrascapular artery, the long head of the triceps, and the orbicular ligament of the shoulder-joint. Its upper edge is either continuous with the infraspinatus, so that they form but one muscle, or is separated from it by a cellular line. Towards the back part there is an aponeurotic septum between them. The lower edge is close to the teres major behind, but separated from it anteriorly by the long head of the triceps. The lower or posterior extremity is small and pointed, and begins its attachment to the scapula, just where that of the teres major ends, between the latter muscle and the infraspinatus: it passes obliquely upwards and outwards, fixed to the lower and outer edge of the scapula, and is inserted in the lower or back part of the great tubercle of the humerus. This insertion is effected by means of a tendon, closely connected to that of the infraspinatus, dispersing some of its fibres on the orbicular ligament, and receiving the fleshy fibres in all directions from the origin of the muscle. Its action has exactly the same effect with that of the *infraspinatus;* which see.

TERES *Folium*, in *Botany*. See LEAF.

TERESA, or THERESA, in *Biography*, a saint in the Roman Catholic church, was born, of a noble family, at Avila, in Old Castile, in March 1515. Her father, by reading the lives of saints to his family, inspired her, at an early age, with an enthusiastic fervour, which induced her to elope with one of her brothers, to seek martyrdoms among the Moors. When they were brought back, they indulged the same passion by constructing little hermitages in the garden, whither they retired to perform their exercises of devotion at twelve years of age. Teresa lost her mother, and was boarded in an Augustine convent, and this situation prevented her being seduced by the pleasures of the world, for which she began to indulge a propensity in consequence of reading romances; but for her farther security she took the veil in the Carmelite monastery of the Incarnation at Avila, in her twenty-second year. Her person was beautiful, and attracted the admiration and love of all who saw her; but her religious ideas, though tender and rapturous, were austere; and perceiving that the discipline of the house in which she resided was relaxed, she undertook a reform of the Carmelite order. After much opposition, she succeeded in establishing the firft monaftery of the female reform at Avila, in 1562, and having extended her plan to the religious males of the order, fhe founded in 1568 the monaftery of Dorvello, which was the origin of the more rigid, or barefooted, Carmelites. Her zeal and affiduity enabled her to found thirty religious houfes of the reform, fourteen for men and fixteen for women; and after her death it extended through all the Catholic countries of Chriftendom. Terefa died at Alva in October 1582, in the 68th year of her age. She was canonized by Gregory XV. in 1621; and afterwards became the patron faint of Spain. See CARMELITES.

TERESA, in *Geography*, a town of Spain, in the province of Valencia; 10 miles N.W. of Segorbe.

TERESSA. See TERRESSA.

TERETES, in *Horfes*, one of the three forts of worms which infeft the bodies of them, and which are very troublefome and injurious. See ASCARIDES, BOTS, and WORMS.

This fort of worm, which is found in horfes, refembles the common earth-worms in many refpects, being only fharper at both ends, callous towards the middle, and they do not contract or dilate themfelves fo eafily. Some of thefe, which have been feen to come from horfes, hinder them from thriving till they are diflodged by proper remedies.

TERETRUM, in *Surgery*. See TEREBRA.

TERFEZ, in *Natural Hiftory*, the name given by the Africans to the truffles found in the defarts of Numidia, and other places in that part of the world, in great abundance.

Thefe are much more delicately tafted than the European truffles, and are white on the outfide. They are called by fome of the Africans *kema*, and by the Arabian writers *cantha* and *camahe*.

TERFOWA, in *Geography*, a town of Africa, in the kingdom of Tunis; 120 miles S. of Tunis.

TERFOWY, a town of Nubia; 150 miles S. of Syene. N. lat. 21° 40′. E. long. 34° 5′.

TERGA, a town of Morocco, on the Morbeya; 90 miles N. of Morocco.

TERGA. See HAIR.

TERGARRY, a town of Hindooftan, in Bednore; 14 miles S.E. of Simogu.

TERGAZA, in *Ancient Geography*, a town of Africa, which was one of thofe which Manlius took poffeffion of in the third Punic war, and which he pillaged.

TERGESTE. See TRIESTE.

TERGESTICUS SINUS, a gulf of Italy, on the coaft of the Adriatic fea. It took its name from the town Tergefte, which was fituated there.

TERGIFOETOUS PLANTS, fuch as bear their feeds on the backfides of their leaves: fuch are the capillaries. See CAPILLARY.

TERGIL, in *Geography*, a town of Afiatic Turkey, in the province of Erzerum; 30 miles E. of Palu.

TERGIS, in *Ancient Geography*, a town of Africa, in Libya, on the confines of Ethiopia.

TERGISONUS, a river of Italy, in Venetia, N. of the river Padus.

TER-GOUD, or TER-GOUW, in *Geography*. See GOUD.

TERGOVITZ, or TERGOVISTA, a town and capital of Walachia, where the waiwode has a palace; 64 miles S.E. of Hermenftadt. N. lat. 45° 3′. E. long. 25° 29′.

TERHALTEN, a fmall ifland near the coaft of Terra del Fuego. S. lat. 55° 20′.

TERHEY, a town of Holland; 10 miles W. of Delft.

TERIDATA, in *Ancient Geography*, a town of Afia, in Mefopotamia, on the banks of the Euphrates. Ptolemy.

TERINA, a town of Italy, upon the weftern coaft of Brutium, and in the northern part of the gulf Hipponium.—Alfo, a town of Afia, fituated in the mountains W. of Moxouné.

TERIUM, a town of Macedonia, in Pieria.

TERKAT, in *Geography*, a town of Afiatic Turkey, in the government of Sivas; 20 miles N.W. of Tocat.

TERKELA, a river of Africa, which joins the Tafilet, 20 miles S. of Togda.

TERKI. See TEREK.

TERKI. See TURKIN.

TERKIRI, a lake of Thibet, about 80 miles long and 25 broad. N. lat. 32°. E. long. 91° 14′.

TERKUL, a river of Ruffia, which runs into the Ural, at Uralfk, in the government of Caucafus.

TERLIZZI, a town of Naples, in the province of Bari; 7 miles S.E. of Trani.

TERLON, a river of France, which runs into the Sambre, about 3 miles below Landrecy.

TERM, TERMINUS, the extreme of any thing, or that which bounds and limits its extent. See EXTREME.

TERM, in *Geometry*, is fometimes ufed for a point, fometimes for a line, &c. A line is the term of a fuperficies, and a fuperficies of a folid.

This is what the fchools call *terminus quantitatis*.

TERM, in *Law*, fignifies a boundary, or limitation of time, or eftate.

In this fenfe we fay, a leafe for term of life, for term of years, &c.

TERMS, *Termes*, *Termini*, in *Architecture*, denote a kind of ftatues, or columns, adorned at top with the figure of a man's, woman's, or fatyr's head, as a capital; and the lower part ending in a kind of fheath, or fcabbard. See HERMES.

Some write the word *thermes*, from *Hermes*, a name the Greeks gave the god Mercury; whofe ftatue, made after this manner, was placed in feveral of the crofs ways in the city of Athens, &c. Others bring the etymology of the word from the Roman god Terminus, the protector of landmarks; whofe ftatue (made without hands or feet, that he might not change his place) was ufed to be planted at the bounds of lands, to feparate them.

Terms are fometimes ufed as confoles, and fuftain entablatures; and fometimes as ftatues, to adorn gardens. Of thefe termini, the architects make great variety; viz. *angelic*, *ruftic*, *marine*, *double*, in *buft*, &c.

TERMS, *Miliary*, *termini miliares*, among the ancient Greeks, were the heads of certain divinities, placed on fquare land-marks of ftone, or on a kind of fheath, to mark the feveral ftadia, &c. in the roads. Thefe are what Plautus calls *lares viales*.

They were ufually dedicated to Mercury, whom the Greeks believed to prefide over the highways.

Some of them were reprefented with four heads, fuch as we ftill fee in Rome, at the end of the Fabrician bridge; which is hence called *ponte di quattro capi*. It is known that Mercury was thus reprefented, and alfo called by the Latins *Mercurius quadrifrons;* as being fuppofed the firft who invented the ufe of letters, mufic, wreftling, and geometry. See HERMES.

TERMS are alfo ufed for the feveral times or feafons of the year, in which the tribunals, or courts of judicature, are open to all who think fit to complain of wrong, or to feek their rights by due courfe of law, or action; and during which the courts in Weftminfter-hall fit and give judgment. But the high court of parliament, the chancery, and inferior courts, do not obferve the terms; only the courts of king's bench, common pleas, and exchequer, which are the higheft courts

courts at common law. In contradiftinction to thefe, the reft of the year is called *vacation*.

Of thefe terms there are four in every year, during which time matters of juftice are difpatched.

Hilary term, which, at London, begins the 23d of January, or if that be Sunday, the next day after; and ends the 12th of February following.

Eafter term, which begins the Wednefday fortnight after Eafter-day, and ends the Monday next after Afcenfion-day.

Trinity term, beginning the Friday next after Trinity-Sunday, and ending the Wednefday fortnight after.

Michaelmas term, which begins the 6th of November, and ends the 28th of November following.

Each of thefe terms has alfo their *returns*; which fee.

Thefe terms are fuppofed by Mr. Selden to have been inftituted by William the Conqueror; but fir H. Spelman hath fhewn, that they were gradually formed from the canonical conftitutions of the church; being no other than thofe leifure feafons of the year, which were not occupied by the great feftivals or fafts, or which were not liable to the general avocations of rural bufinefs. Throughout all Chriftendom, in very early times, the whole year was one continued term for hearing and deciding of caufes. For the Chriftian magiftrates, in order to diftinguifh themfelves from the Heathens, who were very fuperftitious in the obfervation of their *dies fafti* and *nefafti*, adminiftered juftice upon all days alike; till at length the church interpofed, and exempted certain holy feafons from being profaned by the tumult of forenfic litigations; as, particularly, the time of Advent and Chriftmas, which gave rife to the winter vacation; the time of Lent and Eafter, which created that in the fpring; the time of Pentecoft, which produced the third; and the long vacation, between Midfummer and Michaelmas, which was allowed for the hay-time and harveft. All Sundays alfo, and fome peculiar feftivals, as the days of the Purification, Afcenfion, &c. were included in the fame prohibition, which was eftablifhed by a canon of the church, A.D. 517, and fortified by an imperial conftitution of the younger Theodofius, comprifed in the Theodofian code. Afterwards, when our own legal conftitution was eftablifhed, the commencement and duration of our law terms were appointed, with a view to thefe canonical prohibitions; and it was ordered by the laws of king Edward the Confeffor, that from Advent to the octave of the Epiphany, from Septuagefima to the octave of Eafter, from the Afcenfion to the octave of Pentecoft, and from three in the afternoon of all Saturdays till Monday morning, the peace of God and holy church fhall be kept throughout the whole kingdom.

And fo extravagant was afterwards the regard paid to thefe holy times, that though the author of the Mirror mentions only one vacation of confiderable length, containing the months of Auguft and September, yet Britton fays, that in the reign of king Edward I. no fecular plea could be held, nor any man fworn on the Evangelifts, in the time of Advent, Lent, Pentecoft, harveft, and vintage, the days of the great litanies, and all folemn feftivals. He adds, that the bifhops and prelates granted difpenfations for taking affizes and juries in fome of thefe holy feafons, upon reafonable occafions; and foon after a general difpenfation was eftablifhed in parliament by ftat. Weftm. 1. 4 Edw. I. cap. 51, that affizes of novel diffeifin, mort d'anceftor, and darrein prefentment, fhould be taken in Advent, Septuagefima, and Lent, as well as inquefts; at the fpecial requeft of the king to the bifhops. The portions of time that were not included within thefe prohibited feafons, fell naturally into a fourfold divifion; and from fome feftival, or faint's day that immediately preceded their commencement, were denominated the terms of St. Hilary, of Eafter, of the Holy Trinity, and of St. Michael: which terms have been fince regulated and abbreviated by feveral acts of parliament; particularly Trinity term by ftat. 32 Hen. VIII. c. 2. and Michaelmas term by ftat. 16 Car. I. c. 6. and again by ftat. 24 Geo. II. c. 38. Blackft. Com. vol. iii.

Terms, *Oxford*. Hilary or Lent term begins January 14th, and ends the Saturday before Palm-Sunday. Eafter term begins the tenth day after Eafter, and ends the Thurfday before Whitfunday. Trinity term begins the Wednefday after Trinity-Sunday, and ends after the act, or 6th of July, fooner or later, as the vice-chancellor and convocation pleafe. Michaelmas term begins October 10th, and ends December 17th.

Terms, *Cambridge*. Lent term begins January 14th, and ends the Friday before Palm-Sunday. Eafter term begins the Wednefday after Eafter-week, and ends the week before Whitfunday. Trinity term begins the Wednefday after Trinity-Sunday, and ends the Friday after the commencement, or 2d of July. Michaelmas term begins October 10th, and ends December 16th.

Terms, *Scottifh*. In Scotland, Candlemas term begins January 23d, and ends February 12th. Whitfuntide term begins May 25th, and ends June 15th. Lammas term begins July 20th, and ends Auguft 8th. Martinmas term begins November 3d, and ends November 29th.

Terms, *Irifh*. In Ireland the terms are the fame as at London, except Michaelmas term, which begins October 13th, and adjourns to November 3d, and thence to the 6th.

Term, in *Grammar*, denotes fome word or expreffion in a language. See Word.

The word *term*, *terminus*, is borrowed metaphorically, by the grammarians and philofophers, from the meafurers or furveyors of lands: as a field is defined and diftinguifhed by its *termini*, or limits, fo is a thing or matter fpoken of, by the word or term by which it is denoted.

Term, in the *Arts*, or *Term of Art*, is a word which, befides the literal and popular meaning which it has, or may have, in common language, bears a farther and peculiar meaning in fome art or fcience. See Art.

Or, a term is a word which has one or more meanings befide its grammatical one; or which has a peculiar force or import in the language of fome particular fcience or art.

A word then becomes a term when its idea is rendered more complex, confifts of more parts, and includes more fpecial circumftances, on fome occafions than others.

It is this greater complexnefs, this excefs of conftituent parts of the idea, that denominates it a term in the general. Farther, as the parts of the idea, fignified by any word, are arbitrary; and as one may not only add new parts to thofe contained in the literal meaning, but alfo fuperadd others to them, alter them, extend them, and otherwife modify them at pleafure; hence the fame word becomes a term of this or that art, or both, as the inventors or improvers of thofe arts have thought fit to adopt it for the common bafis of certain ideas, and to modify and circumftantiate its meaning to the ufe of their refpective arts. See Definition.

Terms, *abftract*, *complex*, *concrete*, *equivalent*, *equivocal*, *general*, *relative*, *fynonimous*, *univocal*. See the adjectives.

Term, in *Logic*. A propofition is faid to confift of two terms, *i. e.* two principal and effential words, the *fubject* and the *attribute*.

A fyllogifm confifts of three terms, the *major*, *minor*, and *conclufion*. See Syllogism.

Terms *of an Equation*, in *Algebra*. See Equation.

Terms *of Proportion*, in *Mathematics*, are fuch numbers, letters,

letters, or quantities, as are compared one with another. See Proportion.

Terms, or *courses*, in *Medicine*, the menses, or women's monthly purgations.

TERMALY, in *Geography*, a town of Hindooſtan, in Myſore; 15 miles N.E. of Anantpour.

TERMED, or Tarmad, a town of Grand Bucharia, at the union of two large rivers, whoſe united ſtreams form the Jihon; the capital of a conſiderable diſtrict. In 1221, this town was beſieged by Jenghis Khan, and, after eleven days, taken by aſſault: after which the conqueror put moſt of the inhabitants to the ſword, and deſtroyed the town. It was rebuilt in the following century; 130 miles S. of Samarcand. N. lat. 37° 30′. E. long. 65° 48′.

TERMEH, or Karmili, a river of Aſiatic Turkey, which runs into the Black ſea, 30 miles N.E. of Samſoun.

TERMERA, or Termerium, in *Ancient Geography*, a free town of Aſia Minor, in Caria.

TERMES, called *Tierme*, a town of Hither Spain, belonging to the Arevaci, S. of Numantium.

Termes, in *Entomology*, a genus of the Aptera order of inſects. Its characters are, that it has ſix legs formed for running; two eyes; ſetaceous antennæ, and a mouth with two jaws. According to Gmelin, the characters are, that the mouth has two horny jaws, with a horny, quadrifid lip, linear acute fringes, four equal filiform feelers, or palpi, antennæ (moſtly) moniliform, and two eyes. Linnæus enumerates three, and Gmelin eight

Species.

Fatale. Above brown; thorax with three ſegments; wings pallid, and coſta, or rib, teſtaceous. This is the deſtructor of Degeer, and T. bellicoſum of Smeathman. It is found in the ſhady parts of the equinoctial regions of India and Africa. See the ſequel of this article.

Destructor. Above teſtaceous; head black; antennæ yellow. Found in the iſlands oppoſite to South America, Africa, and India.

Arda. Black; abdomen with ſegments white at the apex; legs pallid. Found in the equinoctial parts of Africa.

Mordax. Black; the ſegments of the abdomen white at the apex; legs black. Found in the equinoctial parts of Africa.

Capense. Yellow, with hyaline wings; brown at the margin. Found in India and Southern Africa.

Fatidicum. Abdomen ovate; mouth pallid; brown eyes; antennæ ſetaceous. Found in Europe, chiefly the ſouthern part.

Pulsatorium. Abdomen oblong; mouth red; eyes yellow; antennæ ſetaceous. Found in Europe and America.

Divinatorium. Abdomen tranſverſely ſulcated; brown mouth, and black eyes. Chiefly found in books; very lively, irritable, and whitiſh.

It is obſerved, that the European ſpecies of termes are very ſmall, compared with thoſe of the warmer regions of Africa and America; and inſtead of being gregarious, as in thoſe climates, are uſually found ſingle. Of theſe, the moſt known is the T. pulſatorius of Linnæus, a ſmall inſect of a whitiſh colour, and diſtinguiſhed by Derham and ſome other naturaliſts, by the appellation of "Pediculus pulſatorius." During the months of ſummer it is common in houſes, particularly in decayed wainſcots, and is remarkable for emitting a long-continued ſound, reſembling the ticking of a watch; it is commonly met with in collections of dried plants, &c. to which it is very injurious. It cannot bear, on account of its tender frame, the ſlighteſt preſſure, and it is very quick in its motion. When magnified, the head appears large, the eyes very conſpicuous, of a beautiful golden colour, and divided into innumerable hexagonal convexities; the antennæ long and ſetaceous; the palpi two in number, moderately long, and terminating in a large club-ſhaped top; the thorax rather narrow, and the abdomen obtuſely oval; the thighs, or firſt joints of the legs, thick, the remaining ones ſlender, and the feet furniſhed with very ſmall claws. The whole animal is beſet with ſcattered hairs. This inſect, according to the obſervations of Derham, when firſt hatched from the egg, is white, oval, and very ſmall, exactly reſembling a common mite; furniſhed with eight legs, and beſet with long hairs. After a certain time it caſts its ſkin, and appears in the form already deſcribed. Degeer has found on each ſide of the thorax the appearances of rudiments of wings, reſembling a pair of oblong ſcales; and Dr. Shaw affirms, from his own obſervations, that ſome individuals of this ſpecies become winged at their full growth; the wings, four in number, being very large, of a ſlightly indiſtinct appearance, and variegated with blackiſh and brown clouds or ſpots. In the beginning of July this change takes place, and ſeveral inſects may be ſeen with the wings half-grown; in a few days they gain their full ſize.

Dr. Derham is of opinion, that the ticking ſound of theſe animals is analogous to the call of birds to their mates during the breeding ſeaſon; and this opinion is very probable. This ſound, ſays Dr. Shaw, as well as that produced by the "Ptinus fatidicus," or death-watch, ſeems to prove in a convincing manner, that inſects poſſeſs the faculty of hearing, though this be denied by ſome naturaliſts.

Of the exotic termites, the moſt remarkable is the T. bellicoſus. The animals of this ſpecies have lately been minutely deſcribed by Mr. Smeathman, from whoſe account the following particulars are extracted.

The termites, which have been taken notice of by various travellers in different parts of the torrid zone, and called by the name of white ants, reſemble the ants in their manner of living, which is in communities, forming extraordinary neſts in the ſurface of the ground, and various ſubterraneous paſſages, and alſo in their provident and diligent labour; but in both reſpects much ſurpaſs them. The termites are repreſented by Linnæus as the greateſt calamity of both Indies, becauſe of the havoc they make in all kinds of wooden buildings, utenſils, and furniture, ſo that nothing but metal or ſtone can eſcape their deſtructive jaws.

Smeathman obſerves, that the inſect in its perfect ſtate has four wings without any ſting, and ſhould therefore be ranged under the *neuroptera*, and not under the *aptera* of the Linnæan ſyſtem. The communities of termites conſiſt of one male and one female, generally the parents of all the reſt, and of three orders of inſects, apparently of very different, though really of the ſame ſpecies. Thoſe of the firſt order are the working inſects, or labourers; the ſecond comprehends the fighting inſects, or ſoldiers, which do no labour; and the third are the winged ones, or perfect inſects, which are male and female, and capable of propagation, but neither labour nor fight; the kings and queens belong to this order, and within a few weeks after they are elected and elevated to this rank, they migrate, and either eſtabliſh new kingdoms, or periſh within a day or two. The largeſt ſpecies, called *termes bellicoſus*, is the beſt known on the coaſt of Africa; it erects immenſe buildings of well-tempered earth or clay, which are conſtructed with ſignal ingenuity: it does infinite miſchief in one reſpect, and in another it is peculiarly important and uſeful, by deſtroying thoſe vegetable or animal ſubſtances which incumber the earth, and are noxious on account of their putridity. The

buildings

buildings (usually termed hills) which these insects erect, are in their general form like sugar-loaves, and about ten or twelve feet high; and consist of an exterior part, which is large and strong, intended partly for defence, and partly for preserving a regular degree of warmth in order to hatch the eggs and cherish the young: and an interior, which is the habitable part, divided into many apartments for the residence of the king and queen, the nursing of their progeny, the accommodation of the soldiers and labourers, or magazines of provision. The royal chamber, in the interior building, or that occupied by the king and queen, is situated near the centre, and usually in the shape of a semi-oval within.

In the infant state of the colony, it is not more than about an inch in length, but in time it is enlarged to six or eight inches in the clear, being in size adapted to that of the queen. It has doors or entrances, at pretty equal distances from each other, which entrances are of a size not to admit any animal larger than the soldiers and labourers: so that the king and queen, when once immured, can never go out. The royal chamber is surrounded by many others of different sizes, shapes, and dimensions; and they either open into each other, or communicate by passages suitably contrived. These apartments are connected with the magazines, formed altogether of clay, and nurseries. The provisions lodged in the former appear by the microscope to consist principally of the gums or inspissated juices of plants. The nurseries are composed entirely of wooden materials, joined together apparently with gums. These nurseries are occupied by the eggs, and young insects, which appear at first in the shape of labourers, but white as snow. They are very compact, and divided into small chambers, not one of which is to be found of half an inch in width. They are placed round and near the royal apartments. As the queen enlarges, her chamber is also enlarged; and new apartments are fitted up for her attendants; and also new nurseries at a remoter distance. Thus, says Mr. Smeathman, they continually enlarge their apartments, pull down, repair, and rebuild, according to their wants, with a degree of sagacity, regularity, and foresight, not even imitated by any other kind of animals or insects which he has ever heard of. These nurseries are always found slightly overgrown with or plentifully sprinkled with small white globules, about the size of a small pin's head, first supposed to be the eggs, but found by the microscope to be small mushrooms. The royal chamber is situated at about a level with the surface of the ground, at an equal distance from all the sides of the building, and in every direction surrounded by the apartments of labourers or soldiers, for the purpose of attendance. These apartments compose an intricate labyrinth, extending a foot or more in diameter, from the royal chamber on every side. Here the nurseries and magazines of provisions commence, and being separated by small empty chambers or galleries, are continued on all sides to the outward shell, and reaching up within it two-thirds or three-fourths of its height. All these chambers, and passages leading to and and from them, being arched, help to support one another: and the exterior building supports them on the outside. Our limits will not allow our describing all the subterranean galleries or passages, and the manner in which they are artfully made to communicate with different parts of the building, and to suit the convenience of the labourers and soldiers, as thoroughfares for passing and repassing with their loads of materials and provisions.

There are other nests or habitations constructed by other species, which are in the form of turrets, or upright cylinders, and contain a number of cells: they are of two sizes, for the accommodation o a larger and smaller species: and again another kind of nests, which is the habitation of a distinct species; this is generally spherical or oval, and built in trees.

Of the three orders above-mentioned, the labourers, which are about one-fourth of an inch long, and twenty-five of them weigh about a grain, are the most numerous; *e. g.* in the T. bellicosus, there seem to be at least one hundred labourers to one of the fighting insects or soldiers. The soldiers are about half an inch long, and equal in bulk to fifteen of the labourers; the mouth of the latter is evidently calculated for gnawing and holding of bodies, whereas that of the former, or soldiers, has its jaw shaped like two sharp awls, a little jagged, and as hard as a crab's claws, so that they are incapable of any thing but piercing or wounding: in insects of the third order, which have arrived at their perfect state, the head, thorax, and abdomen, are wholly different from those of the other orders, and they are furnished with four large brownish transparent wings; their length is six or seven-tenths of an inch, and each is equal in bulk to thirty labourers: they have now two eyes which are visible, whereas if they had them before they are not distinguishable. These insects are gathered and eat by the inhabitants, and reckoned both delicious and nourishing food. The king and queen are lodged in apartments, which are closed up, so that a passage remains merely for the ingress and egress of the labourers and soldiers, but at which (as we have already said) neither of the royal pair can come out: and in the business of propagation the abdomen of the female extends to an enormous size, so that an old queen's will be fifteen hundred or two thousand times the bulk of the rest of her body, and twenty or thirty thousand times the bulk of a labourer, and by its peristaltic motion, are protruded eggs to the amount of sixty in a minute, or eighty thousand and more in twenty-four hours: the eggs are removed by the attendants into the nurseries, and after they are hatched, the young are provided with every thing necessary till they are able to shift for themselves. It is remarkable of all the different species of termites, that the working and fighting insects never expose themselves to the open air; but either travel under ground, or within such trees or substances as they destroy, or through pipes made of the same materials with their nests. The termites which build in trees, frequently construct their nests within the roofs and other parts of houses, to which they do considerable damage, unless soon extirpated; and the larger species enter under the foundations of houses, through the floors, or bore through the posts of buildings, making lateral perforations and cavities, as they proceed. They are equally destructive when they get into a trunk containing clothes and other things, and into stores, &c.

Upon opening the hills in which the termites lodge, the behaviour of the soldiers excites admiration. When a breach is made, however quickly it be done, a soldier will run out, and walk about the breach, as if to see whether the enemy is gone, or to examine what is the cause of the attack. He will sometimes return again, as if to give the alarm; but in a short interval he is followed by two or three others, running as fast as they can, and these are followed by a large body, others also succeeding them, as long as any one continues to batter their building: nor is it easy to describe the rage and fury which they manifest on the occasion; biting every thing in their way, and making a vibrating noise, like the ticking of a watch, perceptible at the distance of three or four feet. If they get hold of any one who attacks their habitation, they will in an instant suck out blood enough to weigh against their whole body; and if they chance to wound the leg, the stain upon the stocking will be seen to extend an inch in in width. They make their hooked jaws to meet at the firſt ſtroke, nor will they quit their hold, but ſuffer themſelves to be pulled away leg by leg, and piece after piece, without the leaſt attempt to eſcape. If, however, they are left to themſelves undiſturbed, they will in leſs than half an hour retire into the neſt, as if they conceived their caſtle to be ſecure. Before they all get in, the labourers will be ſeen in motion, haſtening to bring materials for repairing the breach. This they do without mutual obſtruction, though their number be immenſe, and the work is ſoon finiſhed. While the labourers are thus employed, the ſoldiers take no part with them. On a renewed attack, the labourers run with celerity into the numerous pipes and galleries with which the building is perforated; and the ſoldiers ruſh out as numerous and as vindictive as before. One circumſtance more deſerves to be mentioned; and that is the loyalty and fidelity diſplayed by the labourers and ſoldiers in their attendance on the royal chamber. This chamber is a large neſt, is capacious enough to hold many hundreds of the attendants, beſides the royal pair, and it is always found full. Theſe faithful ſubjects never abandon their charge in the laſt diſtreſs, but rather die in their defence than deſert them. If in an attack upon the hill, you ſtop ſhort of the royal chamber, and cut down about half of the building, and leave open ſome thouſands of galleries and chambers, they will all be ſhut up with their ſheets of clay before the next morning. If even the whole is pulled down, and the different buildings are thrown together in a heap of confuſed ruins, provided the king and queen are not deſtroyed or taken away, every interſtice between the ruins, at which either cold or wet can poſſibly enter, will be ſo covered, as to exclude both; and if the inſects are left undiſturbed, in about a year they will raiſe the building to nearly its priſtine ſize and grandeur.

There is another ſpecies, called the *marching* termites, which is much larger, and ſeems to be leſs frequent than the other. For an account of thoſe, and many other curious particulars, we muſt refer to Philoſ. Tranſ. vol. lxxi. part i. art. 11. p. 139—192.

TERMIGON, in *Geography*, a town of France, in the department of Mont Blanc, on the Arc; 12 miles E.N.E. of St. André.

TERMINALIA, in *Antiquity*, feaſts celebrated by the Romans, in honour of the god Terminus.

Varro is of opinion, that this feaſt took its name from its being at the term or end of the year; but Feſtus is of a different ſentiment, and derives it from the name of the deity in whoſe honour it was held.

In reality, the Terminalia, or feaſts of land-marks, were held in honour of Jupiter, conſidered in the capacity of conſervator of land-marks or bounds. Dionyſius Halicarnaſſeus tells us, that it was Numa Pompilius who firſt conſecrated land-marks to Jupiter; and adds, that the ſame prince appointed an anniverſary day, on which the country-people, aſſembling together on the bounds of the lands, ſhould offer ſacrifices in honour of the tutelary gods thereof.

The Terminalia were held on the ſeventh, or, as Struvius will have it, on the tenth of the calends of March. No animal is to be ſacrificed herein, it being deemed unlawful to ſtain the land-marks with blood: they only offered ſacrifices of the firſt fruits of the earth; and this in the open air, and on the ſpot where the land-marks were.

TERMINALIA, in *Botany*, from the terminal mode of growth and foliation in ſeveral of the ſpecies, the ſtem being a ſtriking example of what Linnæus latterly called *determinatè ramoſus*, and the leaves being crowded at the ends of the branches, which are ſwelled in that part.—Linn. Mant. 21. Schreb. Gen. 728. Willd. Sp. Pl. v. 4. 967. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 5. 441. Jacq. Coll. v. 1. 130. Juſſ. 76. Lamarck Illuſtr. t. 848. (Pamea; Aubl. Guian. 946. Tanibouca; ibid. 448? Badamia; Gærtn. t. 97. Myrobalanus; Gærtn. ibid. Lam. Illuſtr. t. 849.)—Claſs and order, *Polygamia Monoecia*, Linn. Rather *Decandria Monogynia*.

Gen. Ch. *Cal.* Perianth ſuperior, of one leaf, internally coloured, in five ovate, acute, equal ſegments. *Cor.* Petals none. Nectary pitcher-ſhaped, compoſed of five ſmall hairy lobes, in the bottom of the calyx. *Stam.* Filaments ten, awl-ſhaped, ſlightly ſpreading, longer than the calyx, inſerted into its lower part; anthers roundiſh, erect. *Piſt.* Germen inferior, ovate-oblong; ſtyle thread-ſhaped, erect, the length of the ſtamens; ſtigma ſimple. *Peric.* Drupa oval, ſomewhat compreſſed, acute. *Seed.* Nut oval-oblong, angular, ſmooth, with an oblong ſolitary kernel.

Numerous flowers, above the others, and later, are entirely male.

Eſſ. Ch. Calyx in five ſegments, internally coloured. Petals none. Nectary five-cleft, hairy. Drupa inferior.

1. T. *Catappa*. Broad downy-leaved Terminalia. Linn. Mant. 128. Willd. n. 1. Ait. n. 1. Jacq. Coll. v. 1. 130. Ic. Rar. t. 197. (Adamaram; Rheede Hort. Malab. v. 4. 5. t. 3, 4.)—Leaves obovate, obtuſe, very ſlightly toothed, deſtitute of glands at the baſe; finely downy beneath.—Native of the Eaſt Indies, in Java and in woods on the coaſt of Malabar, where the ſoil is ſandy. Meſſrs. Lee and Kennedy are ſaid to have introduced this tree into the Engliſh ſtoves in 1778, but it has not yet bloſſomed, nor, conſidering its natural and lofty growth, is that event to be expected. The *branches* grow in a whorled manner; their extremities, clothed with ruſty down, bearing each a cloſe tuft of large broad *leaves*, a foot long, on ſhort downy ſtalks. Each *leaf* is tipped with a ſmall point, and is abrupt or ſomewhat heart-ſhaped, though much contracted, at the baſe. *Cluſters* numerous, axillary, ſtalked, cylindrical, denſe, many-flowered. *Flowers* greeniſh-yellow, half the ſize of a currant-bloſſom, moſt of them males. *Fruit* oval, compreſſed, larger than that of the almond-tree, reddiſh, with a cylindrical kernel, which taſtes like a filberd, but is more tender and ſoluble. Its oil is ſaid never to turn rancid. The wood is hard and durable, and the tree is much planted about houſes, for the ſake of its ſhade.

2. T. *moluccana*. Molucca Terminalia. Lamarck Dict. v. 1. 349. Willd. n. 2. Ait. n. 2. (T. glabrata; Forſt. Prodr. 74. Pl. Eſcul. 52. Spreng. Antiq. Bot. 102. t. 2. Catappa; Rumph. Amboin. v. 1. 174. t. 68.)—Leaves obovate, obtuſe, entire, deſtitute of glands at the baſe; ſmooth on both ſides.—Native of the Molucca and Society iſles. Introduced into the Engliſh ſtoves by the earl of Powis, in 1804. This is ſaid to be of a more humble ſtature than the foregoing, and the *leaves* are ſmaller, ſmooth at the back, though their *footſtalks* are covered with denſe ruſty down. The ſpecific name of *glabrata* ought to have been retained in preference to *moluccana*. This is conſidered as a ſacred tree in Otaheite, though uſed in building boats as well as houſes.

3. T. *ſubcordata*. Heart-leaved Terminalia. Willd. n. 3.—"Leaves obovate, obtuſe, ſomewhat wavy; ſmooth on both ſides, heart-ſhaped at the baſe, without glands."—Gathered by Humboldt and Bonpland, in South America. Willdenow, who had examined one of their dried ſpecimens, ſays "this ſpecies is very like the laſt, but the baſe of the *leaves* is heart-ſhaped, and their margin very ſlightly and unequally waved; the *footſtalks* ſomewhat downy. It differs from *T. Catappa*, in having the *leaves* ſomewhat wavy, very ſmooth

ſmooth on both ſides, and heart-ſhaped at the baſe."—This laſt character ſeems to us to exiſt in *T. Catappa*.

4. T. *latifolia*. Broad wedge-leaved Terminalia. Swartz Ind. Occ. 747. Willd. n. 4. (Arbor maxima, fortè prunifera, cortice cannabino, folio longiſſimo latiſſimoque; Sloane Hiſt. v. 2. 130.)—Leaves obovate, obtuſe, ſomewhat ſerrated, ſmooth on both ſides, deſtitute of glands at the baſe: their midrib downy beneath.—Native of mountainous woods in the north part of Jamaica. A tall, ſtout, umbrageous *tree*, riſing to the height of one hundred feet, or more, with horizontal *branches*, downy when young. *Leaves* crowded about the ends of the branches, on ſmooth ſtalks, thickiſh, ſcarcely pointed, bluntly ſerrated, or nearly entire, tapering (not dilated or heart-ſhaped) at the baſe. *Flowers* ſmall, whitiſh or yellowiſh, in long axillary cluſters; the upper ones chiefly male. *Fruit* pulpy, greeniſh-red, ſweet, boat-ſhaped, larger than a peach, eaten chiefly by hogs. Its kernel taſtes like an almond. The wood is valuable for its hardneſs. The inhabitants of Jamaica know this ſpecies by the name of Broad-leaf Tree. *Swartz*.

5. T. *Chebula*. Oval-leaved Terminalia. Retz. Obſ. faſc. 5. 31. Willd. n. 5. Ait. n. 3. Roxb. Coromand. v. 2. 52. t. 197. (Myrobalanus Chebula; Gærtn. v. 2. 91. t. 97.)—Leaves obovate-oblong, obtuſe, entire, oppoſite, ſmooth on both ſides; ſilky when young. Footſtalks with two glands near the top. Cluſters terminal.—Native of hills in the Eaſt Indies. Retzius, who received his ſpecimens from Koenig, deſcribes this *tree* as not more than three or four times the height of a man, with no very widely ſpreading top. Our ſpecimens, from Dr. Rottler, agree with every particular of his deſcription. The young *leaves* are beautifully ſilky. We find none of the marginal glands repreſented by Roxburgh, nor are our *leaves* pointed, as in his plate. The *flowers* in both are yellow, in terminal, often aggregate, cluſters. Dr. Roxburgh mentions the wood of the tree he deſcribes as hard and valuable, and the head as evergreen, and widely ſpreading. The rind of its *fruit* is much uſed by painters of chintz for drawing a permanent outline, and by dyers to fix their colours. With ſalt of ſteel it makes an excellent ink.

6. T. *elliptica*. Rounded-leaved Terminalia. Willd. n. 6.—" Leaves oblong-elliptical, bluntly rounded, entire; ſlightly hairy beneath, with two glands at the baſe."—Native of the Eaſt Indies. The *branches* are round, brown; downy when young. *Leaves* two or three inches in length; contracted at the baſe; very obtuſe at the extremity, with a ſlight point; dark green and ſmooth above; pale, and beſprinkled with cloſe-preſſed ſcattered hairs, beneath; furniſhed at the baſe with two cup-ſhaped, ſomewhat ſtalked, glands. *Spikes* terminal, panicled. *Willdenow*. We have been inclined to ſuſpect this might not be diſtinct from the following, but the *infloreſcence* does not agree, nor could Willdenow ſurely have omitted to notice the great length of the *footſtalks* in *T. Bellerica*.

7. T. *Bellerica*. Long-ſtalked Terminalia. Roxb. Corom. v. 2. 54. t. 198. (Myrobalanus Bellerica; Breyn. Ic. 18. t. 4. Gærtn. v. 2. 90. t. 97. Tani; Rheede Hort. Malab. v. 4. 23. t. 10.)—Leaves obovate, wavy, ſmooth. Footſtalks about half as long as the leaves, with two glands at the top. Spikes axillary, ſolitary, hardly longer than the footſtalks.—Native of hills in the Eaſt Indies. A large *tree*, with a very widely ſpreading head; the wood is white, but ſoft, and not durable. The *bark*, when wounded, exudes a copious inſipid gum, like gum arabic, ſoluble in water. The *leaves* are firm and ſmooth, ſix or ſeven inches long when full-grown, but in the flowering ſeaſon they ſeem ſcarcely to exceed their *footſtalks*, which then meaſure half that length. *Flowers* fetid, dirty yellow, in copious axillary ſpikes, not cluſters. *Fruit* the ſize of a nutmeg; its kernel eatable, but reported to intoxicate if taken in any great quantity.

8. T. *mauritiana*. Mauritius Terminalia. Lamarck Dict. v. 1. 349. Willd. n. 7. (Badamia Commerſoni; Gærtn. v. 2. 90. t. 97? Pamea guianenſis; Aubl. Guian. v. 2. 946. t. 349?)—Leaves lanceolate, ſlightly crenate, tapering at each end, ſmooth on both ſides. Spikes axillary, the length of the leaves.—Native of the iſles of Mauritius and Bourbon, and probably of Madagaſcar. Commerſon deſcribes it as the largeſt and talleſt tree of the two former iſlands. He took it for a new genus, and named it *Reſinaria*, under which name, and that of *le faux benjoin*, his ſpecimens are preſerved in the Linnæan herbarium. The *wood* is much eſteemed for making canoes. The *branches* are ſwelled at the ends, where they bear ample tufts of *leaves* three or four inches long, on downy ſtalks, three-quarters of an inch in length; when full-grown both appear, by Lamarck's account, to be much larger. *Flowers* copious, in ſimple axillary ſpikes. *Fruit* an inch or inch and half long, with a dilated compreſſed border, not altogether anſwering to Gærtner's figure, which makes us doubt his ſynonym. He has formed his barbarous generic name, *Badamia*, out of the French *Badamier*, which is ſynonimous with *Terminalia*. Aublet's plate of his *Pamea* greatly reſembles our plant, and our chief doubt ariſes from their diſtant places of growth. That they are of the ſame genus cannot be diſputed.

9. T. *anguſtifolia*. Narrow-leaved Terminalia. Jacq. Hort. Vind. v. 3. 51. t. 100. Willd. n. 8. Ait. n. 4. (T. Benzoin; Linn. Suppl. 434. Lamarck Dict. v. 1. 349. Croton Benzoe; Linn. Mant. 297. Willd. Sp. Pl. v. 4. 533.)—Leaves linear-lanceolate, wavy, downy on both ſides.—Native of the Eaſt Indies. Jacquin reports that ſeeds of this ſpecies were ſent him by Lemonnier, under the French name of *Bien-joint*, from the iſle of Bourbon. Hence he ingeniouſly and ſatisfactorily conjectures, that this appellation, which alludes to the mode of growth of the tree, may have been confounded with *Benjoin* or *Benzoin*, the French word for gum Benjamin, or *Benzoe*, and thus the ſaid gum was ſuppoſed to come from the plant before us. (See STYRAX.) *T. anguſtifolia* has long been cultivated in our ſtoves, but the flowers are unknown. Its manner of branching is like *T. Catappa*, *mauritiana*, &c. nor does it much differ from the laſt named, except that the *leaves* are narrower, often quite linear, and clothed, more or leſs completely, with brown, rather rigid, hairs. Their veins, rib, and margin are tinged with a blood-colour. The *fruit* appears to be ſimilar to the laſt. Linnæus raiſed a plant from ſeed in the Upſal ſtove, and remarked that the ſeed-leaves were of a blood-red. The *leaves* of his ſpecimen hardly exceed a line in breadth.

10. T. *Vernix*. Varniſh Terminalia. Lamarck Dict. v. 1. 350. Willd. n. 9. (Arbor vernicis; Rumph. Amboin. v. 2. 259. t. 86.)—Leaves linear-lanceolate, entire, ſmooth on both ſides.—Native of the Molucca iſles. It is preſumed to belong to this genus from the imperfect deſcription of Rumphius, and its evident reſemblance to the two laſt ſpecies. The *leaves* however are more diſperſed, and of larger dimenſions, being from nine to eleven inches long, and the breadth of three or four fingers, ſo that they are ſcarcely to be termed *linear*-lanceolate. The rib is very prominent beneath. *Flowers* yellow or whitiſh, with red *ſtamens*, in drooping cluſters or ſpikes. *Fruit* oblique and compreſſed, two inches broad. The *nut* exudes a large quantity of reſin, ſoon turning brown, and a milky reſinous fluid is lodged under the bark of the tree, at firſt of an acrid quality, but

hardening into a valuable varnifh, deftitute of acrimony, and much ufed in the Moluccas. A noxious vapour is faid to proceed from this tree, fo that the natives of the countries where it grows avoid fleeping, or even fitting for any length of time, under its fhade. Whether this be the moft famous varnifh-tree of the Chinefe, as Rumphius indicates, may perhaps admit of doubt.

11. T. *Tanibouca.* Guiana Terminalia. (Tanibouca guianenfis; Aubl. Guian. 448. t. 178.)—Leaves fcattered, obovate, pointed, entire, fmooth. Clufters terminal and axillary. Native of marfhy places in Guiana. For an account of this fpecies, fee TANIBOUCA. Its genus muft be very doubtful, unlefs the fruit were known, but the fuggeftion of our learned friend Mr. Brown, Prodr. Nov. Holl. v. 1. 351, induces us, for the prefent at leaft, to refer the plant hither.

TERMINANDO *et Audiendo.* See AUDIENDO.

TERMINANS, PUNCTUM. See PUNCTUM.

TERMINATION, TERMINATIO, in *Grammar*, the ending of a word, or the laft fyllable of it.

They are the different terminations of one and the fame words on different occafions, that conftitute the different cafes, numbers, tenfes, moods, &c.

TERMINATION *Ifland*, in *Geography*, an ifland in the South Pacific ocean, fo named by captain Vancouver, as being the termination of his refearches on the S.W. coaft of New Holland, near which it lies. S. lat. 34° 32′. E. long. 122° 8′.

TERMINATOR, in *Aftronomy*, a name fometimes given to the *circle of illumination*, from its property of terminating the boundaries of light and darknefs.

TERMINE, in *Commerce*, a weight for gold, filver, and pearls at Tunis; 8 termini being equal to an ounce; and 80 ounces of Tunis being equal to 81 ounces Englifh troy.

TERMINE, in *Geography*, a town of Naples, in Principato Ultra; 10 miles S.E. of Avellino.

TERMINER, in *Law.* See OYER.

TERMINI, in *Architecture.* See TERMS.

TERMINI, in *Geography*, a town of Sicily, in the valley of Mazara, fituated on the north coaft, celebrated for the warm baths near it, from which it received its name; 18 miles E. of Palermo. N. lat. 38° 5′. E. long. 13° 45′.—Alfo, a river of Sicily, which runs into the Mediterranean, a little to the W. of Termini.

TERMINI. See TERMOLI.

TERMINISTS, TERMINISTÆ, in *Ecclefiaftical Hiftory*, a fect or party among the Calvinifts, whofe particular tenets are reducible to five points:

1. That there are feveral perfons, both in and out of the church, to whom God has fixed a certain term before their death, after which he no longer wills their falvation, how long foever they live afterwards. 2. That God has fixed this fatal term of grace by a fecret decree. 3. That this term once elapfed, he makes them no farther offer of repentance or falvation, but takes away from his word all the power it might have to convert them. 4. That Pharaoh, Saul, Judas, moft of the Jews, and many of the Gentiles, were of this number. 5. That God ftill bears with feveral of this fort of people, and even confers benefits on them after the term is expired; but that he does not do it with any intention they fhould be converted.

All the other Proteftants, and particularly the Lutherans, look on thefe articles with abhorrence, as repugnant to the goodnefs of God, and deftructive to all Chriftian virtue; and as contrary to Scripture, particularly the following texts, Ezek. xviii. 23. 30, 31, 32. xxxiii. 11. 1 Tim. iv. 1. 16. 2 Pet. iii. 9. Acts, xvii. 30, 31. Matt. xi. 28. Ifa. lxvi. 2. Heb. iii. 7. 13. Rom. ii. 5, &c.

TERMINOS, in *Geography*, a lake or bay on the coaft of Tabafco, in the bay of Campeachy. N. lat. 18° 12′. W. long. 92° 46′.

TERMINTHUS, from τερμινθος, *a pine-nut*, in *Surgery*, a large painful tumour, or puftule on the fkin, thought to refemble a pine-nut.

TERMINUM, *ad qui præteriit.* See AD TERMINUM.

TERMINUM, *Infra, quare ejecit.* See QUARE.

TERMINUS, τερμα, fignifies a bound or limit.

TERMINUS, *a quo*, in *Metaphyfics*, denotes the place from whence any motion commences: in contradiftinction from the other extreme, which is called the *terminus ad quem.*

The fchoolmen call privation a *terminus a quo*, in fpeaking of generation, which they confider as a fpecies of motion.

TERMINUS, in *Mythology*, the god of fields and landmarks. M. de Boze, in a learned differtation on this fubject (Mém. de l'Acad. t. i.), obferves, that the Egyptians received from the Hebrews the cuftom of bounding the fields. In procefs of time, as the laws eftablifhed for the fecurity of the land-marks were not a fufficient reftraint on avarice, Numa perfuaded the people that there was a god who protected land-marks and avenged incroachments. He built a temple to him upon the Tarpeian mount, and regulated the ceremonies of his worfhip. He caufed this god to be reprefented under the form of a ftock or ftone, as we learn from Tibullus and Ovid: but afterwards this god was reprefented with a human body placed upon a pyramidical land-mark. It is faid that this god acquired peculiar honour by maintaining his ftation when the other gods were removed by Tarquin the Proud, for the purpofe of building the temple which Tarquin the elder had vowed to erect to Jupiter.

TERMIOVA, in *Geography*, a town of Iftria; 18 miles N.E. of Pedena.

TERMISSUS, or TELMISSUS, in *Ancient Geography*, a town of Afia, in the fouthern part of Pifidia.

TERMITES, in *Entomology.* See TERMES.

TERMOLI, or TERMINI, in *Geography*, a town of Naples, in the province of Capitanata; the fee of a bifhop, fuffragan of Benevento; 57 miles W. of Viefte. N. lat. 42° 2′. E. long. 15° 5′.

TERMOR, *Tenens ex termino*, in *Law*, he that holds lands or tenements for a term of years, or life.

TERMUS, in *Ancient Geography*, a river in the ifle of Sardinia.

TERN, in *Geography*, a river of England, which rifes in Staffordfhire, 5 miles N.E. of Drayton, and runs into the Severn, 7 miles below Shrewfbury.

TERN. See TYRAN.

TERN, in *Ornithology.* See STERNA.

TERN, *Brown*, or *Sterna obfcura* of Linnæus, is by fome authors called the *brown gull.* Mr. Ray defcribes it as having the whole under fide white, the upper brown; the wings partly brown, partly afh-colour; the head black; and the tail not forked: but Mr. Pennant conjectures, that this bird is the young of the greater tern. See STERNA.

TERN, *Great*, or *Sea-fwallow*, *Sterna hirundo* of Linnæus, has the bill and feet of a fine crimfon, the former tipt with black, ftraight, flender, and fharp-pointed; the crown and hind part of the head black; the throat and whole under fide of the body white; the upper part, and coverts of the wings, a pale grey; the tail confifting of twelve feathers, the outer edges of the three outmoft grey, the reft white, and the

the exterior on each fide two inches longer than the other, and clofed in flying, fo as to appear one flender feather.

Thefe birds frequent the fea-fhores, banks of lakes, and rivers; they feed on fmall fifh and water infects, hovering over the watr, and fuddenly darting into it to catch their prey. They breed among fmall tufts of rufhes, and lay three or four eggs of a dull olive-colour, fpotted with black. All the birds of this genus are very clamorous. Pennant.

TERN, *Black*, or *Scare-crow*. See STERNA *Filipes*.

TERN, *Surinam*, or *Darter*. See PLOTUS *Surinamenfis*.

TERNA, a word ufed by fome authors to exprefs an impetigo.

TERNA, *Folia*, in *Botany* and *Vegetable Phyfiology*, are leaves, whether fimple or compound, feffile or ftalked, which grow three together in a whorl, on any ftem or branch, as in *Verbena triphylla*, Curt. Mag. t. 367. Such a difpofition of the foliage appears to prevail remarkably among the plants of Mexico, Chili, and Peru, of which, befides the example juft named, many others may be found. (See the genera FUCHSIA and HEMIMERIS.) Among Britifh plants, *Erica cinerea* has naturally *folia terna;* while the generally oppofite leaves of *Lyfimachia vulgaris* and *Lythrum Salicaria* occafionally become fo. See LEAF.

TERNALLA, in *Geography*, a town of Hindooftan, in Myfore; 45 miles E. of Rettinghery.

TERNARY MEASURE. See MEASURE.

TERNARY *Number*, in *Antiquity*, was efteemed a fymbol of perfection, and held in great veneration among the ancient mythologifts. Whence Virgil,

——"Numero Deus impare gaudet." Ecl. viii. ver. 75.

Servius on this place remarks, that the Pythagoreans afcribed the ternary number to the Supreme God, as being the beginning, middle, and the end of all things. All the heathen gods had a three-fold power attributed to them, as the *tria virginis ora Dianæ*, the three-forked thunderbolt of Jupiter, the trident of Neptune, the three-headed dog of Pluto. Again, the Parcæ were three, the Furies three, Hercules was three nights in begetting, the Mufes were anciently three, the Graces three, &c.

This number was likewife ufed in moft religious ceremonies, but efpecially in luftrations; whence Virgil, Æn. lib. xi. v. 188.

"Ter circum accenfos, cincti fulgentibus armis,
Decurrere rogos."——

TERNATA, FOLIA, in *Botany* and *Vegetable Phyfiology*, are compound leaves, each of which confifts of three leaflets, as in the Trefoil and Strawberry. Thefe are called in Englifh Ternate Leaves, and muft not be confounded with *Folia* TERNA, fee that article, for which laft we have no appropriate term in our language. Some plants bear twice, or thrice, ternate leaves. See LEAF.

TERNATE, in *Geography*, an ifland in the Eaft Indian fea, and the principal, though not the largeft, among thofe called Moluccas or Spice Iflands, of a circular form, and about 21 miles in circumference. In the centre is a lofty volcanic mountain, whofe bafe extends almoft to the fea every way. The upper parts are uncultivated, and covered over with fhrubs and low trees; but in the plain are many gardens, and abundance of fruit-trees. On this mountain are found many hollows or caverns full of fulphur, which emit a thick fmoke, and flame fometimes appears from the fummit, with a noife refembling thunder. The productions are cocoa-nuts, bananas, yams, oranges, and other fruits; but the principal article of commerce is cloves: many birds of paradife, and other beautiful birds, are found here, and plenty of game. The chief quadrupeds are goats, deer, and hogs. The boa ferpent is fometimes found of the length of thirty feet. This ifland was firft fettled by the Spaniards, who were driven away by the Dutch, to whom the king of the ifland is, in fome degree, fubject. The Europeans have two forts, called "Orange" and "Terloehe," between which is a lake, called "Saffe," three miles in circumference, and 60 fathoms deep, feparated from the fea by a narrow dike, which the Spaniards made a fruitlefs attempt to cut through, to form a port. On this ifland are three mofques, and a Dutch church, but no place of worfhip for the Portuguefe. The province or government of Ternate includes the iflands of Ternate, Tidore, Motir, Machian, and Bachian, which are what are properly the Moluccas; they are the original places of growth of the finer fpices; and larger nutmegs are ftill found in the woods of Ternate, than any other produced out of Banda. Some places, fituated in the eaftern part of the ifland of Celebes, belong likewife to this government; and the object of the Company in fettling there is principally to furnifh provifions for Ternate, that part of Celebes being very fruitful in rice and other neceffaries. They alfo yield a confiderable quantity of gold, about 24,000 taels, of a dollar and a half in weight, yearly, amounting, at 5*l. per* tael, to 120,000*l.*, and efculent bird's-nefts, which are efteemed a great delicacy by the Orientals, and efpecially by the Chinefe; in exchange for which the inhabitants take opium, Hindooftan piecegoods, chiefly blue cloth, fine Bengal coffaes and hummums, together with fome cutlery. Ternate does not, in general, require any fupply of provifions from Java, as the ifles of Banda do. This ifland fuffered greatly in Auguft 1770, by earthquakes. More than fixty violent fhocks were felt in the fpace of twenty-four hours, and the fortifications were much injured. N. lat. 0° 50′. E. long. 127° 10′.

TERNATE, in *Zoology*, a fpecies of bat. See VAMPYRE, and VESPERTILIO *Vampyrus*.

TERNATEA, in *Botany*, a genus fo named by Tournefort, from Ternate, the native country of the plant. See CLITORIA.

TERNAVASSO, in *Geography*, a town of France, in the department of the Po; 6 miles N.E. of Carmagnola.

TERNAY, *Bay of*, a bay or harbour on the E. coaft of Chinefe Tartary, fo called by M. Peroufe in 1787. The Dutch navigators called it Port Acqueis. N. lat. 45° 13′. E. long. 137° 29′.

TERNBERG, a mountain of Auftria, near the river Enns; 6 miles S. of Steyr.

TERNEUSE, a town and fortrefs of Flanders, fituated on the W. branch of the Scheld, called the "Hondt," begun by the count of Hohenloe, lieutenant of the prince of Orange, in the year 1583, afterwards augmented by the States: the fortifications have been fince deftroyed; 12 miles S.E. of Flufhing.

TERNI, a town of the Popedom, in the duchy of Spoleto, fituated between two arms of the Nera, and, therefore, anciently called "Interamnium," or "Interamna." It is well built, and the fee of a bifhop, immediately fubject to the pope. Its greateft trade confifts in oil, befides which it alfo reaps confiderable advantage from its excellent vineyards. This was the birth-place of the emperors Tacitus and Florianus, and of Tacitus the famous hiftorian. Between fix and feven Italian miles from Terni, to the N.W. clofe by the little town of Cefi, is Mount Eolo, remarkable for its cool breezes, which, efpecially in fummer, iffue from the chafms and crevices in the rocks of this mountain; 14 miles S.S.W. of Spoleto. N. lat. 2° 34′. E. long. 12° 37′.

TERNIER, a town of France, in the department of the Leman; 5 miles S.S.W. of Geneva.

TERNOIS, Le, a river of France, which runs into the Cauche, near Hefdin.

TERNOSKAIA, a town of Ruffia, in the country of the Coffacs, on the Don; 136 miles E.N.E. of Azoph.

TERNOVA, a town of European Turkey, in Bulgaria. This town was anciently one of the ftrongeft in the country, and the refidence of the princes; at prefent it is thinly inhabited, and the fortifications are ruined. It is the refidence of an ecclefiaftic, who is called the archbifhop of Bulgaria; 95 miles E. of Sophia. N. lat. 43°. E. long. 25° 24'.—Alfo, a town of European Turkey, in Theffaly; large and commercial; on the Peneus; 5 miles W.N.W. of Lariffa.

TERNSTROEMIA, in *Botany*, was fo called by Linnæus at the fuggeftion of Mutis, in memory of one of the pupils of the former, named Ternftroem, who having undertaken a voyage to China, in 1745, died at Poulicandor, at an early age. His illuftrious teacher has not, as in other inftances, given us any account of the voyage, difcoveries, or talents of this unfortunate young man, who, though not one of his favourite pupils, deferves commemoration as a martyr to fcientific refearch.—Linn. Suppl. 39. Schreb. 347. Willd. Sp. Pl. v. 2. 1128. Mart. Mill. Dict. v. 4. Swartz Prodr. 81. Juff. 262. (Cleyera; Thunb. Jap. 12. Nov. Gen. 68. Juff. 433. Taonabo; Aubl. Guian. 569. Tonabea; Juff. 262. Tanabea; Lamarck Illuftr. t. 456.)—Clafs and order, *Polyandria Monogynia*. Nat. Ord. akin to *Thea* and *Camellia*. Juff.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in five deep, orbicular, concave, rather unequal fegments, with two fmaller ones clofely applied to its bafe, all permanent and coriaceous. *Cor.* of one petal, bell-fhaped, in five deep, orbicular, concave, emarginate fegments, longer than the calyx, without any tube. *Stam.* Filaments numerous, awl-fhaped, fhorter than the corolla, and inferted into its bafe in a double row; anthers linear, erect, the length of the filaments. *Pift* Germen fuperior, roundifh; ftyle cylindrical, as long as the ftamens; ftigma capitate. *Peric.* Berry dry, ovate, fmooth, of two cells. *Seeds* about eight, convex on one fide, flat on the other.

Eff. Ch. Corolla bell-fhaped, in five deep fegments, without a tube. Calyx in five deep fegments, with two fmaller at the bafe. Berry dry, of two cells.

1. T. *meridionalis*. Mexican Ternftroemia. Linn. Suppl. 264. Willd. n. 1.—Leaves obovate, obtufe, emarginate, entire. Flower-ftalks axillary, compreffed, recurved. Two outer fegments of the calyx orbicular, fharply keeled.—Gathered by Mutis in Mexico and New Granada. A tree, determinately branched; the branches thick, rigid, leafy, nearly round, with a fmooth grey bark. *Leaves* alternate, an inch or rather more in length, on fhort, thick, channelled, purplifh footftalks, obovate, or nearly elliptical, peculiarly rigid and coriaceous, fingle-ribbed, fmooth, with a thick fomewhat revolute margin; their upper furface often dotted with either prominent or depreffed points; the under purplifh or rufty, efpecially when young. *Stipulas* none. *Flower-ftalks* numerous, axillary, folitary, half the length of the leaves, very thick and rigid, two-edged, brown or purple, curved downwards, deftitute of pubefcence, but, in the dried plant at leaft, wrinkled and uneven. *Flowers* larger than a hawthorn-bloffom, white. The two fmaller external fcales of the *calyx* furnifhed with a fharp keel, ending in a minute point; the reft without any keel, thin and membranous at the edge; all fmooth, orbicular, coriaceous, permanent. *Corolla* occafionally with fix fegments, at firft globofe, then bell-fhaped. *Berry* dry, deftitute of valves. *Seeds* filky, deep red. Such is the plant of Mutis. We have no means of afcertaining whether the Weft Indian one, defcribed by Swartz in his *Obfervationes*, be the fame or not; but he fays the *flower-ftalks* are terminal, nor does he advert to their clumfy two-edged figure, fo different from the reft of the fpecies, that it could fcarcely have efcaped his notice.

2. T. *elliptica*. Elliptical Ternftroemia, or Rottenbane. Swartz Ind. Occ. 929. Willd. n. 2. Vahl Symb. v. 2. 61.—Leaves obovate, obtufe, entire. Flower-ftalks lateral, elongated, nearly thread-fhaped. Outer fegments of the calyx ovate, acute, bluntly keeled.—Native of the Weft Indies, on the Sulphur mountains of Montferrat and Guadeloupe, as well as in St. Vincent's. It is faid to be the pretended Jefuit's bark, mentioned by Labat. This is a *fhrub* with ftout, round, fmooth, difperfed or clultered *branches*, leafy towards their extremities. *Leaves* like the laft, but twice as long, and not emarginate; their *footftalks* longer and more flender. *Flower-ftalks* an inch and half or two inches long, but flightly drooping or recurved, nearly round, not a quarter fo ftout as the laft, flightly fwelling upward, red or purplifh. *Flowers* rather larger than the foregoing, yellowifh-white, fome of them deftitute of a piftil. The fcales of the *calyx* are all pointed, the outer ones narrow and ovate, of a fmaller proportion than in *T. meridionalis*, and fometimes more than two.

3. T. *japonica*. Japan Ternftroemia. Thunb. Tr. of Linn. Soc. v. 2. 335. Willd. n. 4. (Cleyera japonica; Thunb. Jap. 224. Mokokf; Kæmpf. Am. Exot. 873. t. 774.)—Leaves obovato-lanceolate, obtufe, nearly entire. Flower-ftalks lateral, fomewhat angular. Outer fegments of the calyx triangular, pointed, flightly keeled.—Gathered by Thunberg, near Nagafaki in Japan, flowering in autumn. This is a *tree*, fmooth in every part. Specimens fent us by the finder are fo very nearly akin to the two foregoing fpecies, that it is hard to eftablifh a fpecific difference between them. The *leaves* of the Japan plant however are rather more lanceolate, and their margin is fometimes, not conftantly, crenate towards the point. Their furface is quite fmooth, not vifibly dotted. The *flower-ftalks*, about an inch long, are fcattered on the branches, below the leaves, but flightly recurved, ufually triangular, not compreffed. *Flowers* white, fcarcely fo large as in *T. meridionalis*. *Style* fhort and thick. *Berry* the fize of a currant, red, pointed, with a white, fweet, fubaftringent pulp, and, according to Kæmpfer, only one pellucid *feed*.

4. T. *punctata*. Dotted-edged Ternftroemia. Swartz Prodr. 81. Willd. n. 3. (Taonabo punctata; Aubl. Guian. 571. t. 228.)—Leaves elliptic-oblong, dotted at the edge. Flower-ftalks axillary, elongated, nearly thread-fhaped. Segments of the calyx all pointed.—Gathered by Aublet on the fides of the Serpent mountain in Guiana, bearing flowers and fruit in Auguft and September. A large *tree*, whofe *leaves* are bordered with minute glandular points, rough to the touch; their extremity ufually emarginate; their length about three inches. *Flower-ftalks* flender, about half as long as the leaf with its footftalk. *Stamens* about fixty. *Fruit* ovate, pointed, of five or fix cells. Aublet having feen it in an unripe ftate only, took it for a capfule, but Swartz afferts it to be a *berry*.

5. T. *dentata*. Toothed Ternftroemia. Swartz Prodr. 81. Willd. n. 5. (Taonabo dentata; Aubl. Guian. 569. t. 227.)—Leaves elliptical, pointed, ftrongly ferrated. Flower-ftalks lateral or axillary, fingle-flowered.—Gathered by Aublet, in the fame place as the preceding, and at the fame feafon. A *tree*, whofe trunk is twenty-five feet, or more, in

in height, and two in diameter, crowned with an ample tuft of fpreading branches. The *leaves* are four inches long, and an inch and half or two inches broad, thick, fmooth, tapering at each end, befet with tooth-like ferratures in the margin. *Footftalks* flender, an inch long. *Flower-ftalks* recurved, fcattered, hardly an inch in length. *Flowers* yellowifh, the fize of hawthorn. *Fruit* like the laft. The *bark* of the tree is ufed for tanning leather. The *wood* ferves inftead of tiles for houfes.

6. T? *corymbofa*. Corymbofe Ternftroemia?—Leaves oppofite, elliptical, pointed, entire. Panicle forked, corymbofe, many-flowered, terminal.—Native of Guiana. *Mr. Rudge*. This appears to be moft akin to the laft in the fhape and fize of its *leaves*, but differs in their entire margin, and oppofite infertion. The three-forked *panicle* is, moreover, a kind of inflorefcence unexampled in *Ternftroemia*, and the *calyx* wants the two fmall external fegments. All thefe circumftances induce a fufpicion of the genus, which we have not materials to clear up.

We cannot take leave of *Ternftroemia* without adverting to the mifchiefs which arife from the barbarous and unfettled principles of French nomenclature. Juffieu profeffes to adopt the uncouth names of Aublet, only till the genera of that author are better fettled; yet he has tried to foften down *Taonabo* into *Tonabea*, a needlefs change if the name were not to remain. Lamarck prefers *Tanabea;* fo our memories and our indexes would have become burthened with three names inftead of one, all intolerable to a claffical or literary botanift, if the genus had not happily been fuperfeded.

TEROE, in *Geography*, a town of Bengal; 25 miles E. of Ramgur.

TEROUANNE. See THEROUANNE.

TEROWA, a town of the ifland of Junkfeilon, near the eaft coaft; the ufual refidence of a Siamefe governor or viceroy. Here is a pagoda, with about twenty priefts. N. lat. 8° 13′.

TERPANDER, in *Biography*, and *Mufic of the Ancients*, one of the moft renowned muficians of antiquity. It is recorded in the Oxford Marbles, that he was the inventor of characters to exprefs mufical founds in the feveral genera; which event is placed about fix hundred and feventy years before the Chriftian era. Indeed all writers who mention the progreffive ftate of mufic in Greece, are unanimous in celebrating the talents of Terpander; but though there is fuch an entire agreement among them concerning the obligations which the art was under to this mufician in its infant ftate, yet it is difficult to find any two accounts of him which accord in adjufting the time and place of his birth. It does not, however, feem neceffary to lead the reader over hedge and ditch with chronologers, after a truth, of which the fcent has fo long been loft. The Oxford Marbles, which appear to us the beft authority to follow, tell us, in exprefs terms, that he was the fon of Derdeneus of Lefbos, and that he flourifhed in the 381ft year of thefe records; which nearly anfwers to the 27th olympiad, and 671ft year B. C. The Marbles inform us likewife, that "he taught the nomes, or airs, of the lyre and flute, which he performed himfelf upon this laft inftrument, in concert with other players on the flute." Several writers tell us that he added three ftrings to the lyre, which before his time had but four; and in confirmation of this, Euclid and Strabo quote two verfes, which they attribute to Terpander himfelf.

"The tetrachord's reftraint we now defpife,
The feven-ftringed lyre a nobler ftrain fupplies."

If the hymn to Mercury, which is afcribed to Homer, and in which the feven-ftringed lyre is mentioned, be genuine, it robs Terpander of this glory. The learned, however, have great doubts concerning its authenticity. But if the lyre had been before his time furnifhed with feven ftrings in other parts of Greece, it feems as if Terpander was the firft who played upon them at Lacedæmon. The Marbles tell us that the people were offended by his innovations. The Spartan difcipline had deprived them of all their natural feelings; they were rendered machines; and whether Terpander difturbed the fprings by which they ufed to be governed, or tried to work upon them by new ones, there was an equal chance of giving offence. The *new ftrings*, or *new melodies*, and *new rhythms*, upon the old ftrings, muft have been as intolerable to a Lacedæmonian audience, at firft hearing, as an organ, and cheerful mufic would have been, to a Scots congregation fome years ago, or would be at a Quaker's meeting now. "It is not at all furprifing," fays Alcibiades, "that the Lacedæmonians feem fearlefs of death in the day of battle, fince death would free them from thofe laws which make them fo wretched."

Plutarch, in his "Laconic Inftitutions," informs us, that Terpander was fined by the ephori for his innovations. However, in his "Dialogue on Mufic," he likewife tells us, that the fame mufician appeafed a fedition at Sparta, among the fame people, by the perfuafive ftrains which he fung and played to them on that occafion. There feems no other way of reconciling thefe two accounts, than by fuppofing that he had, by degrees, refined the public tafte, or depraved his own to the level of his hearers.

Among the many fignal fervices which Terpander is faid to have done to mufic, none was of more importance than the notation that is afcribed to him for afcertaining and preferving melody, which was before traditional, and wholly dependent on memory. The invention, however, of mufical characters has been attributed by Alypius and Gaudentius, two Greek writers on mufic, and, upon their authority, by Boethius, to Pythagoras, who flourifhed full two centuries after Terpander. It will be neceffary therefore to tell the reader upon what grounds this ufeful difcovery has been beftowed upon him.

Plutarch, from Heraclides of Pontus, affures us that Terpander, the inventor of nomes for the cithara, in hexameter verfe, "fet them to mufic," as well as the verfes of Homer, in order to fing them at the public games. And Clemens Alexandrinus, in telling us that this mufician wrote the laws of Lycurgus in verfe, and "fet them to mufic," makes ufe of the fame expreffion as Plutarch, which feems clearly to imply a *written melody*. See *Mufical* GAMES.

TERPELING, in *Geography*, a town of Thibet; 8 miles S.W. of Painom Jeung.

TERPENTARIA, in *Botany*, a name ufed by fome authors for the betonica aquatica, or great water-figwort, called *water-betony*.

TERPILLUS, in *Ancient Geography*, a town of Macedonia, in Mygdonia. Ptolemy.

TERPONUS, a town of Illyria, belonging to the Japodes, of which Cæfar took poffeffion, according to Appian.

TERPSICHORE, the *Jovial*, as her name imports, in *Mythology*, the name of one of the nine *Mufes*, (which fee.) This mufe is reprefented on medals and other monuments, by the flutes which fhe holds in her hands.

TERRA, in *Geography*. }
TERRA, in *Chemiftry*. } See EARTH.
TERRA, in *Natural Hiftory*. }

Terra *Alana*, a name given to the yellowiſh-white tripoli.

Terra *Adamica*, a name given to the alkaline red mould. See Adamic *Earth*.

Terra *Armenia*. See Bole.

Terra *de Baira*, the name given by ſome to an earth of a white colour, found about Baira, near Palermo.

It is eſteemed a very great medicine in the cure of malignant fevers, and in the ſtopping of hæmorrhages of all kinds. The powder of it is commonly ſold in Italy under the name of Claramont-powder; a name it obtained from a perſon who firſt found out its virtues, and communicated them to the world in a treatiſe expreſsly written on the ſubject. Boccone, Muſ. de Fiſic.

Terra *Carioſa*. See Tripoli.

Terra, *Chio*, in the *Materia Medica of the Ancients*, an earth of the marle kind, found in the iſland of Chio, and given internally as an aſtringent; but its chief uſe among them was as a coſmetic, the ladies eſteeming it the fineſt of all things for clearing the ſkin, and ſmoothing wrinkles. What title it has to theſe qualities the world has not of late ages inquired into; but the ſubſtance is ſtill in being, and to be had in any quantities from the ſame place. And the deſcriptions Dioſcorides and Galen have left us of it are ſo accurate, that there is not the leaſt room to doubt but that the earth now found there, was the very kind they uſed. It is a denſe compacted earth, yet very ſoft, and of a texture eaſily diſunited and broken by water.

Terra *Cilicia*. See Cilicia.

Terra *Cimolia*. See Cimolite.

Terra *Cimolia Purpuraſcens*. See Soap-*Earth*.

Terra *Colonienſis*. See Cologne-*Earth*.

Terra *Damnata*. See Caput *Mortuum*.

Terra *Foliata Tartari*, *foliated earth of tartar*, is a name improperly given to a neutral acetous ſalt, with a baſis of fixed vegetable alkali; or to a combination of the acid of vinegar, ſaturated with the alkali of tartar, or of other vegetable matter. This ſalt has alſo been called *regenerated tartar*, becauſe the alkali of tartar is united with an acid, which is in ſome reſpects ſimilar to the acid of tartar, but is in others very different.

The terra foliata is made by pouring upon a quantity of alkaline ſalt of tartar, in a glaſs cucurbit, a ſufficient quantity of good diſtilled vinegar, at different times, to ſaturate all the alkali, or even a little more than is neceſſary for that purpoſe, till the effervеſcence entirely ceaſes. This ſaturated liquor is to be filtrated and evaporated to dryneſs, with a gentle heat. The dry ſalt thus obtained is to be diſſolved in ſpirit of wine, and the ſolution again evaporated to dryneſs; by which means a ſalt is obtained more or leſs white, of a ſilky appearance, and compoſed of ſmall ſcales or leaves, whence it has been called *foliata*. When the ſalt is dried, and while it is hot, it muſt be ſhut up in a well-cloſed bottle, becauſe it quickly becomes moiſt by expoſure to air.

When diſtilled vinegar is poured upon ſalt of tartar, little or no effervеſcence is made at firſt, becauſe a part of the alkaline ſalt employed is generally cauſtic, or deprived of its gas, which part unites with the acid preferably to the mild part of the alkali, and abſorbs any gas that is extricated from the latter part; and, therefore, till all the cauſtic part of the alkali be nearly ſaturated, little or no effervеſcence can happen. But when more vinegar is added, the effervеſcence becomes ſo conſiderable, that ſome of the liquor will, without care, flow over the veſſel. This effervеſcence is occaſioned by a large quantity of air that is diſengaged during the ſaturation. When the ſaturation is advanced to a certain degree, the effervеſcence diminiſhes; but the combination of the laſt portions of the acid and alkali may be facilitated by frequently agitating the liquor, which will renew the effervеſcence. The taſte of the foliated earth is ſharp, pungent, a little cauſtic, and partaking at the ſame time of the taſte of vinegar and that of fixed alkali. It is ſoluble in ſpirit of wine, and may be decompoſed merely by the action of fire, and from it may be obtained by diſtillation, a very penetrating and concentrated radical vinegar. It is little uſed except in medicine. Macquer's Chem. Dict.

Preparations of this kind are given in doſes of ten or twenty grains as mild aperients, and to a drachm or two as purgatives and diuretics. Lewis.

Terra *Goltbergenſis*. See Goltbergensis *Terra*.

Terra *Japonica*. See Japan *Earth*, and Catechu.

Terra *Lemnia*. See Lemnian *Earth*.

Terra *Lignicenſis*. See Lignicensis *Terra*.

Terra *Livonica*. See Livonica *Terra*.

Terra *Melia*. See Melia *Terra*.

Terra *Melitenſis*. See Melitensis *Terra*.

Terra *Merita*, in the *Materia Medica*, a name given by ſome authors to the curcuma, or turmeric-root.

It is from a falſe pronunciation of this name, *terri merit*, that the Engliſh turmeric has its origin.

Terra *Miſcella*. See Thraustomicthes.

Terra *Noceriana*. See Noceriana.

Terra *Samia*. See Samia *Terra*.

Terra *Seleneuſiaca*. See Seleneusiaca.

Terra *Sigillata*. See Sigillata.

Terra *Sigillata Magni Ducis*. See Etrusca *Terra*.

Terra *Sigillata Fuſca*, a bole of a beautiful brown colour, found in Germany, England, and America.

It is of a denſe texture, makes no fermentation with the ſtrongeſt acids, and if thrown into water, it ſoon ſeparates into a number of thin flakes.

The Germans give it in fluxes and malignant fevers, being an excellent aſtringent, and worthy to be introduced into our ſhops.

Terra *Sileſiaca*, *Sileſian Earth*, a fine aſtringent bole, called by ſome authors *axungia ſolis*.

It is very heavy, of a firm compact texture, and in colour of a browniſh-yellow. It breaks eaſily between the fingers, and does not ſtain the hands, is naturally of a ſmooth ſurface, and is readily diffuſible in water, and melts freely into a butter-like ſubſtance in the mouth; it leaves no grittineſs between the teeth, and does not ferment with acid menſtrua. Theſe are the characters by which it is known from all other earths of a like colour; it is found in the perpendicular fiſſures of rocks near the gold-mines at Strigonium, in Hungary, and is ſuppoſed to be impregnated with the ſulphur of that metal. It is, however that be, a good aſtringent, and better than moſt of the boles in uſe. Hill.

The terra Sileſiaca is alſo called *terra ſigillata Strigonienſis*.

Terra *Sinopica*. See Sinopica *Terra*.

Terra *Solis*, a name given by the German naturaliſts to a kind of black ſpungy earth, ſomewhat approaching to the nature of that Engliſh black earth which we call *kellow*, but containing gold. It is not properly an ore of gold, but is an earth into which ſome ſmall particles of gold have been waſhed from ſome other place, and there detained. A good microſcope will diſcover theſe particles in the richer pieces of the earth, and they are bright and pure, though very ſmall: the earth is found in fiſſures of the other ſtrata, not in any beds or ſtrata of itſelf. It is not to be had in any great quantity, nor does it contain any large portion of gold.

Terra *Strigonienſis*. See Strigoniensis *Terra*.

TERRA *Turcica*. See TURCICA *Terra*.

TERRA *Virgine Aurea*, in *Natural History*, the name of a medicinal earth, mentioned by Boccone.

It is found at a place called Sancto Paolo, in the state of Modena; and is thence sent to Venice, and many other places, where it is esteemed a very famous medicine.

Its great use is in hæmorrhages of all kinds; but it is also given with success in malignant fevers. Boccone, Mus. de Fisic.

TERRA *Viridis*. See TERRE *Verte*.

TERRA *Umbri*. See UMBER.

TERRA *Zoica*, a name given to the alkaline red mould, called also Adamic earth.

TERRA *Petita*, in *Law*. See SUMMONS.

TERRA, in our *Ancient Law-Books*, occurs in the sense of land, or ground, joined with divers additions; as,

Terra Normannorum, the lands of such Norman noblemen as were forfeited to the crown, by the owners taking part with the French king against Henry III. *Terra frusca*, such land as had not been lately ploughed. *Terra gilliflorata*, land held by the tenure of paying a gilliflower yearly. *Terra vestita*, land sown with corn, and the crop still remaining thereon. *Terra testamentalis*, land held free from feudal services, and devisable by will. *Terra culta*, land that is tilled and manured, in contradistinction to *terra inculta*. *Terra affirmata*, land let out to farm. *Terra dominica*, or *indominica*, demesne land of a manor. *Terra hydata*, was land subject to the payment of hydage. *Terra lucrabilis*, land that may be gained from the sea, or enclosed out of a waste or common to particular uses. *Terra wainabilis*, tillage-land. *Terra warecta*, fallow-land. *Terra boscalis*, wood-land, &c.

TERRA *Extendenda*, is a writ directed to the escheator, &c. ordering him to inquire and find out the true yearly value of any land, &c. by the oath of twelve men, and certify the extent in chancery.

TERRA or *Tierra Australis del Espiritu Santo*, in *Geography*, an island in the South Pacific ocean, and the most westerly as well as the largest of those called *New Hebrides*: discovered by Quiros, and visited by captain Cook in the year 1774; 22 leagues long, 60 miles in circuit, and 12 in breadth. The land of it, especially the west side, is exceedingly high and mountainous: and in many places the hills rise directly from the sea. Except the cliffs and beaches, every other part is covered with wood, or laid out in plantations. Besides the bays of St. Philip and St. Jago, the isles which lie along the south and east coast cannot, in the opinion of captain Cook, fail of forming some good bays or harbours. S. lat. 14° 40′ to 15° 40′. E. long. 166° 45′ to 167° 32′.

TERRA *Firma* is sometimes used for a continent, in contradistinction to islands.

Thus Asia, the Indies, and South America, are usually distinguished into terra firmas and islands.

TERRA *Firma*, in a more restricted sense, denotes an immense extent of country under the authority and government, direct or indirect, of the crown of Spain, comprehending several extensive provinces, and three audiences, fixed at Panama, Quito, and Santa Fé de Bogota: the large provinces are Terra Firma Proper, Popayan, Quito, and New Granada, all of which are again subdivided into several smaller provinces or jurisdictions.

TERRA *Firma*, or *Tierra Firmé*, in a still more confined sense, comprises three districts in the viceroyalty of New Granada, *viz.* Darien, Panama or Tierra Firmé Proper, and Veragua.

TERRA *Firma*, or *Tierra Firmé*, *Proper*. See PANAMA.

TERRA *del Fuego*, a large island, separated from the southern extremity of America by a narrow sea, called the "Straits of Magellan:" so named from the volcanoes observed on it. Capt. Cook was the first navigator who had the honour, from a series of the most satisfactory observations, beginning at the W. entrance of the Straits of Magellan, and carried on with unwearied diligence round this island, through the strait of Le Maire, to construct a chart of the southern extremity of America. The south-west coast of Terra del Fuego, says this distinguished navigator (Second Voyage, vol. ii. p. 199, &c.) "with respect to inlets, islands, &c. may be compared to the coast of Norway; for I doubt if there be an extent of three leagues where there is not an inlet or harbour, which will receive and shelter the largest shipping. The worst is, that till these inlets are better known, one has, as it were, to fish for anchorage. There are several lurking rocks on the coast; but happily none of them lie far from land, the approach to which may be known by sounding, supposing the weather so obscure that you cannot see it. For to judge of the whole by the parts we have sounded, it is more than probable that there are soundings all along the coast, and for several leagues out to sea. Upon the whole, it is by no means the dangerous coast it has been represented. The currents between Cape Deseada and Cape Horn set from west to east, that is, in the same direction as the coast; but they are by no means considerable. To the east of the cape, their strength is much increased, and their direction is north-east to Staten Land. They are rapid in Strait le Maire, and along the south coast of Staten Land, and set like a torrent round Cape St. John, where they take a north-west direction, and continue to run very strong both within and without New Year's Isles. While we lay at anchor within this island, I observed that the current was strongest during the flood; and that on the ebb its strength was so much impaired, that the ship would sometimes ride head to wind, when it was at west and west-north-west. This is only to be understood of the place where the ship lay at anchor; for at the very time we had a strong current setting to the westward, Mr. Gilbert found one of equal strength near the coast of Staten Land setting to the eastward; though probably this was an eddy current or tide."

Most writers who have mentioned the island of Terra del Fuego, describe it as destitute of wood, and covered with snow. The latter circumstance may occur (see Hawkesworth's Voyages of Cook, &c. vol. ii.) in winter. And by those who saw it at that season, it might be conceived to be without wood. Lord Anson was there in the beginning of March, answering to our September; but Capt. Cook was there in the beginning of January, corresponding to our July; and thus we may account for their different statements. We fell in with it, says Cook, about 21 leagues W. of the strait of Le Maire, and trees were visible with glasses; and though upon approaching it patches of snow were discoverable, yet the sides of the hills and the sea-coast appeared to be covered with a beautiful verdure. The hills are lofty, but not mountainous, though their summits are quite naked. The soil in the vallies is rich, and of a considerable depth; and at the foot of almost every hill there is a brook, the water of which has a reddish hue, but it is not ill-tasted. The most remarkable land in Terra del Fuego is a hill, in the form of a sugar-loaf, which stands on the W. side, not far from the sea; and the three hills, called the "Three Brothers," about nine miles W. of Cape St. Diego, the low point that forms the entrance of the strait of Le Maire. (See *Le* MAIRE.) In his

his second voyage, Capt. Cook, desirous of coasting the S. side of Terra del Fuego, round Cape Horn, to the strait of Le Maire, reached the W. coast of the island Dec. 17, 1774, and having continued to range it till the 20th, came to an anchor in a place which he called "Christmas Sound." Through the whole course of his navigations, he had never seen so desolate a coast. It seems to be entirely composed of rocky mountains, without the least appearance of vegetation. These mountains terminate in horrible precipices, the craggy summits of which spire up to a vast height; so that scarcely any thing in nature can appear with a more barren and savage aspect than the whole of the country. But barren and dreary as the land is about Christmas Sound, it was not wholly destitute of accommodations. Near every harbour our navigator found fresh water, and wood for fuel. The country abounds likewise with wild fowl, and particularly with geese: which, with their Madeira wine, enabled them to keep a cheerful Christmas. The inhabitants of Terra del Fuego were found by Capt. Cook to be of the same nation which he had formerly seen in Success Bay, and the same with those denominated by M. de Bougainville "Pecharas." They are a little, ugly, half-starved, beardless race, and go almost naked: but it is their own fault that they are not better clad, as nature has furnished them with ample materials for that purpose. By lining their seal-skin cloaks with the skins and feathers of aquatic birds, by making the cloaks themselves larger, and by applying the same materials to different parts of clothing, they might render their dress much more warm and comfortable. But while they are doomed to exist in one of the most inhospitable climates on the globe, they have not sagacity enough to avail themselves of those means of adding to the conveniencies of life, which Providence has put into their power. The captain, after having witnessed many varieties of the human race, pronounces the Pecharas to be the most wretched. Those on the S. are said to be uncivilized, treacherous, and barbarous; while those on the opposite side are represented as simple, affable, and perfectly harmless. The tents which they inhabit are made of poles, disposed in a conical form, covered with skins, or the bark or leaves of trees. The country, though barren, abounds with a variety of unknown plants, for exciting the curiosity of the botanist. The extent of Terra del Fuego, and consequently of the straits of Magellan, was ascertained by Cook to be less than had been laid down by the generality of navigators: nor was the coast, upon the whole, found to be so dangerous as it has been represented: the winter was also remarkably temperate. The sea-lions and sea-bears, the shags and penguins on the coast, are abundant, and intermix, like domestic cattle and poultry in a farm-yard, without attempting to molest one another. Eagles and vultures were seated on the hills among the shags in perfect tranquillity. Sir Joseph Banks, Dr. Solander, and some others, landed here in the month of January 1769, which is the time of summer in that part of the globe, notwithstanding which, two of the company fell a sacrifice only by sleeping one night, and Dr. Solander himself hardly escaped. S. lat. 52° 30′ to 55° 35′. W. long. 51° 20′ tc 58°.

Terra *Magellanica*. See Patagonia.

Terra *Niva*, a bay in Hudson's Bay. N. lat. 62° 4′. W. long. 67°.

Terra *dos Fumos*, a tract of country on the S.E. of Africa, N. of Natal.

Terra *Nova*, a sea-port town of Sicily, in the valley of Noto, situated in a gulf or bay of the Mediterranean, founded about the middle of the 13th century, by the emperor Frederick II. near the scite of the ancient Gela. The number of inhabitants is about 700; 50 miles W. of Syracuse. N. lat. 37°. E. long. 14° 10′.—Also, a river of Sicily, which runs into the sea on the S. coast. N. lat. 37°. E. long. 14° 10′.

Terra *Nuova*, a town of the island of Sardinia, situated in a bay of the Mediterranean, at the bottom of which is the harbour, built on the ruins of Civita, an ancient episcopal town; 57 miles E.N.E. of Sassari. N. lat. 40° 52′. E. long. 9° 40′.—Also, a town of Etruria; 14 miles N.W. of Arezzo.

Terra *del Palucci*, a town of Sicily, in the valley of Mazara, on the scite of the ancient Pelinus.

Terra *Vecchia*, a town of Naples, in Calabria Citra; 2 miles S. of Cariati Nuovo.

Terra *à Terra*. Gallies and other vessels are said to go terra à terra, when they never go far from the coast.

The phrase is also applied, in the manege, to horses that make neither curvets nor balotades, but run smoothly on the ground in a pressed gallop, only making little leaps or risings with the fore-feet.

The gallop is the foundation of the terra à terra, for in these two motions the principle of the action is the same, since the terra à terra is only a shortened gallop with the croupe in, and the haunches following in a close and quick time. And as the mezair is higher than the action of terra à terra, and lower than that of curvets, it may be concluded that the terra à terra is the foundation of the mezair, as well as of curvets.

In the terra à terra the horse should be more together than in the gallop, that he may mark his time and cadence more distinctly; although in a true terra à terra there are no times to be marked, for it is rather a gliding of the haunches, which comes from the natural springs in the limbs of a horse.

When a horse works terra à terra, he always ought, as in the gallop, to lead with the legs that are within the volte, his two fore-feet being in the air, and the moment they are coming down, his two hind feet following. The action of the gallop is always one, two, three, and four; the terra à terra is performed upon two lines and in two times.

To work a horse terra à terra upon large circles, take care to keep the body straight, steady, and true in the saddle, without leaning to one side or the other. Lean upon the outward stirrup, and keep the outward leg nearer the side of the horse than the other leg, taking care to do it so as not to be perceived. If you go to the right, keep your bridle-hand a little on the outside of the horse's neck, turning your little finger up without turning your nails at the same time; although, if need be, you must turn them in order to make the inner rein work which passes over the little finger. Keep your arms and elbows to your hips; by this means you will assure and confine your hand, which ought to accompany, and, as it were, run along the line of the circle with the horse. Berenger's Art of Horsemanship, vol. ii. c. 17.

The term is also applied by the French to dancers, who cut no capers, nor scarcely quit the ground.

And hence, also, it is figuratively applied to authors, whose style is low and creeping.

TERRACE, in *Gardening*, is a sort of raised bank of earth, &c. regularly formed in an oblong manner to any length, broad enough to admit of a spacious level walk at top, and elevated considerably above the level of the general surface; having the sides uniformly sloped, and laid with grass, and the top formed into a flat or level, sufficiently broad

broad for a grafs or gravel walk of proportionable width; defigned in gardens as a high, airy walk, to command a better profpect of the adjacent places around, within and without the garden occafionally, as well as to enjoy the frefh air in fummer more freely. In the former ftyle of laying out gardens, it was confidered as very ornamental, but is at prefent much in difufe.

It may be remarked, that the height of a terrace-walk may be more or lefs, as the fituation admits, as from one foot to one or two yards, or even three or four yards or more in particular fituations; and where there is plenty of earthy materials, rubbifh, &c. to form it, allowing breadth in proportion, from five to ten or twenty feet or more, and extended to any length required. They are fometimes formed on fome naturally high rifing ground, to fave as much trouble as poffible in bringing ftuff from a diftance; and fometimes raifed wholly of forced materials. But the fituation for a terrace may be varied as the natural fituation of the place may require.

In refpect to form, they fhould always be broader at the bafe than the top, and extend lengthways to any diftance required; having the fides regularly floped, of more or lefs acclivity, as the width, height, and fituation admit. Sometimes both fides are floped, and fometimes only one fide, the other perpendicular, and faced with a fubftantial wall, &c. or formed againft the fide of a hill, or fome naturally rifing ground, being finifhed always broad enough at top to admit of a proper walk. In fome naturally elevated fituations, terraces are fometimes formed one above another, in two or more ranges, each having its feparate fide flopes, and elevated walk; in all of which the flopes are to be neatly laid with grafs, and the walk at top occafionally of grafs or gravel.

The entrances leading to terrace-walks were formerly fometimes formed by an eafy acclivity of a grafs or gravelled flope, and fometimes by a grand flight of ftone fteps. Where a rifing ground of confiderable elevation naturally prefents itfelf in a proper fituation, it is an eligible opportunity for forming a terrace with the leaft expence and trouble, on account of its not requiring the addition of fo much earth and rubbifh, as when raifed entirely on a perfect level, wholly of made earth. Where there are any excavations of ground intended to form ha-has, pieces of water, &c. the excavated earth may be employed in forming terraces, &c.

In the bufinefs of forming a terrace, the bafe muft be ftaked out wider than the intended width at top for the walk, in order to admit of the afcent of flopes being moderate. And the whole of the made earth and rubbifh muft be well rammed and rolled down from time to time as it is applied, in order to render the whole equally firm, that it may not fettle irregularly after being finifhed. The flopes may either be laid with turf, or fown with grafs-feeds; but the firft is much the beft method, where it can be employed. See Grass *Ground*.

Terraces are now but little attended to, and, of courfe, but feldom employed in modern ornamental gardening, as they are moftly confidered as having a too ftiff and formal appearance, and as not conftituting that fort of neatnefs and tafteful elegance, which is fo much efteemed and admired at prefent in all forts of works of the garden kind.

Terrace, *Counter*, is a terrace raifed over another to join two grounds, or raife a parterre.

Terrace is alfo applied to the roofs of houfes that are flat, and on which one may walk; as alfo to balconies that project.

The terrace is properly the covering of a building which is in platform; as that of the periftyle of the Louvre, or that of the obfervatory, paved with flint and mortar. All the buildings of the Oriental nations are covered with terraces, to take the frefh air on, and even to lie on. See Pavement *of Terrace*.

Terrace, or *Terras*, ufed for mortar. See Tarrace.

TERRACINA, in *Geography*, a town of the Popedom, in the Campagna di Roma, fituated in a very fruitful but marfhy country, which makes the air unwholefome. This town was anciently the capital of the Volfci, and named Anxur. The Greeks called it Trachyna, corrupted into Terracina. In the year of Rome 348, it was taken and plundered by Fabius Ambuftus; and in 424 was made a Roman colony. Being built on a rock, in the reign of Tiberius 20,000 perfons were killed by the fall of a theatre. It is now a poor place. It had once a harbour: but that is choaked up; near Terracina are confiderable fragments of the Via Appia, made from Rome to Capua by Appius Claudius Coccus, and begun by him while cenfor, in the year of Rome 440: this road was paved with hard ftone of various fizes, but uniformly twelve inches in thicknefs; and was wide enough for two carriages; 47 miles S.E. of Rome. Near this place was a fountain of Neptune, the water of which was faid to be fatal.

TERRADEGLIAS, or Terradellas, Domenico, in *Biography*, a native of Barcelona, in Spain; but who went early into Italy, where he ftudied mufic at Naples under Durante, as an accomplifhment; but was reduced, by accidents in his family, to practife it as a profeffion.

He began to flourifh about 1739, when he compofed the opera of "Aftarto," and part of "Romolo," in conjunction with Latilla, for the Teatro delle Dame, at Rome.

In the latter end of the year 1746 he came to England, where he compofed two operas, "Mithridates" and "Bellerophon." But unfortunately for the compofer, none of the fingers of this time ftood high in the favour of the public. Yet his opera of "Mitridate," we well remember, received much applaufe, as mufic, diftinct from what was given to the performers. And his compofitions, when executed in Italy by fingers of the firft clafs, acquired him great reputation.

Befides the favourite fongs in the two operas juft mentioned, which are printed by Walfh, Terradellas himfelf, while he was in England, publifhed a collection of twelve Italian airs and duets in fcore, which he dedicated to lady Chefterfield. In thefe he feems lefs mafterly and original than in his other productions that have come to our knowledge. In the fongs he compofed for Reginelli, a very learned finger in ruin, we find boldnefs and force, as well as pathos. And fome *arie di bravura* of his compofition, for the celebrated tenor finger Babbi, at Rome, abound with fire and fpirit. If his productions are compared with thofe of his contemporaries, his writings, in general, muft be allowed to have great merit; though his paffages now feem old and common. This compofer having fpent his youth in Catalonia, was not regularly initiated into the myfteries of counterpoint in any Neapolitan converfatorio, having been placed under Durante, for a fhort time, only as a private fcholar; and we think we can fometimes difcover in his fcores, through all his genius and elegance of ftyle, a want of ftudy and harmonic erudition.

Terradellas was remarkable, not only for attending, in every fituation of the finger, to the fpirit of the drama which he had to compofe, but for giving good mufic to bad fingers, and not *under*-writing, as Mr. Bayes calls it, the inferior parts of his theatrical pieces. Indeed, it has always appeared to us, that an exquifite finger who can command attention

attention by the mere tone of his voice, and who requires only a *canevas*, or outline, to colour at his pleasure, is in less want of artificial and captivating composition, than an ordinary singer, who is neither possessed of voice nor taste sufficient to interest the audience. And Terradellas seems to have written all his songs for performers of abilities; for his airs are never made easy and trivial in order to spare the singer. Jomelli's pen always flowed with this spirit: for he never rejected a passage that presented itself, because it would be difficult and troublesome in the execution; but this freedom of style, twenty years ago, might be more safely practised than at present: for it is well known, that a company of singers is now reckoned good, in Italy, if the two first performers are excellent; and an opera is sure to please if two or three airs and a duet deserve attention; the audience neither expecting nor attending to any thing else. And the managers, who find this custom very convenient, take care not to interrupt play or conversation by the useless and impertinent talents of the under-singers; so that performers of the second or third class are generally below mediocrity.

He died at Rome in 1751, of grief and mortification, for the failure of an opera which he had composed with more care and hopes of success than usual.

TERRÆ *Ager*, *Amittere*, *Aratrum*, *Aratura*, *Denariatus*, *Legem*, *Lex*, *Librata*, *Obolata*, *Quadrantata*, *Quadrugata*, *Trinoda*, and *Uncia*. See the several articles.

TERRÆ *Filius*, *son of the earth*, a student in the university of Oxford, formerly appointed in public acts to make jesting and satirical speeches against the members of them, and to tax them with any growing corruption, &c.

TERRÆ *Oleum*. See OIL *of the Earth*.

TERRÆJEBIN. See TERENJABIN.

TERRAGE, or TERRAGIUM, anciently signified a service, in which a tenant or vassal was bound to his lord, to plough and reap the ground for him.

Others will have it to have been money paid for digging or breaking the ground in fairs and markets.

"Quieti sint de thelonio, pavagio, passagio, lastagio, tallagio, carvagio, prisagio, et terragio."

TERRAIGNOL, in the *Manege*, a horse that cleaves to the ground, that cannot be made light upon the hand, that cannot be put upon his haunches, that raises his fore-quarters with difficulty, that is charged with shoulders, and, in general, one whose motions are all short, and too near the ground.

TERRAIN, is the manege ground, upon which the horse makes his piste, or tread.

TERRANTONA, in *Geography*, a town of Spain, in Aragon; 8 miles S.E. of Ainsa.

TERRANUOVA, a town of Naples, in Calabria Citra; 9 miles N. of Bisignano.

TERRAON, or TORRAON, O, a town of Portugal, in Alentejo; 24 miles N.W. of Beja.

TERRAPOUR, a town of Hindoostan, in Baglana; 32 miles N. of Basseen.

TERRAQUEOUS, compounded of *terra* and *aqua*, *earth* and *water*, an epithet given to our globe or earth, considered as consisting of land and water, which together constitute one mass.

Some philosophers, particularly Dr. Burnet, charge the frame and fashion of the terraqueous globe as rude, unartful, and disorderly, and conclude it highly absurd to suppose it came thus out of the hands of the Creator; and, therefore, have recourse to the deluge for making it thus.

But others can perceive much art and conveniency, even in this apparent disorder: Dr. Derham particularly observes, that the distribution of land and water is admirable; the one being laid over the other so skilfully through all the world, that there is a just equipoise or balance of the whole globe. Thus the Northern ocean balances the Southern, and the American continent is a counterpoise to the European, African, and Asiatic.

And what some may object, that the waters occupy too great a part of the globe, which they imagine would be of more use if it were dry land, he obviates, by shewing that this would deprive the world of a due quantity of vapours and rain; for if the cavities which contain the sea and other waters were deeper, though the quantity of water were the same, and only the surface less and narrower, the evaporations would be so much the less, inasmuch as they are made from the surface, and consequently are in proportion to it.

TERRAR. See TERRIER.

TERRAS. See TERRACE and PAVEMENT.

TERRAS, *Marble*. See MARBLE.

TERRASSE, LA, in *Geography*, a town of France, in the department of the Isere; 13 miles N.N.E. of Grenoble.

TERRASSON, JOHN, *Abbé*, in *Biography*, a man of letters, was born at Lyons in 1670, and sent by his father, who was a very religious man, to the house of the Oratory in Paris; but the son, quitting this congregation, and disappointing his father's views, incurred his resentment, so that he was left with a very moderate pittance. However, the abbé Bignon procured him admission into the Academy of Sciences in 1707: he soon became a member; and in 1721, professor of Greek and Latin in the Royal College. Under the famous system of Law, he acquired temporary opulence, but was soon again reduced to penurious circumstances. He then retired from the world, studying and exercising that philosophy which raised him above it. He died at Paris in 1750, at the age of 80 years. His works are, "A Critical Dissertation on Homer's Iliad;" "Reflections in favour of Law's System;" "Sethos," a moral romance; "A Translation of Diodorus Siculus," 7 vols. 12mo. with preface, notes, and fragments. It was one of Terrasson's sayings, "What is the most credulous of all things? Ignorance. What is the most incredulous? Ignorance."

Andrew Terrasson, the elder brother of the former, a priest of the Oratory, was a celebrated preacher, and died at Paris in 1723. His "Sermons," in 4 vols. 12mo. were published in 1726, and reprinted in 1736.

Gaspard Terrasson, another brother, and priest of the Oratory, was more celebrated as a preacher than the former, and officiated at Paris during five years. Having incurred persecution, he quitted the pulpit and the congregation of the Oratory. He died at Paris in 1752. His "Sermons," in 4 vols. 12mo. appeared in 1749. His anonymous work, entitled "Lettres sur la Justice Chretienne," was censured by the Sorbonne.

Another person of the same family, *viz.* *Matthew Terrasson*, was born at Lyons in 1669, studied the law, and pleaded causes with great reputation. He was for some time an associate in the "Journal des Sçavans," and also censor royal. He died, much esteemed, at Paris, in 1734. A "Collection of his Pleadings, &c." was published in 4to.

The son of the preceding, *Anthony Terrasson*, was born at Paris in 1705, brought up to the bar, and excelled in jurisprudence. By order of chancellor d'Aguesseau, he composed a "History of Roman Jurisprudence," with a collection of Ancient Contracts, &c. in fol. 1750. In 1760 he was promoted to the chancellorship of Dombes, and died in 1782. He was the author of "Melanges d'Histoire, de Liter-

Literature, de Jurisprudence, de Critique, &c." 1768; and of other works. Moreri. Nouv. Dict. Hist. Gen. Biog.

Terrasson, in *Geography*, a town of France, and seat of a tribunal, in the department of the Dordogne; 18 miles N.E. of Montignac. N. lat. 45° 7'. E. long. 1° 23'.

TERRAUBE, a town of France, in the department of the Gers; 4 miles S.W. of Lectoure.

TERREBONNE, a town of Canada; 12 miles N.N.W. of Montreal.

TERREGLES, a town of Scotland, in the county of Dumfries; 2 miles W. of Dumfries.

TERREL, a town of North Carolina; 30 miles N. of Greeneville.

TERRELLA, μικρογη, *little earth*, is a magnet turned of a just spherical figure, and placed so as that its poles, equator, &c. do exactly correspond with those of the world.

It was thus first called by Gilbert, as being a just representation of the great magnetic globe we inhabit.

Such a terrella, if nicely poised, and placed in a meridian like a globe, it was supposed, would be turned round like the earth in twenty-four hours by the magnetic particles pervading it; but experience has shewn this to be a mistake.

TERRE-PLEIN, in *Fortification*, the top, platform, or horizontal surface of the rampart, on which the cannon are placed, and the defenders perform their office.

It is thus called as lying level, having only a little slope outwardly to bear the recoil of the cannon.

It is terminated by the parapet on that side towards the champaign; and by the inner talus on that side towards the place. Its breadth is from 24 to 30 feet.

TERRESCHOW, in *Geography*, a town of Bohemia, in the circle of Pilsen; 16 miles N.E. of Pilsen.

TERRESSA, one of the Nicobar islands, about fifteen miles long, and from two to five broad, of an oval form. N. lat. 8° 20'. E. long. 93° 36'.

TERRESTRIAL Birds. See Birds.

Terrestrial *Globe*. See Globe.

Terrestrial *Line*. See Line, *Terrestrial*.

Terrestrial *Paradise*. See Paradise.

Terrestrial *Roads*. See Road.

TERRE-TENANT, is he who has the actual possession of the land, otherwise called the occupant. See Tenant and Occupant.

Thus a lord of a manor having a freeholder, who letteth out his freehold to another to be occupied, this occupier who has the actual possession is called the *terre-tenant*.

TERRE-VERTE, in the *Colour-Trade*, the name of a green earth much used by painters, both singly for a good standing green, and in mixture with other colours.

The name is French, and signifies *green earth*.

It is an indurated clay, of a deep blueish-green colour, and is found in the earth, not in continued strata or beds, as most of the other earths are, but in large flat masses of different sizes, imbedded in other strata; these break irregularly in the cutting, and the earth is generally brought out of the pit in lumps of different sizes. It is of a fine, regular, and even structure, and very hard. It is of an even and glossy surface, very smooth to the touch, and in some degree resembling the morochthus, or French chalk, but adhering firmly to the tongue. It does not stain the hands in touching it; but being drawn along a rough surface, it leaves an even white line, with a greenish cast.

It does not ferment with acids, and is burnt to a dusky brown colour.

It is dug in the island of Cyprus, and in many parts of France and Italy. That from the neighbourhood of Verona has been used to be esteemed the best in the world; but of late there has been some dug in France that equals it. There is also an earth dug on the Mendip hills, in the sinking for coals, which, though wholly unobserved, is nearly, if not wholly, of equal value.

When scraped, and the finer parts separated, it is ready to be made up with oil for the use of the painters, and makes the most true and lasting green of any simple body they use. Hill and Da Costa. See Berg-*Gruen* and Verditer.

TERRIAGULLY, in *Geography*, a town of Bengal; 20 miles N.W. of Rajemal.

TERRIAH, a town of Hindoostan, in Rohilcund; 7 miles S. of Bereilly.

TERRIER, or Terrar, in our *Ancient Customs*, a collection of acknowledgments of the vassals or tenants of a lordship, containing the rents, services, &c. they owe their lord, and serving as a title or claim for demanding and executing the payment of them.

At present, by terrier we mean no more than a book or roll, in which the several lands, either of a private person, or of a town, college, church, &c. are described. The terrier should contain the number of acres, and the site, boundaries, tenants' names, &c. of each piece or parcel. See Domes-*Day*.

Terrier also denotes the lodge or hole which foxes, badgers, rabbits, &c. dig themselves under ground, and in which they save themselves from the pursuit of the hunters. Hence,

Terrier, *Terrarius*, is also used for a kind of little hound to hunt those animals, which, like a ferret, creeps into the ground, and by that means affrights and bites them; either tearing them with his teeth, or else haling them by force out of their holes. See Dog and Hound.

Terrier, in *Geography*, a town of Africa, on the Senegal; 25 miles S. of Cayar.

Terrier *Rouge*, a town of the island of St. Domingo; 15 miles E.S.E. of Cape Français.

TERRIFICATIO, a word used by some chemical writers to express the coalition of the earthy particles of some bodies after fermentation, or during the time of it.

TERRILS or Tyrrells *Pass*, in *Geography*, a post-town of the county of Westmeath, Ireland; 40 miles W. from Dublin.

TERRIMUNGALUM, a town of Hindoostan, in the Carnatic; 25 miles N. of Tritchinopoli.

TERRIORE, a town and fortress of Hindoostan, in the Carnatic; 24 miles N. of Tritchinopoli. N. lat. 11° 12'. E. long. 78° 45'.

TERRIS *Bonis et Catallis*, *Rehabendis post Purgationem*, in *Law*, a writ for a person to recover his lands, goods, or chattels formerly seized, after having cleared himself of a felony, upon suspicion of which he was convicted, and delivered to his ordinary to be purged.

Terris *et Catallis Tentis ultra debitum levatum*, a writ judicial for the restoring lands or goods to a debtor, who is distrained beyond the quantity of the debt. See Distress.

Terris *Liberandis*, a writ lying for a man convicted by attaint, to bring the record and process before the king, and take a fine for his imprisonment, and deliver him his lands and tenements again, and release him of the strip and waste.

It is also a writ for the delivery of lands to the heir after homage and relief performed; or upon security taken that he shall perform them.

TERRITORY, District, the extent or compass of land within the bounds, or belonging to the jurisdiction of any state, city, or other division. See District.

It is a maxim, that the church has no territory, *i. e.* it has no no temporal jurifdiction; and therefore an ecclefiaftical judge cannot arreft any body, not even a prieft. It is much in this fenfe that Cujas fays, the church has an auditory, but no territory.

Territory or *Diftrict of Columbia*, in *Geography*, a diftrict of America, ceded to the United States by thofe of Maryland and Virginia, and eftablifhed in the year 1800 as the feat of general government. It is beautifully fituated on both fides of the Potowmack river, between 38° 48′ and 38° 59′ N. lat., and 7′ E. and 7′ W. long. from Wafhington, the capital. The *capital* is about 77° 0′ 22″ W. from London. It is bounded on the N.E., S.E., and partly N.W., by Maryland; and on the S.W., and partly N.W., by Virginia: in extent it is ten miles fquare, and contains an area of 6400 fquare miles. The face of the country is elegantly variegated, and affords a great number of beautiful profpects, of which the Potowmack river is the leading feature. This diftrict affords a variety of ftreams and fprings for watering the city, and for other purpofes: its rivers are the Potowmack or Potomac, the Tiber creek, Reedy creek, Rock creek, and Four-mile Run. The foil is thin and fandy, but fufceptible of improvement: and the climate is difcriminated by a variable fpring, a pretty warm fummer, an agreeable autumn, and a variable, often very cold, winter.

Topographical Table.

Counties.	Population.
Wafhington city - - - - - -	8208
Georgetown, fituated W. of the city - -	4948
Wafhington county, exclufive of the city and Georgetown - - - - -	2315
Alexandria, on the W. bank of the river, in the lower part of the diftrict - - -	7227
Alexandria county, exclufive of the town -	1325

Morfe and Melifh. See Columbia and Washington.

Territory, *Illinois*, a territory of America, and likely to become foon one of the moft important ftates in the Union, is fituated between 37° and 41° 45′ N. lat., and 10° 15′ and 14° 15′ W. long. from Wafhington city; and is bounded on the N. by the North-weft territory, on the S. by Kentucky and Miffouri territory, on the E. by Indiana territory, and on the W. by Miffouri territory. Its extent from N. to S. is 306 miles, and from E. to W. 210 miles: its area contains 50,000 fquare miles, or 32,000,000 acres. The afpect of the country is level in the fouth, and to the north elevated and hilly, but not mountainous. The foil is generally fertile, and produces grain, grafs, fruit, flax, and hemp; and in the fouthern part, cotton. The climate is temperate and agreeable.

Topographical Table.

Counties.	Population.	Chief Town.	
* Edward.			
* Johnfon.			
* Madifon.			
Randolph -	7275	Kafkufkia -	622
St. Clair -	5007		
* Wabafh.			
	12282		

* Laid out fince laft cenfus. Melifh. See Illinois.

Territory, *Indiana*, an interefting country of America, lately diftinguifhed by this appellation, and now confidered as a *nineteenth ftate*, is fituated between 37° 45′ and 41° 52′ N. lat., and 7° 40′ and 10° 47′ W. long. from Wafhington city; and bounded on the N. by Michigan territory, lake Michigan, and North-weft territory, on the S. by Kentucky, on the E. by Ohio, and on the W. by Illinois territory. Its extent from N. to S. is 240 miles, and from E. to W. 138 miles. Its area contains 34,000 fquare miles, or 21,760,000 acres. The afpect of the country is hilly, but not mountainous; its fcenery rich and variegated; and it abounds with plains and large prairies. Its rivers are the Ohio, Wabafh, White-water, Tippecanoe, Illinois, and St. Jofeph's: its minerals are coal, lime-ftone, free-ftone, falt, and filver. The foil is generally rich and fertile; and its produce grain, grafs, and fruit, and in the fouth, cotton. Its climate is temperate, pleafant, and falubrious. Its legiflature confifts of a houfe of reprefentatives and fenate; the former elected annually, and the latter every three years: they muft hold no office of profit when elected. The executive confifts of a governor and lieutenant-governor; both elected for three years, and capable of being re-elected once: the former has a compenfation of 1000 dollars *per annum*, and the latter two dollars *per* day, while the legiflature is in feffion. Its judiciary adminiftration is compofed of a fupreme and circuit court: the former compofed of three judges, appointed by the governor and fenate for feven years; with a falary not exceeding 800 dollars *per annum:* the latter confifts of a prefiding judge and two affociates, who hold courts in each county: the prefiding judge appointed by the joint ballot of the legiflature for feven years, and the affociates elected by the people for feven years: fheriffs, clerks, and juftices, are elected by the people; the fheriff for three years, the clerks and juftices for feven years. The militia officers are elected by thofe who are fubject to military duty; and all above colonel, by the commiffioned officers. A ftate bank is to be eftablifhed at the feat of government, with one branch for every three counties; and the branch banks muft have 30,000 dollars in fpecie each, before they begin to act. Involuntary flavery is for ever excluded. The conftitution may be amended in 12 years: Corydon is to be the feat of government for nine years. The congrefs, in erecting the Indiana territory into a ftate, appropriated, in addition to the fchool fection, an entire townfhip of land for the fupport of a feminary of learning, and four fections for fixing the feat of the ftate governor.

Topographical Table.

Counties.	Population.	Chief Towns.	
Clark - -	5760	Jefferfonville	239
Dearborn -	7310	Lawrenceburg	165
* Franklin.			
* Gibfon.			
Harrifon -	3595	Corydon.	
* Jefferfon.			
Knox - -	7945	Vincennes	670
* Switzerland -	- -	Vevay.	
* Wafhington.			
* Wayne.			
	24520		

* Laid off fince laft cenfus. Melifh. See Indiana.

Territory, *Michigan*, a diftrict in America, which, in 1796, was denominated Wayne county, has lately been erected into a territorial government, and organized with the ufual offices and powers. It is fituated between 41° 45′ and 45° 35′ N. lat., and 5° 5′ and 8° 18′ W. long. from Wafhington; and is bounded on the N. by the ftraits of Michilimackinac, on the S. by Ohio and Indiana, on the E. by lakes Huron and St. Clair, and Upper Canada, and on on the W. by lake Michigan. Its extent from N. to S. is 234 miles, and from E. to W. 138 miles. Its area contains 27,000 ſquare miles, or 17,280,000 acres. The central part of this territory is high, and from this is a deſcent in all directions.

The rivers are St. Mary's, Huron, Detroit, Black, Maramee, Grand, Carrion, Raiſin, &c. The ſoil is generally rich and fertile, and produces wheat, oats, barley, rye, corn, potatoes, fruit, &c. The climate is temperate and ſalubrious; winter laſting from the middle of November to the middle of March.

Topographical Table.

Diſtricts.	Population.	Chief Town.	
Detroit - -	2227	Detroit -	770
Erie - - -	1340		
Huron - -	580		
Michilimackinac -	615		
	4762		

Morſe and Meliſh. See DETROIT.

TERRITORY, *Miſſiſſippi*, an improving country of America, which, it is preſumed, will be divided into two ſtates, the Tombigby being the boundary. It is ſituated between 30° 15′ and 35° N. lat., and 8° and 14° 32′ W. long. from Waſhington city; and bounded on the N. by Tenneſſee, on the S. by Louiſiana, Weſt Florida, and the gulf of Mexico, on the E. by Georgia, and on the W. by Louiſiana and Miſſouri territory. Its extent from N. to S. is 312 miles, and from E. to W. 324 miles; and its area comprehends 89,000 ſquare miles, or 56,960,000 acres. Its general aſpect is, towards the ſouth, level, to the north, elevated and beautifully diverſified, and on the north-eaſt are ſome ſpurs of the Alleghany mountains. The ſoil, generally good, and in many places excellent, produces cotton, corn, rice, wheat, rye, oats, ſome ſugar, and indigo. The climate is much commended; the winters being mild, and the ſummers not warmer than ſeveral degrees to the northward.

Topographical Table.

Counties.	Population.	Chief Towns.	
Adams -	10002	Natches	1511
Amite -	4750	Liberty.	
Baldwin -	1427		
Claiborne -	3102	Gibſonſport.	
* Clarke.			
Franklin -	2016	Franklin.	
* Green.			
Jefferſon -	4001	Greenville.	
Madiſon -	4699		
* Marion.			
* Monroe.			
Warren -	1114	Warren.	
Waſhington -	2920	Fort Stoddart.	
Wayne - -	1253		
Wilkinſon -	5068	Woodville.	
	40352		

Meliſh. See MISSISSIPPI.

TERRITORY, *Miſſouri*, an improving country of America, which may probably be ſubdivided into diſtinct ſtates, is ſituated between 26° and 49° 37′ N. lat., and 12° and 49° 30′ W. long.; and bounded on the N. by an unſettled country, on the S. by Louiſiana and the gulf of Mexico, on the E. by Upper Canada, the North-weſt territory, Illinois territory, Kentucky, Tenneſſee, Miſſiſſippi territory, and Louiſiana, on the W. by the Pacific ocean, and on the S.W. by the Spaniſh internal provinces. Its extent from N. to S. is about 1380 miles, and from E. to W. about 1680 miles; and its area contains 1,580,000 ſquare miles, or 1,011,200,000 acres. The aſpect of the country, ſouthward, is level, in many places overflowed by rivers; to the north, elevated, ſwelling out into large hills; and to the north-weſt and weſt, very lofty mountains. The rivers of the territory are the Miſſiſſippi, Miſſouri, Kanſes, Grand, Oſage, Maramee, St. Francis, White, Arkanſaw, Wachitta, Red, Sabine, Moines, Rio Colorado, Rio Bravos de Dios, Rio Guadalupe, Rio del Norte, &c. Its minerals are abundant, particularly lead, the mines of which near St. Genevieve are extenſive and valuable. The ſoil is various in quality, but much of it is rich and fertile; and produces grain, graſs, fruit, cotton, and ſome ſugar and indigo. The climate is, in the ſouth, warm, in the middle temperate, to the north and weſt cold; on the Pacific ocean temperate.

Topographical Table.

Diſtricts.	Population.	Chief Towns.	
Cape Girardeau -	3888	Cape Girardeau.	
New Madrid - -	2103	New Madrid.	
St. Charles - -	3505	St. Charles -	450
St. Louis - -	5667	St. Louis -	1600
St. Genevieve -	4620	St. Genevieve.	
Settlements of Hope Field and St. Francis	188		
Ditto on Arkanſaw -	874		
	20845		

Meliſh. See MISSOURI.

TERRITORY, *North-Weſt*, an extenſive territory of America, not yet organiſed into a regular government, is ſituated between 41° 45′ and 49° 37′ N. lat., and 7° and 18° 50′ W. long. from Waſhington city; and bounded on the N. by Upper Canada and lake Superior, on the S. by Indiana and Illinois territory, on the E. by Upper Canada and lake Michigan, on the W. and S.W. by Miſſiſſippi river, which divides it from the Miſſouri territory. Its extent from N. to S. is about 360 miles, and from E. to W. 456 miles; and its area contains about 147,000 ſquare miles, or 94,080,000 acres. The face of the country is generally undulating, in ſome places hilly, but not mountainous. Its rivers are the Miſſiſſippi, Ouiſconſin, Fox, Monomonie, Chippeway, &c. The ſoil is moſtly excellent; and the climate, towards the ſouth, is pleaſant, and to the north, cold. Few ſettlements have yet been made in this extenſive region, and the inhabitants were not included in the laſt cenſus. Meliſh.

TERRITORY *of Orleans*. See LOUISIANA, ORLEANS, and UNITED STATES.

TERROR. The effect of terror, or of ſudden frights, in diſeaſes, is often very great.

It is generally obſerved, that people who are moſt afraid of the plague in time of contagion, catch the infection ſooneſt; and that thoſe who are moſt terrified and diſheartened at firſt in the diſeaſe, generally die of it. It is indeed uncertain, whether this be attributed to the terror, or whether the terror itſelf, as a conſequence of dejection of ſpirits, be not merely a ſymptom of the diſeaſe. Kerkring, Spicileg. Anat.

Sudden frights, in acute diſeaſes, have evidently killed many,

many, by the agitation into which they have thrown the ſpirits, already too much diſorderd. We have alſo accounts of perſons abſolutely killed by terrors, when in perfect health at the time of receiving the ſhock from them: people ordered to be executed, but with private orders for a reprieve, have expired at the block without a wound.

The general effects of terror are a contraction of the ſmall veſſels, and a repulſion of the blood in the large and internal ones; hence proceed the ſuppreſſion of perſpiration, the general oppreſſion, trembling, and anguiſh of heart and lungs overcharged with blood, &c.

When a perſon is affected with terror, the principal endeavour ſhould be to reſtore the circulation to its due order, to promote perſpiration, and to allay the agitation of the patient. For theſe purpoſes he may drink a little warm liquor, as chamomile tea, &c.; the feet and legs may be put into warm water, the legs rubbed, and the chamomile tea repeated every ſix or eight minutes; and when the ſkin is warm, and there is a tendency to perſpiration, ſleep may be promoted by a gentle opiate.

TERRYA, in *Geography*, a town of Bengal; 30 miles S. of Beyhar.

TERSA, a ſmall river of Ruſſia, which runs into the Medveditza, in the country of the Coſſacs. N. lat. 50° 30'. E. long. 44° 34'.

TERSCHUEREN, a town of Guelderland; 7 miles E. of Amersfort.

TERSEKAN, a river of Ruſſia, which runs into the Iſchim, N. lat. 52° 50'. E. long. 67° 34'.

TERSHIZ. See TURSHISH.

TERSION, TERSIO, formed of *tero*, *I wear*, the act of wiping or rubbing a thing. See ABRASION.

TERTA, in *Ancient Geography*, a town ſituated, according to Ptolemy, in the interior of Thrace, between Sardica and Philippolis.

TERTHRON, a word properly ſignifying the extreme part of the ſail-yard in ſhipping. Hippocrates uſes it in a metaphorical ſenſe, to expreſs the extremity of a diſeaſe.

TERTIAN, in *Medicine*, a ſpecies of intermitting fever, of which the ſimilar paroxyſms occur at an interval of about forty-eight hours. See FEVER.

TERTIAN is alſo an old meaſure, containing eighty-four gallons, ſo called becauſe it is the third part of a tun. 1 R. III. c. 13. 2 H. VI. c. 11.

TERTIANARIA, in *Botany*, a name given by ſome authors to the ſcutellaria, or hooded willow-herb. J. Bauhin, vol. iii. p. 435.

TERTIARY CANONS. See CANONS.

TERTIAS, a word uſed very frequently in the writings of phyſicians, with the addition of *ad*; but it is capable of a double ſignification. *Ad tertias* is often uſed to expreſs how far the liquor is to be boiled away in the medical decoctions; yet it may in this caſe ſignify either the boiling to two-thirds, or to one-third part, of the whole. The more uſual ſenſe, however, is to boil away one-third part of the original liquor; and in the ſame manner to fill a veſſel *ad tertias*, does not ſignify to fill a veſſel one-third part full, but two-thirds, leaving only one empty.

TERTIATE, in *Gunnery*. *To tertiate* a great gun, is to examine the thickneſs of the metal at the muzzle, whereby to judge of the ſtrength of the piece, and whether it be ſufficiently fortified or not.

This is uſually done with a pair of calliper compaſſes.

The term is alſo applied to any piece of ordnance for finding whether it has its due thickneſs at the vent, trunnions, and neck; if the trunnions and neck are in their due order, and the chaſe ſtraight, &c.

TERTII *internodii pollicis extenſor*, in *Anatomy*. See EXTENSOR.

TERTIO *adjacente*, *Propoſitio de*. See PROPOSITION.

TERTIVERI, in *Geography*, a town of Naples, in Capitanata; 7 miles N.W. of Troja.

TERTIUM SAL, a *third ſalt*, a term uſed in *Chemiſtry* to expreſs a ſalt reſulting from the mixture of an acid and an alkali, which partakes ſo of the nature of both, as to be itſelf neither acid nor alkali, but neutral.

TERTRE, JOHN BAPTIST DU, in *Biography*, a miſſionary and writer of hiſtory, was born at Calais in 1610: and having ſerved in the army in early life, he joined the Dominicans at Paris, and made his profeſſion in 1635, aſſuming the name of John-Baptiſt inſtead of James. About five years afterwards, he was ſent as a miſſionary to the French American iſlands, where he collected materials for the work which engaged his attention after his return to France in 1658: that was his "Hiſtoire Generale des Antilles habitées par les François;" 4 vols. 4to. 1667—71. After having filled various poſts in the houſes of his order, he died at Paris in 1687. Moreri.

TERTUA, in *Geography*, a town of Hindooſtan, in Bahar; 34 miles E. of Bahar.

TERTULLIAN, QUINTUS SEPTIMIUS FLORENS TERTULLIANUS, in *Biography*, generally reckoned the moſt ancient Latin father extant, was born at Carthage, not long after the middle of the ſecond century. He was the ſon of a proconſular centurion, or military officer under the proconſul of Africa, and well acquainted with the Roman laws, though he does not ſeem to have practiſed the law as a profeſſion. He was alſo intimately converſant with the Greek and Roman poets, hiſtorians, orators, and philoſophers, and other heathen writers of every deſcription. His ſkill in Greek was ſo conſiderable, that he wrote ſeveral books in that language. It has been inferred from his parentage, and from ſome expreſſions in his works, that he was once a Heathen; but the time and circumſtances of his converſion to Chriſtianity are not known. Cave ſuppoſes that he embraced Chriſtianity about the year 185, and was made a preſbyter of the church of Carthage about the year 192. According to Du Pin, he flouriſhed chiefly from about the year 194 to 216. Tillemont is of opinion that he was born in 160, and that he died about the year 245, when he was between 80 and 90 years of age, having lived, as St. Jerom ſays, to an extreme, or decrepit, old age. Cave conjectures that he died about the year 220. It is ſaid that he was married, probably after his converſion to Chriſtianity. Having been a member of the Catholic church for many years, he ſeparated from it and became a Montaniſt, as Cave ſays, about the year 199, but about 205, according to Tillemont. Different accounts have been given of this change; but the moſt probable ſeems to be, that the ſpecious pretences of the Montaniſts to greater mortification in faſts and continence had an influence on his temper, which was ſevere. But whatever might have been his reaſons for adopting the principles of Montaniſm, they ſeem to have made ſo little alteration in him as an author, that there are ſeveral of his pieces, concerning which it is not eaſy to determine, whether they were written by Tertullian a Montaniſt, or Tertullian ſtill a Catholic. Although, in conſequence of this change, his reputation ſunk in the church, yet it produced no ſeparation between him and other Chriſtians, except in point of diſcipline, which, agreeably to his temper, he wiſhed to be harſh and rigorous. His doctrine remained the ſame with that of the Catholics. In proceſs of time, however, he believed the divine inſpiration of Montanus and his two propheteſſes, Priſcilla and Maximilla, and that they were thus enabled to make further diſcoveries than had before been made, for the greater perfection of Chriftians. He approved of the longer, more ftrict, and more freqnent fafts of the Montanifts; he condemned all fecond marriages; and denied that the church was authorifed to receive again into communion any who were chargeable with fornication, adultery, or any fuch offences, after baptifm. He often arrogantly calls his own people fpiritual, and the Catholics, as contemptuoufly, animal or carnal. We have already obferved that his knowledge was extenfive; his fancy alfo was lively; and though his temper was fevere, and his mode of expreffion vehement and pofitive, yet his writings frequently manifeft unaffected humility and modefty. The character given of his ftyle by Lactantius muft be univerfally allowed; that it is "rugged and unpolifhed, and very obfcure;" and yet, as Cave obferves, "it is lofty and mafculine, and carries a kind of majeftic eloquence along with it, that gives a pleafant relifh to the judicious and inquifitive reader." His books ftill extant, though many are loft, are numerous, fome of which were written before and others after he embraced the errors of Montanifm. Of thefe, the Apology is reckoned his principal work; and has been highly commended both by ancient and modern writers; whilft his other performances are written with wit and force, and are edifying and inftructive. The time when his "Apology" was written has been differently ftated by various authors: fome refer it to the year 200, others to 203 and 205; but Mofheim, after laborious examination, concludes that it was compofed in the year 198. All allow that it was written before he joined the Montanifts. Learned men generally agree, that it was not addreffed to the fenate of Rome, but to the governors of provinces, or perhaps to the proconful of Africa, and the chief magiftrates refiding at Carthage, where it was written, according to Lardner; though others are of opinion that it was written at Rome. From this Apology, it appears that Chriftians underwent a variety of grievous fufferings; they were, as he fays, "crucified, hung upon ftakes, burnt alive, thrown to wild beafts, condemned to the mines, and banifhed into defert iflands." That this was the cafe, appears alfo from Tertullian's book to the proconful Scapula, not written before the year 211 or 212. The "Apology" is written for the purpofe of fhewing the injuftice of the perfecutions inflicted upon Chriftians, and the falfehood of the charges brought againft them; and likewife to difplay the excellence of the Chriftian religion, and the folly and abfurdity of that of the Heathens. His two books "Ad Nationes" are connected with his Apology, and indicate his characteriftic vehemence. His addrefs to Scapula, already mentioned, was written under the emperor Caracalla, and contains an avowal of admirable principles. "It ought," he fays, "to be left to the free choice of men, to embrace that religion which feems to them moft agreeable to truth. No one is injured or benefited by another man's religion; it is not an act of religion to force religion, which ought to be adopted fpontaneoufly, not by compulfion." He proceeds to vindicate the conduct of Chriftians, and to fhew that their religious principles induced them to pay entire obedience to the emperors, and that therefore they did not deferve to incur the penalties of treafon. Another work of Tertullian has been often cited, *viz.* "De Præfcriptionibus adverfus Hæreticos." In this work he treats of herefy in general, and then difcuffes particular herefies in his five books againft Marcion, in others againft Praxeas, in defence of the Trinity, and againft Hermogenes, and the Valentinians. In his book "On the Soul," he inquires into the nature of the foul and its properties. In his treatife "On Baptifm," he abfurdly maintains that the moral ftain of the foul is effaced by the external wafhing of the body, and that punifhment is likewife remitted; a doctrine which fome late divines have zealoufly fupported. Baptifm by heretics he confiders as no baptifm, and contends that it ought to be repeated. In cafes of neceffity, he thinks infant-baptifm to be allowable, but he recommends deferring rather than haftening the adminiftration of this facrament. His book "On Penance" refutes the opinion advanced by the Montanifts, that fins committed after baptifm cannot be abfolved by the church. In his treatife "On Idolatry," he extends this crime to practices that are almoft unavoidable in fociety; fuch as bearing arms for the defence of the empire, adorning houfes in honour of the prince, and ufing cuftomary expreffions that have any reference to Heathen mythology. In his work "De Corona Militis," he applauds a Chriftian foldier who refufed to place a crown or garland on his head. In another work he confiders "flight in time of perfecution" as prohibited, and alfo giving money to efcape it. In his treatife "De Spectaculis," he diffuades Chriftians from attending public fhows. In his moral tracts is an exhortation to "patience," in which, as well as in a difcourfe addreffed to martyrs or confeffors, he dwells in an eloquent ftrain on the motives which fhould bind a Chriftian to the practice of that virtue. After his union with the Montanifts, Tertullian wrote four books in oppofition to the difcipline of the Catholic church; *viz.* "On Modefty;" "On Monogamy:" "An Exhortation to Charity;" and "A Treatife on Faith."

Tertullian, in his various writings, has afforded plain teftimonies to all the books of the New Teftament, commonly received by Chriftians at this time, except the Epiftle of James, the 2d of Peter, the 2d and 3d of John. The Epiftle to the Hebrews he afcribes to Barnabas. This ancient father has been much admired: Cyprian calls him "my mafter." Some perfons, however, have doubted whether he has done more good or harm in the Chriftian church. His character is judicioufly appreciated by one of his biographers (Gen. Biog.) in the following manner. Tertullian "was certainly a man of lively parts and large acquirements, of copious invention, and warm feelings. In his reafonings, however, he difplayed more fancy and fubtilty than found judgment; and the ardour of his temper inclines him to violence and exaggeration, while a propenfity to fuperftition renders him weakly credulous and gloomily auftere." His works have been frequently printed both feparately and collectively. Of his whole works, the editions of Rigaltius, fol. Paris, 1641, and of Semler, Hal. Magd. 6 vols. 1770—76, are moft efteemed. Dupin. Lardner. Mofheim.

TERVEERE, in *Geography*. See VEERE.

TERUEL, a town of Spain, in the kingdom of Aragon, at the conflux of the Guadalavir and the Alhambra; the fee of a bifhop, fuffragan of Saragoffa: it is defended by a citadel. This town was deftroyed by the Moors, and lay a long time abandoned, but was rebuilt and repeopled by Alphonfo II. in the year 1171. In the year 1365, on the 25th of April, it was taken and pillaged by Peter, king of Caftile; in memorial of which, the inhabitants keep the day a ftrict faft; 72 miles S. of Saragoffa. N. lat. 40° 32′. W. long. 1°.

TERVIS, a town of Iftria; 8 miles W. of Mitterburg.

TERUM, a town of Arabia, in Yemen; 35 miles W.S.W. of Schibam.

TERUNCIUS, in *Antiquity*, a very fmall brafs coin in ufe among the Romans.

The inconvenience of fuch very fmall pieces being foon found, the teruncius became difufed, but its name is ftill retained in reckoning, and thus it became a money of account.

The teruncius at firft was a quarter of the *as*, or libra; hence,

hence, as the *as* contained twelve ounces, the teruncius contained three, whence the name, which is formed of the Latin *tres unciæ*.

Teruncius was alfo ufed for the quarter of the denarius, fo that when the denarius was at ten affes, the teruncius was worth two and a half; and when the denarius was rifen to fixteen, the teruncius was worth four. See DENARIUS.

TERVOLA, in *Geography*, a town of Sweden, in the Lapmark of Kemi; 116 miles N. of Kemi.

TERWALDE, a town of Holland, in the department of Guelderland; 12 miles S. of Hattem.

TERZA, LA, a town of Naples, in the province of Otranto; 13 miles S.E. of Matera.

TERZA, Ital. the 3d in *Mufic*. The *terza maggiore*, or major 3d, is four femitones, or half notes, above the bafe; the *terza minore*, or minor 3d, is three. See CONCORDS and INTERVALS.

TERZETTO, in the *Italian Mufic*, a little tune or air in three parts. See TRIO.

TERZINI, Ital. implies, in the language of practical muficians, triplets, or three notes in the time of two.

TERZO SUONO, Ital. the third found, difcovered by Tartini to be produced in the medium by two founds that can be fuftained, and which third found is the true fundamental bafe. Upon this harmonic phenomenon Tartini has founded his fyftem; and Mr. Stillingfleet, in his "Principles and Power of Harmony," defcribes the *terzo fuono* in the following manner.

"Two founds being given on any mufical inftrument, which will admit of being held out for any time, and of being ftrengthened at pleafure, as in the trumpet, the German horn, the violin, hautbois, &c. a third found will be heard. On the violin, let the notes C E, C✻ E, B E, B G, B♭ G, be founded with a ftrong bow, the third founds will be heard in the following manner.

Tartini has added the above, and even given us a 3d found to difcords.

"The fame thing will happen if the fame intervals are founded by two players on the violin, diftant from one another about twenty-nine or thirty feet; always ufing a ftrong bow, and holding out the notes. The auditor will hear the third found much better, if placed in the middle between them, than if nearer to one than the other. Two hautbois produce the fame effect placed at a much greater diftance, and even when the hearer is not in the middle, and ftill more if he is."

Tartini has been unfairly treated by d'Alembert, M. Serre, and other French writers, who not only difpute his fyftem built on the *terzo fuono*, his own difcovery, but give the difcovery itfelf to another.

D'Alembert accufes him of writing in a manner fo obfcure, that it is impoffible to form any judgment of his intentions; yet he is obliged to own that the fubject itfelf is obfcure, metaphyfical, and uncertain. As to the obfcurity in the phenomenon itfelf, we deny it; the third found, produced by two other founds, we have always found, from innumerable experiments with two voices, two inftruments, two founds on one inftrument, as double ftops on a violin, violoncello, and on an organ, that the third found thus produced in the medium was the true fundamental bafe, fuch as Tartini himfelf has expreffed by mufical notes.

D'Alembert and all the French writers on the fubject, have ftated the cafe (except Rouffeau) in a difingenuous manner. Even when difputing Rameau's principles, they wifh to keep him above Tartini and all foreign claimants to original difcovery or improvement in mufic. Rouffeau is envied for being the firft to abufe the old French mufic, even by thofe who thought and allowed it to be bad in their other writings. See the Abbé Arnauld and M. Suard's critique upon his Dictionnaire de la Mufique, with thofe of the Abbé Rouffier, M. Laborde, &c. &c.

TERZO, in *Geography*, a town of France, in the department of the Tanaro; 2 miles S.W. of Acqui.

TERZOLA, in *Botany*, a name by which fome authors have called the eupatorium cannabinum, or water hemp-agrimony.

TERZOWITZ, in *Geography*, a town of Bohemia, in the circle of Rakonitz; 7 miles S.S.E. of Rakonitz.

TESA, in *Ancient Geography*, a town of Afia, in Carmania, upon the gulf Paragon. Ptolemy.

TESAKON, in *Geography*, a town of Africa, in the country of Nalus, on the Nuno Triftao.

TESCAPHE, in *Ancient Geography*, a town of Afia, in Mefopotamia, on the banks of the Tigris, near Seleucia. Ptol.

TESCHAR, in *Geography*, a town of Hindooftan, in Lahore; 42 miles E.S.E. of Bullaufpour.

TESCHEN, a principality of Silefia, bounded on the N. by the principality of Ratibor, on the E. by Poland, on the S. by Hungary, and on the W. by Moravia. It is for the moft part hilly, the Moravian chain terminating near Jablunkau, in the fouthern part, where alfo begin the Carpathian mountains. On the other hand, the north part is very fwampy, and overrun with lakes and meres; notwithftanding which, there are feveral fertile fpots. Befides which, it abounds likewife in wood. In the whole principality are five towns, part of the inhabitants of which fpeak German, and the others Polifh. The mountains are inhabited by Walachians, who make good heyducks, or footfoldiers. The excellent fire-arms here, called *Tefchins*, receive their name from this country, and more particularly from its capital, where they are made in great quantities.

TESCHEN, or *Teiffin*, a town of Silefia, which gives name to a principality, fituated on the Elfa, partly in a valley, and partly on a hill, and furrounded by a morafs. It contains a Roman Catholic and a Lutheran church, a college, and four convents. The inhabitants carry on fome commerce in leather, wool, and wine: here is a manufacture of fire-arms, and a particular kind of fufil, called, from the town, *Tefchins*; 26 miles S.E. of Ratibor. N. lat. 49° 43′. E. long. 18° 41′.

TESCHENAU, or TESCHNA, a town of Bohemia, in the circle of Bechin; 8 miles E. of Sobieflaw.

TESCHONOVITZ, a town of Pruffia, in Oberland; 18 miles E.S.E. of Ortelfberg.

TESCUCO. See TEZCUCO.

TESCYLETIUM, in *Ancient Geography*, a town of Italy, on the coaft of Magna Græcia, between the temple of of the Lacinian Juno and the town of Locri, according to Diodorus Siculus.

TESE, in *Geography*. See Test.

TESEGDELT, a town of Morocco, situated on a sharp rock, supposed to be impregnable; 80 miles W.N.W. of Morocco.

TESENI, a town of Asiatic Turkey, in Natolia; 34 miles S.E. of Degnizlu.

TESEREN, a town of Africa, in the country of Tafilet; 50 miles N.N.W. of Tafilet.

TESHOO-LOOMBOO, or Lubrong, the residence of the Teshoo Lama, and the capital of that part of Thibet immediately subject to his authority, is situated in N. lat. 29° 4′ 20″. E. long. 89° 7′. It is a large monastery, consisting of three or four hundred houses, the habitations of the Gylongs, or priests, besides temples, mausoleums, and the palace of the sovereign pontiff; in which is comprised also the residence of the regent, and of all the subordinate officers, both ecclesiastical and civil, belonging to the court. It is included within the hollow form of a high rock, and has a southern aspect. Its buildings are all of stone, none less than two stories high, flat-roofed, and crowned with a parapet rising considerably above the roof, composed of heath and brush-wood, inserted between frames of timber, which form a ledge below, and are fashioned above into a cornice, capped with masonry. The building is stained of a deep garnet-colour; a custom universally adopted in these regions, for distinguishing places of religious establishment, and which, when contrasted with the white walls, produces, in the appearance of their town, a very pleasing effect. All the houses have windows, the centre, or principal one, projecting beyond the walls, and forming a balcony: they are closed with black mohair curtains instead of shutters. The principal apartment in the upper story has an opening over it, covered with a moveable shed, which serves the purpose of sometimes admitting light and air, and in the winter season, occasionally, the grateful warmth of the sun. The tops of the walls are adorned with cylindrical monuments; some of which are plain, covered with black cloth, crossed by a white fillet; while others are made of copper, burnished with gold: as the palace and mausoleums are thus adorned with profusion, the view of the monastery, on approaching it from the plain, is brilliant and splendid. The plain of Teshoo-Loomboo, which is perfectly level, is encompassed by rocky hills: its length is about fifteen miles, and its southern extremity, from E. to W., is five or six miles broad. The rock, upon the southern face of which the monastery is situated, nearly occupies the whole width of the valley, and approaches so near to the hills, as to form a narrow defile, leaving room only for a road, and the bed of the river Painom-tchieu, which runs through it, and at a small distance joins the Burhampooter. A fortress commands the pass. The rock of Teshoo-Loomboo is the loftiest of all that are in its vicinity; and the monastery near its base is thus guarded from the violence of the N.W. winds. From the summit of this rock the eye commands a very extensive prospect, and the most interesting object in view is the celebrated river Burhampooter, called in the language of Thibet Erechoomboo. Here it receives the tributary waters of the Painom-tchieu. Turner's Tibet.

TESI TRAMONTINI, Vittoria, in *Biography*, one of the most renowned female singers that Italy has produced. She was born at Florence in 1690; began her vocal studies under the maestro di cappella Francesco Redi; then went to Bologna, and became a pupil of Campeggi; and received her last polish from Bernacchi. But she was no less admired for the dignity, grace, and propriety of her action, than her vocal powers.

Quantz, who heard her at Dresden in 1719, in the famous opera that was performed on occasion of the nuptials of the prince royal of Poland, sing with Senesino, the Berselli, wife of Lotti, Durestante, and the Faustina, characterizes her in the following masterly manner.

"Vittoria Tesi had by nature a masculine, strong, contralto voice. In 1719 she generally sung, at Dresden *all' ottava*, such airs as are made for base voices; but afterwards, besides the majestic and serious style, she had occasionally something coquettish in her manner, which was very pleasing. The compass of her voice was so extraordinary, that neither to sing high nor low gave her trouble. She was not remarkable for her performance of rapid and difficult passages; but she seemed born to captivate every spectator by her action, principally in male parts, which she performed in a most natural and intelligent manner." Life of Quantz, written by himself.

She sung at Naples in 1725, and at Vienna in 1748, where she remained till the time of her decease, in 1775, at 85 years of age.

She was the mistress of the Teuberinn and the De Amicis, both as justly famed for their acting as singing.

We were told at Vienna in 1772, that she had long quitted the stage, though the remembrance of her talents was so deeply impressed in the minds of many excellent judges, that whenever she was mentioned, it was to the disadvantage of all subsequent female singers. She had been very sprightly in her day, and yet was in high favour with the empress-queen in her latter years. Her story is somewbat singular. She was connected with a certain count, a man of great quality and distinction, whose fondness increased by possession to such a degree as to determine him to marry her: a much more uncommon resolution in a person of high birth on the continent, than in England. She tried to dissuade him: enumerated all the bad consequences of such an alliance; but he would listen to no reasoning, nor take any denial. Finding all remonstrances vain, she left him one morning, went into a neighbouring street, and addressing herself to a poor labouring man, a journeyman baker, said she would give him fifty ducats if he would marry her; not with a view to their cohabiting together, but to serve a present purpose. The poor man readily consented to become her nominal husband: accordingly they were formally married; and when the count renewed his solicitations, she told him it was now utterly impossible to grant his request, for she was already the wife of another; a sacrifice she had made to his fame and family.

Since that time she had lived many years with a man of great rank at Vienna, of nearly her own age; probably in a very chaste and innocent manner.

TESIA, in *Geography*, a town of New Mexico, in the province of Mayo; 45 miles E.S.E. of Santa Cruz.

TESIN, a town of Syria, celebrated for its olive oil; 18 miles N.E. of Antioch.

TESINO, a department of Italy, formed of the Pavese. It contains 156,471 inhabitants, who elect twelve deputies. Pavia is the capital.—Also, a river of Italy, which rises in mount St. Gothard, and passing through lake Maggiora, empties itself into the Po, at Pavia.

Tesino, or *Tessin*, a town of the county of Tyrol; 24 miles N.E. of Trent.

TESKELA, a town of Finland; 70 miles E. of Biorneborg.

TESKOWA, a town of Poland, in Volhynia; 40 miles E. of Lucko.

TESORO, a ſmall iſland in the Spaniſh Main, near the coaſt of South America. N. lat. 10° 8′. W. long. 75° 46′.

TESPIS, in *Ancient Geography*, a town of Aſia, in the interior of Carmania, and near Carmana. Ptolemy.

TESS, in *Geography*, a river of Moravia, which runs into the Marſch, 8 miles N. of Muglitz.

TESSAILAH, a town of Algiers; 20 miles S. of Oran.

TESSALON. See Thessalon.

TESSARACONTA, τεσσαρακοντα, among the Athenians, were forty men who went their circuits round the ſeveral boroughs, and had cognizance of all controverſies about money, if not above ten drachms; as alſo of actions of aſſault and battery. Potter, Archæol. Græc.

TESSARACONTERIS, in the *Naval Architecture of the Ancients*, a word uſed to expreſs a ſort of galley, in which there were no leſs than forty tiers of rowers one above another. Se Enneris and Polycrota.

TESSARA-COSTA, in our *Ancient Writers*. See Quadragesima.

TESSARACOSTON, τεσσαρακοςον, in *Antiquity*, a ſolemnity kept by women on the fortieth day after child-birth, when they went to the temple, and paid ſome grateful acknowledgments for their ſafe delivery. Pott. Archæol. Græc. tom. i. p. 432. and tom ii. p. 335.

TESSARINI, Carlo, in *Biography*, firſt violin, and leader of the band in the metropolitan church at Urbino, was born at Rimini in 1690; he was a ſpirited performer on his inſtrument, and a very voluminous compoſer. His ſtyle was light and flimſy, compared with that of Corelli and Geminiani; but his concertos not being very difficult, were much played in country concerts in our own memory, with thoſe of Alberti, Albinoni, and Vivaldi.

Teſſarini's firſt publication at Amſterdam has a title-page of great promiſe; but whether the promiſe was ever performed, ſceptics in theſe incredulous days will be much inclined to doubt. The title is in French, but literally tranſlated, is the following: "A new Method for learning theoretically, in a Month's Time, to play on the Violin, divided into three Claſſes, with progreſſive Leſſons for two Violins." Then twelve violin concertos; twelve flute ſolos; the maſter and ſcholars; divertimenti for two violins; twelve violin ſolos; ſix divertimenti for two violins, in canon, &c. &c. He lived till the year 1672, in the perpetual labour of publication; but his productions would now be as difficult to find as thoſe of Timotheus and Olympus.

TESSE, in *Geography*, a town of France, in the department of the Sarte; 15 miles S.W. of Le Mans.

TESSELÆ, a word uſed in *Pharmacy*, to expreſs lozenges cut into regular figures.

TESSELARII, among the Romans, artificers of chequered or moſaic work.

TESSELATED Pavement, *pavimentum teſſelatum*, a rich pavement of moſaic work, made of curious ſmall ſquare marbles, bricks, or tiles, called *teſſellæ*, from the form of dies.

Teſſelated pavements were much uſed in the tents of the Roman generals.

TESSERA, in *Roman Antiquity*, denoted in its primary ſenſe a cube or dye; ſo called from the Greek word τεσσαρα, or τεσσερα, *four*; reſpect being had to its number of ſides, diſtinct from the two horizontal planes, above and below. And it was thus diſtinguiſhed from the *talus*, which, being round at each end, contained only four planes or faces on which it could ſtand: and therefore, when thrown, had no more than two ſide faces in view. Hence *ludere talis et ludere teſſeris* are ſpoken of by Roman writers as two different games. The ſyllable *tes*. occurs often in Roman inſcriptions.

The word *teſſera* was applied to many other things, not ſo much from a ſimilitude in the figure, as from the relation they bore to ſome other thing of which they were the ſign or token; as the points on the upper plane of the dye denoted the good or ill ſucceſs of the caſt.

The *teſſera hoſpitalis* was either public or private. As to the former, we find among the inſcriptions publiſhed by Gruter, inſtances of two municipal towns which put themſelves under the patronage of the Roman governor; and the reciprocal engagements between them, engraved on two copper-plates in the form of an oblong ſquare, with a pediment at the top, is called in both *teſſera hoſpitalis*.

The deſign of the latter was to cultivate or maintain a laſting friendſhip between private perſons and their families; and gave a mutual claim to the contracting parties, and their deſcendants, of a reception and kind treatment at each other's houſes, as occaſion offered. For which end thoſe teſſeræ were ſo contrived, as beſt to preſerve the memory of that tranſaction to poſterity. And one method of doing this was by dividing one of them lengthwiſe into two equal parts, upon each of which one of the parties wrote his name, and interchanged it with the other. From this cuſtom came the prevailing expreſſion *teſſeram hoſpitalem confringere*, applied to perſons who violated their engagements.

The *teſſeræ frumentariæ* were ſmall tallies given by the emperors to the populace of Rome, entitling them to the reception of a quantity of corn from the public at ſtated ſeaſons. The perſon who had the inſpection of theſe was called *teſſerarius*. They were made of wood and of ſtone.

There was another kind of teſſera which intitled perſons to a ſight of the public games and other diverſions, uſually made in the form of an oblong ſquare.

The *teſſera militaris* was a ſignal given by the general, or chief commander of an army, as a direction to the ſoldiers for executing any duty or ſervice required of them.

This, upon urgent occaſions, was only vocal; but, in ordinary caſes, it was written on a tablet, commonly made of wood. Beſide the civil and military teſſeræ, there are others which related to religious affairs, and may be called ſacred. Phil. Tranſ. vol. xlv. art. 12.

TESSERMUIT, in *Geography*, an iſland near the S.W. coaſt of Eaſt Greenland. N. lat. 59° 59′. W. long. 44° 20′.

TESSET, a town and diſtrict of Africa, in the country of Sahara; 170 miles S. of Morocco. N. lat. 15° 24′. W. long. 7°.

TESSIN, Charles Gustavus, in *Biography*, a Swediſh count and conſiderable ſtateſman, was born at Stockholm in 1695, and received the rudiments of his education under his father. In 1714 he ſet out on his travels, and continued them through various countries of Europe for five years, availing himſelf of every opportunity that occurred of acquainting himſelf with their reſpective conſtitution and laws. At the age of twenty-five he was deputed to the courts of Great Britain, Denmark, and France, and alſo to the States of Holland, to announce the acceſſion of Frederic I. to the Swediſh throne; and in 1725 he was ſent to Vienna, to ſolicit the attention of that court to the new treaty of alliance between Sweden and Ruſſia. On the death of his father, in 1728, he ſucceeded him as principal intendant of the court, and in order to qualify himſelf for the office, he undertook a new tour at his own expence. In 1735 he was again diſpatched

to

to the court of Vienna, where he remained two years. He was chosen by the nobility speaker at the famous diet of 1738, on which occasion he obtained, in recompence of his conduct, a gold medal, bearing on one side his crest, and on the other the motto "Conscius Recti." He was appointed in 1739 to conduct an embassy from this diet to France, and resided at Paris till the year 1742, concluding during this interval an advantageous treaty of commerce with the king of the Two Sicilies, and terminating a subsidiary treaty of alliance with France, by which Sweden was to receive in the course of three years 27 tons of gold. In 1743 he was sent to Denmark, and in the following year to Berlin, on business of great importance. At Berlin he was honoured with the Prussian order of the Black Eagle. He occupied several other stations of dignity and trust, the duties of which he discharged with singular wisdom and fidelity. But the most important office assigned him, was that of preceptor to the crown prince, Gustavus III., to which he was appointed in 1747. On this occasion he wrote his "Letters addressed to a Young Prince," for the use of his royal pupil, which were afterwards translated into most of the languages of Europe. Retiring from public business in 1761, he lived on his estate till the time of his death, which happened in January 1770. Count Tessin was a zealous patriot and enlightened citizen, and a distinguished patron of letters. With a view of encouraging the arts and sciences, he made a great collection of books, pictures, drawings, coins, and other curiosities. But notwithstanding his various excellent qualities, his enemies were assiduous in fruitless attempts to throw a shade over his character, as may be seen in a work entitled, "An Historical Account of the State of Sweden under Frederic I." Gen. Biog.

Tessin, in *Geography*, a town of the duchy of Mecklenburg; 18 miles S.E. of Rostock.

TESSIURSAK, an island near the W. coast of West Greenland. N. lat. 61° 10′. W. long. 47° 30′.

TESSOUA, a considerable town of Africa, in the country of Fezzan; 100 miles E.S.E. of Mourzouk. Near this town, a river, now overwhelmed by the moving sands, but formerly a deep and rapid stream, had its course.

TESSOUELLE, a town of France, in the department of the Mayne and Loire; 5 miles S. of Chollet.

TESSUA, a town of Hindoostan, in Rohilcund; 18 miles S.S.E. of Bereilly.

TESSUE, a town of Persia, in the province of Adirbeitzan; 50 miles W. of Tauris.

TESSUNTEE, a town of the state of Georgia; 80 miles W. of Tugeloo.

TESSUT. See Teceut.

TESSY, a town of France, in the department of the Channel; 9 miles S. of St. Lo.

TEST, in *Metallurgy*, is a vessel of the nature of a coppel, used for large quantities of metals at once, and formed of the same materials.

The coppels, or small vessels, serve for operations of this kind, when small quantities only are concerned; but when larger are worked on, vessels of a larger size and coarser texture are employed, which are distinguished by the name of *tests*.

These are usually a foot and half broad, and are made of wood-ashes, not prepared with so much care as for coppel-making, and mixed with finely powdered brick-dust; these are made into the proper shape, either by means of a shallow vessel, made of crucible earth, or cast-iron, of proper dimensions, or only an iron ring, or hoop, with three bars arched downwards across the bottom, about two inches deep, and of different widths, from three or four inches to fifteen or more, according to the quantity of metal to be tested at once.

To make them in the first manner, an earthen vessel is to be procured, not glazed within, and by its depth and breadth proportioned to the quantity of metal to be worked; the inside of this vessel is to be well moistened with fair water, that the ashes to be put into it may adhere the better. Put into this vessel, thus prepared, the ashes and brick-dust before-mentioned, and first moistened either with water alone, or with water with a little white of an egg mixed in it; let the quantity of this be so much as will half fill the vessel, then press the mass with a wooden indented pestle, or, if not for a very large test, with a wooden cylinder, only of an inch thick: when thus pressed down add fresh ashes, and press them a second time, as in the making of coppels, and repeat this addition of fresh ashes till the earthen vessel be nearly full; then remove the superfluous ashes with an iron ruler, and let the inequalities remaining at the border be smoothed with a wooden or glass ball rolled round about. This done, you are to cut the cavity with a bowed iron, that you may have a broad spherical segment, not very deep; and lastly, by means of a sieve, strew this cavity carefully and regularly over with dry ashes of bones of animals, ground extremely fine, and squeeze these hard in, by the rotation of the wooden or glass ball. Thus you have a test finished, which, together with its earthen pot, must be set in a dry warm place.

To make the tests in the other manner, or by means of an iron ring; let a ring of that metal be filled with ashes mixed with brick-dust, and moistened as before mentioned, in such manner that they may rise considerably above the ring; then press them strongly either with your hands, or with an indented pestle, and afterwards, with gentle blows of a rammer, press the ashes from the circumference toward the centre, in a spiral line, and that in such manner, that, after having been sufficiently pressed, they may be a small matter higher than the brink of the ring. If there are now any vacancies in the mass, empty the ring, and fill it again with more ashes; for if you should attempt to fill up these by adding, were it but ever so little, ashes, the second, or additional quantities, will never cohere so firmly with the first, but that they may probably separate in the operation.

This done, turn the ring upside down, and on the other side, or bottom, take out the ashes to the quantity of one-third part of the depth of the ring, and again fill the vacuity with the same ashes, in such a manner that there may remain no sensible cavity,

When the mass is thus prepared, cut out a cavity in the larger surface of the ring, with a bowed iron, as in the former method.

The Germans have, beside these, another kind of tests, which they call *treibscherben*. These are a sort of vessels which resist the most violent fire, and are so extremely compact, that they sometimes will retain not only melted metals, but even the glass of lead itself.

The figure and size of these vessels may be the same with that of the coppel, but they are usually made larger; and the great difference of these tests from coppels, and from the ordinary tests, which are indeed only a kind of large and coarse coppels, is, that the matter of these is more compact and coherent.

The matter for making these tests is thus prepared: take of the purest and finest clay a sufficient quantity, make it into balls, and dry them either in the air, or on the fire; when dried, beat them to powder in a mortar, and pour on the powder a great quantity of warm water; let this mixture rest a while, and when the clay has subsided, pour off the

the water which ſwims at top; and let this waſhing be ſo often repeated, that all the moſt minute lumps of the clay be broken, and whatever ſalt it contains perfectly waſhed out: then add to this fine clay, of the pureſt ſand, of powder of calcined flints, ground, and well waſhed, of faulty but clean Heſſian crucibles, or of any incombuſtible ſtones ground very fine, ſuch a quantity as will render the maſs thick, and hardly adhering to the hands in kneading it, or pliant when rolled into a thin lamina.

This is the matter for making this ſort of teſts; but, before any quantity of the veſſels be made of this earth, it will be prudent firſt to finiſh a ſingle one, and try it, by putting on it a quantity of glaſs of lead, and expoſing it for an hour or more to the ſtrongeſt fire; by this trial you will be certain whether or not the maſs is capable of making veſſels that will reſiſt both the fire and the glaſs of lead; and by no other means but this trial is it poſſible to determine the due proportion of the mixture of the ingredients for this uſe, on account of the variety of the clays. Nature in ſome places affords a clay ſo well tempered, that it is extremely proper for the making of teſts without any preparation, or without the admixture of any other matter. Sometimes this only requires a ſimple waſhing, but commonly it is neceſſary to make it into balls, and powder or waſh them as before directed.

On the trial of a teſt made of this, or the former mixed clay, if it runs into glaſs, you muſt add to it of the powder of ſtones, eſpecially ſuch as beſt reſiſts the fire. Great care is to be taken not to add too much powdered chalk to theſe compoſitions, ſince if the matter is tempered with that alone, the teſts will indeed reſiſt the fire very well, but being too porous, they will yield a paſſage to litharge, which will ſoften them to ſuch a degree, that they will either fall aſunder of themſelves, or be totally cruſhed when taken hold of with the tongs.

Theſe veſſels are to be made in the following manner: rub over the ſides and bottom of a ſmall mortar, and alſo its peſtle, with oil, or with the fat of bacon; fill it two-thirds full of prepared clay, then make a ſlight impreſſion with your fingers in the middle of the clay; then place the bottom of the peſtle there, and force it down with blows of a hammer, the ſtronger the better. When thus properly hollowed, take it out of the mortar, and pare its edges, and dry it, as the coppels are dried, in the air, in a dry warm place.

Teſts thus prepared may be uſed as ſoon as dry, unleſs for ſalts or litharge; but theſe bodies, when melted in veſſels not firſt baked or hardened in the fire, always make their way through them.

Some of the German writers alſo recommend, both for teſts and coppels, a ſort of friable opaque ſtone, called white ſpath, which appears to be a ſpecies of gypſum, or of the ſtones from which plaſter of Paris is prepared. The ſpath is directed to be calcined with a gentle fire, in a covered veſſel, till the ſlight crackling, which happens at firſt, has ceaſed, and the ſtone has fallen in part into powder; the whole is then reduced into ſubtle powder, which is paſſed through a fine ſieve, and moiſtened with ſo much of a weak ſolution of green vitriol, as is ſufficient for making it hold together. Gellert, however, finds, that if the ſtone is of the proper kind, which can be known only by trials, calcination is not neceſſary. Theſe teſts are liable to ſoften or fall aſunder in the fire, which inconvenience may be remedied, according to Scheffer, by mixing with the uncalcined ſtones ſomewhat leſs than equal its weight, as eight-ninths of ſuch as had been already uſed and penetrated by the ſcoria of the lead, taking that part of the old teſt which appears of a green-grey colour, and rejecting the red cruſt on the top. But from his account it appears, that theſe teſts are leſs durable than thoſe made of the aſhes of bones, though much ſuperior to thoſe of wood-aſhes. Vegetable aſhes, which ſtand pretty well the teſting of ſilver, can ſcarcely bear any great quantity of gold, which requires a conſiderably ſtronger fire than the other; but bone-aſhes, ſays Dr. Lewis, anſwer ſo effectually, and are among us ſo eaſily procured, that it is unneceſſary for the refiner to ſearch for any other materials. Cramer's Art of Aſſaying, p. 60. 62. Lewis's Com. Ph. Tech. p. 144.

Test-*Liquor*, a term uſed by our dealers in brandies, &c. for a liquor which they uſe as a teſt of brandy, &c. to prove whether they be genuine, or mixed with home ſpirit. The people who uſe this, place great confidence in it, but it is really a very vague and uncertain thing. They pretend that this liquor will ſhew, by the colour which it makes on its being poured into brandy, whether it be genuine or adulterated; or if not genuine, in what proportion the adulterating ſpirit is mixed with it.

The whole fact is this: if a little common green or white vitriol be diſſolved in ſome fair water, it makes a teſt-liquor, a few drops of which being let fall into a glaſs of old French brandy, will turn the whole to a purple or fine violet-colour; and by the ſtrength or paleneſs of this colour, the dealers judge the brandy to be genuine or mixed in different proportions, with home ſpirits.

Old French brandy, having long lain in the caſk, takes a dilute tincture of the wood of the caſk, that is, of oak; and this being of the ſame nature with a ſolution or tincture of galls, naturally turns blueiſh or blackiſh with vitriol. A new diſtilled brandy, though wholly foreign, would not give this teſt; and a common malt ſpirit, with oak chips infuſed in it, will turn as dark as the fineſt brandy. While our diſtillers, indeed, had nothing in uſe for the colouring of their ſpirits but burnt ſugar, it was poſſible to make ſome gueſs at an adulteration with them, becauſe the brandy, in this caſe, would not become blackiſh in proportion to its former colour; the ſugar colour not turning to ink with the vitriol, like the other: but our diſtillers have ſince found a way of uſing an extract of oak for the colouring of their ſpirits, and ſince that, this teſt-liquor is of very little uſe, our common ſpirits, of any kind, turning as deep with it as the foreign brandies.

The very beſt way of making this teſt-liquor, is with a calcined vitriol of iron, diſſolved in a dilute or aqueous mineral acid. The liquor, when well made in this manner, is of a fine yellow colour, and will give, for a time, the fineſt blue to any ſpirituous tincture of oak.

The Engliſh were, at one time, very fond of high-coloured brandies, and it was then that the uſe of this teſt-liquor was moſt eſteemed; afterwards we, as well as other nations, finding that this colour was only owing to the caſk, began to diſlike, and to favour the pale brandies: at length we fell into the uſe of ſuch as were wholly limpid and colourleſs, and the re-diſtilling of all the old brandies of which people were poſſeſſed, took place; on this the teſt-liquor was found to be of no uſe at all, and accordingly rejected; but as we are of late again come into the eſteem of coloured brandies, and that with great juſtice, as the colour, when genuine, is a certain mark of the age of the liquor, this teſt-liquor is again got into more credit than it deſerves.

The famous Helvetian ſtyptic depended wholly on this accident for its colour; and it was no ſmall mortification to our chemiſts, when, ſome years ago, it was introduced into uſe among us, that they could not make it with our own ſpirits, but muſt be at the expence of true French brandy

brandy for it; our own spirits, though equally coloured, would never make that violet tincture, because their colour was owing to burnt sugar, not a tincture of oak. At length this mystery was explained, and a little scrapings of galls made all those quantities of this styptic, which had been set by as good for nothing, perfectly fine and well-coloured. Shaw's Essay on Distillery.

TEST-*Act*, in *Law*, is the statute 25 Car. II. cap. 2. (1673) which directs all officers, civil and military, to take the oaths, and make the declaration against transubstantiation, in the court of king's bench or chancery, the next term, or at the next quarter sessions, or (by subsequent statutes) within six months after their admission; and also within the same time to receive the sacrament of the Lord's supper, according to the usage of the church of England, in some public church, immediately after divine service or sermon, and to deliver into court a certificate thereof, signed by the minister and churchwarden, and also to prove the same by two credible witnesses, upon forfeiture of 500*l.* and disability to hold the same office. Besides this penalty, if, without taking the sacramental qualification within the time prescribed by the act, a person continues to occupy a civil office, or to hold a military commission, and is lawfully convicted, then he is disabled from thenceforth, for ever, from bringing any action in course of law, from prosecuting any suit in any court of equity, from being guardian of any child, or executor or administrator of any person, as well as from receiving any legacy. For an account of the nature and operation of the CORPORATION *Act*, we refer to that article.

The word *test* signifies *proof* or *trial*, being formed of *testis*, *witness*; this act being established with a view to exclude Roman Catholics from any share in the government, though it has operated to the exclusion of Protestant dissenters in general. The Corporation act, enacted in the year 1661, the 13th of Charles II., was principally, but not wholly, designed against Protestant Non-conformists. It was passed in a period of great heat and violence, the year after the Restoration; and it paved the way for the act of uniformity, which soon after passed. The king, with his ministers, and the majority in both houses, hated the Presbyterians, whom they considered, whether justly or not, as the authors of the late rebellion. Great power still remained in their hands, for, during the Protectorate, they had been appointed magistrates in all the country towns. To leave authority in such hands seemed dangerous: it was therefore judged expedient to regulate the corporations, and to expel those magistrates, whose principles were inimical to the constitution, civil and ecclesiastical. This gave rise to the Corporation act. The sacramental clause, however, in the Corporation act was intended against the Catholics; for, as the other provisions of the statute, by dispossessing the enemies of the court, had established the influence of the crown in all the corporations of the kingdom, the parliament was apprehensive that in the *next* reign, under a *Catholic* king, all corporation offices would be filled with *Catholics*. Besides, before the passing of the act of uniformity, those that were afterwards called dissenters, were within the inclosure of the church, and consequently participated in her sacraments, so that the sacramental clause must therefore have been intended as a guard against the Catholics, to whom it effectually applied, and not as a guard against those who were afterwards called dissenters, on whom, at that period, it could not operate.

It must also be allowed, that the original design of the test was not so much to exclude the Protestant dissenters, as the papists, as the Catholics were then called. It was brought in by the patriots, in the reign of Charles II., under their apprehension of popery, and a popish successor; and when, during the debate in the house of commons, it was observed, that it was drawn in such a manner as to comprehend the Protestant dissenters, the court greatly endeavoured to avail themselves of that circumstance in order to defeat the bill. But the dissenting members disappointed them, by declaring, that they had rather confide in the justice and generosity of parliament, to pass some future bill in their favour, than be the occasion of retarding or defeating the security, which the present bill was calculated to afford to the liberties of their country. Their patriotism produced, soon afterwards, a bill for their relief from the penal laws; but the parliament was prorogued, through the resentment of the court, to prevent its passing: and when, notwithstanding this, a bill in favour of the dissenters did afterwards pass both houses, *viz.* in the year 1680, and lay ready for the royal assent, the court ventured upon a very extraordinary expedient: the clerk of the crown was ordered to convey away the bill, and, accordingly, it was never afterwards to be found. The particular test of receiving the sacrament according to the rites of the church of England, was calculated to exclude the papists rather than the Protestant dissenters; as it was no uncommon thing for the latter, at that time, to receive the sacrament occasionally in the church of England, in order to express their charity towards it, as a part of the church of Christ. If it had been the design of the legislature to exclude all from civil offices but those who have a real affection for the constitution and worship of the church, it is apprehended they would have appointed the test to be, not merely once taking the sacrament at church, but a stated and constant conformity to its religious services.

It has been alleged, however, that though the Test act was designed against the Catholics, yet that few, even then, of the number, merited a treatment so severe. They, it is said by their advocates, had no concern in the views of Charles or his brother, in the schemes of wild ministers, or in the machinations of bad politicians. They had suffered much in the royal cause, and were pining in penury and distress, under the additional pressure of cruel laws. But whatever might be the reasons, real or pretended, for passing an act, of which Catholics were the principal ostensible objects, the case is now very much altered, and Catholics have assumed a new character, which entitles them, in the judgment of many, not merely to protection, but to a participation of the privileges of their fellow-subjects.

As the question concerning the repeal of the disqualifying laws which we have already mentioned, has been, and is likely soon again to become a subject of public discussion, and as it is a subject, generally considered, of great importance and interest, it may not be thought improper to state the arguments for and against the repeal of those excluding statutes, comprehending both Protestant dissenters and Catholics, in as concise a manner as possible. The general principles upon which the equitable decision of this question depends, are such as follow:—Every man has an undoubted right to judge for himself in matters of religion; nor should any mark of infamy, or any civil penalty, be attached to the exercise of this right:—Every man has a right to the common privileges of the society in which he lives; and among these common privileges, a capacity in law for serving his sovereign and country is one of the most valuable, distinguishing a *legal capacity* of service, from a *right* to an actual appointment, which depends upon the choice of his sovereign, or of his fellow citizens; and this capacity of serving the state is a right of such high estimation, and of such transcendent value, that exclusion from it is is deemed a proper punishment for some of the greatest crimes:—Actions, and not opinions, political or religious, are the proper objects of human authority and cognizance:—No man, who does not forfeit that *capacity* of serving his sovereign and country, which is his natural right, as well as the honour and emoluments that may happen to be connected with it, by overt-acts, ought to be deprived of them; and disabilities that are not thus incurred are unjust penalties, implying both disgrace and privation:—Punishment, without the previous proof of guilt, cannot be denied to be an injury; and injuries inflicted on account of religion are undoubtedly persecutions:—The ends of civil society can never justify any abridgment of natural rights that is not essential to these ends:—The institutions of religion, and the ordinances of civil government, are distinct in their origin and their objects, in the sanctions that enforce them, and the mode in which they are administered:—The institution of the Lord's supper, being wholly of a religious nature, and appointed merely as a memorial of his death, is improperly applied to the secular ends of civil society; and if it be so applied, it is not only an improper, but in many cases an insufficient, test of the principles and character of those to whom it is administered. Such are some of the leading principles, which have been the subjects of discussion in the debates that have occurred, both among writers and among our legislators, in considering the expediency of repealing the test laws. The case of the Catholics and of the Protestant dissenters has been repeatedly argued in both houses of parliament, and may probably again become the subject of public discussion. Many (indeed most) of the same arguments apply to both descriptions of persons; but we shall chiefly restrict ourselves to the pleas of the dissenters. They have urged, that being well-affected to his majesty and the established government, and ready to take the oaths required by law, and to give the fullest proof of their loyalty, they think their scruple to receive the sacrament after the manner of the church of England, or after the manner of any church, as a qualification for an office, ought not to render them incapable of holding public employments, civil or military: they also allege, that the occasional receiving of the Lord's supper as a qualification for a place, cannot, in the nature of things, imply that those who thus receive it, mean to declare their full and entire approbation of the whole constitution and frame of the established church; some men may be compelled by their necessities, or under the allurement of secular advantages, to do what they would not do, if they were left to their free choice. Others, perhaps, may comply with the sacramental test who are not even Christians, and who therefore cannot be supposed to wish well to Christianity itself, or to any national establishment of it whatsoever. Hence they are led to think, that such a test can be no real or effectual security to the church of England. Conceiving that they have a right, as *men*, to think for themselves in matters of religion, and that this right is prescribed and sanctioned by the Author of Christianity; and that they have a right, as *citizens*, to a common chance with their fellow-subjects for offices of civil and military trust, if their sovereign or fellow-citizens should think them worthy of confidence; they cannot be of opinion that any of the ends or objects of civil society require that these rights should be superseded, and that they should be excluded from the service of the state. Their advocates plead on their behalf, that the continuance of those acts which invade their rights is so far from being necessary to the well-being of the state, or to the establishment of the national church, that they are actually pernicious both to the state and church, and ought to be repealed. Their inutility is shewn by referring to the higher trust of legislative authority, to which the dissenters are admitted without hesitation or reserve, and without submitting to any such test. An exciseman surely, it is said, does not sustain a more important office, neither is it necessary that he should make a profession of his Christian faith more than a member of the house of commons or the house of peers. The principles of the dissenters, their attachment to the constitution, and their zeal in support of it, have been sufficiently manifested in a variety of instances, from the Revolution to the present day; and yet can it be asserted, that their exclusion from the service of the public is necessary or beneficial to the state? Can it be said that the continuance of the disabilities to which their profession subjects them, is necessary for the safety or honour of the church? The establishment of a church requires a legal provision for its ministers; but it does not require for its laity an exclusive right to civil and military trusts. The establishment of the church of England consists in her tithes, her prebendaries, her canonries, her archdeaconries, her deaneries, and her bishoprics. These constituted her establishment before the Corporation and Test acts had any existence: and they will equally constitute her establishment if these acts should be repealed. In Scotland they have had no such acts; and yet Scotland has an established church. In Ireland these acts have been repealed; and yet the established church of Ireland remains. In Holland, Russia, Prussia, Germany, &c. they have no such acts. As to the intimate and beneficial connection between church and state, on which some have grounded the supposed propriety and necessity of these laws, it would be sufficient to refer to the authority of archdeacon Paley, who has stated what ought to be the single end of church establishments. (See Religion.) Upon an appeal to history, it has been argued that the civil government maintained itself in former times, when *unconnected* with the church; and the disturbances which terminated in the ruin of both church and state, are said to have originated in the intolerant spirit and arbitrary proceedings of some ecclesiastics, who had themselves exercised powers, and had instigated their unhappy sovereign to actions and claims at least as contrary to, and subversive of, the true spirit of the constitution, as any of those violences of the times immediately succeeding, which have been so justly reprobated. In this connection, we may refer to the speech of an able advocate for the repeal of the disabling statutes: who maintains that no human government has a right to inquire into men's private opinions, to presume that it knows them, or to act on that presumption. Men should be tried by their actions, not by their opinions. This, if true with respect to *political*, was more peculiarly so with regard to *religious* opinions. In the position, said Mr. Fox, that the actions of men, and not their opinions, were the proper objects of legislation, he was supported by the general tenor of the laws of the land. History, however, afforded one glaring exception in the case of the Roman Catholics. The Roman Catholics, or rather the Papists, as they were then properly denominated, had been supposed by our ancestors to entertain opinions that might lead to mischief in the state. But it was not their religious opinions that were feared. Their acknowledging a foreign authority paramount to that of the legislature; their acknowledging a title to the crown superior to that conferred by the voice of the people; their political opinions, which they were supposed to attach to their religious creed, were dreaded, and justly dreaded, as inimical to the constitution. Laws therefore were enacted to guard against the pernicious tendency of their political, not of their religious, opinions; and the principle thus adopted, if not founded on justice, was at leaſt followed up with conſiſtency. Their influence in the ſtate was feared, and they were not only reſtricted from holding offices of power or truſt, but rendered incapable of purchaſing lands, or acquiring influence of any kind. But if the Roman Catholics of thoſe times were Papiſts in the ſtricteſt ſenſe of the word, and not the Roman Catholics of the preſent day, ſtill he would ſay, that the legiſlature ought not to have acted againſt them, till they put in practice ſome of the dangerous doctrines which they were thought to entertain. Diſability and puniſhment ought to have followed, not to have anticipated, offence. Thoſe who attempted to juſtify the diſabilities impoſed on the diſſenters, muſt contend, if they argued fairly on their own ground, not that their religious opinions were inimical to the eſtabliſhed church, but that their political opinions were inimical to the conſtitution. If they failed to prove this, to deprive the diſſenters of any civil or political advantage, was a manifeſt injuſtice; for it was not ſufficient to ſay to any ſet of men, we apprehend certain dangers from your opinions, we have wiſely provided a remedy againſt them, and you, who feel yourſelves aggrieved, calumniated, and proſcribed, by this remedy, muſt prove that our apprehenſions are ill-founded. The *onus probandi* lay on the other ſide; for whoever demanded that any other perſon ſhould be laid under a reſtriction, it was incumbent on him firſt to prove that the reſtriction was neceſſary to his ſafety, by ſome overt act, and that the danger he apprehended was not imaginary but real. Was it ſeriouſly to be contended, that religion depends upon political opinions; that it can ſubſiſt only under this or that form of government? It was an irreverend and impious opinion to maintain, that the church muſt depend for ſupport, on its being an engine, or ally, of the ſtate, and not on the evidence of its doctrines, to be found by ſearching the ſcriptures, and the moral effects it produced on the minds of thoſe whom it was its duty to inſtruct. See Toleration.

Mr. Pitt agreed with Mr. Fox in admitting, as a general principle, that the religious opinions of any ſet of men were not to be reſtrained or limited, unleſs they ſhould be found likely to prove the ſource of inconvenience to the ſtate: nor ought the civil magiſtrate, in any other point of view, to interfere with them; but he maintained, that when religious opinions are ſuch as *may* produce a civil inconvenience, the government has a right to guard againſt the probability of the civil inconvenience being produced; nor ought they to wait till, by being carried into action, the inconvenience has actually ariſen. It was not therefore on the ground that the diſſenters *would* do any thing to affect the civil government of the country, that they had been excluded from civil offices, but that if they had any additional degree of power in their hands, they *might*. On the other hand it has been pleaded, that to reſtrain men's civil rights from the ſuppoſed *tendency* of their opinions, is a very dangerous principle, as it muſt render their condition precarious and wholly dependent on the prejudices and will of the magiſtrate, and warranted unlimited reſtraint, and almoſt every ſpecies of perſecution.

Mr. Pitt, premiſing that the eſtabliſhment of a ſettled form of church and of its miniſters is neceſſary to the civil government of the country, ſuggeſts the impropriety of diſtributing the emolumenſs and offices of the eſtabliſhed church among perſons who, however reſpectable their characters might be, were not members of the ſame communion; but others ſay, that the emoluments and offices of the eſtabliſhed church are not the objects contended for, but thoſe of the ſtate, unleſs the church and ſtate be abſolutely identified. He alſo ſays, that theſe offices may be conſidered as matter of favour, becauſe it is conſiſtent with the government of this country, that all offices ſhould be given at its diſcretion; and here, he ſays, from the delicate nature of the caſe, the legiſlature had thought proper to interpoſe, and to reſtrain the ſupreme magiſtrate, the head of the executive authority, and limit him in his appointment to theſe offices; but ſurely, as he contends, this differed eſſentially from any degradation, diſgrace, or puniſhment of the diſſenters. Others, however, have conſidered this kind of reaſoning as fallacious, both in its principle, and in the inference deduced from it.

Mr. Fox concurred with lord North, who, though an advocate for the continuance of theſe diſqualifying laws, bore teſtimony to the principles and character of the diſſenters, in his avowal of their ſteady attachment to government; and he added, that their religious opinions were favourable to civil liberty, and that the true principles of the conſtitution had been remembered and affirmed by them, at times when they were forgotten, perhaps betrayed, by the church. See Dissenters.

Mr. Fox maintained, that the Teſt act was altogether inadequate to the end it had in view. The purport of it was, to protect the eſtabliſhed church, by excluding from office every man who did not profeſs himſelf well affected to that church. But a profeſſed enemy to the hierarchy might go to the communion table, and afterwards ſay, that in complying with a form, enjoined by law, he had not changed his opinion, nor, as he conceived, incurred any religious obligation whatever. There were many men, not of the eſtabliſhed church, to whoſe ſervices their country had a claim. Ought any ſuch man to be examined, before he came into office, touching his private opinions? Was it not ſufficient that he did his duty as a good citizen? Might he not ſay, without incurring any diſablility, "I am not a friend to the church of England, but I am a friend to the conſtitution, and on religious ſubjects muſt be permitted to think and act as I pleaſe." Ought their country to be deprived of the benefit ſhe might derive from the talents of ſuch men, and his majeſty prevented from diſpenſing the favours of the crown, except to one deſcription of his ſubjects? But whom did the teſt exclude, the irreligious man, the man of profligate principles, or the man of no principle at all? Quite the contrary; to ſuch men the road to power was open; the teſt excluded *only* the man of tender conſcience; the man who thought religion ſo diſtinct from all temporal affairs, that he held it improper to profeſs any religious opinion whatever, for the ſake of a civil office. Was a tender conſcience inconſiſtent with the character of an honeſt man? or did a high ſenſe of religion ſhew that he was unfit to be truſted? Allowing that the eſtabliſhed church ought to be protected, it was natural to inquire what was the eſtabliſhed church? Was the church of England the eſtabliſhed church of Great Britain? Certainly not: it was only the eſtabliſhed church of a part of it; for, in Scotland, the kirk was as much eſtabliſhed by law as the church was in England. The religion of the kirk was wiſely ſecured, as the eſtabliſhed religion of Scotland, by the articles of Union; and it was ſurely abſurd to ſay, that a member of the kirk of Scotland, accepting an office under government, not for the ſervice of England excluſively, but for the ſervice of the united kingdom, ſhould be obliged to conform, not to the religious eſtabliſhment of Scotland, in which he had been bred, but to the religious eſtabliſhment of England.

To the argument urged in favour of the Corporation and Teſt acts, founded on the apprehenſion that if they were repealed, the diſſenters might become a majority of the people, Mr. Fox gives a brief reply, *viz.* that if the majority of the people of England ſhould ever be for the abolition of the eſtabliſhed church, then it ought to be aboliſhed. It has been ſaid, that by manifeſting indulgence to other ſects, a candid a candid respect for their opinions, and a desire to promote mutual charity and good-will, the established church will be most likely to secure its stability and its honour. Whilst the grievances of persons of a different profession are redressed, and they are admitted to a participation of their civil rights, the church need not fear any combination for sapping its foundation, or for depriving it of its peculiar and distinguishing honours or emoluments. Men who are aggrieved, under a sense of what they conceive to be an indignity and injury, are the most likely to manifest hostility against an ecclesiastical establishment that engrosses all civil and secular advantages to itself.

It has been said, that it would conduce to the honour of the rulers and dignitaries of the church, if they would concur in abolishing laws which perpetuate the perversion and profanation of a religious institution :—an institution which certainly was not intended by its divine founder for the attainment and promotion of any selfish and secular purposes. *Here*, it is maintained, if any where, a line of separation should be drawn between religious and civil policy ; nor should the performance of a Christian duty be made an indispensible qualification for a secular office. The dissenters, says a well-informed member of the legislature (Mr. W. Smith), who, being himself one of them, is thoroughly acquainted with their principles and character, would equally object to receiving the sacrament *as a test* in their own places of worship, though many of them would not scruple to partake of it with their brethren of the establishment, and according to their form, when considered only in its true light, as a religious duty, and an expression of Christian charity. The writer of this article is acquainted with several conscientious and avowed members of the established church, who lament this abuse of a Christian ordinance, and who wish, for the purity and honour of the church to which they are attached, that the laws imposing this test were repealed. It would likewise contribute to the satisfaction of scrupulous ministers of the established church, to be released from the obligation of administering the sacrament, as a qualification for office abstractedly considered, and more especially to persons of known licentiousness of principles and conduct. By the duties of his function, by the positive precepts of his religion, and by the rubrick or canons of the church, the minister is enjoined to warn from the sacred table all blasphemers of God, all slanderers of his word, all adulterers, and all persons of a profligate life ; and yet to these very persons, if they demand it as a qualification, he is compelled, by the Test act, to administer the sacrament ; and if he refuses, a ruinous prosecution for damages is the obvious and inevitable consequence. On the other hand it has been said, that if the minister's conviction of profligacy of conduct is supported by all the circumstances which constitute legal proof, he may lawfully refuse the sacrament. The truth of this opinion is doubtful ; but it is certain, that if he should fail in that proof, his ruin is inevitable : and if he should succeed, it is almost equally certain ; for the expences of his suit will devour his scanty means, and probably consign him to a prison for his life. Allowing that any notorious evil-doer, offering himself to receive the sacrament, might be rejected by the minister, without becoming liable to any punishment, let it be considered what is the situation in which A or B, or the person who upon application to a minister had been refused the sacrament, was placed : from that moment he had incurred the penalties of the act, and was punished in a manner perfectly new, unexampled, and unauthorized by the laws of the land ; he was convicted without a trial by jury, and was disabled from enjoying an office which his majesty, in the legal exercise of his prerogative, had thought proper to confer on him ; and a person was thereby absolutely put into the hands of the clergy, who were to be the great arbitrators of qualification or disqualification for offices, and places of power and emolument. Some have attempted to justify the legal establishment of the profanation of a religious institution, by comparing it with those provisions of our law which enjoin the sanction of an oath ; but this argument has been considered as inapplicable to the present case, and altogether unavailing ; for though it be indeed true that the legislature, by compelling every petty officer of the revenue, and every collector of a turnpike toll, to swear deeply on his admission into office, has made the crime of perjury more common, at this time, in England, than it ever appears to have been in any other age or country : yet how does the frequent commission of this crime *against* law, justify the establishment of a religious profanation *by* law ? But, without any comment on the folly of pleading for a legislative debasement of religion in one way, by shewing that the legislature has contributed to its debasement in another, let it be asked, what resemblance the sacrament of the Lord's supper, which is merely a religious institution, bears to the ceremony of an oath, which is an institution so entirely political, that it answers none of the purposes of religion, promotes none of her interests, forms no part of her establishment, and belongs as much to the Jew, the Mahometan, and the idolater, as it does to the Christian. The difference, says Mr. W. Smith, between the sacrament, used as a test for office, and an oath, as a test of truth, is too obvious to escape the most careless observer. An oath was neither primarily, nor at all, an act of worship ; nor, though it necessarily supposed a belief in a supreme moral governor, was it ever used as a test of particular religious opinions : the sole object to which it was directed was the attainment of truth, (with respect either to the past or the future,) where other means were insufficient, —an appeal to a Being who, by the supposition, must be acquainted with all the circumstances, and must also be both able and inclined to punish falsehood in such cases, as an insult added to a crime, was perfectly well calculated to attain the proposed end, and inapplicable to any other purpose.

If, says Mr. Fox, in concurrence with some previous observations of Mr. Beaufoy, when a man is seen going to take the sacrament, it should be asked, " is this man going to make his peace with God, and to repent him of his sins ?" the answer should be, " No ; he is only going there, because he has lately received the appointment of first lord of the treasury ;" can any circumstance afford a greater proof of the indecency resulting from the practice of so qualifying ?

Some have contended, that to grant a remission in favour of Scotland of the Test and Corporation acts, would be a breach of the union ; an opinion which supposes, that because, by the articles of union, nothing can be *taken* from Scotland but what was then stipulated, therefore nothing can be *given*. Others say, that as the Test and Corporation acts are among the statutes which secure the doctrines, discipline, worship, and government of the established church of England, they are therefore by the act of union declared to be unalterable. In reply to this mode of arguing it has been observed, that the government and discipline, the doctrines and the worship of the English church, were the same before the statutes were enacted, and would continue the same if those statutes were repealed ; and consequently do not derive their security from them : whereas the act which relates to the patronage of the church of Scotland, and which *did* seem to affect its discipline, was held to be no breach of the articles of union ; neither was that union understood to be weakened by the subsequent act, which gave a complete toleration in Scotland to episcopal dissenters.

When the articles of union were under the consideration of parliament, a proposal was made in the house of lords, that

that the perpetual continuance of the Teſt act; and in the houſe of commons, that the perpetual continuance of the Corporation act, ſhould be declared a fundamental condition of the intended union: but the motions were both rejected; a proof that the legiſlature did not mean to give to them the ſame perpetual exiſtence as to the act of uniformity, and to the ſtatute that was paſſed in the thirteenth of Elizabeth, both of which were ſpecifically named, as conditions of the compact, and expreſsly declared irrevocable.

If the teſt and corporation laws are deemed unalterable parts of the articles of union, it follows, of courſe, that every alteration in thoſe laws muſt be deemed a breach of the union, and that every ſuſpenſion of thoſe laws muſt be conſidered as a ſuſpenſion of the union. Now both theſe acts are altered, and in part repealed, by ſubſequent ſtatutes, and for ſix months in almoſt every year are wholly ſuſpended. But who will aſſert that the articles of union are diſſolved, or that their obligation on the two countries is ſuſpended for ſix months in every year? or who will deny that the ſame power which alters a part may alter the whole of thoſe laws? Who will deny that the ſame authority which ſuſpends a law for ſix months, may aboliſh it for ever?

In favour of the continuance of theſe laws it has been urged, that they have exiſted for many years with great advantage; but many attempts have been made to diſprove the advantage of them, and they have repeatedly been complained of as both uſeleſs and unjuſt. Beſides, this argument for their exiſtence is abſurd, as it tends to perpetuate every enormity that can plead the ſanction of age. The horror of innovation may be felt or feigned as a bar to every improvement. It may be neverthеleſs aſked, how have theſe laws ſubſiſted? By repeated ſuſpenſions; for the indemnity bills are, with few exceptions, annual acts: and where would be the impropriety of ſuſpending them for ever, by an act of perpetual operation. In order to ſilence complaints of theſe partial and injurious laws, it has been ſaid that the act of indemnity, annually paſſed, protects from the penalties of the teſt and corporation laws all ſuch perſons as have offended againſt them. If it afford ſuch protection, what inconvenience can ariſe from a repeal of the ſtatutes themſelves? Is not the conſtant and invariable practice of paſſing ſuch a bill annually, a tacit acknowledgment that the teſt acts are improper or unneceſſary; that the penalties, if incurred, ought not to be enforced; and therefore no man could be blamed for reſorting to an indemnity, held out as a protection againſt puniſhments inflicted by laws which the legiſlature itſelf continually treated with a kind of diſreſpect, and which were already almoſt repealed in practice, though they were ſtill preſerved in the ſtatute-book by a ſpecies of ſuperſtitious regard? The only juſtification for evading a ſtatute, that can be for a moment maintained, is, when that ſtatute notoriouſly ought not to remain in force; and when to evade it, on account of its nature and tendency, is meritorious. But it has been ſaid, that the Indemnity act does not protect the diſſenters from the teſt and corporation laws; for its only effect is, that of allowing farther time to thoſe treſpaſſers on the law, againſt whom final judgment has not been awarded. Should, for example, a proſecution have been commenced, but not concluded, the Indemnity act does not diſcharge the proceedings; it merely ſuſpends them for ſix months; ſo that if the party accuſed does not take the ſacrament before the ſix months allowed by the Indemnity act ſhall expire, the proceedings will go on, and, long before the next indemnity act will come to his relief, final judgment will be awarded againſt him. Thus it appears, that the Indemnity act gives no effectual protection to the diſſenter, who accepts a civil office or military command; for he who cannot take the ſacrament at all, cannot take it within the time required by that act. After all, indemnity ſuppoſes criminality, and an obnoxiouſneſs to puniſhment: the office and penalty are created by theſe ſtatutes: repeal the laws, and indemnity becomes needleſs. No man would wiſh, if it were always practicable, to ſhelter himſelf under an act of indemnity for omitting to do what, independently of theſe laws, he ought not to do; or chuſe to have it thought that he is leſs fit and able to ſerve his king and country than his neighbour, who does not feel the reſtraint of his conſcientious ſcruples. In corporate towns and many public offices, the obligation to qualify is conſidered as a kind of dead letter, and an informer would be very generally thought an odious character.

As to the Corporation act, it is ſaid to have been *forced* from the legiſlature as an act of ſelf-defence; and this is the proper deſcription of an act, which, after the lapſe of much more than a century, when the grounds and reaſons for paſſing it no longer exiſted, ought to be repealed. The queſtion that forms the ſubject of this article is, in our opinion, intimately connected with the honour of the church and the proſperity of the ſtate, as well as with the general intereſts of religion and liberty; and with theſe views of its importance, we refer the deciſion of it to the impartial judgment of the reader.

Test, or *Teſe*, in *Geography*, a river of England, which riſes in the north-weſt part of Hampſhire, bordering on Wiltſhire, and runs into Southampton Water. Sir Henry Englefield ſeems inclined to think the original name was *Ant*.

TESTA, in *Antiquity*, the ſame with *oſtracon*. See Ostracism.

Testa, in *Italian Singing*. When a performer ſings through the noſe, the throat, or the teeth, the voice is called *voce da teſta*, to diſtinguiſh it from *voce di petto*. Toſi ſays: "let the maſter attend with great care to the voice of his ſcholar, which, whether it be *di petto*, or *di teſta*, ſhould always come forth neat and clear, without paſſing through the noſe, or being choaked in the throat; which are two of the moſt horrible defects in a ſinger, and paſt all remedy if once grown into a habit." Galliard's Tranſl. of Toſi on florid Song.

Testa, Pietro, in *Biography*, called Il Luccheſino, from having been born at Lucca. His birth took place in 1611, and he was firſt inſtructed in painting by Pietro Paolini; afterwards he ſtudied at Rome, under Domenichino and Pietro da Cortona. The principal objects of his ſtudy were antique marbles, and the remains of ancient architecture; in which employment ſuch was his aſſiduity, that few veſtiges of antiquity were known which had eſcaped his pencil. His extreme poverty made him moroſe and melancholy; and he made himſelf many enemies, by the freedom with which he ſpoke of the productions of other painters. From this ſtate of trouble he was relieved by Sandrart, who found him among the ruins, and compaſſionating his diſtreſs, took him to his houſe, where he clothed and entertained him, and introduced him to the prince Juſtiniani, who employed him. After this he ſucceeded; and the great freedom and eaſe of his pencil procured him many patrons. Several of the churches and palaces at Rome are adorned with his productions: the beſt are eſteemed to be thoſe of the Death of St. Angelo, in the church of St. Martino à Monti, and of the Death of Iphigenia, in the Palazzo Spada. His works, however, are more frequently to be met with at Lucca. As a deſigner, Pietro Teſta was unequal: he frequently tacked to antique torſos ignoble heads, and extremities copied from vulgar models. Of female beauty he appears to have been ignorant,

rant, though he adopted a character and form which are peculiar to himself. Of his compositions, generally perplexed and crowded, the best known and most correct is that of Achilles dragging Hector from the walls of Troy to the Grecian fleet. He delighted in allegoric subjects, and produced many of picturesque effect and attitudes: but, in their meaning, as obscure as the occasions to which they allude. Of expression, he only knew the extremes, grimace, or loathsomeness and horror. As a colourist, he was frequently rich and effective, harmonious and warm: and his execution bears the stamp of incredible freedom: while his chiaro-scuro is managed with great breadth and depth. His just character is that of a powerful machinist. He was drowned in the Tyber, in 1650, endeavouring to recover his hat, which the wind had blown into the water; though some suspect that he threw himself in, in a fit of despondency, to which he was prone.

He was an eminent engraver as well as a painter, and the number of his works in both arts attest his industry and ingenuity, considering the short period of his life.

Testa, in *Botany* and *Vegetable Physiology*, is the skin of a seed or kernel, which enfolds the embryo, cotyledons, and, if present, the albumen, giving them their due shape; for this integument is perfectly formed, before they have attained any solidity or distinct organization. The skin is generally double, as may be seen in the peach, apricot, and walnut, that glutinous coat of the latter, which stains our fingers in peeling the kernel, being lined with a much finer, white and smooth membrane, technically called *membrana* by Gærtner. In true pulpy seeds, like those of *Jasminum*, a quantity of pulp is lodged between the *membrana* and the outer skin. Both these integuments burst irregularly, merely from the swelling of their contents in germination.

Testa *di Moro*, in *Geography*, a small island near the E. coast of Sardinia. N. lat. 40° 45′. E. long. 9° 53′.

Testa *di Saori*, a town of the island of Corsica; 7 miles N. of Bastia.

Testa *Nevilli*, or *Testa de Nevil*, an ancient record kept by the king's remembrancer in the exchequer, containing the king's fees throughout the greatest part of England, with inquisitions of land escheated, and sergeanties.

It was denominated from its compiler Johan. de Nevil, one of the itinerant justices under king Henry III.

Testa *Sepiæ*. See Cuttle-*Fish Bone*.

TESTACEOLOGY, the science of testaceous vermes, or, in other words, of those soft and simple worms, which have a shelly or testaceous covering; whether, as in some kinds, it be sufficient to envelope and conceal the whole body, or only to cover a portion of it, as in others. The term is derived from *testa*, a shell; or we should rather wish, in order to support our definition, from *Testacea*, the name of the order of those vermes which have a shelly covering, and which, in the Gmelinian system, are thus defined: Testacea. Animalia Mollusca simplicia, domo sæpius calcarea propria, obtecta.

Under this idea of its derivation, the word testaceology must be considered preferable to that of conchology, in designating the science of those bodies which have a shelly covering; because it may imply, or be understood to imply, not only the science of the shells which form the covering or habitation, but the animal also by which it is inhabited, while that of conchology might be confined to the shells alone. It must however be confessed, that, strictly speaking, the terms testaceology and conchology are synonimous, and that their application in the manner we propose, must rather be determined by the taste of the future naturalist than any positive rule we might lay down. The science itself is but a branch of vermeology; and either the term conchology or testaceology may be applied with much propriety, at the discretion of the writer.

The term testaceology is certainly of late invention, and may in some degree be regarded rather as an innovation than amendment; for even with the definition we might be inclined to assign it, in order that it may be retained, there is still no actual difference in its meaning from the term conchology, a term which, to use the words of a writer of the last century, "comprehends the study of all animals that are testaceous, or have shelly coverings; not only those of the sea, but also those of the rivers and land;" and it has moreover an evident claim to priority, having been in use for at least the last forty years among the best English authors. Da Costa, a writer of no ordinary information, indeed appears to have assumed to himself the establishment, if not the actual invention of the term; for in his "Elements of Conchology," published in 1776, he expressly observes, "this peculiar branch of the history of nature, I shall call conchology." Many authors call it conchyliology; and this we find to be true in compliance both with the French and the Latin, the "Conchyliologie" of D'Argenville, and "Historia Conchyliorum" of Lister, two works of great celebrity, that had appeared some time before his "Elements" were published. We have thus endeavoured to prove that the terms testaceology and conchology are purely synonimous; and if any doubt remained, we might finally quote one further passage from the Elements before alluded to, in which we are distinctly told, that "the term of Conchology, applied to this branch of natural history by all authors, is quite applicable to its arrangement by the shells, and not by the fish." As we have already endeavoured to exemplify the rise, progress, and present state of the science of testaceous bodies in a very ample manner under the article Conchology, and may be allowed to presume, with some little confidence, that we have therein concentrated much useful information upon this truly pleasing and very favourite science, it might be esteemed a waste of words to enter into any very considerable digression upon the same subject again; we shall therefore merely recommend a careful perusal of that article to the attention of the reader, and trust the result will be considered satisfactory.

It was indeed our wish, and we had made some general promise to that effect, that under the present article we would resume this subject, and submit the outlines of what we were induced to think an improvement upon the present prevailing arrangement; and upon this point it is now incumbent to offer a few remarks.

The most ardent admirer of the great Linnæus will readily concede to us, that the science of conchology was not one of those within the province of his deep research, or the decided contemplation of his active mind. Its introduction as a science, was necessary to complete the series of the vast chain of animated nature, the classification of which he had undertaken in his "Systema Naturæ," and it was therefore one he could not omit. But for this, it is believed, and with tolerable certainty, that he would have willingly avoided the subject altogether in the latter editions of that work, as it was in the early ones. We have already shewn, under our article Conchology, the actual state in which Linnæus found the science, as handed down to him by his predecessors; and the various purposes to which he applied their labours and assistance. From a general view of the whole, there can no doubt remain that there is yet much to amend in the classification of shells, and that the subdivision of many of the genera already established into natural genera, appears desirable. It was under this persuasion that we had

had intended, when writing the article Testaceology, to have ſubmitted our ideas as to a new and more comprehenſive claſſification of the genera; to have pointed out the very eſſential diſtinctions that exiſt in ſhells of the ſame Linnæan genera; and have thence endeavoured to deduce an arrangement congenial with the characters of the reſpective natural genera which his artificial genera preſent. This we believe would have been regarded as an improvement in the claſſical diſtribution of the ſhell-tribe, but ſuch an illuſtration does not appear, upon more mature reflection, to be admiſſible here. It muſt be apparent that no words, unaccompanied by figures, could poſſibly convey to the reader any adequate conception of the minute, ambiguous, and intricate eſſential characters, which many among the various tribes of ſhells preſent; and that ſuch a ſeries of plates as it would demand to illuſtrate a ſubject ſo very copious and diffuſe, however deſirable in the opinion of the naturaliſt, could not be appropriated, with any degree of propriety, in addition to the very coſtly ſeries of plates already devoted by the Cyclopædia to this ſcience in particular.

The ſeries of plates which have already appeared, elucidate the whole of the Linnæan genera, and under each of thoſe genera, a number of the more ſtriking natural genera which appertain to them reſpectively. Theſe plates are numerous, and the ſubjects for them have been ſelected with every poſſible attention; nor can we heſitate to think upon the whole they will be conſidered, without any further addition, as amply ſufficient for every uſeful purpoſe of general information.

TESTACEOUS, in *Natural Hiſtory*, an epithet given to thoſe fiſh, which are covered with a ſtrong, thick ſhell; as oyſters, pearl-fiſh, &c.

In ſtrictneſs, however, teſtaceous is only applied to fiſh whoſe ſtrong and thick ſhells are entire; thoſe which are ſoft, thin, and conſiſt of ſeveral pieces jointed, as the lobſter, &c. being called *cruſtaceous*.

In medicine, all preparations of ſhells, and ſubſtances of the like kind, are called teſtaceous.—Such are powders of crab's claws and eyes, pearl, &c.

Dr. Quincy, and others, ſuppoſe the virtue of all teſtaceous medicines to be alike; that they ſeldom or never enter the lacteals, but that the chief of their action is in the firſt paſſages; in which however they are of great uſe in abſorbing acidities.

Hence they become of uſe in fevers, and eſpecially in rectifying the many diſtempers in children, which generally owe their origin to ſuch acidities.

TESTAMENT, Testamentum, in *Law*, a ſolemn and authentic act, by which a perſon declares his will, as to the diſpoſal of his eſtate, effects, burial, &c.

Teſtaments, according to Juſtinian, and ſir Edward Coke, are ſo called, becauſe they are *teſtatio mentis*: an etymon, ſays judge Blackſtone, which ſeems to favour too much of the conceit, it being plainly a ſubſtantive derived from the verb *teſtari*. The definition of the old Roman lawyers is much better than their etymology; *voluntatis noſtræ juſta ſententia de eo, quod quis poſt mortem ſuam fieri velit; i. e.* the legal declaration of a man's intentions, which he wills to be performed after his death. It is called *ſententia*, to denote the circumſpection and prudence with which it is ſuppoſed to be made; it is *voluntatis noſtræ ſententia*, becauſe its efficacy depends on its declaring the teſtator's intention, whence in England it is emphatically ſtyled his *will*: it is *juſta ſententia*, that is, drawn, atteſted, and publiſhed with all due ſolemnities and forms of law: it is *de eo, quod quis poſt mortem ſuam fieri velit*, becauſe a teſtament is of no force till after the death of the teſtator. Blackſtone's Com. vol. ii.

A teſtament has no effect till after death, and is always revocable till then. As teſtaments are acts, of all others, the moſt ſubject to deceits, ſurprize, &c. it was found neceſſary to uſe all kinds of precautions to prevent the wills of the deceaſed from being eluded, and the weakneſs of dying perſons from being abuſed. See Will.

The moſt ancient teſtaments among the Romans were made *viva voce*, the teſtator declaring his will in the preſence of ſeven witneſſes; theſe they called *nuncupative* teſtaments; but the danger of truſting the will of the dead to the memory of the living ſoon aboliſhed theſe: and all teſtaments were ordered to be in writing.

The French legiſlators thought *holographic* teſtaments, *i. e.* teſtaments written wholly with the teſtator's hand, an abundant ſecurity; but the Roman law, more ſevere, did not admit of teſtaments without farther ſolemnity.

The eaſieſt, and moſt favourable, is the twenty-firſt law in the *code de teſtamentis*, which permits ſuch as are unwilling to truſt the ſecret of their teſtaments to others, to write it with their own hand, and to cloſe it in the preſence of ſeven witneſſes, declaring to them, that it is their teſtament; after which it is to be ſigned by all the ſeven witneſſes.

Otherwiſe, to make a ſolemn teſtament, it was required to be atteſted by ſeven witneſſes, and ſealed with their ſeals.

Yet the *military* teſtament was not ſubject to ſo many formalities: the ſoldier was ſuppoſed too much employed in defending the laws, to be ſubject to the trouble of knowing them. His tumultuary profeſſion excuſed him from obſerving all the rules. See Military.

Teſtaments, wherein fathers diſpoſed of their eſtates among their children, had particular privileges, and were diſpenſed from moſt of the ordinary formalities.

Testament, *Probate of a*. See Probate and Will.

Testament, *Old* and *New*, in *Sacred Hiſtory*. The moſt common and general diviſion of the canonical books of ſcripture, is that of the Old and New Teſtament. (See Canon.) The Hebrew word *Berith*, from which it is tranſlated, properly ſignifies "Covenant." Accordingly St. Paul (2 Cor. iii. 6—18.), when he is ſhewing the ſuperior excellence of the goſpel covenant, or the diſpenſation by Chriſt above the legal covenant, or the diſpenſation by Moſes, uſes the word teſtament, not only for the covenant itſelf, but likewiſe for the books in which it is contained. The Hebrew term ברית, *berith*, invariably rendered covenant by our tranſlators in the Old Teſtament, is uniformly tranſlated Διαθηκη in the Septuagint; and in the writings of the apoſtles and evangeliſts, the words ἡ καινη διαθηκη are almoſt always rendered by our tranſlators the New Teſtament. It is obſerved, that the Hebrew term correſponds much better to the Engliſh word "Covenant," though not in every caſe perfectly equivalent, than to "Teſtament;" and yet the word διαθηκη, in claſſical uſe, is more frequently rendered *Teſtament*. Our tranſlators, ancient and modern, have probably been led to render it Teſtament, by the manner in which the author of the epiſtle to the Hebrews argues (ch. ix. 16, 17.), in alluſion to the claſſical acceptation of the term. The term *New* is added to diſtinguiſh the religious inſtitution of Jeſus Chriſt from the *Old Covenant*, that is, the diſpenſation of Moſes. Accordingly the two covenants are always in ſcripture the two diſpenſations, or religious inſtitutions; that under Moſes is the *Old*, and that under the Meſſiah is the *New*. Hence, from ſignifying the two religious diſpenſations, they came ſoon to denote the books in which what related to theſe diſpenſations was contained; the ſeveral writings of the

Jews being called ἡ παλαια διαθηκη, and the writings ſuper-added by the apoſtles and evangeliſts, ἡ καινη διαθηκη.

The New Teſtament conſiſted very anciently of two codes or collections, called goſpels and epiſtles. This was the caſe in the time of Ignatius, and alſo in the time of Tertullian, who diſtinguiſhes the goſpels by the names of the writers, and calls them our "Digeſta," or digeſts, in alluſion, as it ſeems, to ſome collection of the Roman laws digeſted into order. As to the order of the ſeveral goſpels, it appears, that in Tertullian's time they were diſpoſed, at leaſt in the African churches, according to the quality of the writers; thoſe two occurring firſt which were written by apoſtles, and then the other two written by apoſtolical men. In ſome of the moſt ancient MSS. now extant, the order of the ſeveral evangeliſts is thus; Matthew, John, Luke, Mark. The order of the four goſpels has been generally this: Matthew, Mark, Luke, John; then follow the Acts, St. Paul's epiſtles, the Catholic epiſtles, and the Revelation. It ſufficiently appears, from a variety of conſiderations ſuggeſted by the excellent Dr. Lardner, that the books of the New Teſtament, conſiſting of a collection of ſacred writings, in two parts, one called Goſpel or Goſpels, or Evangelicon; the other Epiſtles, or Apoſtle or Apoſtles, or Apoſtolicon, were only known, read, and made uſe of by Chriſtians. (See Canon.) It has been a ſubject of ſome diſpute, whether any ſacred books of the New Teſtament have been loſt; but there are many conſiderations, tending to ſatisfy us, that no ſacred writings of the apoſtles of Chriſt are loſt.

The four goſpels, in our poſſeſſion, were written for the benefit of thoſe who would undoubtedly receive them with reſpect, keep them with care, and recommend them to others; and if any other ſuch authentic hiſtories of Jeſus Chriſt had been written by apoſtles, or apoſtolical men, they would have been received, and preſerved in like manner. The book of the Acts, which we ſtill have, was the only authentic hiſtory of the preaching of the apoſtles after our Lord's aſcenſion, which they had in their hands, or had heard of; conſequently there was no other ſuch hiſtory to be loſt. The epiſtles of Paul, James, Peter, John, Jude, were ſent to churches, people, or particular perſons, who would ſhew them great regard when received, would carefully preſerve them, and readily communicate them to others, that they might take copies of them, and uſe them for their eſtabliſhment in religion and virtue; and if other ſuch epiſtles had been written, the caſe would have been much the ſame, nor could any of them have been eaſily loſt. Beſides, the apoſtles and evangeliſts, who drew up any writings for the inſtruction or confirmation of Chriſtian people, muſt have been careful of them. Upon the whole, we have no ſufficient reaſons for believing, that any ſacred writings of the New Teſtament have been loſt. All the books of the New Teſtament were written in Greek, except the goſpel of St. Matthew, who, according to St. Jerom, firſt wrote in Judea in the Hebrew language. Tertullian, as well as many other ancient writers, afford us various teſtimonies to the integrity and genuineneſs of the goſpels and other books of the New Teſtament in his time, as well as to their divine inſpiration. See Bible.

Although the New Teſtament was written in Greek, an acquaintance with the Greek claſſics will not be found ſo conducive to the interpretation of it, as an acquaintance with the ancient Hebrew ſcriptures. The propriety of its being written in the Greek language will appear from the following hiſtorical fact. After the Macedonian conqueſts, and the diviſion which the Grecian empire underwent among the commanders on the death of their chief, Greek ſoon became the language of the people of rank through all the extenſive dominions which had been ſubdued by Alexander. The perſecutions with which the Jews were haraſſed under Antiochus Epiphanes, concurring with ſeveral other cauſes, occaſioned the diſperſion of a great part of their nation throughout the provinces of Aſia Minor, Aſſyria, Phœnicia, Perſia, Arabia, Libya, and Egypt; which diſperſion was in proceſs of time extended to Achaia, Macedonia, and Italy. The unavoidable conſequence of this was in a few ages, to all thoſe who ſettled in diſtant lands, the total loſs of that dialect, which their fathers had brought out of Babylon into Paleſtine, excepting only amongſt the learned. At length a complete verſion of the ſcriptures of the Old Teſtament was made into Greek; a language which was then, and continued for many ages afterwards, in far more general uſe than any other. (See Septuagint.) The Jews, who inhabited Grecian cities, where the oriental tongue was unknown, would be naturally anxious to obtain copies of this tranſlation. Wherever Greek was the mother-tongue, this verſion would be gradually adopted into uſe not only in private in Jewiſh houſes, but alſo in public in their ſchools and ſynagogues, for the explanation of the weekly leſſons from the law and the prophets. The ſtyle of it would conſequently ſoon become the ſtandard of language to them with regard to religious ſubjects. Hence would ariſe a certain uniformity in phraſeology and idiom among the Grecian Jews, whereſoever diſperſed, in reſpect of their religion and ſacred rites, whatever might be the particular dialects which prevailed in the places of their reſidence, and were uſed by them in converſing on ordinary matters. From the conformity and peculiarity in language now noticed, ſome critics, in order to diſtinguiſh the idioms of the LXX and New Teſtament from that of common Greek, have termed it *Helleniſtic;* which ſee. Under that article we have intimated, that the habit which the apoſtles and evangeliſts had of reading the ſcriptures, and hearing them read, whether in the original or in the ancient verſion; would, by infecting their ſtyle, co-operate with the tendency which, as natives of Paleſtine, they would derive from converſation, to intermix Hebraiſms and Chaldaiſms in their writings. Some modern writers, whilſt they have adverted to this circumſtance, have defended the diction of the ſacred penmen of the New Teſtament, and extolled it as altogether pure and elegant. Among theſe we may reckon Pſochenius and Blackwall, who, with this view, have made diligent reſearches among the writings of the ancient Greeks, for the diſcovery of words and phraſes, which might appear to reſemble what has been accounted Hebraiſm or Syriaſm in the New Teſtament. Whereas the writings of the New Teſtament carry, in the very expreſſion and idiom, an intrinſic and irreſiſtible evidence of their authenticity. They are ſuch as, in reſpect of ſtyle, could not but have been written by Jews, and hardly even by Jews ſuperior in rank and education to thoſe whoſe names they bear; and yet, under this homely garb, we find the moſt exalted ſentiments, the cloſeſt reaſoning, the pureſt morality, and the ſublimeſt doctrine.

Abſtracting from that loweſt kind of beauty in language, which reſults from its ſoftneſs and harmony, conſidered as an object to the ear, every excellency of ſtyle is relative, ariſing ſolely from its fitneſs for producing, in the mind of the hearer, the end intended by the writer. Now in this view it is evident, that a ſtyle and manner may, to readers of one denomination, convey the writer's ſentiments with energy as well as perſpicuity, which, to thoſe of a different denomination, would convey them feebly, darkly, and, when judged by their rules of propriety, improperly. This ſeems to have been actually the caſe with the writers of the

New Teftament. The language of Matthew, Mark, Luke, and John, is better adapted to the readers, for whofe ufe the Gofpels and Acts were at firft compofed, than the language of Plato or Demofthenes would have been.

If we would enter thoroughly into the idiom of the New Teftament, we muft familiarife ourfelves to that of the Septuagint; and if we would enter thoroughly into the idiom of the Septuagint, we muft accuftom ourfelves to the ftudy, not only of the original of the Old Teftament, but of the dialect fpoken in Paleftine between the return of the Jews from the Babylonifh captivity, and the deftruction of Jerufalem by the Romans; for this laft, as well as the Hebrew, has affected the language both of the old Greek tranflation and of the New Teftament.

Such is the origin and the character of the idiom, which prevails in the writings of the apoftles and evangelifts, and the remarkable conformity of the new revelation we have by them, though written in a different language, to the idiom of the old. It has been diftinguifhed in the former by the name Helleniftic, not with critical accuracy, if regard be had to the derivation of the word, but with fufficient exactnefs, if attention be given to the application which the Hebrews made of the term Hellenift, by which they diftinguifhed their Jewifh brethren, who lived in Grecian cities and fpoke Greek. It has been by fome of late, after father Simon of the Oratory, more properly termed the Greek of the fynagogue. It is acknowledged, that it cannot ftrictly be denominated a feparate language, or even dialect, when the term dialect is conceived to imply peculiarities in declenfion and conjugation. But, with the greateft juftice, it is denominated a peculiar idiom, being not only Hebrew and Chaldaic phrafes put in Greek words, but even fingle Greek words ufed in fenfes in which they never occur in the writings of profane authors, and which can be learnt only from the extent of fignification given to fome Hebrew or Chaldaic word, correfponding to the Greek in its primitive and moft ordinary fenfe. This difference in idiom conftitutes a difficulty of another kind from that which is created by a difference in dialect; a difficulty much harder to be furmounted, as it does not affect the form of the words, but the meaning.

It is pertinent, however, to obferve, that the above remarks on the Greek of the New Teftament, do not imply that there was any thing which could be called idiomatical or vulgar in the language of our Lord himfelf, who taught always in his mother tongue. His apoftles and evangelifts, on the contrary, who wrote in Greek, were, in writing, obliged to tranflate the inftructions received from him into a foreign language of a very different ftructure, and for the ufe of people accuftomed to a peculiar idiom. The apparently refpectful manner in which our Saviour was accofted by all ranks of his countrymen, and in which they fpoke of his teaching, fhews that he was univerfally confidered as a perfon of eminent knowledge and abilities. It was the amazing fuccefs of his difcourfes to the people, in commanding the attention and reverence of all who heard him, which firft awakened the jealoufy of the fcribes and pharifees.

Although all the writers of the New Teftament wrote in the idiom of the fynagogue, we are not to conclude from hence, that there is no difcernible diverfity in their ftyles. As the fame language admits of a variety of dialects, and even of provincial and foreign idioms, fo the fame dialect and the fame idiom are fufceptible of a variety of ftyles. The ftyle of Paul has fomething peculiar, by which, in our opinion, there would be no difficulty in diftinguifhing him from any other writer. A difcerning reader would not readily confound the ftyle of Luke with that of either of the evangelifts who preceded him, Matthew or Mark; and ftill lefs would he miftake the apoftle John's diction for that of any other penman of the New Teftament. The fame differences of ftyle will be difcovered by one who is but moderately converfant in Hebrew in the writers of the Old Teftament. In it we have ftill greater variety than in the New. Some of the books are written in profe and fome in verfe: and in each, the differences between one book and another are confiderable. In the book of Job, for inftance, the character of the ftyle is remarkably peculiar. What can be more diffimilar in this refpect, though both are excellent in their kind, than the towering flights of the fublime Ifaiah, and the plaintive ftrains of the pathetic Jeremiah? In the books of Scripture we can fpecify the concife ftyle and the copious, the elevated and the fimple, the aphoriftic and the diffufe.

How this diverfity of ftyle is reconcileable with the idea of infpiration, we have attempted to fhew under the article Inspiration. See Campbell's Prelim. Diff.

For other particulars in connection with the fubject of this article, fee Bible and Canon.

TESTAMENTARY Adoption. See Adoption.

Testamentary *Caufes*, in *Law*, are thofe that relate to teftaments, which were originally cognizable in the king's courts of common law, *viz.* the county-courts; and afterwards transferred to the jurifdiction of the church, by the favour of the crown, as a natural confequence of granting to the bifhops the adminiftration of inteftates' effects. This fpiritual jurifdiction of teftamentary caufes is a peculiar conftitution of this ifland; for in almoft all other (even in popifh) countries, all matters teftamentary are of the jurifdiction of the civil magiftrate. And that this privilege is enjoyed by the clergy in England not as a matter of ecclefiaftical right, but by the fpecial favour and indulgence of the municipal law, and as it fhould feem by fome public act of the great council, is freely acknowledged by Lindewode, the ableft canonift of the fifteenth century; and about a century before, in a canon of archbifhop Stratford; alfo by the conftitutions of cardinal Othobon; and likewife by archbifhop Parker, in the time of queen Elizabeth. At what period of time the ecclefiaftical jurifdiction of teftaments and inteftacies began in England, is not afcertained by any ancient writer. It appears the foreign clergy were early ambitious of this power, though they were curbed by the edict of the emperor Juftin, which reftrained the infinuation or probate of teftaments (as formerly) to the office of the *magifter cenfus*: but afterwards by the canon law it was allowed, that the bifhop might compel, by ecclefiaftical cenfures, the performance of a bequeft to pious ufes. And therefore it fell within the jurifdiction of the fpiritual courts, by the exprefs words of the charter of king William I. which feparated thofe courts from the temporal. And afterwards, when king Henry I. by his coronation-charter, directed that the goods of an inteftate fhould be divided for the good of his foul, this made all inteftacies immediately fpiritual caufes, as much as a legacy to pious ufes had been before. This therefore, fays judge Blackftone, we may poffibly conjecture, was the era referred to by Stratford and Othobon, when the king, by the advice of the prelates, and with the confent of his barons, invefted the church with this privilege.

This jurifdiction is principally exercifed with us in the confiftory courts of every diocefan bifhop, or in the prerogative court of the metropolitan originally; and in the arches court, and courts of delegates by appeal. It is divifible into three branches; the probate of wills, the granting of adminiftrations, and the fuing for legacies. The two former

former of which, when no oppofition is made, are granted merely *ex officio et debito juftitiæ*, and are then the object of what is called the voluntary, and not the contentious jurifdiction. But when a caveat is entered againft proving the will or granting adminiftration, and a fuit thereupon follows, in order to determine either the validity of the teftament, or who hath a right to the adminiftration, this claim and obftruction are remedied by the fentence of the fpiritual court, either by eftablifhing the will, or granting the adminiftration. Blackftone's Com. vol. ii. See SUBTRACTION *of Legacies*.

TESTAMENTARY *Guardian*, *Succeffion*, and *Tutorage*. See the fubftantives.

TESTAMENTO *Annexo*, *Adminiftration cum*. If a teftator makes his will, without naming any executors, or if he names incapable perfons, or if the executors named refufe to act; in any of thefe cafes, the ordinary muft grant adminiftration *cum teftamento annexo*, to fome other perfon.

TESTAMENTS *of the Twelve Patriarchs*, in *Ecclefiaftical Hiftory*, a kind of apocryphal or fuppofititious book, in which thofe patriarchs are introduced, fpeaking their laft dying words, containing predictions of things future, and rules of virtue and piety; which they deliver to their fons as a choice treafure, to be carefully preferved, and to be delivered by them to their children. We have feveral editions of thefe in Latin; they were firft publifhed in Greek, by Grabe, and from his edition republifhed by Fabricius; and tranflated into Englifh by Mr. Whifton. Cave places the anonymous author of this book in the year 192, or nearer the beginning of the fecond century. They are cited by Origen, and, therefore, were probably written before his time. Grabe thinks they were written before the time of our Saviour, and afterwards interpolated by a Chriftian. But Mr. Whifton afferts, that they are really genuine, and one of the facred apocryphal, or concealed books of the Old Teftament. Cave fuppofes that this book was written by a judaizing Chriftian; Grabe apprehends that it was written in Hebrew: Beaufobre is of opinion that it was forged at the end of the firft, or beginning of the fecond century, by fome Chriftian converted from Judaifm, and he fufpects that the author was an Ebionite, and that he believed Jefus to be the fon of Jofeph and Mary. Dr. Lardner is pofitive that thefe teftaments are not the real laft words of the twelve patriarchs; but the clear knowledge of Chriftian affairs and principles fhews this book to have been written, or elfe very much interpolated, after the publication of the Chriftian religion. He fays, there is nothing in this work that might not have been written by a learned Jew of the fecond century or later, though he thinks that the author was a Chriftian, and well verfed in the Jewifh learning: and moreover he is of opinion, that he is placed early enough by Cave, at the year 192. Lardner's Works, vol. ii.

TESTATOR, or TESTATRIX, the perfon who makes his or her will and teftament.

M. Gillet fhews, that a perfon incapable of a legacy cannot demand any fum which the teftator in his teftament declares himfelf indebted to him in; in regard fuch a declaration of debt is prefumed a fraud againft the intention of the law.

TESTATUM, in *Law*, a writ in perfonal actions; where, if the defendant cannot be arrefted on a *capias* in the county where the action is laid, but is returned *non eft inventus* by the fheriff, this writ fhall be fent into any other county, where fuch perfon is thought to be, or to have wherewithal to fatisfy the demand.

It is called *teftatum*, becaufe the fheriff has before teftified, that the defendant was not to be found in his bailiwick.

TESTE, a term commonly ufed in the clofe of a writ, where the date is contained, which begins with *Tefte meipfo*, if it be an original writ; or, if judicial, *Tefte*, the *lord chief juftice*, &c. according to the court whence it comes. In fome ancient formulas, we read *Tefte cuftode Angliæ*. There muft be at leaft fifteen days between the tefte and return of every procefs awarded from the king's bench into any foreign county. See WRIT.

TESTENICH, in *Geography*, a fmall ifland in the gulf of Venice. N. lat. 44° 54′. E. long. 14° 47′.

TESTER. See TESTON.

TESTES, TESTICULI, in *Anatomy*; quia virilitatem teftantur; glandular bodies, peculiar to the male fex of animals, ferving the office of fecreting the fecundating fluid: hence their removal deprives an animal of the power of propagating its kind. See GENERATION, *Male Organs of*.

The teftes are wanting in moft of the fifh kind. The fpinofe fifhes in general have neither teftes nor paraftatæ; but all the cetaceous fifhes have them, and not a few of the cartilaginous kinds. Thofe fifh that have them, have always two, as in land-animals; but they differ much in figure and fituation in the feveral kinds, particularly in the whale and flat-fifh. See *Anatomy of* FISH.

TESTES *of the Brain*, two fmall hemifperical eminences, fituated at the pofterior and inferior afpect of the optic thalami, and now more generally known, together with two very fimilar ones immediately above them, by the name of tubercula quadrigemina. See BRAIN.

TESTES *Synodales*. See SYNODALES.

TESTI, FULVIO, *Count*, in *Biography*, an Italian poet, was born in 1593, at Ferrara, and fettling, when young, at Modena, he rofe to the higheft offices and honours of the ftate. Neverthelefs, alternate profperity and adverfity vifited him: inconftant and ambitious, he fell into difgrace with Francis I. who imprifoned him in the citadel of Modena, where he died in 1646. His poems are chiefly of the lyric clafs. The productions of his maturer judgment are diftinguifhed above thofe of his contemporaries for vigour and poetical fpirit; and fome of them, with refpect to elevation of fentiment and beauty of imagery, will bear comparifon with the productions of the beft Italian poets. He alfo attempted tragedy in two compofitions, intitled "Arfinda," and "L'Ifola d'Alcina;" but their ftyle is lyric rather than dramatic compofition. Tirabofchi. Gen. Biog.

TESTIBUS HIIS. See HIIS.

TESTICLE, TESTIS, in *Anatomy*. See GENERATION.

TESTICLE, *Difeafed*, in *Surgery*. See SARCOCELE, HYDROCELE, FUNGUS *of the Tefticle*, FUNGUS *Hæmatodes*, HERNIA *Humoralis*, &c.

TESTICLE, *Operation of removing*. See CASTRATION.

TESTIGOS, LOS, in *Geography*, a clufter of fmall iflands, about ten leagues from the continent of South America, and the fame diftance from the ifland of Grenada. N. lat. 11° 25′. W. long. 62° 5′.

TESTIMON, a town of Pruffia, in the province of Ermeland; 16 miles S.S.E. of Hilfberg.

TESTIMONIAL, a kind of certificate, figned either by the mafter and fellows of the college, where a perfon laft refided, or by three, at leaft, reverend divines, who knew him well for three years laft paft; giving an account of the conduct and learning of the perfon.

Such a teftimonial is always required before holy orders are conferred; and the bifhop even ordinarily demands one of a prieft before he admits him to a benefice.

TESTIMONIAL is alfo a certificate under the hand of a juftice of peace, teftifying the time and place when and where a foldier a foldier or mariner landed, and the place of his dwelling, and whither he is to pafs.

TESTIMONY. See Evidence.

Teftimony is a ferious intimation from another of any fact or obfervation, as being what he remembers to have feen, heard, or experienced. The evidence of teftimony is either oral or written. Some have unreafonably fuppofed, that this kind of evidence is folely and originally derived from experience. With regard to this it may be obferved, that the evidence of teftimony is to be confidered as ftrictly logical, no farther than human veracity, in general, or the veracity of witneffes of fuch a character, and in fuch circumftances in particular, is fupported, or hath not been refuted by experience. But that teftimony, antecedently to experience, hath a natural influence on belief, is undeniable, in which refpect it refembles memory. And in what regards fingle facts, it is a more adequate evidence than any conclufions from experience. When experience is applied to the difcovery of the truth in a particular incident, the evidence is called *prefumptive;* whereas ample teftimony is accounted a pofitive proof of the fact. Teftimony is capable of giving us abfolute certainty even of the moft miraculous fact, or of what is contrary to uniform experience. To this, when we have no pofitive reafons of miftruft or doubt, we are, by an original principle of our nature (analogous to that which compels our faith in memory), led to give an unlimited affent. As on memory alone is founded the merely perfonal experience of the individual, fo on teftimony, in concurrence with memory, is founded the much more extenfive experience, which is not originally our own, but derived from others. See on this fubject Campbell's Philof. of Rhet. vol. i. book i. chap. 5. and Differtation on Miracles, part i. fect. i. and i. See Faith.

For the credibility of human teftimony, fee Certitude.

TESTINA, in *Ancient Geography*, a town of Italy, belonging to the Sabines, placed by D'Anville S.W. of Amiternum.

TESTING, in *Metallurgy*, denotes the operation of refining large quantities of gold and filver, by means of lead, in the veffel called a *teft*. This operation is performed by the deftruction, vitrification, and fcorification of all the extraneous and deftructible metallic fubftances with which thofe noble metals are alloyed. It confifts in adding to the alloyed gold and filver, a certain quantity of lead, and in expofing afterwards this mafs to the action of the fire. The lead, by increafing the proportion of imperfect metals, prevents them from being fo well covered and protected by the perfect metals; by uniting with thefe, it communicates to them a property it has of lofing very eafily a great part of its inflammable principle; and laftly, by its vitrifying and fufing property, which it exercifes with all its force upon the calcined and naturally refractory parts of the other metals, it facilitates and accelerates the fufion, the fcorification, and feparation of thefe metals. The lead, which in this operation is purified, and fcorifies along with it the imperfect metals, feparates from the metallic mafs with which it is then incapable of remaining united: it floats upon the furface of the melted mafs; becaufe by lofing part of its phlogifton, (according to the former language of chemifts,) it lofes alfo part of its fpecific gravity, and laftly it vitrifies. The removal of the vitrified matter in the procefs is procured either by the nature of the veffel in which the melted matter is contained, and which, being porous, abforbs and imbibes the fcorified matter as faft as it is formed; or by a channel cut in the edge of the veffel through which the matter flows out.

The procefs of tefting is generally performed in the fame manner as that of cupellation. See Assaying and Copelling.

But when great quantities of bafe metal are to be worked off from a little gold, recourfe is had to a more expeditious method, that of tefting before the bellows. An oval teft is placed in a cavity, made in a hearth of a convenient height, and fome moiftened fand or afhes preffed round it to keep it fteady: the nofe of a bellows is directed along its furface, in fuch a manner, that if afhes are fprinkled in the cavity of the teft, the bellows may blow them completely out: fome have an iron plate fixed before the bellows, to direct the blaft downwards. To keep the furface of the teft from being injured in putting in the metal, fome cloths or pieces of paper are interpofed. The fuel confifts of billets of barked oak, laid on the fides of the teft, with others laid crofs-wife on thefe: the bellows impels the flame on the metal, clears the furface of afhes or fparks of coal, haftens the fcorification of the lead, and blows off the fcoria, as faft as it is formed, to one end of the teft, where it runs out through a notch made for that purpofe. About two-thirds of the fcorified lead may be thus collected; the reft being partly abforbed by the teft, and partly diffipated by the action of the bellows. Care muft be taken not to urge the blaft too ftrongly, left fome portion of the gold fhould be carried away by the fumes impetuoufly forced off from the lead, and fome minute particles of it entangled and blown off with the fcoriæ. Macquer's Chem. Dict. Art. *Refining*. Lewis's Ph. Techn. p. 146.

TESTO, Ital. literally *teft*. In *Mufic* it implies a fubject, or words of a fong, or other vocal compofition, to which fome air, melody, or harmony, is to be compofed.

It is a matter of great concern to underftand well how to appropriate or adapt the mufic to the words of a fong, to exprefs the fenfe, and make a juft application of the long and fhort fyllables to the notes and time with which they are to be connected.

But this branch of the fcience, which depends greatly on the knowledge of poetry, has lain a long time almoft unregarded; and even at prefent, very little care is taken in this point in the modern mufic, which is fomewhat wonderful, fince it was to this that the ancients attributed the extraordinary effects of their mufic; for by them this branch was moft accurately obferved, and by this they regulated and governed their meafures, fo that they might produce the defired effects; and fome philofophers fay, the human paffions and affections. Voffius de Poem. Cantu, &c.

TESTON, Tester, the name of a coin ftruck in France by Louis XII. in 1513, and in Scotland in the time of Francis II. and Mary queen of Scotland, fo called from the head of the king, (*tefte* or *tête*,) which was engraved upon it. The filver it contained was 11 deniers 18 grains; its weight, 7 deniers $11\frac{1}{2}$ grains; and its value 10 fols. The coinage of it was prohibited by Henry III. in 1575, when the value of it was augmented to 14 fols 6 deniers. Encycl.

A remarkable Scottifh medal of this kind was that inaugurative of Francis II. of France with Mary of Scotland, though it is more properly indeed French, being, as it is thought, ftruck upon their coronation, as being a queen of that country. It prefents bufts of Francis and Mary, face to face, with three legends around them, the outermoft of which contains their titles, the middle one this fingular fentence,

"Which wonders how the devil it got there:"

HORA NONA DOMINUS IHS EXPIRAVIT HELI CLAMANS, a moft ominous motto, one would imagine, to a fuperftitious ear. The innermoft legend is only the name of the city of Paris. There are fine French teftoons of Francis and Mary, likewife prefenting them face to face, with the arms of France

France and Scotland upon the reverſe, as is alſo the caſe of the medal juſt mentioned. Theſe pieces are ſo fine and rare, that Dr. Hunter gave ten guineas for the one in his cabinet, which contains as vaſt and well-choſen a private collection, of all ſorts of coins and medals, as any in the world.

Teſtoons, or ſhillings, were firſt coined in Scotland about the year 1553, and they bore the buſt of the queen and the arms of France and Scotland on the reverſe: they were of the ſame intrinſic value with thoſe of England, and were worth four ſhillings; the half-teſtoon two, Scottiſh money. The ſilver teſtoon of Mary, chiefly of 1553 or 1562, with her buſt, are rare, worth about 30*s.*; half ſtill more rare, valued at 3*l.* Pinkerton on Medals.

The teſton, teſtoon, or teſter, among us, ſucceeded the groat, which was introduced by Edward III. in 1354. It was alſo called ſhilling, and firſt coined by Henry VII. in 1503: and was rated at 12*d.* in the reign of Henry VIII. and afterwards reduced to 6*d.* The teſtoon of the firſt year of Edward VI. is extremely rare.

TESTOON, or Testone, a ſilver coin in Italy, and alſo in Portugal. At Florence, the teſtoon, or teſtone, as a money of account and a ſilver coin, is worth two lire, or three paoli. The teſtoon is a money of account at Liſbon, and is valued at 100 rees. And of the gold coins ſtruck ſince 1722, there are the Dezeſeis teſtoon of 1600 rees, and the Oito teſtoon of 800 rees. The ſilver coins are teſtoons of 100 and halves of 50 rees.

At Rome the ſcudo, as a money of account, is divided into $3\frac{1}{3}$ teſtoni; and among the ſilver coins, the teſtoni are valued at 3 paoli, the paoli being worth $5\frac{1}{4}$*d.* ſterling nearly. See Coin.

TESTORE, Carlo Giovanni, in *Biography*, a violiniſt and muſic-maſter, reſident at Verſeilles in 1770. In 1767 he publiſhed a treatiſe on muſic, entitled, "Muſica ragionata," in 4to. This author was perhaps the firſt Italian who adopted Rameau's principles. He ſimplified his rules, and made his treatiſe more intelligible to *principiante* than Rameau himſelf, or his ſcientific commentator d'Alembert. The full title of his book is "La Muſica ragionata eſpreſſa familiarmente in dodeci Paſſeggiate a Dialogo, ornati 140 eſſempi Muſicali in rami."

TESTOURE, in *Geography*, a town of Africa, in the country of Tunis, on the Mejerdah; 40 miles S.W. of Tunis.

TESTUDO, in *Antiquity*, was particularly uſed among the poets, &c. for the ancient lyre, or lyre of Amphion; becauſe it was ſaid to have been originally made, by its inventor Mercury, of the back or hollow ſhell of a teſtudo aquatica, or ſea-tortoiſe, which he accidentally found on the banks of the river Nile.

Mr. Molyneux has an expreſs diſcourſe, in the Philoſophical Tranſactions, to ſhew that the tortoiſe-ſhell was the baſis of the ancient lyre, and that the whole inſtrument had thence the denomination teſtudo; which account throws ſome light on an obſcure paſſage in Horace, ode iii. lib. 4. miſtaken by all the commentators:

"O, teſtudinis aureæ
  Dulcem quæ ſtrepitum, Pieri, temperas!
O mutis quoque piſcibus
  Donatura cygni, ſi libeat, ſonum!"

Testudo, *Tortoiſe*, in the *Military Art of the Ancients*, was a kind of cover, or ſcreen, which the ſoldiers, *e. gr.* a whole company, made themſelves of their targets, by holding them up over their heads, and ſtanding cloſe to each other.

Thus, if we ſuppoſe the firſt rank to have ſtood upright on their feet, and the reſt to have ſtooped lower and lower by degrees, till the laſt rank kneeled down on their knees, ſo that every rank covering with their targets the heads of all in the rank before them, they repreſented a tortoiſe-ſhell, or a ſort of ſloping roof.

This expedient ſerved to ſhelter them from darts, ſtones, &c. thrown upon them, eſpecially thoſe thrown from above when they went to the aſſault. It was alſo uſed in field-battles as well as in ſieges.

Testudo was alſo a kind of large defenſive engine, of an oval figure, compoſed of boards, and wattled up at the ſides with wicker, which moved on ſeveral wheels, ſerving to ſhelter the ſoldiers when they approached the walls to mine them, or to batter them with rams.

Testudo, in *Medicine*, denotes a ſoft broad tumour, or gathering of impure humours between the ſkull and the ſkin, called alſo *talpa*, as reſembling the ſubterraneous windings of the tortoiſe or mole.

Testudo, *Tortoiſe*, in *Zoology*, a genus of animals of the claſs of Amphibia and order of Reptiles; the generic characters of which are, that the body is furniſhed with a tail, and defended by a bony or coriaceous integument above and below, or above by ſcales; and that the upper mandible of the mouth cloſes over the lower; without diſtinct or proper teeth, the teeth, as they are called in the generality of tortoiſes, being no other than the ſerratures of the mandibles.

Gmelin enumerates thirty-three ſpecies, which are diſtributed into the three claſſes of *marine*, *fluviatile*, and *land* tortoiſes.

A. *Marine Tortoiſes, or Turtles with pinniform Feet, the former being longer.*

The animals of this claſs are diſtinguiſhed from the land tortoiſes by their very large and long fin-ſhaped feet, in which are incloſed the bones of the toes, the firſt and ſecond on each foot being furniſhed with viſible or projecting claws, the others not appearing beyond the edge. The ſhield, as in the land tortoiſes, conſiſts of a ſtrong bony covering, in which are imbedded the ribs, and which is coated externally by hard horny plates, in one or two ſpecies much thicker and ſtronger than thoſe of the land tortoiſes. Mr. Schœpf, cited by Dr. Shaw, obſerves, that the apparent number of claws or projecting extremities on the feet of the marine tortoiſes, appears to be no certain criterion of the ſpecies; but, on the contrary, is found to vary ſo as to contradict the Linnæan ſpecific characters.

Species.

Coriacea; Coriaceous Tortoiſe. Striated lengthwiſe; or brown turtle, paler beneath, with coriaceous ſhell, marked by five longitudinal tuberculated ribs. This is the largeſt of the marine tortoiſes, being found eight feet long, and one thouſand pounds in weight. It is larger than others of its tribe, and its external covering differs by not being horny, but reſembling ſtrong leather, marked over the ſurface into ſmall, obſcurely ſubhexagonal and pentagonal diviſions, without deſtroying its general ſmoothneſs. The longitudinal ribs or ridges are five; and comprehending thoſe that border the ſides, the number is ſeven. It has no under or thoracic ſhell; the head is large, and the upper mandible notched at the tip, ſo as to exhibit the appearance of two large teeth, between which, when the mouth is cloſed, is received the tip of the lower mandibles; the fins are large and long, and covered with a tough leathery ſkin; the tail is rather ſhort and ſharp-pointed. This ſpecies is a native of the Mediterranean, and has occaſionally been taken on the coaſts both of France and England. It is alſo found, not only in the European

ropean feas, but in thofe of South America, and about fome of the African coafts. The Greeks, according to Cépéde, were well acquainted with this fpecimen, and ufed it in the conftruction of the lyre or harp. (See TESTUDO, in *Antiquity*.) Pennant fays, that this fpecies is extremely fat, but the flefh coarfe and bad; but the Carthufians will eat no other fpecies. The fmall fea tortoife defcribed by Pennant in the Phil. Tranf. for 1771, is faid to be the young of this animal. Gmelin mentions this and another as varieties.

IMBRICATA. The imbricated or variegated turtle with thirteen imbricated fcales on the difk; thefe lap over each other at the extremities like tiles on the roof of a building. The head is fmaller than in other turtles; the neck longer; and the beak narrower, fharper, and more curved, fo as confiderably to refemble the bill of a hawk, and from this circumftance the animal derives its popular name of the "hawkfbill turtle." This turtle is a native of the Afiatic and American feas, and is fometimes found in the Mediterranean. It has been often known to meafure five feet in length, and to weigh 500 or 600 pounds. In the Indian ocean it attains a prodigious fize. Its fhell was anciently ufed for a fhield, and ftill ferves for that purpofe among barbarous nations. The flefh is not efteemed as a food; the lamellæ or plates of the fhell, being much ftronger, thicker, and clearer than thofe of any other kind, conftitute its fole value. See TORTOISE-*Shell*.

MYDAS. Brownifh turtle, with thirteen fcales on the difk; the green turtle of fome writers, with two nails on the fore-feet, and fingle ones on the hind-feet. This common green turtle (efculent turtle), is fo named from the green tinge, derived from the vegetable fubftances on which it feeds, often exhibited by its fat, when the animal is in its higheft perfection. It is one of the largeft of this genus, often meafuring above five feet in length (fometimes more than fix), and weighing more than 500 or 600 pounds. Its colour is a dull palifh brown, variegated with deeper undulations, but not exhibiting the beautiful colours which diftinguifh the T. imbricata. Its flefh, however, is in fuch eftimation, that the inhabitants of the Weft Indian iflands have long confidered it as one of the moft excellent articles of food, and have introduced a fimilar tafte into fome of the European nations. In our own country it is much efteemed, and confiderable quantities of it are imported to fupply the luxury of the metropolis. Its introduction, however, cannot be traced farther than about 50 or 60 years backward. Sir Hans Sloane informs us, in his Hiftory of Jamaica, that forty floops were employed by the inhabitants of Port Royal, in Jamaica, for catching them, and that the markets there are fupplied with turtle as ours are with butcher's meat. The method of taking them at the Bahama iflands is by ftriking them with a fmall iron peg two inches long, put in a focket at the end of a ftaff twelve feet long. Two men ufually fet out for this work in a little light boat or canoe, one to row and gently fteer the boat, while the other ftands at the head of it with his ftriker. The turtle are fometimes difcovered by their fwimming with their head and back out of the water, but they are ofteneft difcovered lying at the bottom, a fathom or more deep. If a turtle perceives he is difcovered, he ftarts up to make his efcape, the men in the boat purfuing him, endeavour to keep fight of him, which they often lofe, and recover again by the turtle putting his nofe out of the water to breathe: thus they purfue him, one paddling or rowing, while the other ftands ready with his ftriker. It is fometimes half an hour before he is tired; then he finks at once to the bottom, which gives them an opportunity of ftriking him, which is by piercing him with an iron peg, which flips out of the focket, but is faftened with a ftring to the pole. If he is fpent and tired by being long purfued, he tamely fubmits, when ftruck, to be taken into the boat or hauled afhore. There are men who by diving will get on their backs, and by preffing down their hind parts, and raifing the fore-part of them by force, bring them to the top of the water, while another flips a noofe about their necks.

The fea tortoifes, or turtles, fays Catefby, never go on fhore but to lay their eggs, which they do in April: they then crawl up from the fea above the flowing of high water, and dig a hole above two feet deep in the fand, into which they drop in one night above an hundred eggs, at which time they are fo intent on Nature's work, that they regard none that approach them; but will drop their eggs into a hat, if held under them; but if they are difturbed before they begin to lay, they will forfake the place, and feek another. They lay their eggs at three, and fometimes at four different times; there being fourteen days between every time; fo that they hatch and creep from their holes into the fea at different times alfo. When they have laid their complement of eggs, they fill the hole with fand, and leave them to be hatched by the heat of the fun, which is ufually performed in about three weeks. It may be proper to add, that the eggs are about the fize of tennis-balls, round, white, and covered with a fmooth parchment-like fkin. Gmelin mentions feveral varieties of this fpecies.

CARETTA. The variegated turtle, with fifteen dorfal fcales, thofe of the middle range gibbous towards their tips. This fpecies is larger than any yet difcovered, except perhaps the *coriacea*. It is called the "loggerhead turtle;" and though it refembles the laft fpecies, or green turtle, it is diftinguifhed by the fuperior fize of the head, the proportional breadth of the fhell, and by its deeper and more variegated colours: but the principal diftinction confifts in the number of dorfal fegments or fcutella of the fhell, which amount conftantly to fifteen. The fore-feet are very large and long; the hind-feet much fhorter, though broad. In a commercial view, this fpecies is of little importance; its flefh being rank and coarfe, and the laminæ of the fhell too thin for general ufe. It is faid, however, to afford a good quantity of oil, which may be ufed for lamps, &c. This turtle is very ftrong and fierce, and even dangerous. It is an inhabitant of the fame feas with the green turtle, but has been found in remote latitudes, even in the Mediterranean, and particularly about the coafts of Italy and Sicily.

MACROPUS. With an ovate, carinate, emarginate fhield, and the feet very large and bifarioufly unguiculated.

B. *Fluviatile, with palmated feet, fhell joined with the fternum by a membrane, and fupported in the middle on both fides by two proceffes of the fternum.*

ORBICULARIS. The T. europea of Schneider, with oval, flattifh, fmooth, dark brown fhell, marked with very numerous yellowifh fpecks and ftreaks. This fpeckled tortoife of the "Naturalift's Mifcellany," or T. meleagris, is of fmall fize, the fhell meafuring about four or five inches in length, and its difk compofed of thirteen, and the margin of twenty-five pieces; the under fhell whitifh-yellow, tinged towards the joints with brown; the head ovate, fomewhat convex above, and flattifh on each fide and beneath; the fkin of the neck lax and wrinkly; the legs fhort and fcaly, feet webbed, fore-feet having five toes and hinder only four; the claws on all the feet fharp-pointed, and crooked; the tail nearly half as long as the body, thin, attenuated, compreffed and fcaly, and alfo fpotted like the body.

This elegant fpecies is a native of many parts of Europe, being

being found in Italy, Sardinia, France, Hungary, Pruffia, &c. inhabiting lakes and muddy waters, and feeding on aquatic plants, infects, fnails, and fmall fifh. The flefh is faid to be good as food, for which purpofe it is fold in the markets, and occafionally kept in ponds, and fed or fattened with lettuce-leaves, bread, &c. &c. It may be conveniently kept in a cellar and fed with oats, fcattered on the floor, which it greedily eats when they begin to germinate. It depofits its eggs in fandy and funny places in the beginning of fpring, which are not hatched, as it is pretended, till the fucceeding fpring.

Membranacea. With three claws on the feet, and fhell ftriated on the back, membranaceous, ovate and grey. Found in the fea that wafhes Guiana. See T. Ferox.

Triunguis. With three claws on the feet, the difk of the back rugofe and orbiculated, the lower border fmooth, and noftrils in a cylinder elevated above and projecting beyond the head. Found rarely in the Nile, and fuppofed to be the fame with the former.

Cartilaginea. Shell orbicular, membranaceous, ftriated on the back; three claws on the feet, and nofe cylindric and prolongated. This is the T. Boddaerti and a rare fpecies. See the next article.

Ferox; Fierce Tortoife. With ovate, cartilaginous fhell; three claws on the feet, and tubular, prominent noftrils. Dr. Shaw queries whether the T. roftrata of Schœpf, the T. with palmated feet, &c. of Thunberg, the T. cartilaginea of Boddaert, the T. Boddaerti of Schneider, the T. triunguis of Forfkal, and the T. membranacea of Blumenberg, do not belong to this fpecies. This is a remarkable fpecies, and diftinguifhed by the unufual nature of its fhield, which is hard and offeous only in the middle part, while the edges gradually degenerate into a flexible coriaceous verge; obfcurely marked with five or fix tranfverfe bands, and granulated with fmall warts or prominences, gradually enlarging as they approach the flexible edge; the head rather fmall, fomewhat trigonal, with the fnout much lengthened, and the upper part drawn out into a fub-cylindric form, terminated by the noftrils, and projecting much beyond the lower mandible; the neck, when retracted, thick, and furrounded with many folds of fkin, but when exferted, equal in length to that of the whole fhell; the legs fhort, thick, and covered with a wreathed fkin; the feet furnifhed with ftrong and broad webs, connecting the three laft toes of each; the three firft on each foot furnifhed with ftrong claws, and the remaining ones unarmed; having, befides the proper toes, two fpurious ones on the hind and one on the fore feet, ftrengthening and expanding the web; the tail fhort, pointed, and curving inwards; the eyes very fmall and round; the colour above deep brownifh-olive, and below white; the fhell marked beneath in a very elegant manner, with ramifications of veffels.

This fpecies is found in Pennfylvania, Carolina, &c. &c.; and is poffeffed, differently from moft others of the tribe, of confiderable vigour and fwiftnefs of motion, fpringing towards its affailant, when attacked, with great alacrity and fiercenefs; about a foot and half long, and fifteen inches broad. It was firft defcribed by Dr. Garden. Its flefh is faid to be extremely delicate, being equal, if not fuperior, even to that of the green turtle. The great foft-billed turtle, defcribed by Mr. Bartram in his Travels, appears to be the fame with this. Found in all the rivers, lakes, and pools of Eaft Florida, weighing from 30 to 40 pounds. The T. roftrata of Thunberg feems to be the young of the fpecies above defcribed; and the T. triunguis of Forfkall is allied to the fame fpecies. Shaw.

Scabra. With fmooth difcoloured head, and fhield oval, convex, carinated and rough. The *fcabra* of Linnæus is defcribed as having palmated feet and flattifh fhell, with all the intermediate fcutella elevated on the back. The fhell of this fpecies is figured by Seba; it meafures about two inches and a half in length, and nearly two inches in breadth; being of a cordated figure, or fomewhat pointed at the bottom. Its colour is light-reddifh, variegated on the head and fhell with white lines and fpots; the feet marked with red fpecks, and having each five toes with fharp claws; the head prominent, and eyes fmall. Shaw.

Squamata; Scaly Tortoife. With ovate body, fmooth beneath, but covered above, together with the neck, feet, and tail, with numerous fcales. According to Bontius, in his Hiftory of Java, this fingular fpecies is an inhabitant of frefh waters, where it burrows under the banks, in order perhaps to depofit its eggs. The Javanefe call it *taunah*, or the digger, and the Chinefe *lary*, or the runner, a burlefque title given to it on account of its flow pace. Its flefh is faid to be extremely delicate; and the Chinefe ufe the pulverized fcales diffolved in water, as a remedy in dyfenteric cafes and againft the colic. It is faid to prey on fmall fifh. This fpecies feems to connect the lizard and tortoife tribes. Shaw.

Lutaria; Mud or Brown Tortoife. With flattifh fhell, and tail half the length of the body; carinated, fays Gmelin, behind with three fcutella. This fpecies is faid to be common in many parts of Europe, as well as Afia, being found in India, Japan, &c. According to Cépéde, it is not more than feven or eight inches from the tip of the nofe to that of the tail, and about three or four inches in breadth; the difk confifts of thirteen pieces, ftriated and flightly punctated in the centre, and along the middle range runs a longitudinal carina; the margin confifts of twenty-three pieces, bordered with flight ftriæ; the colour of the fhell is blackifh and alfo of the fkin; the feet are webbed, with five toes before, and four behind; the exterior toe of each foot is unarmed; the tail is ftretched out in walking, from which circumftance the animal has been called "Mus aquatilis." Like other tortoifes, it fometimes utters a kind of broken hifs. This animal is common in France, and particularly in Languedoc and many parts of Provence; and in a lake, fituated in the plain of Durance, fuch numbers were found as to fupply the neighbouring peafantry for more than three months. Although this fpecies be aquatic, it always lays its eggs on land, digging a hollow and covering them with mould. This animal is ufeful in a garden, which it frees from noxious animals, without doing any mifchief itfelf. It may be domefticated, and kept in a bafon or receptacle of water, fo contrived on the edges as to give it a ready egrefs, when it wifhes to wander about for prey. In fifh-ponds it is deftructive. Shaw. Gmelin mentions two varieties, *viz.* T. tabulata and T. campanulata.

Scorpioides. See T. Fimbriata.

Hermanni. With four claws on the feet, and the tip of the tail unguiculated. See T. Tricarinata.

Gmelin mentions feveral varieties of this fpecies.

Carolina. With digitated feet, gibbous fhell, and no tail. This is the T. claufa, or clofe tortoife, of Linnæus and other writers, with blackifh fhell, irregularly fpotted with yellow, with obtufe dorfal carina, and bivalve under-fhell completely clofing the upper, whence it obtains its name. The under part of the fhell is fo continued round the margin, that when the animal withdraws its head and legs, it is able accurately to clofe all parts of the fhell together, fo as to be perfectly fecure. The defence of this little animal, which rarely exceeds four or five inches in length, is fuch, that it is uninjured by a weight of 500 or 600 pounds, and

and able to walk under this heavy load. It is a native of many parts of North America, found chiefly in marſhy ſituations, and occaſionally in the drieſt and hotteſt places. It is principally ſought for on account of its eggs, which are reckoned a delicacy. It feeds on ſmall animals, as beetles, mice, and even ſerpents, which it draws into its ſhell, and cruſhes to death; and alſo on various vegetable ſubſtances.

Palustris. With depreſſed ſhell, five claws on the fore-feet, and four on the hind-feet; found in the ſtagnant waters of Jamaica, and ſeeking food in the adjoining meadows. This is the T. terrapin of Schœpf, and the T. concentrica of other writers, with ſub-depreſſed, ſub-carinated, oval yellow ſhell, with the ſcutella marked by concentric brown zones. The ſhell meaſures from four to ſix inches, or more. It is a native of North America, and ſold in the markets at Philadelphia, and elſewhere, under the name of "Terrapin," which name is indiſcriminately applied in America to ſeveral other ſpecies. It is common, as we have already ſaid, in Jamaica, and firſt deſcribed by Dr. Browne, in his "Hiſtory of Jamaica," who ſays it is a wholeſome and even delicate food. In the Leverian Muſeum there is a large and beautiful ſpecimen of the ſhell of this ſpecies. Shaw.

Caspica. With orbicular ſhell, ſcaly head, five claws on the fore-feet, four on the hind, and naked tail. Gmelin repreſents it as a native of Hircania, inhabiting freſh waters, and ſometimes growing to a vaſt ſize. The pieces compoſing the diſk are ſub-quadrate; thoſe of the border parallelogrammic; the colour variegated with black and green; the lower ſhell blackiſh, ſpotted with white.

Clausa. See T. Carolina, ſupra.

Pensylvanica. Tortoiſe, according to Schœpf, with ſmooth, elliptic, brown ſhell, with flattiſh back, the middle range of ſcutella ſub-rhomboid and ſub-imbricated, the firſt ſub-triangular; and according to Gmelin, with five claws on the fore-feet and four on the hind, and the apex of the tail horny and acute. This is the ſmall mud tortoiſe of Edwards; the ſhell meaſuring three or four inches in length. The head on the parts ſurrounding the jaws and eyes is of a reddiſh-yellow colour; the upper part, as well as the neck, legs, and tail, duſky; feet webbed; the tail ſmall. It is a native of North America, and is found in Pennſylvania, &c. inhabiting muddy waters. When living, it is ſaid to exhale a ſtrong muſky odour. Mr. Schœpf mentions a variety, and another occurs in the Leverian Muſeum Shaw.

Serpentina. The ſnake tortoiſe, characteriſed by Schœpf as having an ovate, depreſſed, triply carinated, ſharp-ſcaled ſhell, rounded and acutely ſerrated at the poſterior margin; and by Gmelin as having digitated feet, ſub-carinated ſhell, behind obtuſe, and acutely quindentated. This is the ſerrated tortoiſe of Pennant. It is a native of North America, inhabiting ſtagnant waters, growing to the weight of fifteen or twenty pounds, or more, preying on fiſh, ducklings, &c. ſeizing its prey with great force, and at the ſame time ſtretching out its neck, and hiſſing at the ſame time. The head is large, depreſſed, triangular, and covered with a ſcaly and warty ſkin: the orbits of the eyes are oblique; the mouth wide; the mandibles ſharp; the neck covered by ſcaly warts; the toes diſtinct; the tail ſtraight, and about two-thirds the length of the ſhell; and the under part of the body covered by a looſe, wrinkled ſkin, beſet with ſmalliſh ſoft ſcales and granules. This animal conceals itſelf in muddy water, leaving out only a part of its back, and thus appearing to be a ſtone or other inanimate object, more eaſily obtains its prey. In New York it is known by the title of the "ſnapping tortoiſe."

Spengleri. See T. Serrata, infra.

Fimbriata. Tortoiſe, according to Bruguiere, with oval, ſub-convex, triply carinated ſhell, ſub-digitated feet, cylindric ſnout, and neck fimbriated on each ſide. This is an animal of very ſingular and diſagreeable appearance. The ſhell is about fifteen inches or more in length, and its breadth eleven; but the whole animal, from the noſe to the end of the tail, is two feet three inches. The head is large and flat, rounded in front, and edged on the ſides with warty and wrinkled membranaceous appendages, about five inches wide, and covered behind by a three-lobed prominence; the noſe reſembles a proboſcis, cylindric, ten lines long, truncated, pierced by the noſtrils, at the tip, where they are ſeparated by a cartilaginous diviſion; the eyes are round, ſeated at the baſe of the proboſcis, and ten lines diſtant from each other; the mandibles are equal in length, and entire; the gape of the mouth is wide; the neck ſeven inches long, and four and a half broad; above flat and warted, and furniſhed on each ſide with ſix fimbriated membranaceous appendages diſpoſed lengthwiſe, and alternately larger and ſmaller; the under part of the neck is beſet with four ſimilar appendages, placed oppoſite to the two on the head, and increaſed by two longitudinal wrinkles: the fore-feet are ſcaly and warty, having five indiſtinct toes, with as many longiſh ſharp claws, convex above and flat beneath; the hind-feet are alſo ſcaly, with leſs diſtinct toes, having four claws, the fifth toe being unarmed, and very ſhort: the tail is an inch long, bent ſlightly, and covered with a granulated ſkin; all the thirteen ſemicircular pieces, of which the ſhell conſiſts, are wrinkled and irregularly notched at the hind part; the twenty-five marginal pieces are almoſt ſquare, radiated on the ſurface with oblique wrinkles, and toothed in the interior edge. The colour of the whole is brown, ſomewhat paler beneath. This animal is ſaid to be a native of Guiana, but is now rare in the rivers of Cayenne, as it has been plentifully taken by fiſhermen, it being conſidered as excellent food. It feeds on aquatic plants, and wanders by night to ſome diſtance in ſearch of paſture. It has been ſuggeſted, but without certainty, that this is the T. ſcorpioides of Linnæus. Shaw.

Picta. Tortoiſe with plane ſhell, marked on both ſides with a double ſpot of a black-blueiſh colour; ſcutella ſurrounded with a yellow margin, and neck ſtriated longitudinally with yellow and black; or tortoiſe with oblong, ſlightly convex, ſmooth, brown ſhell, with the ſcutella bordered with yellow. This is the cinereous tortoiſe of Brown's Zoology, and ſufficiently diſtinguiſhed from all others by the remarkable colours of the ſhield. This is a freſh-water ſpecies, and inhabits ſlow and deep rivers in North America, and ſhould have been referred by Gmelin to his ſecond claſs. In clear ſunny weather theſe animals are ſaid to aſſemble in multitudes, ſitting on the fallen trunks of trees, ſtones, &c. and immediately plunging into the water on the leaſt diſturbance. They are ſaid to ſwim very ſwiftly, but to walk ſlowly; to be able to continue many hours entirely beneath the water, but not to ſurvive many days if kept out of their favourite element. They are very voracious, deſtroying ducklings, &c. which they ſeize by the feet, and drag under water. They are ſometimes uſed as a food. The colour, as has been above obſerved, varies; being ſometimes of a blackiſh-brown, at other times of a reddiſh-cheſnut: the yellow markings are alſo either pale or deep in different individuals, and ſometimes whitiſh; the inferior, or under edges of the upper ſhell, as well as the upper edges, or commiſſures of the lower, are elegantly ſtreaked with black, as if artificially painted, and this variegation is continued over the ſkin of the ſides of the body. Shaw.

Guttata. Tortoiſe ſpotted, with oblong, moderately convex,

convex, ſmooth, brown ſhell, with ſcattered yellow ſpots. This is T. punctata of Schœpf. It is a rather ſmall ſpecies, and a native of North America, inhabiting rivers and lakes. The young are ſcarcely larger than pigeon's eggs, and are very black, beautifully ſpotted with gold colour.

Longicollis; Long-necked Tortoiſe. Smooth, ovate, with extremely long neck. This ſpecies is a native of New Holland, and is of the river or freſh-water kind. The colour of the whole animal above is deep olive-brown; beneath paler, and inclining to whitiſh. Shaw.

C. *Land tortoiſes, with clavated unguiculated feet, convex ſhell, and bony commiſſures joined with the ſternum.*

Denticulata. Tortoiſe with ſub-digitated feet, and orbicularly-cordated ſhell, with denticulated marginal ſegments. The ſhell is of a pale yellowiſh-brown colour, about four inches long and three broad, covered on the diſk by broad hexagonal and pentagonal ſcutella, of a flattened form, with a large diſtinct middle ſpace, granulated by ſmall tubercles, and the remainder marked by five lines or furrows. The edge of the ſhell conſiſts of twenty-three pieces, projecting in a ſerrated manner round the outline. It is ſuppoſed to be a native of North America. The feet, in Gmelin's edition of the Syſtema Naturæ, are ſaid to be without diſtinct toes; and the tail ſhort.

Græca. The common land tortoiſe, with ſub-digitated feet, hinder part of the ſhell gibbous, lateral margin very obtuſe, and ſcutella flattiſh. Gmelin.

It is deſcribed by others as the tortoiſe with hemiſpheric black and yellow ſhell, gibbous behind; the pieces compoſing the diſk convex, and the ſides obtuſe. This tortoiſe is ſuppoſed to be a native of almoſt all the countries bordering on the Mediterranean ſea, and to be more frequent in Greece than in other regions. It is found in the European Archipelago iſlands, and in Corſica and Sardinia, and alſo in many parts of Africa. In Greece it is an article of food; the eggs are eaten boiled, and the blood is often ſwallowed recent. In September the animal hides itſelf under ground, and emerges in February: it lays its eggs in June, in a ſmall hole on a ſunny ſpot, out of which, after the firſt rains of September, the young are hatched. In England it retires about the end of October, and re-appears about the middle of April; but theſe ſeaſons vary with the climate and weather, &c. The males often fight, butting at each other with a noiſe that may be heard at a conſiderable diſtance. This animal lives to a moſt extraordinary age, exceeding the period of even a century.

One of the moſt remarkable inſtances is that of a tortoiſe introduced into the archiepiſcopal garden at Lambeth, in the time of archbiſhop Laud, and as near as can be collected from its hiſtory, about the year 1633, which continued to live there till the year 1753, when it was ſuppoſed to have periſhed rather from accidental neglect on the part of the gardener, than from the mere effect of age. This tortoiſe has had the honour of being commemorated by Derham, and many other writers, and its ſhell is preſerved in the library of the palace at Lambeth.

The general manners of the tortoiſe, in a ſtate of domeſtication in this country, are very agreeably detailed by Mr. White, in his Hiſtory of Selbourn. "A land tortoiſe," ſays Mr. White, "which has been kept thirty years in a little walled court, retires under ground about the middle of November, and comes forth again about the middle of April. When it firſt appears in the ſpring, it diſcovers very little inclination for food, but in the height of ſummer grows voracious; and then, as the ſummer declines, its appetite alſo declines; ſo that for the laſt weeks in autumn it hardly eats at all. Milky plants, ſuch as lettuces, dandelions, ſow-thiſtles, &c. are its principal food.

"The tortoiſe is totally a diurnal animal, and never ſtirs after it becomes dark. The tortoiſe," adds Mr. White, "like other reptiles, has an arbitrary ſtomach, as well as lungs, and can refrain from eating, as well as breathing, for a great part of the year. I was much taken with its ſagacity, in diſcerning thoſe that do it kind offices; for as ſoon as the good old lady comes in ſight who has waited on it for more than thirty years, it hobbles towards its benefactreſs with awkward alacrity; but remains inattentive to ſtrangers. Thus, not only 'the ox knoweth his owner, and the aſs his maſter's crib,' but the moſt abject and torpid of beings diſtinguiſhes the hand that feeds it, and is touched with the feelings of gratitude. This creature not only goes under the earth from the middle of November to the middle of April, but ſleeps great part of the ſummer; for it goes to bed in the longeſt days at four in the afternoon, and often does not ſtir in the morning till late. Beſides, it retires to reſt for every ſhower, and does not move at all in wet days. When one reflects on the ſtate of this ſtrange being, it is a matter of wonder that Providence ſhould beſtow ſuch a ſeeming waſte of longevity on a reptile that appears to reliſh it ſo little as to ſquander away more than two-thirds of its exiſtence in a joyleſs ſtupor, and be loſt to all ſenſation for months together in the profoundeſt of all ſlumbers! Though he loves warm weather, he avoids the hot ſun; becauſe his thick ſhell, when once heated, would, as the poet ſays of ſolid armour, 'ſcald with ſafety.' He therefore ſpends the more ſultry hours under the umbrella of a large cabbage leaf, or amid the waving foreſts of an aſparagus bed. But as he avoids heat in the ſummer, ſo in the decline of the year he improves the faint autumnal beams, by getting within the reflection of a fruit-tree wall; and though he has never read that planes inclining to the horizon receive a greater ſhare of warmth, he inclines his ſhell by tilting it againſt the wall, to collect and admit every feeble ray."

The tortoiſe is ſaid to be more tenacious of life than any other of the amphibia; many experiments performed upon them by Redi, of a cruel nature, ſuch as opening their ſhells, taking out the brain, cutting off the head, evince their tenaciouſneſs of life, and that the vital principle is very ſlowly diſcharged from theſe animals. Shaw.

Carinata. Tortoiſe with digitated feet, and gibbous ſhell, with the four firſt dorſal ſcutella carinated, and entire ſternum: found in warm regions, but very little known.

Geometrica. Shell ovated, with all the elevated ſcutella above plane, marked with yellow ſtriæ iſſuing from the centre in form of a ſtar: or, according to others, this is the tortoiſe with ovate black ſhell, and elevated ſcutella radiated with yellow; the T. teſſelata minor of Ray. The pieces of which the diſk of the ſhell conſiſts are very prominent, ſtriated, or furrowed pretty diſtinctly with numerous lines on their ſides, and terminated above by a yellowiſh, flat, ſquare, or rather hexagonal roughened ſpace or centre, from which proceed, in a radiated direction, ſeveral well-defined yellow ſtreaks towards the edge; thus conſtituting a beautiful kind of geometrical appearance on the black ground colour on which they are diſpoſed: the marginal pieces, which are commonly twenty-four, ſometimes twenty-ſix, in number, are alſo ſtreaked with yellow, but in a ſomewhat different ſtyle.

The native country of this beautiful tortoiſe is perhaps not truly aſcertained; though the ſhell is more frequently ſeen in Europe than that of almoſt any other kind. It is ſaid, however, to inhabit Aſia and Africa, and even to be found in America. According to Mr. Thunberg it is particularly common in ſhrubby places about the Cape of Good Hope. It is ſaid to lay about twelve or fifteen eggs at a time.

time. The count de Cépedé fuppofes this fpecies to be the Terrapin of Dampier, which that navigator reprefents as very beautifully variegated, and as delighting in moift and marfhy places; adding, that its flefh is efteemed as a food, and that it is found in plenty on the coafts of the Pine iflands, between the continent of America and Cuba: they are found in the forefts, where they are eafily taken: the hunters mark them on the fhield, and let them wander about the woods; being fure to find them again at no great diftance, every one eafily recognizing his own property, and afterwards carrying them to Cuba. Shaw.

Pusilla; Little Tortoife. With fub-digitated feet, and hemifpheric fhell, with convex, trapezial fcutella, ftriated on the margin, and punctated on the difk. This is the African land tortoife of Edwards, and thus defcribed by him from a fpecimen obtained from Weft Barbary. "The iris of the eye is of a reddifh hazel colour; the lips hard, like the bill of a bird; the head covered with fcales of a yellowifh colour; the neck, hind legs, and tail, covered with a flexible fkin of a dirty flefh-colour; the fore-legs covered with yellow fcales on their outfides, which are partly expofed when the legs are drawn in; the fhell round, and pretty much rifing on its upper fide, and flat beneath; the pieces or compartments are of a yellowifh colour, clouded and fpotted with large and fmall irregular dufky or blackifh fpots, and are alfo furrowed or creafed, the creafes leffening, one within the other, till they reach the top or middle part of each: the tail is thick, fcaly, and about an inch in length; and the vent is fituated within the tail itfelf near the bafe: there are five claws on the fore-feet, and four on the hind, all ftrong, black, rather bowed, and fharp-pointed." This fpecies is found at the Cape of Good Hope, and much refembles the T. græca.

Indica. Tortoife with brown fhell, reflected above the neck, and marked with a tubercle on the three upper fcutella. This is the great Indian tortoife, firft defcribed by Perrault in the "Hiftory of Animals," publifhed by the Royal Academy of France; and confounded by M. Cépéde with the T. græca. It is found in India, on the coaft of Coromandel, &c. Of this there are two varieties, one brought from the Cape of Good Hope, and another from the Southern iflands.

Sulcata. Tortoife with a tail, digitated feet, gibbofe fhell, and fcutella lineated and circumfcribed with a furrow; or tortoife with brown ovate fhell, with furrowed fcutella yellow on each fide. This is one of the larger fpecies of land tortoife, being about a foot or more in length from the nofe to the tip of the tail. The fhell is very convex, and has the general habit of the *græca* and *geometrica* as to fhape. This fpecies is faid to be a native of the Weft Indies, and perhaps may be the "Hicatee" of Brown, defcribed in his Hiftory of Jamaica. Dr. Shaw fuggefts that this fpecies may be the fame with T. tabulata.

Planairia. Tortoife with digitated feet, and fhell oval, convex, and fmooth. Found at Surinam.

Americana Terrestris. Tortoife with oval, gibbofe fhell; fcutella yellow in the middle of the difk; the margin marked with fhining, black, furrowed, lateral polygons. This is conjectured by Gmelin to be the Jaboti of the Brafilians, and the cagado of the Portuguefe. Found in South America.

Tabulata. Tortoife with oblong, gibbofe, brown fhell, with the fcutella of the difk rectangular and furrowed; with yellowifh centres. This was firft defcribed and figured in Seba's "Thefaurus," and there faid to be a native of Brafil, though it is believed to be rather an African fpecies. The general length of the fhell is about five or fix inches: fufpected to be the fame fpecies with T. fulcata, fupra. Shaw.

Marginata. Tortoife with blackifh-brown, oblong, gibbofe fhell, variegated with yellow, widened and depreffed on the hind part. The true native country of this fpecies is not very diftinctly known. Mr. Schœpf inclines to think that it is an American fpecies. Cépéde has confounded it with the T. græca. Shaw.

Radiata. Tortoife with ovate black fhell, and flattifh fcutella radiated with yellow. This is the great chequered tortoife-fhell of Grew's Muf. Reg. It has been concluded by fome perfons, from a general refemblance in the pattern of the fhell, and a fimilarity in colours, that this is the fame fpecies with T. geometrica, or a variety of it. But Dr. Shaw has pointed out a variety of differences between them and fuch as warrant our ftating that the two fhells are perfectly diftinct. Grew, who has defcribed this fpecies, fays that its native country is Madagafcar; but Dr. Shaw fuggefts that it is alfo a native of Jamaica, and that in characters and fize it agrees with the "Hicatee" tortoife mentioned in Brown's Zoology. Shaw.

Rugosa. Tortoife wrinkled, with black wrinkled fhell, mottled and variegated with yellow; with the middle dorfal pieces fubpanduriform or fiddle-fhaped. In the Leverian mufeum there is a variety, or perhaps a fexual difference of this fpecies.

Elegans. Tortoife with orbicular, convex, yellow fhell, with tranfverfe, oval, brown fpots. Seba has defcribed it under the name of the T. terreftris Ceilonica elegans minor. Shaw.

Areolata. Tortoife with moderately convex fhell, with fubquadrangular, elevated, deeply furrowed fcutella, and depreffed rough areolæ. This is defcribed by Seba under the appellation of T. terreftris Brafilienfis.

Serrata. Tortoife with depreffed yellowifh fhell, minutely freckled with dufky fpecks; all the fcutella of the difk carinated, and the hinder margin of the fhell ferrated. This is fuppofed by Dr. Shaw to be the T. fpengleri of Gmelin's Linnean Syftem.

Tricarinata. Tortoife with oval, flightly convex, fhell, with entire margin, and all the fcutella of the difk carinated. This fpecies agrees, in fhape and other particulars, with Linnæus's defcription of his T. orbicularis. Shaw.

Scripta. Tortoife with orbicular depreffed fhell, with all the fcutella marked by varioufly-formed characters, and the marginal pieces fpotted beneath. This is the T. fcabra of Thunberg. Its native place is not afcertained. Shaw.

Galeata. Tortoife with depreffed oval fhell, with the three middle fcutella fharply carinated, and twenty-four marginal pieces. The native place of this fpecies is not known; but it was brought to Mr. Retzius from India, and lived two years kept in frefh water: it fubfifted on bread, &c. and fometimes on flies. From the beginning of October to the middle of May it remained without food, fcarcely elevating its head above the water. It delighted in funfhine, and endeavoured to climb up the fides of the veffel occafionally, in order to enjoy its influence. It is doubtful, whether this be the T. fcabra of Linnæus. It is called *galeata* by Retzius, from the armed or cataphracted covering of the head. Shaw.

Granulata; Chagrin Tortoife. With orbicular, flattifh, granulated fhell, with cartilaginous border. This fpecies feems to be allied to the T. ferox, having the fhield furnifhed with a cartilaginous and flexible border. It is defcribed by M. Cépéde, and was brought from India by M. Sonnerat. Shaw.

Dr. Shaw, among the fea-tortoifes or turtles, has defcribed the

the turtle with green variegated fhell, fo named by the count de Cépéde. Thefe turtles are faid to be found in great numbers in the Southern ocean, and about Cape Blanco, in New Spain. They alfo occur in the gulf of Mexico, and many of the large American rivers, both above and below the line; but they have never been difcovered in the feas of the Old Continent. The flefh is faid to be very delicate; and is even preferred in fome places to that of the common turtle. M. Bomare is faid by Cépéde to have firft defcribed this fpecies.

The "trunk turtle" is mentioned by Catefby, who fays, without ever having feen it, from the report of others, that thefe turtles grow to a very large fize, of a narrow form, but very deep, the upper fhell being more convex than in other kinds of turtle. Their flefh is rank, but affords a large quantity of oil, which conftitutes their value.

The "rhinoceros turtle," or *la tortue nafìcorne*, has not been accurately defcribed. Count de Cépéde fays, that it is a native of the American feas, and bears a general refemblance to the common or green turtle; but is diftinguifhed by having a large foft tubercle on the tip of the fnout, in which are fituated the noftrils. It is eaten in the fame manner as the green turtle, and is chiefly found in the equatorial regions. Shaw's General Zoology, vol. iii. pt. 1.

TESTUDO *Veliformis Quadrabilis*, an hemifpherical vault, or cieling of a church, &c. in which four windows are fo contrived, as that the reft of the vault is quadrable, or may be fquared.

The determination of thefe windows was a problem propofed to the great mathematicians of Europe, particularly the cultivators of the new calculus differentialis, in the Acta Eruditorum Lipfiæ, by fig. Viviani, under the fictitious name of A. D. Piollfei pufillo-geometra, which was the anagram of poftremo Galilæi difcipulo.

It was folved by feveral perfons, particularly M. Leibnitz, the very day he faw it: and he gave it in the Leipfic Acts in a variety of ways; as alfo did M. Bernouilli, the marquis de l'Hofpital, Dr. Wallis, and Dr. Gregory.

TESTWOOD, in *Biography*, a finging man in the choir of Windfor, was burnt for his intemperate zeal in the caufe of Proteftantifm, 1544, when Marbeck was likewife condemned, but afterwards pardoned.

TESZERSKEY, in *Geography*, a town of Croatia; 6 miles S.W. of Nevi.

TET, a river of France, which rifes in the Pyrenées, a little above Mont Louis, and runs into the Mediterranean, 7 miles E. of Perpignan.

TETANUS, in *Medicine*, a difeafe confifting in a fpafmodic contraction of feveral of the mufcles of voluntary motion, and more particularly of thofe which fhut the lower jaw: and this being a conftant and prominent fymptom, the affection is commonly known by the name of *locked jaw*. The fpafm of the mufcles is of the *tonic* kind; or that in which the exceffive contraction continues for a confiderable time, without any interval of complete relaxation: in which refpect it is oppofed to *clonic* fpafms, or convulfions, where the contractions and relaxations alternate in rapid fucceffion. (See CONVULSION and SPASM.) The powers of fenfation and of intellect remain unimpaired in tetanus; in which refpect alfo it is contrafted with epilepfy.

Tetanus admits of many varieties and modifications, on which the older nofologifts had founded different fpecies of the difeafe. A rigidity of the mufcles of the lower jaw was denominated *trifmus*. When the mufcles of the back were chiefly affected, the difeafe was termed *opifthotonos*: when thofe of the fore-part of the trunk, with the flexors of the extremities, were the feat of fpafm, it was called *emprofthotonos*. Sometimes, though very rarely, the fpafms are confined to one fide of the body only, bending it ftrongly to that fide; a form of the difeafe which has been named by Sauvages *tetanus lateralis*, and by later writers, the *pleurofthotonos*, or *pleurotonos*. It was only when the fpafm was almoft univerfal, that it was confidered as entitled to the appellation of *tetanus*. Of late years, however, thefe names have very properly been confidered as expreffing only varieties of one and the fame affection, differing merely in feverity, but arifing from the fame caufes, and requiring the fame mode of treatment. Thefe various forms of fpafm often follow one another in fucceffion in the fame cafe, and mark the progrefs of the difeafe through its different ftages. Thus the trifmus, or locked jaw, is only a part or prelude of opifthotonos and tetanus; and though it may prove fatal at this early period, the imperfect form in which the fymptoms of a difeafe, which has been thus arrefted in its courfe, may appear, is by no means fufficient to eftablifh a generic difference in the difeafe itfelf. There appears, however, to be fome foundation for a divifion of cafes, according to their duration, into the acute and the protracted: the former being very little under the controul of medicine, and in almoft every inftance fatal; the latter being milder in its character, and often yielding, if proper means are employed for its fubjugation.

Another ground of diftinction among the different cafes of this formidable diforder, is derived from the nature of the caufes from which they have originated. The moft ufual caufes are certain mechanical injuries to the body, more efpecially fuch as are attended with a puncture or laceration of a nerve: on other occafions, it may be the effect of the fudden application of cold, when the body has been previoufly overheated: and, in a few inftances, it has appeared to arife fpontaneoufly; that is, when it could not be traced to any external exciting caufe whatever. Tetanus arifing from wounds is, in general, flower in its progrefs than that which proceeds from cold; but is attended with more danger to life.

On fome occafions the difeafe comes on fuddenly, and with great violence; but more commonly the attack is gradual. It is often eight or ten days, and fometimes much longer, after the infliction of a wound, before the firft fymptoms of tetanus make their appearance: and this frequently happens when the effects of the injury on the part itfelf appear to have fubfided; when the wound has healed, and no pain or uneafinefs has remained. Thofe cafes in which the difeafe is more flow in its approach, afford the beft opportunity of tracing the natural fucceffion of fymptoms: and the firft uneafy fenfation which is then obferved, is that of a flight ftiffnefs in the back part of the neck and about the fhoulders, which, gradually increafing, impede the rotatory motions of the head, and alfo its flexion forwards: fo that the patient cannot look downwards, or to either fide, without turning his whole body. This uneafy feeling, being chiefly felt on motion, very much refembles what occurs from rheumatifm, but it is accompanied with a fenfe of general laffitude and debility. The rigidity now extends from the back of the neck to the mufcles of the jaw, and of the root of the tongue, fo that both maftication and fwallowing become difficult and painful; and at length impoffible. The attempt at deglutition is attended with convulfive efforts; efpecially when liquids are endeavoured to be fwallowed. So great is the diftrefs which accompanies thefe convulfions, that the patient becomes very reluctant to renew the trials, and refufes all nourifhment; and it fometimes infpires him with even a dread of the fight of water.

As the difeafe advances, another fet of fymptoms appears, bringing

bringing with them a confiderable increafe to the fufferings of the patient. A fudden and violent pain is felt fhooting from the lower extremity of the fternum to the fpine, in the fituation of the diaphragm. Thefe fpafms recur from time to time, at fhort intervals; and at each recurrence, give the fignal for an immediate aggravation of all the other fpafms. The mufcles of the neck and jaw are immediately called into violent action; the head is pulled ftrongly backwards; and the jaw becomes firmly clenched. Thefe periodical acceffions of fpafm become more fevere, and their effects more durable; fo that the head continues to be in a ftate of retraction, and the jaw is permanently clofed, the teeth being fo firmly fet together, as not to admit of the fmalleft opening. Such conftitutes what may be regarded as the firft ftage of the difeafe; which fometimes takes up three or four days. At other times the difeafe eftablifhes itfelf, with its whole train of dreadful fymptoms, in a few hours; in which cafe the danger is imminent; as death generally takes place in from twenty-four to forty-eight hours, and the patient very rarely paffes over the third day.

The continuance of the difeafe, if the patient furvive the immediate attack, is marked by the increafing fpafm of the diaphragm, which now returns every ten or fifteen minutes, and is inftantly fucceeded by a ftronger retraction of the head, and rigidity of the mufcles extending down the back, along the fpine, and affecting even thofe of the lower extremities. Their contractions increafing in force, the body is frequently raifed in the form of a bow, refting upon the head and feet alone: a ftate which is more particularly denominated *opifthotonos*. The countenance, as is obferved by Dr. Chalmers, is pale and contracted; the maftoid, coracohyoid, and fterno-hyoid mufcles, together with the others concerned in deglutition, and the deltoid and pectoral mufcles, are moft violently contracted, fo that the fhoulders are ftrongly raifed forwards, and the arms are ftretched out, or drawn acrofs the body; but the wrifts and fingers feem not to be affected. In a few feconds, a remiffion takes place; the fhoulders and arms recline, and the inferior extremities relax; yet not fo entirely, but that generally fuch a degree of rigidity continues, as to prevent their being bent, even when this is attempted by another perfon. The mufcles on the fides and fore part of the neck continue ftill contracted, although not fo ftrongly; but their action is overcome by the number and ftrength of the pofterior ones; fo that the contraction of the head conftantly remains. The patient breathes quick for fome minutes, as if he had been exceffively exercifed, and the pulfe is fmall, fluttering, and irregular, but both become more calm and flow. The face is fometimes pale in the intervals, but oftener flufhed; and the whole countenance expreffes ftrong appearances of the moft melancholy diftrefs; as well on account of the terror the patient feels at the approaching paroxyfm, as from the torture he has fuffered from the laft, of which the painful contractions he ftill feels perpetually remind him. He, for the moft part, defires to lie ftill as much as poffible, and to avoid all attempts at drinking, fpeaking, or any kind of motion; all of which are apt to occafion a return of the fpafm in all its horrors. Some, indeed, are folicitous to try a change of pofition, in hopes of obtaining one of greater eafe; but the act of turning the patient never fails to bring on an attack of the convulfion, by which the head is drawn back to the fpine: and it is at length found, that the beft means of avoiding this is for him to lie perfectly ftill on the back.

It may, in general, be obferved, that the extenfor mufcles are affected with fpafm before the flexors. In the lower extremities, indeed, both the flexor and extenfor mufcles are commonly at the fame time affected, and keep the limbs rigidly extended. The flexors of the head, and the mufcles that pull down the lower jaw, become affected in the progrefs of the difeafe, together with the abdominal mufcles; fo that the belly is ftrongly retracted, and feels hard, like a piece of board. The fpafm of thefe and the other flexor mufcles, becoming fo powerful as to balance the action of the extenfors, is a circumftance that marks the advance of the difeafe, and may be regarded as conftituting the commencement of a third ftage. In this fituation the body and limbs are perfectly ftraight and rigid, and incapable of being moved in any way; and it is to this condition that the term *tetanus* has been more efpecially applied. It is a ftate of the moft exquifite fuffering: the patient is on the rack from the continual recurrence of the fpafm, which has fcarcely any remiffion. The recti mufcles of the abdomen often contract unequally, producing the appearance of hard balls in particular parts. The whole belly is drawn inwards, and does not yield in the leaft to the defcent of the diaphragm in infpiration. Although the lower extremities are always rigid at this period, yet their action is fo violent during the height of the paroxyfms, that were it not for the ftanders-by, the patient would be projected feet foremoft off the bed; or would, at other times, be pufhed upwards with fuch an impetus, as to ftrike the head with great force againft whatever might happen to be in the way. Occafionally, the flexor mufcles acquire the preponderance over the extenfors, and the trunk of the body is bent forwards, the chin being fixed to the breaft. This is what has been called *emprofthotonos*, and occurs only in the moft violent, and of courfe the leaft frequent form of the difeafe. It would appear from fome cafes reported by Sauvages, that thefe oppofite ftates are difpofed to alternate with one another.

In extreme cafes, there are hardly any of the voluntary mufcles that remain in their natural ftate. The face and eyes are diftorted; the tongue is fuddenly darted out between the teeth, and often miferably lacerated from their clofing at the fame moment. Even the fmall mufcles of the ear partake of the fpafmodic action, which fo univerfally prevails in the fyftem. While the tongue is thruft out, the mufcular flefh, which is fituated between the arch of the lower jaw, and the upper part of the trachea, is drawn upwards within the throat. The countenance is much contracted; a general fweat breaks out; the eyes are watery and languid; and a pale or bloody froth bubbles out from between the lips. Tetanus, in thefe violent forms, is, perhaps, the moft painful difeafe that can affect the human frame. So exquifite a degree of pain would fcarcely be compatible with life, were it not occafionally affuaged by the fhort and imperfect remiffions of fpafm which occur. A more continued and fevere fpafm, or a general convulfion, generally finifhes the tragedy, and releafes the unhappy victim from all his mifery: or, if already too exhaufted by the feverity of pain to admit of this mode of termination, delirium often enfues, protects the patient by a happy infenfibility to further fuffering, and fmooths the avenue to death, which is then preceded by a general relaxation of the fpafms.

Such are the fymptoms which peculiarly belong to tetanus: and it is, perhaps, the moft remarkable circumftance attending the difeafe, that hardly any function is primarily affected, except that of mufcular action. The fenfes and appetites are perfect and entire; the intellectual functions are undifturbed; and the natural functions proceed in their ufual courfe. Fever is neither an effential nor a common attendant on the difeafe. In the firft ftage, when the fpafm is confined to a few mufcles, the pulfe is not affected: it becomes accelerated only when the fpafmodic actions are general,

general, and this merely in confequence, as it would appear, of the mechanical effect produced on the blood-veffels by the contractions of the mufcles, which will hurry on the circulation, and throw the blood upon the heart in larger quantity than ufual, rendering the pulfe contracted, frequent, and irregular. The refpiration is hurried from the fame caufe, and the temperature of the body, as might be expected, is increafed in the fame proportion. That thefe fymptoms are not the effect of fever, appears from the ftate of the blood, which is ftated to be of a loofer texture than natural, and never exhibits the buffy coat, as in inflammatory difeafes. This circumftance is particularly noticed by Dr. Clephane, and alfo by Dr. Chalmers; and the remark has often been verified by fubfequent obfervers. On fome occafions, indeed, when the diforder is very violent, the arterial actions are increafed, and a febrile ftate prevails; and this appears to take place more frequently when the difeafe has originated from cold, than when it has been excited by wounds. The fkin is at firft natural, but, as the difeafe advances, is covered with a cold fweat. The tongue is always moift. Vomiting fometimes takes place early in the complaint, but it commonly fubfides in the progrefs of it: it is even ufual for the appetite of hunger to remain through the whole courfe of the difeafe; and what food can be got down appears to be fufficiently well digefted. Some local effects feem to be attributable to the contractions of the abdominal mufcles. The fphincter of the bladder is occafionally affected with fpafm, fo as to impede the difcharge of urine, which is voided with pain and difficulty: at other times, its fecretion is fuppreffed. When it can be obferved, it is ftated as being high-coloured, and fomewhat turbid. The bowels are found to be, in every inftance, obftinately coftive, a ftate which may partly be accounted for by the effect of opiates, which are fo generally adminiftered for the cure: but which, independently of this caufe, appears to be inherent in the difeafe itfelf. The bowels require the moft draftic purgatives; and there is a great fenfe of uneafinefs about the precordia. In the latter ftages of this diforder, indeed, when the powers of life begin to decline from the vaft expenditure of energy occafioned by the violent mufcular actions, every function in the fyftem partakes of the general diforder; the intellect gives way, and the patient finks from exhauftion alone, if a general convulfion does not occur to haften his end. It is mentioned by Dr. Cullen, that, in feveral cafes, a miliary eruption has appeared upon the fkin; but he expreffes a doubt whether this was a fymptom of the difeafe, or the effect of a certain treatment of it. It has not been obferved, he adds, to denote either fafety or danger, or to have any effect in changing the courfe of the diftemper.

From the more violent forms of the difeafe, hardly any inftance of recovery has been known to take place. On the other hand, the mere protraction of the fymptoms is an indication of the comparative mildnefs of the difeafe. Few patients fall a facrifice after the ninth or tenth days, which period they never could have attained, unlefs the violence of the complaint had in a great meafure fubfided. In this milder form, however, it may be prolonged feveral weeks; and fometimes the fpafmodic difpofition remains, even for months, before health is completely reftored. The pulfe, in thefe cafes, continues flow and hard, and the belly bound: but if blood b drawn, it does not exhibit any difference from its ufual ftate. Under every circumftance of recovery, indeed, the convalefcent labours long under general debility, and cannot, for months, raife himfelf from a fupine or recumbent pofture without affiftance, nor without pain.

Occafional deviations from the courfe above defcribed are met with in different cafes; but they are not of fufficient importance to lay the foundation of any diftinct variety. The moft fingular of thefe anomalies is the one recorded by Dr. (now fir Gilbert) Blane, of a cafe in which tetanus prevailed to a very confiderable extent, without affecting the patient with the leaft degree of pain. The fpafms were, in this inftance, accompanied with a tingling fenfation, which was even rather agreeable than diftreffing. The cafe, however, terminated fatally: but to the laft, no pain was experienced. In two cafes mentioned by the fame author, the fpafms affected only the fide of the body in which the wound was fituated.

The refult of diffections of patients who have died of tetanus, has thrown no light whatever on the nature of this terrible affection. Sometimes there are found flight effufions within the cranium: but, in general, no morbid appearance whatever can be detected in the head. There appears to be always more or lefs of an inflammatory appearance in the villous coat about the œfophagus and ftomach in the neighbourhood of the cardia. But thofe who are converfant with diffections, muft be well aware that thefe appearances are common to a great number of difeafes, and are uniformly met with in every cafe of rapid or violent death. Befides the rednefs and increafed vafcularity of thefe parts, M. Larrey ftates that he found the pharynx and œfophagus much contracted, and covered with a vifcid reddifh mucus. Dr. M'Arthur found, in feveral cafes, the inteftines much inflamed; and in two of them a yellow waxy fluid, of a peculiar offenfive fmell, covering their internal furface: but whether the inflammation was primary, or only a confequence of the preffure of the abdominal mufcles, which contract fo violently in this difeafe, he is unable to decide. See Medico-Chirurgical Tranfactions, vol. vii. p. 475.

Tetanus is a difeafe much more prevalent in hot than in cold climates. It is comparatively a rare difeafe in this ifland; but even here, the effect of warmth in giving a predifpofition to it is fufficiently obfervable. It is more common in the fouth than in the north of England, and is much more feldom met with in Scotland than in England. It is fenfibly more frequent in warm than in cold feafons. In warm, and efpecially in tropical climates, it may be regarded as an endemic difeafe, appearing at all feafons, but efpecially during the prevalence of the greateft heats. Warmth operates by increafing the mobility of the fyftem, while at the fame time it tends to diminifh the pofitive ftrength of the fibre. The fenfibility to all impreffions is greater in hot climates, while the power of refifting the caufes of injury is leffened: hence the greater predifpofition to fpafmodic difeafes in general. The natives of hot climates do not enjoy a greater exemption from tetanus than European fettlers. Negro flaves are peculiarly liable to its attacks. It affects all ages, fexes, conftitutions, and complexions: but, *cæteris paribus*, is more apt to feize upon thofe in whom the largeft fhare of vital power has been beftowed upon the mufcles of voluntary motion. Hence it attacks more readily the robuft, and thofe who are accuftomed to much bodily labour. Partly on this account, and partly from their being more expofed to the occafional caufes of the difeafe, men are much more frequently the fubjects of tetanus than women.

In the torrid zone, the moft frequent exciting caufe of tetanus is the application of cold when the body is heated. It is often induced by the alternate expofure to the fcorching heat of the fun, and to the heavy fhowers which frequently occur in tropical regions, and produce great and fudden viciffitudes of temperature. Sleeping out of doors after a hot day, efpecially on damp ground, or in a fituation where a ftream of cool air is admitted to the body, is often followed by tetanus in hot climates. Dr. Chalmers relates that a young man chofe to cut off his hair and fhave his head on a

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warm day in March, and went to bed without a cap: but the weather changing and becoming cold in the night, he was feized with tetanus, and the next morning was found rigid with the difeafe. The imprudent ufe of the cold bath, or even a draught of cold water, when the body has been warm by exercife, has frequently brought on tetanus.

In temperate climates, on the other hand, the difeafe feldom arifes from the application of cold; although there is one well-attefted inftance mentioned by Dr. Gregory in his lectures, of its occurring from this caufe in Scotland: but it is more frequently the confequence of lacerated or punctured wounds, and is particularly incident to injuries of nerves, and of tendinous parts. It fometimes follows the amputation of a limb; and it would appear that wounds of the joints, particularly thofe of the hands or feet, are more peculiarly liable to produce tetanus. In warm countries, the flighteft cut or bruife is in danger of being fucceeded by this formidable malady. Hence few of thofe that are wounded in battle recover: and few furvive any confiderable operation. It has been fuppofed by many, that tetanus arofe from the partial divifion of fome nervous fibres, in confequence of which the undivided filaments were unequally and violently ftretched: a ftate which would be remedied by their complete divifion. Experience, however, the ftubborn enemy to fo many hypothefes, has by no means proved favourable to this opinion. It has alfo been ftated to be more frequently the refult of wounds, which remain in a ftate of great irritability, without proceeding to fuppuration; it does not, however, appear that this pofition is fupported on any extenfive obfervation. It very often happens, indeed, that tetanus fhews itfelf when the wound was almoft healed, and the dreffings have been laid afide.

In the late campaigns of our armies in the peninfula of Spain and Portugal, according to the report of fir James Macgrigor, tetanus occurred in every defcription, and in every ftage of wounds, from the flighteft to the moft formidable, from the healthy and the floughing, from the incifed and lacerated, from the moft fimple and moft complicated. It occurred at uncertain periods; but it was remarked, that if it did not commence before twenty-two days from the date of the wound, the patient was fafe. It terminated in the fecond, third, and fourth days, and even as late as the feventeenth and twentieth days, though ufually it was not protracted beyond the eighth. The moft rapidly fatal cafe that has ever been recorded, is one that we have on the authority of the late profeffor Robifon of Edinburgh. It occurred in a negro, who was a waiter at a tavern, and who happened to fcratch his thumb with the broken edge of a china plate, and who died of tetanus a quarter of an hour after this apparently flight accident.

As the acute form of traumatic tetanus, obferves Dr. Dickfon, is fo uniformly fatal, it is of the greateft confequence to attend to whatever may affift in detecting the difeafe early, or in warding it off. Richerand ftates, that in wounds threatening convulfions and tetanus, a perfevering extenfion of the limbs during fleep often manifefts itfelf before any affection of the lower jaw; and we fhould naturally pay more attention to any admonition of this kind in punctured or extenfive lacerated wounds, particularly of tendinous or ligamentous parts, efpecially in injuries of the feet, hands, knee-joint, back, &c. in which the difeafe moft frequently fupervenes. Some prelufive indications of danger may often be derived from the increafe of pain, irritation, and reftleffnefs, nervous twitchings, pain and difficulty in deglutition, or in turning the head; fpafms, or partial rigidity of fome of the voluntary mufcles; pain at the fcrobiculus cordis; a fuppreffed or vitiated ftate of the difcharge, &c. which mark the flower approaches of the difeafe. M. Larrey adduces feveral inftances of tetanus, in which the wound was either dry, or afforded only a fcanty ferous exudation, and where the fymptoms were relieved on fuppuration being re-eftablifhed; and Dr. Reid, in the Edinburgh Medical and Surgical Journal for July 1815, remarks, that on removing the dreffing, inftead of healthy pus, the furface of the wound was coverd with a darkifh unhealthy looking matter, which he had in two former inftances noticed as the forerunner of tetanus. A torpor of the inteftines has generally been obferved to precede as well as to accompany the difeafe. Mr. Abernethy obferves, that in four cafes where he inquired into the ftate of the bowels, the evacuations were not like fæces; and he propofes as a queftion in inveftigating the caufe, what is the ftate of the bowels between the infliction of the injury and the appearance of this dreadful malady? Dr. Parry has adduced the velocity of the circulation as an ufeful criterion of the danger of the difeafe; and obferves, that if the pulfe be not above 100 or 110, by the fourth or fifth day the patient almoft always recovers; but if it be quickened early, that it proves fatal; and yet there are a few inftances of recovery where the pulfe has rifen to 120 on the firft day. M. Larrey remarks, that when the perfpiration, which fo often attends the difeafe, is fymptomatic, it begins upon the head and extremities; and when it is critical, it occurs over the cheft and abdomen: but in many cafes, perfpiration flows very freely without bringing relief.

We have already ftated, that in fome inftances the fource of irritation producing the difeafe is not obvious. Such cafes of fpontaneous tetanus are very rare. Dr. Willan, in his Reports, p. 289, mentions having met with an inftance in a female, 32 years of age, where there had not been any previous accident or local injury whatever; and where the only circumftance, which was likely to have contributed to its production, was fevere diftrefs of mind, occurring in a frame previoufly debilitated.

When we reflect upon the obfcurity which involves both the *ratio fymptomatum* and the proximate caufe of tetanic affections, we need not wonder that the practice in thefe diforders fhould ftill be entirely empirical. The indication of cure which is generally applicable in all difeafes, namely, the removal of the exciting caufes, has but little place in a morbid condition, which is the confequence of caufes that in general have ceafed to act, or which it is not in our power either to remove or controul. In thofe cafes where we could fuppofe local irritation to be ftill operating, the moft effectual method of counteracting its effects on the fyftem, would obvioufly be to intercept all communication between the feat of the irritation and the fenforium. If, however, the difeafe has already eftablifhed itfelf, and the fevere fymptoms have come on, it does not appear that this would fucceed in arrefting the courfe of the diforder. Experience has but too fully fhewn, that the amputation of the limb from the injury of which the tetanus had arifen, will very feldom procure even a mitigation of the fymptoms, if performed after a certain period from their firft appearance. This plan was fully tried in our army at Touloufe, and totally failed. In fome inftances, however, it is faid that a favourable change has enfued, and that patients have even recovered by the facrifice of the wounded limb: and it has been remarked, that the fpafms relaxed immediately on the divifion of the foft parts by the knife, and before the faw was applied to the bone, in order to complete the operation. It is, therefore, highly probable, that the free divifion of the parts above the wound, or ftill more certainly the amputation of the limb, would, at a certain ftage of the affection,

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fecure the patient from the approach of tetanus. But the difficulty is here to eftimate the probability of the patient's having the difeafe, as nothing fhort of the certainty of its being at hand, could well juftify the operation.

As it is matter of experience that an early and highly irritable and painful condition of the wound has a tendency to excite tetanus, as well as a ftate in which the difcharge is of a peculiar unhealthy character, or is fuppreffed altogether, our immediate objects fhould be to allay as much as poffible the local irritation, and to re-eftablifh a healthy fecretion of pus. Mechanical caufes of irritation fhould as much as poffible be obviated, by early attention to remove fplinters of bone, balls, or other foreign bodies, that may be lodged in the wound. Poultices and foothing applications will anfwer the double purpofe of quieting local inflammation, and bringing on healthy fuppuration. The irritability of the furface may fometimes be moft effectually deftroyed by lunar cauftic, after which, an emollient poultice may be applied. An oppofite plan of treatment has been recommended by Dr. Rufh, namely, that of exciting confiderable inflammation in the wounded part, by epithems of turpentine, and other highly ftimulating applications; which, though it may in certain cafes have fucceeded in preventing tetanus, does not appear to be generally applicable, and feems accordingly to have been abandoned. On the contrary, it has of late been the univerfal practice in the navy, to add tincture of opium to the dreffings applied to wounds, with a view of preventing tetanus. With the intention of re-exciting fuppuration where there is no difcharge, M. Larrey recommends the application of blifters as near as poffible to the wound, and adduces inftances of fuccefs from this mode of treatment.

But the cure of tetanus, when once it has commenced, is to be fought for more by the ufe of general, than of topical remedies. The feat of the diforder has been transferred to the brain and nervous fyftem, and our efforts muft be directed to allay their inordinate actions. The plan from which theory would lead us to expect moft fuccefs, is that of exciting fome new action in thefe organs, by which their energies would be directed into fome different channel, and the exifting morbid action would be fufpended and fuperfeded. The remedies which exert the moft powerful immediate effects in the nervous fyftem, are accordingly found to be the moft efficacious in the cure of tetanus. Opium, wine, and other highly diffufible ftimuli, digitalis and other narcotics, the fudden affufion of cold water, bleeding, purging, impregnating the fyftem with mercury, the exhibition of arfenic, of oil of turpentine, of alkalies, and of ipecacuanha, have refpectively been reforted to, and with very various, and in general but limited fuccefs. The fame methods from which cures have been obtained in the milder cafes, generally fail to make the leaft impreffion on the difeafe in its feverer forms. We learn from the valuable report of fir James Macgrigor, already alluded to, that there were very few, out of feveral hundred cafes that occurred in the Britifh armies during the late campaigns on the Peninfula, where this difeafe had made any progrefs, in which it terminated fuccefsfully, or in which remedies, however varied, feemed to have any beneficial influence.

Opium is the remedy on which reliance has moft generally been placed in combating this formidable difeafe; and there is no doubt that in mild cafes it is competent to its complete folution. But for this purpofe, it is abfolutely neceffary that its ufe be begun from the earlieft appearance of the fymptoms; that it be given in very large dofes; and that the dofes be repeated at fhort intervals: fo that the fyftem be kept conftantly under the influence of the remedy. It is, indeed, aftonifhing how the fyftem, when poffeffed by a ftrong difpofition to fpafm, will refift the operation of this and other remedies, which in its ordinary ftate would have been more than fufficient to overpower and deftroy it. Patients labouring under tetanus will bear with impunity quantities of opium, that at any other time would have been certainly fatal. Inftances are upon record of five, ten, and even twenty grains, being taken every two or three hours for many days, without its producing any extraordinary narcotic effects upon the fenforium. It is always, however, advifeable to begin with comparatively moderate dofes, fuch as forty or fixty drops of tincture of opium, which may be repeated at intervals of three or four hours, and increafed at each repetition, till fome fenfible effect is produced on the fpafms. It feems requifite to augment the dofe rapidly, as the difeafe preffes upon us every hour, and no time is to be loft in refifting its advances, while there is yet a chance of controuling its fury. The circumftance of the clofing of the jaw, and the difficulty of deglutition, the increafe of which may foon render it hardly poffible to introduce medicines into the ftomach, is an additional motive urging us to pufh our remedies before thofe obftacles arife. Glyfters are our only refource, when it is impoffible to overcome the fpafm of the fauces. Opium has alfo been applied externally and topically to the jaws; and relief has fometimes been obtained from an opiate plafter on the maffeter mufcles, or behind the ears; but thefe are comparatively very trifling in their efficacy, and applicable only to the flighteft cafes, or to thofe in which convalefcents are ftill affected with a recurrence of one or two local fymptoms.

It is of the greateft importance in all cafes of tetanus, and more efpecially where opium is given, to excite a proper action of the bowels, fo as to allow of no ftagnation of their contents. The teftimony of the army phyficians, as appears from the report of fir James Macgrigor, is highly in favour of a rigid perfeverance in the ufe of purgatives, given in dofes to produce a full effect daily. Dr. Forbes ftates, that a folution of fulphate of magnefia, in infufion of fenna, was found to anfwer better than any other purgative, and it was daily given in a fufficient quantity to procure a copious evacuation, which was always dark-coloured, and highly offenfive: and to this practice he chiefly attributes, in one fevere cafe, the removal of the difeafe. The infrequency of locked jaw in the Weft Indies, in the public fervice, of late years, is chiefly afcribed by Dr. Dickfon, to the greater freedom with which purgatives have been employed, particularly fince the publication of Dr. Hamilton's work on the operation of this clafs of remedies; an opinion which is corroborated by the teftimony of various authors, as to the ftate of obftinate coftivenefs which prevails in this difeafe, and the offenfive nature of the contents of the inteftines.

For the introduction of the ftimulant and tonic plan of treatment, we are chiefly indebted to Dr. Rufh, who was led to adopt it from fome theoretical views he entertained on the nature of tetanus, which he conceived to be effentially a difeafe of debility. There can be no doubt that in many cafes the exhibition of wine or fpirits has been attended with very good effects. Dr. Hoffack, in vol. iii. of the American Medical Repofitory, relates feveral cafes which were cured by large quantities of wine.

A free allowance of wine and porter after gun-fhot wounds has appeared alfo, according to the ftatement of Dr. M'Arthur, to have contributed to the very fmall number of cafes of tetanus which occurred under his care in the hofpital at Barbadoes, during nearly fix years of the moft active period of the war. Of the numerous cafes of gun-fhot wounds received into the hofpital, and of operations performed, during the whole

whole of that period, only two inftances of tetanus occurred. Bark has been given in conjunction with wine and opium; and the muriated tincture of iron has alfo been ufed with apparent advantage. The fuccefs of the tonic plan of treatment refts alfo on the teftimonies of Dr. Wright of Jamaica, Dr. Cochrane of Nevis, and feveral other Weft Indian practitioners; and alfo on that of Dr. Currie of Liverpool.

The prefence of an inflammatory diathefis, which occafionally accompanies the fpafmodic ftate, prefents, however, a material obftacle to the employment of the above-mentioned remedies. So much is this the cafe, that many phyficians have recommended the free ufe of the lancet, particularly in the early ftages of tetanus. Dr. Dickfon ftates it as his opinion, that in a full habit, where the wound is fwelled, inflamed, and painful, venefection, with free purging, and fuch other means as are calculated to allay the general and local irritation, afford the faireft chance of averting the danger. (See the 7th volume of the Medico-Chirurgical Tranfactions, part 2.) In the 6th volume of the fame work, a cafe is detailed by Mr. Earle, in which, though it terminated fatally, bleeding was beneficial, and leffened the patient's fufferings; and in the fame volume, it is alfo mentioned with approbation by the medical officers in the Peninfula. Dr. M'Arthur confiders that he ufed blood-letting with evident relief in one cafe, in the naval hofpital at Barbadoes; that the fpafms were ameliorated, the difeafe protracted, and the morbid appearances after death were lefs marked in confequence. M. Larrey alfo adduces fome examples where it produced a good effect. Mr. Guthrie gives three cafes which occurred in the hofpitals of St. Andero, out of many which were recorded, where venefection was the principal remedy. In the firft, in which tetanus from a wound in the hand was advancing with rapidity, the patient was bled *ad deliquium* feveral times with good effect, calomel and diaphoretics being given at the fame time, and he recovered. In the fecond cafe, the patient was bled in the fame manner, with an evident amendment of the fymptoms; fo much fo, indeed, that he fuffered but little from fpafm, and could open his mouth very well, when he was feized with diarrhœa, which, in the debilitated ftate he was in, carried him off. In the third cafe, of a man of a fanguine temperament, and fuffering from acute tetanus, venefection pufhed to the utmoft totally failed.

Digitalis has been tried in the Peninfula in feveral cafes, occafionally with good effect, though it never appears to have effected a cure. Ether, camphor, mufk, and other antifpafmodics, as likewife the alkalies, were alfo tried, and found equally unfuccefsful. Caftor is ftrongly recommended by Aratæus, but is too feeble a remedy to have any decifive influence in fo violent a diforder.

The affufion of cold water has in general been attended with great benefit. It is a practice particularly recommended by Dr. Wright, in the London Medical Obfervations, and is fanctioned by the concurring teftimonies of Dr. Cochrane, in the Medical Commentaries, and of Dr. Currie, in his Medical Reports, &c. as well as by many other practitioners. A large pailful of cold water fhould be thrown upon the patient every two or three hours; he is to be immediately wiped dry, and laid in bed after each affufion, and an opiate draught adminiftered. Some remiffion of the fpafms will in this way be generally obtained; and many inftances are upon record, of complete cures being effected by perfeverance in this plan. Before the introduction of this practice, the warm bath was very commonly employed; the patient, after ufing it, being placed in bed, without being dried, between two blankets, with a view to bring out a fweat. It does not appear, however, that this plan was attended with any general or permanent advantage; and is certainly inferior in efficacy to the cold affufion. The cold bath, fays fir James Macgrigor, in acute tetanus, is worfe than ufelefs. The ufe of a hot bath impregnated with potafs, and a few ounces of quick-lime, has been much recommended by Dr. Stutz of Suabia in traumatic tetanus. See Medical and Phyfical Journal, vol. iii.

The powerful relaxing effects of tobacco given in glyfter in cafes of hernia and enteritis, have fuggefted its employment in tetanus. Mr. Earle tried it in one very acute cafe, in which, although it afforded a temporary alleviation from fpafm, fo much agitation was produced by it, that it was not perfevered in. He is, however, induced to recommend the trial of a fuppofitory made of the extract of nicotiana, and paffed up into the rectum. But, according to the report of fir James Macgrigor, tobacco glyfters, tried in the advanced ftage of the difeafe, feemed to have no effect. He reprefents, however, the tobacco fume as deferving of further trial. A remarkable cafe is recorded by Dr. Phillips, in the 6th volume of the Medico-Chirurgical Tranfactions, in which the jaw fuddenly fell, upon the exhibition of an enema with oil of turpentine.

It has been fuppofed that mercury thrown quickly into the fyftem, fo as to excite falivation, would prove highly ferviceable in relieving the fpafms, and particularly thofe of the mufcles of the jaw. This practice was firft introduced by the practitioners in the Weft Indies, and in particular by Drs. D. and A. Monro, and appears to have fucceeded in many cafes. Dr. Rufh conceives that its falutary effect is connected with its inducing in the fyftem a ftate of inflammatory diathefis incompatible with the fpafmodic action, which it would therefore fuperfede. Whatever benefit, however, may have been experienced from this plan in mild cafes, it completely fails in the more fevere of making any impreffion on the difeafe. Dr. Emery, Mr. Guthrie, and other medical officers attached to our army in the Peninfula, after the battle of Salamanca, tried inunction of the whole body three times a day, with ftrong mercurial ointment, in unlimited quantity, with no degree of fuccefs. Mr. Guthrie reports, that after the battle of Touloufe, a fatal cafe occurred in a man ftrongly under the influence of mercury, which he had ufed previous to the action for the cure of the itch. The combination of calomel with ipecacuanha, which has been much recommended, is equally inefficacious with the other remedies, in the acute and fully formed difeafe. In the mild tetanus, benefit has been derived from calomel: and its operation on the bowels is always ufeful, and fingularly fo in the mild difeafe diftinguifhed by the fpafms coming on flowly, and continuing of the fame violence; inftead of their fudden acceffion, and their continuing with increafing violence, as happens in the acute fully formed tetanus. In this, calomel cannot be depended upon, as the patient is carried off before the medicine can have any effect.

Several remedies were formerly in vogue, of which it is hardly neceffary to give any account, as they have now loft all the credit they once enjoyed. It may be fufficient to mention the Barbadoes tar, alluded to by Dr. Cullen; the colchicum autumnale, or meadow faffron, recommended by Dufrefnoy; bliftering, electricity, unctuous applications, partial fomentations, &c. moft of which appear either to be inert, or at beft very weak auxiliaries to the remedies already defcribed.

Of late years, tetanus has been much lefs frequent in the Weft Indies, when compared with former wars. This is attributed, apparently with great reafon, by Dr. Dickfon, to the improvements in the medical and furgical treatment of wounds; to greater cleanlinefs, and more perfect ventilation; and in general to fuperior comforts, diet, and accom-

 modation;

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modation; but particularly to the greater attention paid to the ftate of the bowels. See Medico-Chirurgical Tranfactions, vol. vii.

TETARBOLION, in *Ancient Coinage*, the quarter-obolus, which is the moft minute coin yet found, being of $2\frac{1}{4}$ grains, and its current worth a farthing and a half.

TETARIUM, in *Ancient Geography*, a town of Afia, fituated in that part of Lycaonia, which Ptolemy comprehends in Galatia.

TETARTEMORION, among the *Ancients*, denotes the fourth part of the zodiac.

TETARTO-CHRUSOS, τεταρτο-χρυσος, in *Ancient Coinage*, a gold coin of Philip, Alexander, and Lyfimachus, which was a quarter of the Philippus or χρυσος; it weighs 33 grains, and paffed for 5 drachmæ of filver, 3*s.* 9*d.*, now worth intrinfically 5*s.*

TETAVI, in *Geography*, a town of the principality of Georgia, in the province of Caket.

TETBURY, or Tedbury, anciently *Teteberie*, a large and refpectable market-town in the hundred of Longtree, and county of Gloucefter, England, is fituated 20 miles S. by E. from Gloucefter, and 99 miles W. by N. from London. Its name evidently determines it to have been a military ftation. On the S.E. fide, within the memory of many living, were traces of a ftrong camp, now completely deftroyed, where arrows and javelin-heads have been found, with various Englifh coins of high antiquity. Roman coins of the Lower Empire have likewife been met with in and near the town. Tetbury confifts principally of four ftreets, croffing in the centre, and contains many good ftone buildings. The governing officer is a bailiff, who is annually chofen. The population of the parifh, including four hamlets, in the year 1811, was 2533, the number of houfes 522. A weekly market is held on Wednefday, and four fairs annually. The wool-combing and wool-ftapling branches are carried on here, but to no great extent. The clothing manufacture was formerly attempted, but the want of a continual fupply of water prevented its being brought to perfection. Even for domeftic ufes, water has, till within a few years, been fcarce; but in 1749, a well was funk to the depth of 104 feet, fince which time other wells have been opened, and the inconvenience in a great degree removed. The parifh church confifts of an ancient tower, and a modern body; the former is terminated by a fpire, the latter is built in imitation of the pointed ftyle, appearing externally as a fingle nave with cloifters, but withinfide divided into aifles, by a very flight arcade and cluftered columns, on the principle on which the roof of the theatre at Oxford was conftructed. The old church, which was built foon after the Conqueft, having become from length of time very ruinous, was taken down (excepting the tower and fpire), and rebuilt at the expence of 5000*l.*; and opened for divine fervice in 1784. Two turnpike roads lead through the town in crofs directions; one to London and Bath, the other to Gloucefter and Southampton. A deep hollow, in the nature of a moat, at the weft end, made the entrance into the town inconvenient, till the commiffioners of the roads built a high bridge of four arches acrofs it in 1775. Rudge's Hiftory of Gloucefterfhire, vol. i. 1803. Beauties of England and Wales, vol. v. Gloucefterfhire; by J. Britton and E. W. Brayley, 1803.

TETCHA, a fmall river of Ruffia, which runs into the Ifet, near Dolmatov, in the province of Ekaterinburg.

TE-TCHUEN, a town of Corea; 60 miles E.N.E. of Han-tcheou.

TETE, a fort belonging to the Portuguefe, in the country of Mocaranga, on the Zambefe.

Tete *de Buch, La*, a town of France, in the department of the Gironde, fituated on the S. fide of a large bay, called "The Harbour of Arcachon," the entrance of which is dangerous on account of the fand-banks; 30 miles S.W. of Bourdeaux.

TETEROA, a harbour on the W. coaft of the ifland of Ulietea.

TETEROW, a town of the duchy of Mecklenburg; 18 miles S.W. of Guftro.

TETERSKOI, a town of Ruffia, on the Podkamenfkaia Tungufka. N. lat. 59° 54′. E. long 101° 14′.

TETHALASSOMENOS, a term ufed by the old medical writers, to exprefs wine mixed with fea-water.

TETHER. See Tedder.

TETHERING, the practice of confining animals to a certain range of feeding, by means of ropes, chains, or other contrivances.

TETHRONIUM, in *Ancient Geography*, a town of Greece, in the Phocide; being one of thofe which Herodotus refers to the vicinity of the river Cephifus.

TETHUROA, in *Geography*, a fmall ifland in the South Pacific ocean, fubject to Otaheite, compofed of fix or feven low iflets near each other, not many feet above the level of the fea; abounding in cocoa-nut trees, but not in bread-fruit, which the inhabitants are not allowed to cultivate. The inhabitants are about 3000, chiefly employed in catching of fifh, which they bring to Otaheite, and exchange for bread-fruit; 24 miles N.W. of Point Venus. S. lat. 17° 4′. W. long. 149° 30′.

TETHYS, in *Mythology*, the daughter of Cœlum and Terra, and wife of Oceanus. Her chariot, which is reprefented as gliding over the furface of the waters, was a fhell of an extraordinary figure, and whiter than ivory.

Tethys, in *Zoology*, a genus of the Mollufca order of Vermes, or worms; the characters of which are, that the body is free, fomewhat oblong, flefhy, and having no peduncles; the mouth terminating in a cylindric probofcis, under the lip; and two foramina on the left fide of the neck. It has two fpecies.

Leporius. With a ciliated lip; found in the Mediterranean fea.

Fimbrica. With a crenulated lip; found in the Adriatic fea.

TETIMIXIRA, in *Ichthyology*, the name of an American fifh, more ufually known by the name of the *pudiano*.

TETIN, in *Geography*, a town of Bohemia, in the circle of Beraun; 3 miles S. of Beraun.

TETITLAN, a town of Mexico, in the province of Xalifco; 18 miles S.E. of Compoftello.

TETIUS, in *Ancient Geography*, a river of the ifle of Cyprus, which ran from the N.W. to the S.E. and difcharged itfelf into the fea, near the promontory of Dades, after having watered Citium.

TETIUSCHI, in *Geography*, a town of Ruffia, in the government of Kazan, on the Volga; 52 miles S. of Kazan.

TETOBE, a town of the ftate of Georgia; 5 miles W. of Tugeloo.

TETRACERA, in *Botany*, received that name from Linnæus, in allufion to the four horn-like points of the capfules of the original fpecies, the word being compounded of τετρας, *four-fold*, and κερας, *a horn*. The genus however has fubfequently received an acceffion of feveral fpecies with folitary capfules and ftyles, which invalidate the ftrict propriety of its name, and render its fituation in the artificial fyftem of Linnæus ambiguous.—Linn. Gen. 275. Schreb. 369. Willd. Sp. Pl. v. 2. 1240. Mart. Mill. Dict. v. 4. Juff. 339. Lamarck Illuftr. t. 485. Gærtn. t. 69. (Delima; Linn. Gen.

Gen. 271. Schreb. 359. Juff. 339. Lamarck Illuftr. t. 475. Gærtn. t. 106. Rhinium; Schreb. 701. Tigarea; Aubl. Guian. 917. Juff. 339. Lamarck Illuftr. t. 826. Euryandra; Forft. Gen. t. 41. Schreb. 367. Juff. 280. See EURYANDRA.)—Clafs and order, *Polyandria Tetragynia*, Linn. Willd. Rather *Icofandria Monogynia*; or *Pentagynia*, according to the principles laid down in Sm. Introd. to Bot. ed. 3. 325. Nat. Ord. *Senticofæ*, Linn. *Rofaceæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in five or fix deep, rounded, unequal fegments, permanent. *Cor.* Petals from three to five, roundifh, concave, inferted into the calyx, and longer than its fegments. *Stam.* Filaments numerous, inferted into the calyx, fhorter than the petals; anthers of two round lobes. *Pift.* Germens fuperior, from one to three or four, ovate, quite diftinct; ftyles vertical, awl-fhaped; ftigmas obtufe. *Peric.* Capfules from one to three or four, ovate, divaricated, each of one valve, burfting along the upper edge, of one cell. *Seeds* folitary, roundifh, attached to the bottom of the capfule, and clothed with a jagged tunic from the bafe.

Eff. Ch. Calyx in five or fix deep unequal fegments. Petals four or five. Capfules burfting at their upper edge. Seeds folitary, tunicated.

Obf. The capfules refemble follicles, but the feed is attached to their bafe.

Section 1. *Flowers with a folitary germen and ftyle.*

1. T. *farmentofa.* Trailing Tetracera. "Vahl Symb. v. 3. 70." Willd. n. 1. (Delima farmentofa; Linn. Sp. Pl. 736. Burm. Ind. 122. t. 37. f. 1. Piripu; Rheede Hort. Malab. v. 7. 101. t. 54. Frutex indicus farmentofus, foliis hifpidis rigidis, &c.; Burm. Zeyl. 101.)—Leaves elliptic-oblong, ferrated, rough. Style folitary. Follicle ovate, polifhed, briftly.—Native of Ceylon.—The *ftem* is fhrubby, with trailing, round, leafy *branches*, rough with minute briftly hairs. *Leaves* alternate, ftalked, very rough on the upper fide with minute fcales, furnifhed with one rib, and many ftraight, parallel, tranfverfe, oblique veins, which latter are hairy beneath. *Panicles* terminal, compound, many-flowered, hairy. *Calyx* of the fruit reflexed, reddifh, fringed. *Follicle* pointed, the fize of a fmall pea, brown, highly polifhed, clothed with erect briftly hairs. *Seed* black, ftanding on a toothed cup-like tunic.

2. T. *tomentofa.* Downy Tetracera. Willd. n. 2. (Tigarea dentata; Aubl. Guian. 920. t. 351.)—Leaves elliptical, pointed, with tooth-like ferratures; fmooth above; downy beneath. Flowers dioecious. Style folitary.—Native of woods in Cayenne, flowering in January, and ripening its feed in March. The trailing fhrubby branched *ftem* climbs to the tops of the higheft trees, from whence its pendulous *branches* reach almoft to the ground. The young *fhoots* are downy. *Leaves* alternate, ftalked, four or five inches long, and two or more in breadth; their upper furface fmooth and green; the under filky and hoary. The *flowers* and *fruit* agree with the following.

3. T. *afpera.* Harfh Tetracera. Willd. n. 3. (Tigarea afpera; Aubl. Guian. 918. t. 350.)—Leaves roundifh, fomewhat undulated, rough. Flowers dioecious. Style folitary.—Frequent in the woods of Cayenne, bearing flowers and fruit in January. Aublet fays it is fometimes fo abundant as to render the forefts impaffable, from the entanglement of its *ftems* and *branches*, which climb to the tops of trees, and hang from thence to the ground. Their roughnefs, like that of the *leaves*, renders them the more troublefome and dangerous. The French call this fhrub *Liane rouge*, or red climber, from the colour of its decoction, which the natives of the country confider as a remedy for venereal diforders. The *leaves* are alternate, ftalked, of a broad elliptical, or roundifh, figure, obtufe, flightly wavy at the margin, rough on both fides with rigid, crooked, hoary hairs. Their ribs and veins like thofe of the firft fpecies. The largeft *leaves* are three inches and a half long, and three broad. *Flowers* in axillary panicles, male on one plant, female on another. *Calyx* in four or five concave, pointed fegments. *Petals* four or five, white. *Stamens* numerous, fhort. *Anthers* yellow, their two lobes feparated by a furrow. *Piftil* abortive in the male flowers, as the *ftamens* are without *anthers* in the female, whofe *germen* is roundifh, with one *ftyle*, and a broad blunt *ftigma*. *Capfule* folitary, reddifh, rough to the touch, containing one feed. *Aublet.*

4. T. *nitida.* Polifhed Tetracera. "Vahl Symb. v. 3. 70." Willd. n. 8.—"Leaves lanceolate-oblong, rough, entire. Style folitary."—Suppofed to be a native of Trinidad. *Willd.*

Willdenow has four more fpecies in this fection, of which his *T. Doliocarpus*, *ftricta*, and *Calinea*, will be found under our article DOLIOCARPUS; and his *T. obovata* is our MAPPIA.

Sect. 2. *Flowers with three or four germens and ftyles.*

5. T. *Euryandra.* New-Caledonian Tetracera. "Vahl Symb. v. 3. 71." Willd. n. 9. (Euryandra fcandens; Forft. Prod. 41.)—Leaves oblong, obtufe, fmooth, entire. Styles three.—Native of New Caledonia. *Stem* fhrubby, climbing. *Leaves* ftalked, two inches or more in length; paler beneath.

6. T. *volubilis.* Serrated Rough Tetracera. Linn. Sp. Pl. 751. Hort. Cliff. 214. Willd. n. 10. (Arbor americana convolvulacea, Broad leaf, *i. e.* platyphyllos barbadenfibus dicta, foliis ferratis; Pluk. Phyt. t. 146. f. 1.)—Leaves obovate-oblong, ferrated, very harfh. Styles four. Calyx filky within.—Native of the Weft Indies. The *branches* are round, with a rough, dotted, membranous, deciduous bark. *Leaves* alternate, ftalked, five or fix inches long, and two and a half or three wide, obtufe, very rough, like a file, with minute fcales, efpecially beneath; each lateral rib, at leaft in the upper half of the leaf, terminating in a fharp but fhallow ferrature. *Panicles* terminal, compound, rough with ftarry hairs. *Calyx* harfh and hoary externally; briftly and filky within. *Capfules* unequal, ovate, tumid, beaked, brown, fmooth and highly polifhed; rounded, not depreffed or keeled, at the fides. *Seed* fmall, black, in a pale, finely laciniated, tunic.

7. T. *rotundifolia.* Round-leaved Tetracera.—Leaves roundifh-elliptical, entire, very harfh on both fides. Styles four. Calyx fmooth within.—Native of Guiana. We have received fpecimens of this new fpecies from Mr. Rudge and Mr. Forfter, under the name of *Tigarea afpera* of Aublet, our *Tetracera afpera*, fee n. 3, which, unlefs that author has made feveral great miftakes, muft be a very different plant. The prefent has always three or four *ftyles*, and as many *capfules*; and the *leaves*, though like Aublet's t. 350. in fhape, are quite entire, not undulated. They are harfh on both fides, like a very fine file, as is the *branch* in a lefs degree. The *panicles* are terminal. The *calyx* has a fhort, inverfely conical, tube, and is hoary externally, fmooth and naked within. The *ftamens* appear to be perfect in the fame flower with the four *piftils*. *Capfules* three or four, oval, brown, fmooth and fhining; keeled and depreffed at the fides, lefs tumid than the foregoing. *Seed* entirely enveloped in its jagged tunic.

8. T. *lævis.* Smooth Tetracera. "Vahl Symb. v. 3. 71." Willd. n. 11.—"Leaves oblong, fmooth, pointed, nearly entire. Flowers terminal. Capfules four."—Native of the Eaft Indies. *Stem* fhrubby. *Leaves* alternate, two or three inches

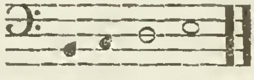
inches long, veiny, smooth on both sides; tapering at the base; serrated with a few slight teeth towards the point. *Footstalks* very short. *Flower-stalks* solitary or in pairs, terminal, an inch long. *Flowers* somewhat racemose, one or two on each partial stalk. *Calyx* with six roundish segments. *Capsules* four, as long as the finger-nail, roundish, tumid, pointed, very smooth and polished. *Seed* small, black, polished, covered in its lower half with a whitish tunic, whose margin is toothed. *Vahl.*

9. T. *alnifolia.* Alder-leaved Tetracera. Willd. n. 12.—"Leaves oblong, acute, nearly entire; roughish beneath. Panicle terminal."—Native of Guinea. *Branches* woody, round, smooth. *Leaves* coriaceous, tapering at the base, rounded at the extremity, with somewhat of a point; mostly entire, but occasionally furnished with an obsolete tooth or two near the end; veiny; shining and smooth above. *Calyx* with four deep segments. *Petals* apparently five. *Filaments* a little dilated at the end, with an anther (or lobe) at each side. *Capsules* four. *Seed* black, entirely covered by its whitish tunic. *Panicle* simple. *Stalks* three-flowered. *Willd.*

Willdenow suspects the *Assa indica*, of Houttuyn's Dutch edition of the Vegetable System of Linnæus, v. 4, 40. t. 26. f. 1, may be another species of the genus before us. The same author is also inclined to refer Thunberg's WAHLBOMIA, see that article hereafter, to *Tetracera.*

TETRACHORD, TETRACHORDON, formed of τετρα, of τετράκις, *four times*, and χορδη, *a chord*, or *string*, in the *Ancient Music*, was a series of four sounds, of which the extremes, or first and last, constituted a fourth. These extremes were fixed and immutable; the two middle sounds were changeable according to the genera, and called *mobiles.* There were three genera or ways of tuning each tetrachord; the *diatonic*, *chromatic*, and *enharmonic.* The character of the diatonic was the tone; of the chromatic, the semitone; and of the enharmonic, the quarter-tone.

A tetrachord in the diatonic genus consisted of one major semitone and two tones.



In the chromatic genus, of two semitones and a minor third.

In the enharmonic genus, of a quarter tone, a semitone, and a major third.

The general system or scale of the Greeks consisted of tetrachords repeated, as the scale of Guido does of octaves. See GREEK *Music.*

The tetrachord of Mercury contained four strings or chords, in the proportion of twelve, nine, eight, and six; so as to give the fourth, fifth, and octave of the lowest chord. This is the opinion of Boethius, and after him of Zarlino. Vide Wallis's Append. Ptolem. Harm. p. 178.

TETRACTIS, in *Natural History*, a name given by Linkius, and other authors, to a kind of star-fish, composed only of four rays, the more common kinds having five.

TETRACTYC ARITHMETIC. See ARITHMETIC.

TETRACTYS, in the *Ancient Geometry.* The Pythagoric tetractys is a point, a line, a surface, and a solid.

TETRADECARHOMBIS, in *Natural History*, the name of a genus of fossils, of the class of the selenitæ.

The word is derived from the Greek τετρα, *four*, δεκας, *ten*, and ῥομβος, *a rhomboidal figure*, and expresses a rhomboidal body consisting of fourteen planes.

The characters of this genus are, that the bodies of it are exactly of the same form with the common selenitæ; but that in these, each of the end planes is divided into two; and there are by this means eight of these planes, instead of four. See SELENITES.

TETRADIAPASON, *Quadruple Diapason*, a musical chord, otherwise called a quadruple eighth, or nine-and-twentieth. See DIAPASON.

TETRADITÆ, TETRADITES, in *Antiquity*, a name given to several different sects of heretics, out of some particular respect they bore to the number four, called in Greek τετρα. Thus the Sabbatians were called tetraditæ, from their fasting on Easter-day, as on the fourth day, or on Wednesday.

The Manichees, and others, who admitted of a quaternity instead of a Trinity in the Godhead, or four persons in lieu of three, were also called tetraditæ.

The followers of Petrus Fullensis bore the same appellation of tetraditæ, by reason of the addition they made to the Trisagion, to countenance an error they held, that in our Saviour's passion it was not any particular person of the Godhead, *e. gr.* the Son that suffered, but the whole Deity.

The ancients also gave the name tetraditæ to children born under the fourth moon, and these they believed unhappy.

TETRADIUM, in *Botany*, from τετραδιον, *a party of four*, as a file of four soldiers, &c. alluding to the prevalence of the number four in its parts of fructification.—Loureir. Cochinch. 91.—Class and order, *Tetrandria Tetragynia.* Nat. Ord. *Terebintaceæ*, Juss.? or perhaps *Rutaceæ.*

Gen. Ch. *Cal.* Perianth inferior, minute, permanent, of four spreading acute leaves. *Cor.* Petals four, ovate, incurved, or nearly erect, longer than the calyx. *Stam.* Filaments four, thick, awl-shaped, hairy, equal to the corolla in length; anthers ovate, erect, of two cells. *Pist.* Germen roundish, four-lobed; style none; stigmas four, awl-shaped, erect. *Peric.* Capsules four, roundish, bursting at the top. *Seeds* solitary, roundish, polished, tunicated.

Eff. Ch. Calyx inferior, of four leaves. Petals four. Capsules four. Seeds solitary, tunicated.

1. T. *trichotomum.* *Cây dâu deâu* of the Cochinchinese. Native of the hills of Cochinchina. A middle-sized tree, with ascending branches. *Leaves* pinnate, with an odd one; leaflets lanceolate, smooth, entire. *Flowers* whitish, in ample, nearly terminal, three-forked *clusters;* or rather, as we presume, *panicles.*

De Theis well remarks, that this genus appears to be allied to BRUCEA: we think also it is evidently very near FAGARA (see those articles). In deference to the weighty opinion of Jussieu, we have not, without doubt, referred it to his natural order of TEREBINTACEÆ; but it appears rather to belong to his imperfectly-defined one of RUTACEÆ, to both which articles we refer the reader.

Nothing is said by Loureiro respecting the qualities or uses of this tree.

TETRADRACHM, in *Ancient Coinage*, a silver coin worth four drachmas, or 3*s.* sterling, the drachma being valued at 9*d.* But if we estimate the value of the drachma at a higher rate, that of the tetradrachm will increase in due proportion. This is the largest form of Greek silver coins, excepting the tetradrachm of the Eginean standard, which is worth 5*s.* The largest tetradrachms weighed from 430 to 440 grains. See DRACHM and SHEKEL.

TETRADYNAMIA, in *Botany*, (from τετρα, *four*, and δυναμις, *power*, indicating a superiority of four stamens over the rest,) the fifteenth class of the Linnæan artificial system, which

which is in itſelf, with the exception of one genus, *Cleome*, a natural claſs, comprehending all the cruciform flowers. Its eſſential character conſiſts in having ſix ſtamens, four of which riſe above the reſt. This is indeed ſo naturally diſtinct a tribe of plants, that it is hard to trace any particular affinity between them and any others. The following is the character of the flowers.

Cal. Perianth oblong, of four ovate-oblong, concave, obtuſe, converging leaves, projecting downwards at their baſe, the oppoſite ones moſt ſimilar to each other, deciduous. The projection generally obſervable at the baſe is for the lodgment of honey, the calyx here being a nectary, ſo far at leaſt as containing the honey. *Cor.* termed cruciform, of four equal petals; their claws inverſely awl-ſhaped, or tapering downwards, flattened, erect, rather longer than the calyx; limb flat, or nearly ſo, the border of each petal being dilated outwards, obtuſe, its ſides ſcarcely touching its neighbour. The petals are inſerted into the ſame circle in which the ſtamens are placed. *Stam.* Filaments ſix, awl-ſhaped, erect, the two oppoſite ones the length of the calyx, the reſt rather longer, but not equal to the corolla; anthers ſomewhat oblong, pointed, thickeſt at the baſe, erect, their points recurved. Nectariferous glands, variouſly circumſtanced in the different genera, are ſeated at the baſe of the ſtamens, eſpecially between the ſhorter ones and the piſtil, thoſe ſtamens, to avoid preſſing upon ſuch glands, being moſtly curved, by which they become ſhorter than the four others. *Piſt.* Germen ſuperior, daily increaſing in height; ſtyle either the length of the longer ſtamens, or wanting; ſtigma obtuſe. *Peric.* Pod of two valves, and frequently as many cells, burſting from the baſe to the ſummit, the partition, if preſent, more or leſs extended beyond the valves, the prominent part being the original ſtyle. *Seeds* roundiſh, drooping or pendulous, ranged alternately, in a double row, along the partition, in which they make ſlight depreſſions. *Receptacle* linear, ſurrounding the edge of the partition, and embraced by the margins of the valves.

Linnæus obſerves, that all ſyſtematic botaniſts, even the moſt eminent, have unanimouſly conſidered this as a truly natural claſs of plants. Some of them have neverthelеſs admitted into it, here and there, a genus or two in oppoſition to nature, which fault he juſtly conceives himſelf to have avoided, except with regard to *Cleome*.

The plants of this claſs have univerſally been termed antiſcorbutic. Their flavour is generally acrid, though watery. Few vegetables yield leſs of an eſſential oil; yet this ſubſtance is to be obtained from them by cohobation, or repeated diſtillation, and its qualities are peculiarly acrid and fœtid, ſomewhat like volatile alkali. This oil gives the offenſive ſcent to water in which cabbage has been boiled, and it cauſes theſe vegetables to diſagree with ſome ſtomachs, though they are generally reputed wholeſome.

The claſs in queſtion is divided into two orders, 1. *Siliculoſa*, in which the pod is roundiſh, and for the moſt part hardly longer than its ſtyle. 2. *Siliquoſa*, with a very long pod, to which the ſcarcely perceptible ſtyle bears no proportion.

The genera of the firſt order are diſtributed into two ſections, one having the pod, here termed a *ſilicula*, or pouch, entire, and the other furniſhed with a notched, or emarginate, pouch. The genera here are characteriſed by the different ſhapes of their pouch, or its valves, and the comparative length of the ſtyle.

The order of *Siliquoſa* is divided into ſuch as have a cloſe calyx, whoſe leaves converge longitudinally, and ſuch as have a gaping, or ſpreading calyx. The genera here are partly defined by the form of the pod and its valves, and their mode of burſting, and partly by the ſituation of the nectariferous glands.

Theſe principles of generic diſtinction, laid down by Linnæus, have not proved ſo ſatisfactory in practice as could have been wiſhed, inſomuch that, not only Haller, but ſome leſs controverſial botaniſts, have differed from the learned Swede in their ideas of ſeveral of the cruciform genera. The beſt attempt to reform them has lately been made by Mr. R. Brown, in the ſecond edition of Mr. Aiton's *Hortus Kewenſis*. This able obſerver has recurred for aſſiſtance to the cotyledons, taking into conſideration their being either folded or flat, accumbent or incumbent. The latter difference we believe to have been firſt noticed by Gærtner, in his characters of *Eryſimum*. By *accumbent* is meant that the edges of the unexpanded cotyledons are applied, in a parallel manner, to the infant radicle; and by *incumbent*, that the flat ſide, or back, is preſented to that part. The latter is ſeen in *Eryſimum*, and is the moſt unuſual poſition. The number of ſeeds in each cell of the pouch is alſo adverted to by Mr. Brown, as well as ſeveral other incidental marks; by the aſſiſtance of all which the whole tribe appears much more ſatisfactorily arranged than heretofore, though we do not profeſs to agree, in every point, with our learned friend. His *Mathiola*, conſiſting of the hoary ſpecies of *Cheiranthus*, ſuch as *incanus*, *ſinuatus*, *tricuſpidatus*, &c. ſeems leſs happily ſeparated from the original genus, than his *Malcomia*, compoſed of *C. maritimus*, *Heſperis africana*, &c. In the latter caſe, the ſimple acute ſtigma, incumbent cotyledons, and the habit of the plants, afford a ſufficiently clear diſtinction. In the former, whatever difference there may be in habit, the characters ſeem to us not ſufficiently evident or important. It is alſo proper to remark, that whatever aſſiſtance ſuch a difference as that above deſcribed in the cotyledons may afford, towards forming a philoſophical idea of a genus, its great obſcurity renders it unfit for practical and daily uſe. On this ſubject we need not enlarge upon what Linnæus has ſo happily enforced, and generally practiſed.

TETRAEDRON, or TETRAHEDRON, formed of τετρα, *four*, and ἕδρα, *ſide*, in *Geometry*, one of the five regular or Platonic bodies of ſolids, comprehended under four equilateral and equal triangles.

The tetraedron may be conceived as a triangular pyramid of four equal faces. Such is that repreſented in *Plate* XV. *Geomet. fig.* 4.

It is demonſtrated by mathematicians, that the ſquare of the ſide of a tetraedron is to the ſquare of the diameter of a ſphere, in which it may be inſcribed, in a ſubſeſquialteral ratio: whence it follows, that the ſide of a tetraedron is to the diameter of a ſphere it is inſcribed in, as $\sqrt{2}$ to the $\sqrt{3}$: conſequently they are incommenſurable. See REGULAR *Body*.

TETRAETERIS, τετραετηρις, in the *Athenian Chronology*, a cycle of four years; for which ſee Potter, Archæol. Græc. lib. ii. cap. 26. tom. i. p. 459.

TETRAGASTRIS, in *Botany*, from τετρα and γαστηρ, *the ſtomach* or *belly*, becauſe of the four protuberant lobes of the ſeed-veſſel.—Gærtn. v. 2. 130. t. 109. f. 5.—Claſs and order, as well as Nat. Ord. unknown.

Nothing is known of this genus but its fruit, which Gærtner obtained from the collection at the botanic garden of Amſterdam. He deſcribes it as a depreſſed *berry*, of four lobes and four cells, with ſolitary ſeeds.

Its form is nearly globoſe, a little depreſſed, convex and pointed at the ſummit, marked with four longitudinal furrows, ſeparating the prominent, cuſhion-like lobes, into which

which it is divided below, and which form four ſingle-ſeeded cells. Its diameter is above an inch. The fleſh, in the old fruit at leaſt, is thin and rather leathery. The nuts, or cells, are large, hard, undivided, gibbous at the outſide, angular at the inner, moderately thick, or rather thin, whitiſh, not ſeparated from each other by any intermediate pulp. *Receptacle* central, ending in the ſummit of the berry, producing from its upper part four ſhort umbilical threads. *Seeds* ſolitary, pendulous, large, obovate, reddiſh-brown. *Skin* ſimple, thin, coriaceous. *Albumen* none. *Embryo* the ſhape of the ſeed, inverted, pale and whitiſh. *Cotyledons* thick, fleſhy, flat on one ſide, convex on the other, emarginate at the inſertion of the *radicle*, which is minute, ſeated within the notch of the cotyledons, at their upper end.

TETRAGON, τετραγονος, formed from τετρα, *four*, and γωνια, *angle*, in *Geometry*, a quadrangle, or a figure with four angles.

Thus a ſquare, parallelogram, rhombus, and trapezium, are tetragonal figures.

Tetragon, in *Aſtrology*, denotes an aſpect of two planets with regard to the earth, when they are diſtant from each other a fourth part of a circle, or 90°.

The tetragon is expreſſed by the character □.

TETRAGONIA, in *Botany*, ſo called by Linnæus, from τετρα and γωνια, *an angle*, alluding to the quadrangular figure of the fruit. The word is happily abbreviated from Boerhaave's *Tetragonocarpus*, which has the ſame meaning. —Linn. Gen. 252. Schreb. 340. Willd. Sp. Pl. v. 2. 1023. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 3. 210. Juſſ. 317. Lamarck Illuſtr. t. 437. Gærtn. t. 127. and 179.—Claſs and order, *Icoſandria Pentagynia*. Nat. Ord. *Succulentæ*, Linn. *Ficoideæ*, Juſſ.

Gen. Ch. *Cal.* Perianth ſuperior, in four, occaſionally three or five, ovate, flat, rather deflexed, coloured, permanent, deep ſegments, revolute at the edges. *Cor.* none, unleſs the calyx be taken for ſuch. *Stam.* Filaments twenty, capillary, ſhorter than the calyx, into whoſe baſe they are inſerted; anthers oblong, incumbent. *Piſt.* Germen inferior, roundiſh, with four angles; ſtyles four, awl-ſhaped, recurved, the length of the ſtamens; ſtigmas downy, running along the ſtyles. *Peric.* Drupa coriaceous, quadrangular, with four prominent longitudinal wings, or points, the oppoſite ones narroweſt, not burſting. *Seed.* Nut ſolitary, bony, of two or more cells, with oblong ſolitary kernels.

Eſſ. Ch. Calyx with from three to five deep permanent ſegments. Petals none. Drupa inferior, angular. Nut with ſeveral cells.

Obſ. Linnæus remarks that the primary flower is five-cleft, which led him to refer this genus to the order *Pentagynia*. But it only affords an inſtance, among many others, that his orders of *Icoſandria*, like thoſe of *Polyandria*, except *Monogynia* and *Polygynia*, are beſt reſolved into one, they being liable to frequent uncertainty, not only in the ſame genus or ſpecies, but the ſame individual plant. See Tetracera.

1. T. *fruticoſa*. Shrubby Tetragonia. Linn. Sp. Pl. 687. Willd. n. 1. Ait. n. 1. (T. foliis linearibus; Mill. Ic. t. 263. f. 2. Tetragonocarpus africana fruticans, foliis longis et anguſtis; Commel. Hort v. 2. 205. t. 103.)—Stem ſhrubby, erect. Leaves linear. Fruit winged.—Native of the Cape of Good Hope. A greenhouſe plant in England, ever ſince the time of biſhop Compton, flowering in the latter part of ſummer, and eaſily propagated by cuttings, but not endowed with much beauty, or any other quality to render it popular. The *ſtem* is ſhrubby, buſhy, with round, alternate, leafy *branches*. *Leaves* alternate, ſeſſile, linear-oblong, obtuſe, entire, revolute, downy and ſoft, an inch or more in length, with axillary tufts of ſmaller ones. *Flowers* yellow, in ſomewhat whorled leafy cluſters.

2. T. *decumbens*. Trailing Tetragonia. Ait. ed. 1. v. 2. 177. ed. 2. n. 2. Willd. n. 2. "Decand. Pl. Graſſes, t. 23. (T. foliis ovatis integerrimis, caule fruticoſo decumbente; Mill. Ic. t. 263. f. 1.)—Stem ſhrubby, downy, decumbent. Leaves obovate. Fruit winged.—Native of the Cape of Good Hope. A greenhouſe ſhrub, cultivated by Miller in 1758. It differs from the former in the larger ſize, and broad obtuſe form of its *leaves*, as well as in having a more gliſtening mealy ſurface, and more numerous axillary tufts of *flowers*. The *ſtem* is more or leſs decumbent, and clothed with very ſoft denſe hairs.

3. T. *herbacea*. Herbaceous Tetragonia. Linn. Sp. Pl. 687. Willd. n. 3. Ait. n. 3. (Tetragonocarpus africana, radice magnâ craſſâ et carnoſâ; Commel. Hort. v. 2. 203. t. 102.) Stem herbaceous, ſmooth, decumbent. Leaves ovate, ſtalked. Flowers ſomewhat corymboſe. Fruit winged. Native of the Cape, cultivated by Miller. The *root* is perennial, thick, fleſhy, and lobed. *Herb* ſmooth, ſucculent, with many decumbent, branched, annual, leafy *ſtems*, and ſcattered, ovate, more or leſs acute, entire *leaves*. *Flowers* yellow, generally five-cleft, larger, and more ſhowy, than in the two preceding, ſtalked, partly axillary, partly corymboſe. All our knowledge of this ſpecies is derived from Commelin's work, nor had Linnæus any ſpecimen in his herbarium. The laſt-deſcribed is ſometimes, in gardens, miſtaken for *T. herbacea*.

4. T. *hirſuta*. Hairy Tetragonia. Linn. Suppl. 258. Willd. n. 4. Thunb. Prodr. 87.—"Herbaceous, hairy, procumbent. Leaves ovate, villous. Flowers axillary, ſeſſile, three together."—Gathered by Thunberg, at the Cape of Good Hope.

5. T. *ſpicata*. Spiked Tetragonia. Linn. Suppl. 258. Willd. n. 5. Thunb. Prodr. 87.—"Herbaceous, ſmooth, erect. Lower leaves ovate; uppermoſt lanceolate. Flowers racemoſe."—From the ſame country as the laſt. *Thunberg*. We have ſeen no ſpecimens of theſe two ſpecies. It is remarkable that the younger Linnæus defines the *flowers* of *T. hirſuta* ſeſſile, whilſt Thunberg calls them ſtalked. Poſſibly the latter confounded with his *hirſuta*, our *decumbens*, of which there is a ſpecimen, apparently gathered by him, in the Linnæan collection.

6. T. *echinata*. Hedge-hog Tetragonia. Ait. ed. 1. v. 2. 177. ed. 2. n. 4. Willd. n. 6. "Decand. Pl. Graſſes, t. 113."—Stem herbaceous. Leaves rhombeo-ovate. Fruit prickly.—Native of the Cape, from whence Mr. Maſſon introduced it at Kew, in 1774. The *root* is annual or biennial. *Stem* herbaceous, divided from the baſe into ſeveral decumbent *branches*, hardly a foot long, angular, from the decurrent *footſtalks*, which are half the length of the ſpreading ſucculent *leaves*, each an inch long. *Flowers* pendulous, on very ſhort, axillary, ſolitary, thread-ſhaped, purple *ſtalks* clothed with cryſtalline globules. *Calyx* in three or four ſegments; cryſtalline without; greeniſh-yellow within. *Stamens* only three or four. *Germen* triangular, flat underneath, its angles beſet with numerous conical thorns. *Styles* three. *Nut* of three cells. *Willden.*

7. T. *expanſa*. Horned Tetragonia. Ait. ed. 1. v. 2. 178. ed. 2. n. 5. Willd. n. 7. "Decand. Pl. Graſſes, t. 114." Scop. Inſubr. v. 1. 32. t. 14. Thunb. Tr. of Linn. Soc. v. 2. 335. (T. halimifolia; Forſt. Prodr. 39. Pl. Eſcul. 67. T. japonica; Thunb. Jap. 208.)—Stem herbaceous. Leaves ovate-rhomboid; tapering at the baſe. Fruit with four horns.—Native of New Zealand, about the borders of woods, in buſhy ſandy places, as well as of the Friendly iſlands, and of Japan. Sir Joſeph Banks introduced

it

it to Kew garden, in 1772, and from thence the other gardens of Europe have been ſupplied. The plant is a rather tender biennial herb, flowering in Auguſt and September. Forſter tells us it proved a moſt valuable reſource to captain Cook's crew, as a pot-herb, while his ſhip lay at Tongatabu. The whole plant is ſucculent, covered with very minute cryſtalline dots, as if moiſt with dew. *Root* fibrous. *Stem* divided from the bottom into many irregular, round, leafy branches. *Leaves* alternate, ſtalked, ſomewhat deltoid, entire, rather heart-ſhaped at the baſe, but tapering down into the *footſtalk*. *Flowers* yellow, axillary, on ſhort, uſually ſolitary, ſtalks. *Fruit* turbinate, clumſy, the ſize of a filberd, with four or five ſharp horns. The cells are five or ſix, anſwering to the number of *ſtyles*.

8. T. *cryſtallina*. Diamond Tetragonia. Ait. ed. 1. v. 2. 178. ed. 2. n. 6. Willd. n. 8. L'Herit. Stirp. v. 1. 81. t. 39. "Decand. Pl. Graſſes, t. 34."—Stem herbaceous. Leaves ovate, ſeſſile, dotted with cryſtalline points. Fruit without thorns.—Native of Peru. *Dombey*. Sent to Kew, by M. Thouin, in 1788. It is annual, and flowers in the dry ſtove in June. *Herb* a ſpan high, covered with cryſtalline granules, like the Ice-plant. *Stem* nearly erect, branched from the bottom. *Leaves* acute, entire, about two inches long, bright green. *Flowers* of a dull orange, or tawny yellow, axillary, ſtalked, moſtly ſolitary. *Calyx* in four ſegments. *Stamens* about ſixteen. *Styles* four. *Drupa* turbinate, quadrangular. *Nut* four-lobed, with four cells.

For *Tetragonia ivæfolia*, Linn. Suppl. 257, ſee HALORAGIS, n. 1.

TETRAGONIA, in *Gardening*, contains plants of the ſhrubby and herbaceous, ſucculent, perennial kinds, among which the ſpecies moſt uſually cultivated are the following; the ſhrubby tetragonia (T. fruticoſa); the trailing tetragonia (T. decumbens); the herbaceous tetragonia (T. herbacea); and the hedge-hog tetragonia (T. echinata). All theſe plants are natives of the Cape, and, of courſe, of the rather tender kind.

Method of Culture.—The firſt and laſt ſorts may be increaſed by cuttings, which ſhould be cut off from the plants a few days before they are planted, that the part where they are cut may be healed, ſetting them out in July, that they may have time to make good roots before winter, on a bed of freſh earth, ſhading them from the ſun in the heat of the day. They ſhould afterwards be frequently refreſhed with water in ſmall quantities. In a few weeks, when well rooted, they ſhould be taken up, and planted into pots filled with light freſh undunged earth, and be placed in a ſhady ſituation until they have taken new root, after which they may be placed with other hardy exotic plants in a ſheltered ſituation, where they may remain till the middle or latter end of October, at which time they ſhould be removed into the greenhouſe, and placed where they may enjoy as much air as poſſible in mild weather, as they only require to be protected from the froſt, being pretty hardy with reſpect to cold. As, when planted in the full ground in the ſummer ſeaſon, they are apt to grow rank and large, or even when permitted to root into the ground through the holes at the bottom of the pots, the pots ſhould be frequently removed to prevent it, as they are injured by it.

The firſt and ſecond ſorts are likewiſe capable of being raiſed by ſeeds, ſown in a gentle hot-bed, or in a warm border of light freſh earth, in the ſpring. When the plants are about four inches high, they may be planted out in pots, treating them in the ſame manner as the cuttings.

And the third ſort will grow from cuttings planted early in the ſpring, in the ſame manner as the others.

The ſhrubby ſorts are durable in their ſtems, roots, and branches; but the herbaceous kinds often die down in the ſtalks and branches towards the autumn, and ſend up new ones at the end of that ſeaſon, which retain their leaves during the winter months.

They afford ornament among other potted plants, and the firſt ſort has ſomething ſingular and curious about it.

TETRAGONIAS, a name given to a meteor whoſe head is of a quadrangular figure, and its tail or train long, thick, and uniform: this is not much different from the trabs or beam.

TETRAGONIS, in *Ancient Geography*, a town of Arachoſia, at the foot of mount Caucaſus, called more anciently Cartana. Pliny.

TETRAGONISM, τετραγωνισμος, a term which ſome authors uſe to expreſs the quadrature of the circle.

TETRAGONOPTERUS, in *Ichthyology*. See SALMO *Bimaculatus*.

TETRAGONOPTRUS. See ZEUS, CHÆTODON *Cornutus*, *Nigricans*, and *Capiſtratus*.

TETRAGONOTHECA, in *Botany*, from τετραγωνος, *quadrangular*, and θηκη, *a caſe*, or *cell*, a name firſt contrived by Dillenius, to expreſs the ſquare form of the common calyx, and now retained by L'Heritier and Willdenow for the original and only remaining ſpecies of the genus. See the others under DIDELTA, POLYMNIA, and WEDELIA.—Dill. Elth. 378. Linn. Gen. 438. L'Herit. Stirp. 177. Willd. Sp. Pl. v. 3. 2116. Ait. Hort. Kew. v. 5. 84. Purſh 563.—Claſs and order, *Syngeneſia Polygamia-ſuperflua*. Nat. Ord. *Compoſitæ oppoſitifoliæ*, Linn. *Corymbiferæ*, Juſſ.

Gen. Ch. *Common Calyx* ſimple, large, of one leaf, in four deep, flat, ſpreading, triangular-heartſhaped ſegments, permanent. *Cor.* compound, radiant. Florets of the diſk perfect, numerous, funnel-ſhaped, five-cleft, reflexed; thoſe of the radius ten or twelve, ligulate, dilated outwards, three-cleft, equal, bluntiſh. *Stam.* in the florets of the diſk. Filaments five, capillary, very ſhort; anthers united into a cylindrical tube. *Piſt.* in all the florets. Germen roundiſh; ſtyle thread-ſhaped, the length of the ſtamens; ſtigmas two, reflexed or revolute. *Peric.* none. *Seeds* ſolitary; in the diſk roundiſh; in the radius ſomewhat ovate. Down none. *Recept.* chaffy.

Eſſ. Ch. Receptacle chaffy. Seed-down none. Calyx ſimple, of one leaf, quadrangular, in four deep ſegments.

Obſ. The ſynonym of *Tetragonotheca*, Linn. Gen. 438, ſhould be eraſed from our article POLYMNIA.

1. T. *helianthoides*. Sun-flower Tetragonotheca. Linn. Sp. Pl. 1273. Willd. n. 1. Ait. n. 1. Purſh n. 1. (T. doronici maximi folio; Dill. Elth. 378. t. 283. Polymnia tetragonotheca; Linn. Syſt. Veg. ed. 13. 658. Sm. Inſ. of Georgia, v. 2. 137. t. 69.)—Native of North America, in a fertile ſoil, on the borders of woods, and along hedges, from Virginia to Florida, flowering from July to September. *Purſh*. The *root* is perennial, hardy in our gardens. *Stem* erect, round, leafy, hairy, branched, from four to ſix feet high. *Leaves* hairy, veiny, toothed or wavy; the lowermoſt ſtalked, ovate; upper ſeſſile; oppoſite acute. *Flowers* from the forks and ends of the branches, ſtalked, large, of a golden yellow, reſembling a ſun-flower.

TETRAGONUS, in *Anatomy*, a muſcle, called alſo *quadratus genæ*.

TETRAGRAMMATON, τετραγραμματον, a denomination given by the Greeks to the Hebrew name of God, יהוה *Jehovah*, becauſe in the Hebrew it conſiſts of four letters. See ADONAI.

TETRAGYNIA, in *Botany*, from τετρα, and γυνη, *a female*, the name of an order in ſeveral claſſes of the Linnæan artificial ſyſtem, characterized, as the word itſelf imports, by by the flowers having four ftyles, or piftils. This order is better founded, and more invariable, in fome claffes than others. With the TETRANDRIA, (fee that article,) it naturally correfponds, and is well exemplified in the genera *Potamogeton* and *Ruppia*. In *Octandria*, though of rare occurrence, it is no lefs certain. In *Icofandria* and *Polyandria* it is very fallible, of which we have lately given examples. (See TETRACERA and TETRAGONIA; alfo POLYANDRIA.) The order *Tetragynia* in the claffes *Pentandria* and *Dodecandria* is, however, fufficiently well-founded. In *Decandria* no example of it occurs, nor fcarcely in *Hexandria*.

TETRAHIT, an old name, fuppofed to allude to the four-cornered ftem. See GALEOPSIS.

TETRALOGIA, in the *Dramatic Poetry of the Ancients*, denoted four dramatic pieces of the fame author, of which the three firft were tragedies, and the laft of the fatyric kind. Their defign was to celebrate a victory in the literary contefts. Æfchylus and Euripides have written fome pieces of this kind. Encycl.

TETRAMETER, in the *Ancient Poetry*, an iambic verfe confifting of four feet.

The word is formed from τετρα, *four*, and μετρον, *meafure*; *q. d.* four metres.—We meet with none of thefe but in the comic poets, as Terence, &c.

TETRANDRIA, in *Botany*, the fourth clafs in the Linnæan artificial fyftem, is fo called from τετρα, and ανηρ, *a man*, becaufe it is characterized by having four ftamens, in the fame flower with the piftil or piftils. Thefe are of equal length, the flower being regular, by which this clafs is diftinguifhed from the 14th, whofe flowers are ringent, and two of their four ftamens, which ftand next each other, are longer than the reft. See DIDYNAMIA.

The orders of this fourth clafs are three, diftinguifhed by the number of their piftils. 1. *Monogynia*, a numerous and various order, comprifing the ample tribe of *Proteaceæ*; and the intricate family of the *Stellatæ*, to which *Galium* and *Rubia* belong. The large genera of *Scabiofa* and *Plantago* likewife range under the *Tetrandria Monogynia*; the former of which exhibits a curious example of aberration in number between the *corolla* and *ftamens*. Some of its fpecies have a four-cleft *corolla*, anfwering in that refpect to the *ftamens*, whilft others have five fegments in the former, though the number of the latter remains invariably but four. 2. *Digynia* is a fmall order, to which, amongft a few other genera, Linnæus has referred *Cufcuta*, but it rather belongs to *Pentandria Digynia*, the greater number of the fpecies having five-cleft pentandrous flowers. This order will, however, receive a very curious acceffion in TETRARRHENA. (See that article.) 3. *Tetragynia* contains *Ilex*, *Potamogeton*, and *Ruppia*, Britifh genera, all of which have four feffile ftigmas; with feveral others, not naturally related, but for the moft part feparated, by the artificial character of *number*, from their allies in other parts of the fyftem. That character however is fufficiently conftant in the prefent inftance.

TETRANDRIA is likewife the denomination of feveral orders in the Linnæan Syftem, as in *Gynandria*, if STYLIDIUM (fee that article) be judged to have four ftamens; and certainly in *Monoecia* and *Dioecia*, where there are feveral really tetrandrous genera.

TETRANGURIA, a name ufed by fome authors for the citrul, a plant of the gourd kind, whofe feeds are ufed in medicine.

TETRANTHERA, fo named by Jacquin, from τετρα, and ανθηρ, becaufe of the four feparate cells, which have the appearance of four diftinct anthers, on the dilated fummit of each filament, and were indeed confidered as fuch by the author. We greatly prefer this name to that of *Litfea*, ufed by Lamarck and Juffieu; becaufe the latter is of barbarous origin, and becaufe we are happy to follow the example of Mr. Brown, who juftly prefers, in this cafe, the claffical authority of Jacquin. To the learned Juffieu neverthelefs belongs the honour of having firft affembled under this genus feveral plants, which authors had either confidered as diftinct genera, or erroneoufly referred to others already eftablifhed, as will appear by the various fynonyms we are about to exhibit.—Jacq. Hort. Schoenbr. v. 1. 59. Dryandr. in Roxb. Coromand. v. 2. 25. Brown Prodr. Nov. Holl. v. 1. 408. (Litfea; Lamarck Dict. v. 3. 574. Juff. in Bull. des Sciences, v. 3. 73. Tomex; Thunb. Jap. 10. Nov. Gen. 65. Schreb. Gen. 315. Willd. Sp. Pl. v. 2. 839. Mart. Mill. Dict. v. 4. Juff. 440. Hexanthus; Loureir. Cochinch. 195. Sebifera; Loureir. ibid. 637. See TOMEX, HEXANTHUS, and SEBIFERA.)—Clafs and order, *Dodecandria Monogynia*. Nat. Ord. *Lauri*, Juff. *Laurinæ*, Brown.

Gen. Ch. *Cal.* Involucrum of four or five ovate, concave, deciduous leaves, containing feveral ftalked flowers. Perianth none, unlefs the corolla be taken for fuch. *Cor.* of one petal, tubular, more or lefs deeply divided into from four to fix elliptic-oblong equal fegments; fometimes abrupt and entire, the limb being deficient. Nectary of feveral ftalked glands or fcales intermixed with the ftamens. *Stam.* Filaments from twelve to eighteen, fometimes but fix, thread-fhaped, erect, the outer ones longeft; anthers with four lateral cells at their inner fide. *Pift.* Germen fuperior, ovate; ftyle thread-fhaped; ftigma notched. *Peric.* Berry ovate or globofe, of one cell. *Seed* folitary, the fhape of the berry.

Obf. The ftamens are ufually imperfect in the flowers of one tree, and the piftil in thofe of another; but this is hardly a fufficient reafon for placing this genus in the clafs *Dioecia*, the ftructure of the flowers being alike, and both organs, at leaft their rudiments, prefent in each. The four cells of the anthers, as Mr. Brown obferves, diftinguifh *Tetranthera* from *Laurus*.

Eff. Ch. Involucrum of four or five leaves, deciduous. Corolla with about five fegments. Nectary of feveral ftalked glands. Anthers of four lateral cells. Stigma fomewhat lobed. Berry fuperior, with one feed.

1. T. *japonica*. Japan Tetranthera. (Tomex japonica; Willd. n. 1. Thunb. Jap. 190.)—Stamens twelve. Leaves obtufe; downy beneath, as well as the involucrum. Flower-ftalks fimple.—Common at Kofido in Japan, flowering in October and November.—It is there known by the name of *Fiwa*. The *ftem* is arboreous, tall, branching, above two feet in diameter. *Branches* downy, knotty; angular when young. *Leaves* alternate, ftalked, oblong, obtufe, entire, erect, with parallel ribs; fmooth and green above; hoary and downy beneath; three or four inches long. *Footftalks* angular, ftriated, downy, an inch in length. *Flowers* axillary, capitate, dioecious, on folitary, angular, downy, bracteated ftalks, half an inch long. The *involucrum* confifts of five or fix leaves, the outer ones fmalleft, and contains the fame number of flowers. *Thunberg*.

2. T. *laurifolia*. Laurel-leaved Tetranthera. Jacq. Hort. Schoenbr. v. 1. 59. t. 113. (Tomex Tetranthera; Willd. n. 2.)—Stamens about fifteen. Leaves obtufe, fmooth, as well as the involucrum. Flower-ftalks fomewhat umbellate.—Native of China. Cultivated at the Mauritius by the name of Cerifier de la Chine, or Chinefe Cherry-tree. From thence it was brought to Schoenbrun gardens, where it bears the open air in fummer, and flowers in the hot-houfe in September and October.—It is there a *tree*, ten feet

feet high, with a head of round knotty *branches*, downy when young. *Leaves* about the ends of the branches, alternate, on downy ſtalks, an inch long, obovate, coriaceous, entire, light green, ſmooth and ſhining, except a ſlight pubeſcence on the rib and veins; their length about five inches. *Flower-ſtalks* lateral, ſcattered, below the leaves, umbellate, about two inches long, each bearing from two to five *flowers*, whoſe *involucrum* is pale green, *corolla* white; their ſhort partial ſtalks (within the involucrum) hairy, as well as the *ſtamens*. *Berries* red, globoſe, the ſize of a currant. Jacquin ſays nothing of the dioecious nature of the *flowers*, but he appears to deſcribe one with an imperfect *piſtil*. His *fruit* perhaps was of exotic growth.

3. T. *apetala*. Apetalous Tetranthera. Roxb. Coromand. v. 2. 25. t. 147. Brown n. 1. (Laurus involucrata; Retz. Obſ. faſc. 6. 27?)—Stamens about fifteen. Leaves elliptical, obtuſe, ſingle-ribbed, ſmooth. Corolla abrupt, undivided, bearing the ſtamens on its margin.—Native of the mountainous parts of the circars of Hindooſtan, flowering in June. *Roxburgh*. Mr. Brown met with the ſame in the tropical part of New Holland. This is ſaid to be a middle-ſized *tree*, with round ſmooth *branches*, leafy towards the ends. The *leaves* are ſtalked, three or four inches long, and two, or two and a half, wide, entire, bright green. *Flower-ſtalks* uſually three-flowered, much like thoſe of the laſt, to which this ſpecies is nearly akin; but the want of a limb to the *corolla*, and the oval violet-coloured *berry*, ſufficiently diſtinguiſh it.

4. T. *monopetala*. Monopetalous Tetranthera. Roxb. Corom. v. 2. 26. t. 148.—Stamens about nine. Leaves elliptic-oblong, acute, ſingle-ribbed; ſomewhat downy beneath. Flowers cluſtered. Limb of the corolla half five-cleft.—Native of the vallies of Hindooſtan, flowering in the hot ſeaſon. Dr. Roxburgh ſays the *wood* is white, tolerably hard; and that the bark is uſed by the inhabitants of the hills, to cure diarrhœas, being given in ſubſtance. Its taſte is mildly aſtringent, with much balſamic ſweetneſs. The *leaves* are longer, narrower, and more acute than in the former. *Flowers* in ſhort, axillary, denſe, partly umbellate, cluſters, with five leaves to the *involucrum*, and as many ſegments to the greeniſh tubular *corolla*. *Berries* ovate, of a violet black.

5. T. *ferruginea*. Ruſty Tetranthera. Brown n. 2. (Hexanthus umbellatus; Loureir. Cochinch. 196. Litſea hexantha; Juſſ. n. 4.)—Stamens about nine. Leaves elliptic-oblong, acute, ſingle-ribbed; downy beneath, as well as the branches. Corolla in ſix deep ſegments.—Native of Cochinchina, as well as of the tropical part of New Holland. A *tree* of a moderate ſize, whoſe timber is uſed in building. The *leaves* are large, entire, with many tranſverſe veins. *Flowers* pale green, in ſmall axillary umbels.

6. T. *dealbata*. White-leaved Tetranthera. Brown n. 3.—"Stamens ſix. Leaves broadly elliptical, pointed, triple-ribbed, ſmooth; whitened beneath. Footſtalks and branches downy. Corolla deeply four-cleft, hairy. Involucrum villous."—Native of the neighbourhood of Port Jackſon, New South Wales. Mr. Brown thinks *Laurus Myrrha*, Loureir. Cochinch. 251, which is perhaps not ſpecifically different from *Laurus involucrata*, Roxb. Coromand. v. 2. 46. t. 187, is very nearly related to the preſent ſpecies, though differing in having ſmaller *leaves*, a ſomewhat ſilky *involucrum* on a ſhort ſtalk, and nearly ſmooth *corolla*. We cannot but obſerve that Roxburgh's t. 187. by no means exhibits the peculiar *anthers* or *nectary* of a *Tetranthera*. His plant however ſhould ſeem to be the *Litſea trinervia* of Juſſieu, which the latter takes for *Laurus involucrata* of Retzius, but that ſhould have ſingle-ribbed *leaves*. See our third ſpecies.

7. T. *chinenſis*. Chineſe Tetranthera. (Litſea chinenſis; Lamarck Dict. v. 3. 574. Juſſ. n. 5.)—Stamens numerous, polyadelphous. Leaves elliptical, obtuſe, ſmooth. Footſtalks, branches, and involucrum downy. Corolla none.—Native of China; cultivated in the iſland of Mauritius, where its power of reſiſting the force of high winds, renders this tree valuable for making tall hedges. The *leaves* are four inches long, two broad; pale beneath. *Flowers* dioecious. *Involucrum* of four concave, ſpreading, downy leaves. *Stamens* united into from five to nine downy bundles. *Germen* ſurrounded with abortive ſtamens. *Berry* ſpherical, ſmooth, the ſize of a ſmall cherry, with a flavour of camphor and ivy, which renders it diſagreeable, and only fit food for birds. *Lamarck*. This ſpecies is ſaid to have been brought alive to Europe, and was in 1789 cultivated in the Pariſian garden; but we have neither heard nor ſeen any thing of it in England.

8. T. *ſebifera*. Tallow Tetranthera. (Tomex ſebifera; Willd. n. 3, excluding the ſynonym of Retzius. Sebifera glutinoſa; Loureir. Cochinch. 638.)—Stamens from twelve to fifteen. Leaves ovate-oblong, bluntiſh, ſingle-ribbed, ſmooth. Flower-ſtalks umbellate, downy as well as the involucrum. Corolla none.—For a further account of this ſpecies, ſee SEBIFERA, under which article Loureiro's faulty generic character, and eſpecially his deſcription of the ſtamens, prevented our recognizing the plant as already deſcribed by Willdenow.

9. T. *piperita*. Pepper Tetranthera. (Litſea piperita; Juſſ. n. 7. Laurus Cubeba; Loureir. Cochinch. 252.)—Stamens ſix. Leaves lanceolate, without rib or vein. Stalks ſingle-flowered. Corolla in ſix roundiſh unequal ſegments.—Native of Cochinchina, and perhaps alſo of China. In the former country it is frequently cultivated, for the ſake of the cordial and tonic qualities of its berries and bark. A decoction of one or the other, the latter being weakeſt, is given in hyſteric, paralytic, and melancholic diſorders. The recent fruit is uſed as a ſeaſoning for fiſh. The ſcent is fragrant; taſte aromatic and pungent. Each berry reſembles a grain of black pepper, with a long ſlender ſtalk. Loureiro ſuſpected it to be the true Cubeb, but erroneouſly. (See PIPER.) The *tree* is of a moderate ſize, much branched. *Leaves* alternate, ſtalked, two inches long, entire, flat, ſhining, and, we preſume, ſmooth. *Flowers* white, on crowded, lateral, ſimple ſtalks. *Involucrum* of four roundiſh, concave, coloured, deciduous leaves, containing five flowers. *Style* none. *Berry* globoſe, very ſmall, black.—Such is Loureiro's account, from which, having ſeen no ſpecimen, we have extracted the ſpecific character.

TETRANTHUS, ſo called by profeſſor Swartz, in his *Prodromus*, p. 115, from τετρα and ανθος, on account of the four flowers in one common calyx.—Schreb. Gen. 592. Willd. Sp. Pl. v. 3. 2402. Mart. Mill. Dict. v. 4. Swartz Ind. Occ. 1385. t. 27.—Claſs and order, *Syngeneſia Polygamia-ſegregata*. Nat. Ord. *Compoſitæ capitatæ*, Linn. *Corymbiferæ*, Juſſ.

Gen. Ch. *Common Calyx* of five ſmall, linear, fringed leaves, at firſt reflexed, then erect, containing four flowers: *partial* of one leaf, tubular, much longer than the former; tapering and ſomewhat compreſſed at the baſe; oblique, acute and fringed at the ſummit; containing one floret. *Cor.* of each floret tubular; its limb in five unequal ſegments, the three lowermoſt longeſt, and moſt reflexed. *Stam.* in each floret, Filaments five, capillary; anthers united into a cylindrical tube, rather ſhorter than the tube of the corolla. *Piſt.* Germen ſuperior, in the tube of the partial calyx, oblong; ſtyle

 thread-

thread-fhaped, divided, fpreading, longer than the corolla; ftigmas linear, downy, reflexed. *Peric.* none, except the permanent fheathing partial calyx. *Seeds* folitary, oblong, fomewhat ftriated, crowned with a membranous fringed border. *Recept.* minute, naked.

Eff. Ch. Common Calyx of five leaves, containing four flowers: partial of one oblique leaf. Seeds with a membranous fringed border. Receptacle naked.

1. T. *littoralis.* Shore Tetranthus. Willd. n. 1. Swartz Ind. Occ. 1386.—Found on the banks of rivers in Hifpaniola. A fmall annual herb, flowering in the fpring, and, as Swartz juftly obferves, very peculiar in its fructification. There certainly cannot be a better example of the order *Polygamia-fegregata.* Willdenow fays it has the afpect of MITCHELLA; fee that article. The *ftem* is flender, creeping, fmooth, fubdivided, a fpan long, attaching itfelf by little tufts of long white fibrous *radicles* from each joint. *Leaves* oppofite, ftalked, roundifh-ovate, entire, with a fhort obtufe point, three-ribbed, fmooth, half an inch long. *Footftalks* fmooth and flender, nearly an inch in length. *Flower-ftalks* axillary, folitary, erect, longer than the leaves, flender and downy. *Flowers* fmall, white.

TETRAO, in *Ornithology*, a genus of the Gallinæ order of birds; the characters of which are, that it has a fpot near the eyes naked, or papillofe, or rarely covered with feathers. It comprehends fixty-feven fpecies, claffed under feveral divifions and fubdivifions.

A. *With the naked Spot above the Eyes, and hairy Legs.* LAGOPODES.

a. *With four-toed Feet.*

UROGALLUS. With roundifh tail, and white axillæ. This is the cock of the wood of Ray and Willughby, and wood grous of Pennant and Latham. (See GROUSE.) It is found in the forefts and marfhes of the colder parts of Europe and Northern Afia.

PHASIANELLUS. With wedge-fhaped tail; head, neck, and body above, teftaceous, and black-banded. This is the long-tailed grous from Hudfon's Bay of Edwards, long-tailed grous of Latham, and fharp-tailed grous of Pennant. Found in Hudfon's Bay and the uncultivated parts of Virginia.

TETRIX. With bifurcated tail, fecondary quills white towards the bafe. This is the urogallus minor of Briffon and Gefner, and black cock, black game, or black grous of Ray, Willughby, Pennant, and Latham. Found in the woods, heaths, &c. of the cold parts of Europe and Siberia. (See GROUSE.) The varieties of this fpecies are the tetrix alba of Blum. Act. Stock. 1785, and the urogallus minor punctatus of Briffon, or tetrao hybridus of Sparrman, or fpurious grous of Pennant.

NEMESIANUS. With red tail, fpotted with black; black tip, and body varied with black and red: the Nemefian grous of Latham.

BETULINUS. With black tail, varied with black tranfverfe fpots; and rump whitifh, with black bands: the birch grous of Latham.

CANADENSIS. With black tail-feathers, yellow at the tip, and two white ftreaks at the eyes: the black and fpotted heath-cock of Edwards, and fpotted grous of Pennant, Forfter, and Latham; and gelinotte du Canada of Buffon.

CANACE. With entire tail, and white fpot near the ears and noftrils: the black and fpotted heath-cock of Edwards. Found at Hudfon's Bay.

LAGOPUS. Cinereous; hairy toes; white quills; black tail-feathers, tipped with white; the intermediate white: this is the white game of Willughby, and ptarmigan of Pennant and Latham. (See PTARMIGAN.) Of this fpecies there are feveral varieties; as the lagopus varia of Gefner and Willughby, the bonafia fcotica of Briffon, and the attagen of Briffon, or red game, moor-cock, or gor-cock of Ray and Willughby, and red grous of Pennant and Latham. (See GOR-COCK.) Found in Siberia and the northern parts of Europe.

ALBUS. Orange, varied with black bands and white ftreaks; hairy toes; tail-feathers black, tipped with white; the intermediate wholly white: this is the white partridge of Ellis and Edwards, and the white grous of Pennant and Latham. Found gregarious in the forefts of North America, Europe, and Afia.

RUPESTRIS. Orange, varied with black bands and white ftreaks; plumofe toes; black tail-feathers tipped with white; the intermediate wholly white with black lores: this is the rock grous of Pennant. Found at Hudfon's Bay.

LAPPONICUS. With naked fcaly legs; with a fuperciliary fcarlet line covered with a membrane of the fame colour; the primary quill-feathers and tail-feathers tipped with white: the rehufak of the Arctic Zoology. Found in the woods and mountains of Lapland.

CUPIDO. With fuccenturiate cervical wings: the attinga americana of Briffon, and pinnated grous of the Arctic Zoology and of Latham. Found gregarious in North America.

UMBELLUS. With the cervical umbo exftant: this is the attagen pennfylvanica of Briffon, the ruffed heath-cock of Edwards, and ruffed grous of the Arctic Zoology and of Latham. Found in North America.

TOGATUS. With the greater axillary feathers black-azure: this is the bonafia major canadenfis of Briffon, and fhoulder-knot grous of Forfter (Phil. Tranf. vol. lxii.) and of Latham. Found at Hudfon's Bay.

BONASIA. The tail-feathers cinereous, with black points and band; the two intermediate excepted: this is the bonafia of Briffon, the gallina corylorum of Gefner and Aldrovand, the gelinotte of Buffon, the hafelhuhn of Ray and Willughby, and hazel grous of the Arctic Zoology and of Latham. Found among the hazels of Europe and Weftern Siberia.

CANUS. Body grey, undulated with brown; the beak and legs black. Found in Sweden.

ALCHATA. Above varied; the two intermediate tail-feathers twice longer than the others, and fubulate: the ganga of Buffon, the partridge of Damafcus of Willughby and Ray, the kitiwiah or African lagopus of Shaw's Travels, the kara of Ruffel's Aleppo, the little pin-tailed grous of Edwards and Latham. Of this there are two varieties, *viz.* the tetrao fenegallus and gelinotte of Senegal of Buffon; and the tetrao caudatus of Gmelin's Travels. Found in Southern Europe, Africa, Arabia, Syria, and Perfia.

NAMAQUA. Above fpadiceous, with the two intermediate tail-feathers longer and fubulate: the Namaqua grous of Latham. Found in Africa amid the dry defarts inhabited by the Namaquis, flying gregarious to fountains.

INDICUS. Front white, furrounded by a wreath behind black; the body above yellowifh-red, varied with black lunules: the Indian grous of Latham. Found at Coromandel.

ARENARIUS. Ruff, abdomen, and vent black; tail-feathers with brown and grey bands, tipped white; the two intermediate yellowifh: the fand grous of Latham. Found about the Volga near Aftrachan.

b. *With three-toed Feet.*

PARADOXUS. With three-toed feet; toes hairy, almoft joined

joined at the apex: this is the heteroclitous grous of Latham. Found in the Southern Tartarian defart.

B. *With papillofe Skin about the Eyes; and naked Legs.*

c. *With the Feet of the Male fpurred.* PERDICES, *or Partridges.*

FRANCOLINUS. Abdomen and throat black, and wedge-formed tail: this is the tetrao orientalis of Haffelquift, and francolin of other authors. Found in the fouth of Afia and Europe, and in Africa, of the fize of the partridge, feeding on feeds, emitting a hiffing found, and flefh delicious.

MADAGASCARIENSIS. Abdomen black, varied with large red fpots; throat white; the two intermediate tail-feathers reddifh, with black bands; the pintado partridge of Latham. Found in Madagafcar.

RUFUS. Legs and beak fanguineous; throat white, furrounded with a band black, white pointed: this is the perdix græca of Briffon and Ray, the bartavelle of Buffon, the red partridge of Albin, the Greek or great red partridge of Willughby, and Greek partridge of Latham. Of this fpecies there are three varieties, *viz.* the tetrao rufus of Gmelin, or perdix rubra of Briffon, or perdix rufa major of Gefner and Jonfton, or red-legged partridge of Ray, Willughby, and Albin, or Guernfey partridge of Latham; the perdix rufa alba of Briffon; and the perdix rubra barbarica of Briffon, or the red-legged partridge from Barbary of Edwards, or Barbary partridge of Shaw's Travels. Found gregarious in the woody mountains of Europe, Afia, and Africa, much larger than the partridge.

PERDIX. With a naked fcarlet fpot under the eyes; tail ferruginous; breaft brown; and legs whitifh: this is the common *partridge*, (which fee.) Of this fpecies there are the following varieties; *viz.* perdix cinereo alba of Briffon; perdix tota alba; perdix torque albo; perdix brunnea; perdix mento gulaque, or chin and throat red. Found in flocks in the cultivated fields and paftures of Europe and Siberia.

DAMASCENUS. With a naked fcarlet fpot under the eyes; tail ferruginous; breaft brown; and legs yellow: the perdix damafcena of Briffon, and Damafcus partridge of Ray, Willughby, and Latham. This fpecies migrates in flocks through the middle of Europe, and is allied to the partridge, but lefs, with a longer beak.

MONTANUS. Legs and beak red; throat reddifh and dingy: the perdix montana of Briffon. Found in the mountains of Europe.

RUBRICOLLIS. Legs, beak, chin, and throat naked, all red: the red-necked partridge of Latham. Found in Africa.

PETROSUS. Beak and legs red; body brown, and ferruginous fpot on the breaft: the rufous-breafted partridge of Latham. Found amid the rocks and mountains near Gambia.

PERLATUS. Legs and eye-brows red; beak blackifh; throat white; and body varied with brown: the perdix chinenfis of Briffon, and pearled partridge of Latham. Found in China: and it has a variety with beak and legs brown, eye-brows fpotted with white and black, at the Cape of Good Hope.

BICALCARATUS. With double-fpurred feet, and black eye-brows: the Senegal partridge of Latham. Found near the Senegal.

ZEYLONNENSIS. With double-fpurred feet; beak and naked area of the eyes red; tail round and brown: the Ceylon partridge of Latham.

SPADICEUS. With two-fpurred feet red; beak yellow; and body fpadiceous or bright red-coloured; the brown African partridge of Latham. Found in Madagafcar.

NUDICOLLIS. With two-fpurred feet, and naked throat red; the bare-necked partridge of Latham.

GINGICUS. Bill black; rump and tail red, grey, and black mixed; and eye-brows white: the Gingi partridge of Latham. Found near Gingi, in Coromandel.

PONDICERIANUS. Bill black; two intermediate tail-feathers red, numerous angulated lines brown; and four bands ochre-coloured: the Pondicherry partridge of Latham. Found in Coromandel.

NÆVIUS. Legs and bill reddifh; body brown, variegated with yellow: the ococolin of Ray and Buffon, the Mexican partridge of Latham. Found in the temperate parts of New Spain.

d. *Coturnices, or Quails.* See QUAILS.

e. *With four Toes.*

FERRUGINEUS. Legs and beak brown; body beneath diluted light red, above ferruginous-brown; feathers of the neck longer and acutely tipped; the hackled partridge of Latham. Found in China.

JAVANICUS. Legs flefh-coloured; front, fpot on the hind head, and abdomen, orange; beak, breaft and tail cinereous, varied with black: Javan partridge of Latham. Found in the ifland of Java.

VIRIDIS. Green; legs and beak reddifh; area of the eyes red; wings fpadiceous: the green partridge of Latham.

VIRGINIANUS. With a black band above and below the eyes; vertical line yellow; the Virginian partridge of Latham. Found among the trees of America.

MARILANDUS. With white eye-brows; neck pointed with white and black: the New England partridge of various writers; the Maryland partridge of the Arctic Zoology and of Latham. Found in America.

KAKELIK. Bill, eye-lids and legs fcarlet; breaft cinereous; back undulated with white and cinereous. Found in Bucharia, &c.

CASPIUS. Cinereous, fpotted with light red; the noftrils, orbits, and temples dufky. Found near Aftrabad, in Perfia.

MEXICANUS. Legs and bill fanguineous; the fuperciliary line white: the coturnix ludoviciana of Briffon, colcuicuiltu of Ray and Willughby, the Louifiana quail of Latham. Found in Louifiana.

FALKLANDICUS. Variegated with brown fpots and curvated ftriæ; beneath white; bill lead-coloured; legs brown; temples fpotted with white: Malouine quail of Latham. Found in the Falkland iflands.

NOVÆ HISPANIÆ. Legs and bill black; crefted head and neck variegated with white and black; body and quill-feathers yellow, the latter tipped with white: this is the grand colin of Buffon, and Mexican quail of Latham. Found in New Spain.

COYOLCOS. With yellow legs; crown and neck fafciated with white and black; body above yellow, varied with white. This is the coturnix mexicana of Briffon; the coyolcozquo of Ray and Willughby, the coyolcos of Buffon, and leffer Mexican quail of Latham; the eyes are black.

SUSCITATOR. Variegated with yellowifh, red, black and grey; bill longer. This is the coturnix javenfis of Briffon, the coturnix indica Bontii of Ray and Willughby, the reveil-matin or caille de Java of Buffon, and noify quail of Latham. Found in the woods of Java.

STRIATUS. With reddifh legs; white eye-brows; tail, throat,

throat, lower breaſt and abdomen black, white-guttated: the Madagaſcar quail of Latham.

GRISEUS. With black legs and bill; body dilutely and ſordidly grey, black-banded: the grey-throated quail of Latham. Found in Madagaſcar.

COROMANDELICUS. Head black; vertex and ocular faſcia red and yellow; throat white, ſurrounded with a black ſtria; body ſtriated; quill-feathers brown: the Coromandel quail of Latham.

NOVÆ GUINEÆ. Brown; greyiſh legs; black quill-feathers, the covers of the wings obſoletely yellow: the New Guinea quail of Latham.

MANILLENSIS. Above black; legs and bill black; throat white; breaſt grey, ſpotted black; abdomen yellow, black-banded: the Manilla quail of Latham.

CRISTATUS. The dependent creſt and throat yellow: this is the quauhtzonecolin of Ray and Willughby, the zone-colin of Buffon, the creſted quail of Latham. Found in Guiana and New Spain.

SINENSIS. Body ſpotted grey; throat black, with a white bow: the coturnix philippenſis of Briſſon, and Chineſe quail of Edwards and Latham. Found in China and the Philippine iſles.

COTURNIX. Body ſpotted grey; eye-brows white; the margin and lunule of the tail-feathers ferruginous: the quail of Pennant and others. Of this there are two varieties, the coturnix major of Briſſon, and the coturnix wholly white.

f. *With three Toes.*

GIBRALTARICUS. With pale legs; black bill; quill-feathers and tail black: the Gibraltar quail of Latham.

ANDALUSICUS. Red, variegated with black; beneath reddiſh-white; legs and bill fleſh-coloured: the Andaluſian quail of Latham.

NIGRICOLLIS. Body above cinereous, variegated with red and black beneath; legs and bill cinereous; chin and throat black; quill-feathers brown: black-necked quail of Latham. Found in Madagaſcar.

LUZONNIENSIS. Head, neck, and throat variegated with white and black; throat and breaſt bay; abdomen yellowiſh; legs and bill dilutely grey: the Luzonian quail of Latham. Found in the Manilla iſlands.

C. *With the Area about the Eyes covered with Feathers, but naked and tetradactyle:* TINAMOU.

GUIANENSIS. With legs and bill brown; back variegated with cinereous brown and blackiſh ſtreaks; throat cinereous; abdomen palely orange and brown. This is the partridge of Guiana of Bancroft and Latham. Found in Cayenne and Guiana.

MAJOR. Legs yellowiſh and brown; bill black; vertex red; body olivaceous; ſpots on the back and tail black. This is the macucagua of Marcgrave, Ray, and Willughby, the magona of Buffon, the tinamou of Cayenne, the great tinamou of Latham. Found in South America, particularly in the woods of Cayenne and Guiana.

CINEREUS. Cinereous-brown: the cinereous tinamou of Latham.

VARIEGATUS. Legs and bill brown; head and neck black; body above variegated with tranſverſe lines, light red and black; beneath red; throat and middle of the abdomen white: the variegated tinamou of Latham. Found in Guiana.

SUVI. Legs and bill yellow; head and neck black; body above brown; beneath red: the little tinamou of Latham. Found in Guiana.

TETRAODON, in *Ichthyology*. See TETRODON.

TETRAPETALOUS, in *Botany*, an epithet given to the flowers that conſiſt of four ſingle petala, or leaves placed around the piſtil.

Theſe M. Juſſieu calls *polypetalous* flowers.

Mr. Ray, who calls them *tetrapetalous*, makes them conſtitute a diſtinct claſs, which he divides into, 1. Such as have an uniform tetrapetalous flower, and their ſeed-veſſels a little oblongiſh, which he therefore calls *ſiliquoſe*. 2. Such as have their ſeed-veſſels ſhorter, which therefore, for diſtinction ſake, he calls *capſulatæ* and *ſiliculoſæ*. 3. Such as have a ſeeming tetrapetalous flower, that is, a monopetalous one, divided deeply into four partitions, which he particularizes alſo as *anomalous*.

TETRAPHARMACUM, τετραφαρμακον, compounded of τέτρα, *four*, and φαρμακον, *drug*, or *remedy*, in the general denotes any remedy conſiſting of four ingredients.

TETRAPHIS, in *Botany*, a name contrived by Hedwig, to expreſs the four points by which the fringe of this moſs is peculiarly diſtinguiſhed. (See FRINGE.)—Hedw. Fund. v. 2. 87. t. 7. f. 32. Schreb. Gen. 758. Sm. Fl. Brit. 1179. Compend. 153.—Claſs and order, *Cryptogamia Muſci*. Nat. Ord. *Muſci*.

Eſſ. Ch. Capſule oblong. Fringe ſimple, of four pyramidal, erect, unconnected teeth.

1. T. *pellucida*. Tranſparent Four-toothed Moſs. Fl. Brit. n. 1. Compend. 163. Engl. Bot. t. 1020. Hedw. Sp. Muſc. 45. t. 7. f. 1. *a—f*. Sibth. Oxon. 275. Turn. Muſc. Hib. 13. (Mnium pellucidum; Linn. Sp. Pl. 1574. M. ſerpillifoliis tenuibus pellucidis; Dill. Muſc. 232. t. 31. f. 2.)—Capſule cylindrical. Leaves ovate, acute, ſingle-ribbed.—Not rare in moiſt ſhady places, about the roots of trees, in various parts of Europe. It is annual, flowering early in the ſpring, and ripening fruit in May. The whole moſs is of a bright tranſparent green. *Root* fibrous, matted. *Stems* moſtly ſimple, an inch high, clothed with alternate, ſeſſile, ovato-lanceolate, acute, entire, wavy, ſingle-ribbed *leaves*, and each terminated by a ſolitary *flower*. The male *flowers*, far more abundant than the female, are little, round, ſtalked, powdery heads, each enveloped in three broad ovate leaves. The *females*, on a different ſtem, are leſs elevated, and more minute, each with from four to ſix *ſtyles*, one of which only, as uſual, is prolific, and the cylindrical, ſmooth, nearly upright *capſule* becomes elevated on a bright orange or crimſon ſtalk, an inch long. The tawny *veil* is torn at the baſe. *Lid* conical, reddiſh, thin, not half ſo long as the capſule. *Fringe* remarkable for its four rigid, poliſhed, acute, pyramidal teeth, of a ſhining brown, by which the genus was well characterized, even when the preſent was the only known ſpecies. Hedwig obſerved the flowers to be ſometimes abortive, and replaced by buds. In the early ſpring he now and then met with *ſtamens* and *piſtils* in the ſame flower.

2. T. *ovata*. Ovate Four-toothed Moſs. Mohr Ind. Crypt. 3. Sm. Compend. 163. Grimmia Browniana; Engl. Bot. t. 1422. Bryum Brownianum; Dickſ. Crypt. faſc. 4. 7. t. 10. f. 16. Orthotrichum Brownianum; Fl. Brit. 1269.)—Capſule ovate. Radical leaves ligulate, obtuſe, without a rib.—Gathered by Mr. R. Brown, by the river ſide at Roſlin, near Edinburgh; and by the late Mr. William Brunton, on ſand-ſtone rocks at lord Grantley's lakes, near Ripon, Yorkſhire. The habit of the plant, and eſpecially the ribbed *veil*, cauſed us firſt to refer our imperfect ſpecimen to *Orthotrichum*, till Mr. Sowerby thought he found the *fringe* to be that of a *Grimmia*. Meanwhile Mr. Funk, a German botaniſt, aſcertained it to be formed of four teeth only, conſtituting a genuine *Tetraphis*, thus

thus adding a fecond fpecies to the curious genus before us. With refpect to habit, indeed, this has little refemblance to the original fpecies. It is a minute, brownifh, pellucid mofs, whofe foliage is all over dotted or reticulated. The *root* feems annual. *Stems* none. Radical *leaves* few, erect, linear, very narrow, a little dilated upwards, obtufe, entire, without rib or vein: thofe which form a *fheath*, at the bafe of the *fruitftalk*, fhort, ovate, acute, with a rib or keel. *Stalk* red, folitary, half an inch high. *Capfule* erect, fmooth, ovate, brown. *Lid* fhort, with an oblique point. *Fringe* red, certainly of only four fhort, acute, firm teeth.

TETRAPHOE, a name given by the people of Guinea to a plant, which they give in decoction as a cure for fluxes. This plant grows alfo in Malabar, where they ufe the roots boiled in whey for the piles; and in the colic they give the root in powder, about a fcruple for a dofe. It is called in this latter place *wellia cadavalli*, and by Petiver *xanthium Malabaricum capitulis lanuginofis*. The ftalks of it are woody and hoary, efpecially about the tops. Its leaves ftand by pairs on fhort footftalks, and while young they are hoary underneath, with a very foft and velvety down; the others are rough, like the fpotted lungwort, but feldom are fo large; the flowers grow in fpikes, and confift each of fine green leaves filled with fcarlet filaments; after thefe the fruit ripens, and is a fort of woolly bur, covered with foft and hooked prickles, very like the common Englifh burdock, but not of a third part of the fize. Phil. Tranf. N° 232.

TETRAPILUS, a genus of Loureiro's, in his Cochinch. 611, named from τετρα, and πιλος, *a hat*, or *hood*, becaufe the four fegments of the corolla end each in a hooded point. Every part of the defcription anfwers to the genus OLEA, fee that article; except that the flowers are dioecious (which indeed is of little confequence, fome of the known fpecies being fubject to have the ftamens and piftils occafionally in feparate flowers); and the berry is faid to have two cells, with feveral feeds. Though *Olea* therefore is known to have two cells in the young germen, there being here more than one feed, muft reduce Loureiro's plant to *Liguftrum;* and it may prove very near *L. japonicum*, Thunb. Jap. 17. t. 1, though fcarcely the fame fpecies.

TETRAPLA, formed from τετραπλος, *quadruplex*, *fourfold*, in *Church Hiftory*, a Bible difpofed by Origen, under four columns, in each of which was a different Greek verfion, *viz.* that of Aquila, that of Symmachus, that of the Seventy, and that of Theodotion.

Sixtus of Sienna confounds the tetrapla with the hexapla; but the tetrapla is a different work, compofed after the hexapla, and in favour of fuch as could not have the hexapla.

Some authors are of opinion, that the order in which the four verfions of the tetrapla were ranged, was different from that in which we have rehearfed them; and particularly, that the Septuagint was in the firft column; but St. Epiphanius fays exprefsly to the contrary, and places it in the third. He even gives us Origen's reafon for putting it there, which was, fays he, that the beft verfion might be in the middle, that the others might be the more eafily confronted with it, and corrected from it.

Baronius, however, in his Annals for the year 231, takes the Septuagint to have been in the third place in the hexapla, but in the firft in the tetrapla; but Epiphanius gives it the fame place in both. See HEXAPLA.

TETRAPOGON, in *Botany*, fo named by Desfontaines, from τετρα, and πωγων, *a beard*, becaufe of the four awns affembled in each calyx.—Desfont. Atlant. v. 2. 388. Willd. Sp. Pl. v. 4. 898.—Clafs and order, *Polygamia Monoecia*, Desfont. and Willd. rather *Triandria Digynia*. Nat. Ord. *Gramina*.

Gen. Ch. *Cal.* Glume of two nearly equal, oblong, membranous, fhining, awnlefs valves, containing three florets. *Cor.* of two valves; the outer one keeled, abrupt, villous, with a long, ftraight, terminal, fpreading awn; inner fmaller, membranous, awnlefs. *Stam.* Filaments three, fhort, capillary, deflexed; anthers oblong, emarginate, pendulous. *Pift.* Germen fmall, roundifh, fuperior; ftyles two, fhort; ftigmas feathery, oblong. *Peric.* none, except the permanent corolla. *Seed* folitary, invefted with the corolla, but not united to it. The terminal *floret* is imperfect, but both valves are awned.

Eff. Ch. Calyx of two valves, three-flowered. Corolla of two unequal valves; the outermoft abrupt, awned. Central floret imperfect; both valves awned.

1. T. *villofus*. Villous Four-bearded Grafs. Willd. n. 1. Desfont. Atlant. v. 2. 389. t. 255.—Gathered by Desfontaines in fandy ground in Barbary, near Cafsa. The *ftem* is erect, about a foot high, knotty, leafy, a little compreffed, fmooth. *Leaves* linear, fmooth, narrower than their long fheaths, of which the uppermoft, in particular, is much inflated, embracing the bafe of the *fpike*, which refembles that of a POLYPOGON. (See that article.) The *flowers* are feffile, difpofed in four ranks, on a flender zigzag common ftalk, or *receptacle*, their copious yellowifh *awns* about half an inch in length, fpreading every way. The outer valve of the *corolla* is clothed with copious foft fpreading hairs.

TETRAPOLIS, in *Ancient Geography*. See CARPATHOS.

TETRAPOLIS, *Attica*, the name of a country of Greece, N. of Attica; in which, according to Strabo, were four towns built by Xanthus, when he reigned in this diftrict of Greece; whence its name, from τετρα, *four*, and πολις, *city*.

TETRAPOLIS, *Dorica*, a country of Greece, in the Doride, between the country of the Etolians and that of the Enianes, according to Strabo.

TETRAPOLIS *Syriæ*, a country of Afia, in Syria, according to Strabo; it contained four principal towns, which had the fame founder.

TETRAPTOTE, TETRAPTOTON, in *Grammar*, a name given to fuch defective nouns as have only four cafes; fuch are *aftus*, &c.

TETRAPYRAMIDIA, derived from τετρας, *four*, and πυραμις, *a pyramid*, in *Natural Hiftory*, the name of a genus of fpars.

The bodies of this genus are fpars influenced in their fhape by an admixture of particles of tin; and are found in form of broad-bottomed pyramids of four fides.

Of this genus there is only one known fpecies, which is ufually of a brownifh colour, and is found in Saxony; as alfo in Devonfhire, Cornwall, and other counties of England, where there is tin. Hill.

TETRAPYRGIA, in *Ancient Geography*, a town of Cappadocia, in Garfauria.—Alfo, a town of Africa, upon the coaft of Marmarica, before Portus-Phycus, according to Strabo.

TETRARCH, TETRARCHA, τετραρχης, formed of τετρα, *four*, and αρχη, *rule*, *dominion*, a prince who holds and governs the fourth part of a kingdom.

Such, originally, was the import of the title *tetrarch;* but it was afterwards applied to any petty king or fovereign; and became fynonimous with *ethnarch*, as appears from the follow-

following considerations: 1. That Pliny makes mention of six tetrarchies within the cities of Decapolis. 2. That Herod's kingdom was only divided into three parts, which yet were called tetrarchies, and the sovereigns of them (Luke, iii. 1.) tetrarchs. 3. Josephus Antiq. Jud. lib. xiv. c. 23. tells us, that, after the battle of Philippi, Antony, going into Syria, constituted Herod tetrarch; and on medals the same Herod is called *ethnarch*.

TETRARRHENA, in *Botany*, so named by Mr. R. Brown, from τετρα, and αῤῥην, *male*, on account of the very remarkable character in this tribe, the grasses, of the four stamens, which Mr. Brown says he has ascertained by repeated examination.—Brown Prodr. Nov. Holl. v. 1. 209.—Class and order, *Tetrandria Digynia*. Nat. Ord. *Gramina*.

Eff. Ch. Calyx of two-valves, single-flowered. Corolla double; each of two valves, naked at the base. Nectary of two scales, opposite, alternate with the valves of the corolla. Stigmas feathery.

The inflorescence is a simple, equal, somewhat racemose spike. Flowers awnless.

1. T. *distichophylla*. Two-ranked Tetrandrous Grass. Br. n. 1. (Ehrharta distichophylla; Labill. Nov. Holl. v. 1. 90. t. 117.)—Flowers downy. Corolla ribbed, obtuse; the outermost valve half the length of the rest. Leaves straight, hairy as well as their sheaths. Stem branched at the base.—Native of Cape Van Diemen. The *stem* is hardly a foot high, with many erect leafy branches. *Leaves* lanceolate, acute, about an inch long, moderately spreading in two ranks. *Spikes* solitary, stalked, terminal, erect, about an inch in length, simple, the *flowers* almost all sessile, spreading in two rows.

2. T. *acuminata*. Pointed Tetrandrous Grass. Br. n. 2.—"Flowers smooth. Corolla ribbed; the outer glumes acute; one valve rather shorter than the inner glumes; the other longer, with a taper point. Leaves and their stems smooth. Stem branched."—Found by Mr. Brown in the same country.

3. T. *juncea*. Rushy Tetrandrous Grass. Br. n. 3.—"Flowers smooth, imbricated. Calyx without ribs. Corolla ribbed, obtuse. Stem branched; straight and smooth like the leaves."—From the southern coast of New Holland. *Brown*.

4. T. *lævis*. Smooth Tetrandrous Grass. Br. n. 4.—"Flowers smooth, distinct. Calyx ribbed, rather acute. Corolla obtuse, smooth, without ribs. Stems simple. Leaves smooth, flat, rather lax."—Gathered by Mr. Brown in the same country with the last species.

TETRASARIUS, a word used by some of the medical writers, to express half an ounce.

TETRASPASTON, τετρασπαστον, in *Mechanics*, a machine in which are four pullies. See Pulley.

TETRASTATER, τετραστατηρ, in *Ancient Coinage*, a Grecian gold coin of Lysimachus, Antiochus III., and of some of the Egyptian monarchs. It was the quadruple chrusos (χρυσος), weighing about 530 grains, and current for 80 drachmas of silver, valued at about 3*l*., now worth 4*l*. sterling. Some weigh 540 grains, which may be owing to the gold of such being of more alloy; though it may well be questioned, says Pinkerton (Medals, vol. i.), if they were ever meant to relate to the Attic standard.

TETRASTICH, τετραστιχον, a stanza, epigram, or poem, consisting of four verses.

TETRASTŒCHON, in *Botany*, a term often used by the Greek writers, and generally misunderstood by those who copy their accounts. Pliny has made an error in the description of the euonymus, which has confounded two different shrubs together ever since, by mistaking the sense of this word, used by Theophrastus, in his account of it. He says, that the fruit is divided within into four orders or series of seeds; this he expresses by the word *tetrastœchon*, which Pliny, supposing to be the same with the word *tetragonon*, has translated into *granum quadrangulæ figura*.

But this is by no means the sense of the word which was used by the Greeks, to express that a thing had τετταρας ταξεις, four rows, orders, or series of seeds in it: nor does it at all express the seeds being square, much less its being single, for the original derivation of the word was from the term κατα στοιχον, used in dances. These were composed of several series of persons, called στοιχοι, *stæchi*; and every stœchon consisted of several persons, who all moved together. See Euonymus.

TETRASTYLE, formed from τετρα, *four*, and στυλος, *column*, in the *Ancient Architecture*, a building, and particularly a temple, with four columns in its front.

TETRASYLLABICAL, a word consisting of four syllables.

TETRATHECA, in *Botany*, received that name from the writer of the present article, in allusion to the four cells of its anthers, the word being compounded of τετρα, and θηκη, *a case*, or *cell*. Mr. Brown indeed, in his General Remarks on the Botany of Terra Australis, p. 12, offers some observations tending to invalidate this name and character. But it appears to us, that they both derive confirmation from the consideration, of which we are well aware, that most anthers have four cells when young, though, as they burst lengthwise, the partition of each cell is obliterated. Whereas the peculiarity of our *Tetratheca*, admitted by our intelligent friend, consists in the four cells remaining unaltered, because the pollen is discharged by a terminal tube or orifice; nor is it of any great consequence that he has found, in some species, the partition to be obliterated, in an advanced state of the anthers. *Ceratopetalum*, for example, is a good name and a well-marked genus, though there is a species destitute of petals. With respect to the natural order, and the situation of the singular appendage to the seed, in the genus before us, we gladly profit by Mr. Brown's correction, hoping to be pardoned, though we may have made several false steps, in the totally strange wilderness of New Holland plants, which we were among the first, without any guide, to attempt to lay open to botanists.—Sm. Bot. of New Holl. 5. Exot. Bot. v. 1. 37. Willd. Sp. Pl. v. 2. 321. Ait. Hort. Kew. v. 2. 347.—Class and order, *Octandria Monogynia*. Nat. Ord. akin to *Polygaleæ*, a new order to which *Polygala* is referred; but in Mr. Brown's opinion constituting, along with another genus, a still different order, which, from the name destined for that genus, he chooses to denominate Tremandreæ, of which we propose to treat in its proper place.

Gen. Ch. *Cal.* Perianth inferior, in four deep equal segments, deciduous. *Cor.* Petals four, obovate, equal, many times longer than the calyx. *Stam.* Filaments eight, inserted into the receptacle, very short, equal, erect, simple; anthers terminal; oblong, somewhat curved, much shorter than the corolla, with four longitudinal furrows, and as many cells, and terminating in a simple tubular beak, through which the pollen is discharged. *Pist.* Germen superior, very small, obovate, compressed; style vertical, cylindrical, simple, hardly so long as the anthers; stigma simple. *Peric.* Capsule obovate, compressed, of two cells and two valves, the partitions from the middle of each valve. *Seeds* one or two in each cell, oval, pendulous, with a naked scar, but crowned, at the opposite end, with a twisted crest.

Eff.

Eff. Ch. Calyx four-cleft, inferior. Petals four. Anthers beaked, with four cells. Capfule of two cells and two valves, with partitions from their middle. Seeds crefted, about two in each cell.

1. T. *juncea*. Rufhy Tetratheca. Willd. n. 1. Ait. n. 1. Sm. Bot. of New Holl. 5. t. 2.—Smooth. Leaves alternate, lanceolate. Stem with fharp angles. Branches elongated, and almoft naked.—Native of New South Wales, from whence we received drawings and fpecimens, through the hands of Dr. John White, foon after the fettlement of the colony there. This plant was fent to Kew, by Mr. Peter Good, in 1803, and it is marked as flowering in July and Auguft, being kept in the greenhoufe in winter. The *root* is woody, fmall, perennial. *Stems* fomewhat fhrubby, much branched even from the bafe; the branches long, flender, very acutely angular, fo as to be almoft winged, leafy, fmooth like every other part. *Leaves* generally few and fmall, acute, feffile, entire, with a ftrong mid-rib. *Stipulas* none. *Flowers* fcattered along the branches, on fimple folitary red ftalks, about an inch long, each from the bofom of a diminifhed leaf, and making a very elegant appearance. The *calyx* is red. *Petals* crimfon or rofe-coloured, three-fourths of an inch long. *Anthers* purplifh-brown, tipped with yellow. We have a variety with white *petals*, the *calyx* and *ftalks* of which preferve their ufual colour.

2. T. *ericifolia*. Heath-leaved Tetratheca. Sm. Exot. Bot. v. 1. 37. t. 20.—Leaves whorled, linear, revolute, minutely toothed. Stem rough with afcending briftles. Flower-ftalks and calyx very fmooth. From the fame country as the foregoing, and fent, with drawings, at the fame time. This is of more humble growth than *T. juncea*, and much more leafy. The *leaves* are four, five, or more, in each whorl from top to bottom of the ftem and branches, feffile, narrow, about half an inch long; their edges, and fometimes their upper furface, near the point, rough with minute teeth. *Flowers* rofe-coloured, drooping, about half the fize of the foregoing, on fimple, folitary, axillary ftalks, as long as the leaves. *Anthers* purple, with yellow tips, badly reprefented by the engraver, who miftook the original drawing of the fection of an anther, for the *germen*, and altered it accordingly. *Capfule* ovate, emarginate. *Seeds* with a fmall white creft, moftly two in each cell.

3. T. *glandulofa*. Glandular Tetratheca. Sm. Exot. Bot. v. 1. 39. t. 21.—Leaves imperfectly whorled, lanceolate, revolute, toothed with little fpines. Stem downy. Flower-ftalks and calyx rough with glands.—Sent intermixed with the laft, from New South Wales. The fpecimens of both appeared to have been burnt down to the ground, probably by fires made by the favages in the woods, and had grown up again; which proves them to be perennial plants, though fcarcely fhrubby. The fize of the prefent fpecies, and its general afpect, agree with *T. ericifolia*, but the *corolla* and *anthers* are of a darker tint. The *ftem* is clothed with very fhort clofe down, by no means briftly; while the *flower-ftalks* and *calyx*, inftead of being fmooth, are covered with glandular hairs. The *leaves* are rather broader, and lefs whorled, being often merely oppofite, or even difperfed.

4. T. *thymifolia*. Thyme-leaved Tetratheca. Sm. Exot. Bot. v. 1. 41. t. 22.—Leaves whorled, lanceolate, toothed with little fpines. Stem, flower-ftalks, and calyx rough with afcending briftles.—From the fame country. Rather larger than either of the two laft, and readily diftinguifhed, at firft fight, by its broader lefs revolute *leaves*. The briftly hairs clothing the *flower-ftalks* and *calyx* are its peculiarly diftinguifhing character. The *flowers* are of a fine crimfon, with violet *anthers*, whofe tips are yellow. Few genera are more peculiar, or more elegant, than *Tetratheca*, and the fpecies are all worthy of a place in our collections.

TETRATONON, is the Greek name of an interval of four tones; which in modern mufic is ufually called the fuperfluous or fharp fifth.

TETRAX, in *Ornithology*, the name of a bird of the *otis* or buftard kind, called by fome authors *anas campeftris*, or the field-duck, and alfo little buftard; and by fome others, the *canna*. See OTIS.

It is a very common bird in France, where it is called *canne patriere:* it is called *anas*, from its fitting on the ground, juft as the duck does on the water. It is of the fize of a pheafant, and has a beak like that of the common hen. It is taken with nets, as the partridge: it runs very fwiftly, and, like the buftard, has no hinder toes. Its belly is white, and its back is variegated with grey, red, and black. It feeds on vegetables, and on fmall infects.

TETREUMA, in *Botany*, a name given by the people of Guinea to a fpecies of fhrub, very common among them, and ufed to cure whitlows. They dry the leaves, and reduce them to powder; and, moiftening them with any liquor, apply them to the place. Petiver has called this *arbor Guineenfis lauruftini facie*, from its great likenefs to the common fhrub which we call the lauruftine. The leaves are opaque and ftiff, and are an inch and a quarter broad, and two inches and a half long. Thefe ftand alternately on all fides of the ftalk, and are fixed on fhort pedicles. The flowers grow out of the bofoms of the leaves, and ftand in clufters in the manner of thofe of the common lauruftine. Phil. Tranf. N° 232.

TETRICA, in *Ancient Geography*, a town of the Sabines, placed by Varro in the environs of mount Fifcellus, which lay northward. Servius on Virgil fays, that it belonged to Picenum, becaufe in his time, its limits had been changed. The Abbé Chaupé places it where we now find Leoneffa. There we find the terrible rocks, horrentes rupes, mentioned by Virgil.

TETRICUS MONS, a fcraggy mountain of Italy, in the country of the Sabines. Pliny.

TETRINA, in *Geography*, a town of Ruffia, in the government of Archangel, near the White fea; 100 miles N.N.W. of Archangel.

TETRIX, in *Ornithology*, a fpecies of *tetrao;* which fee.

TETRODON, in *Ichthyology*, a genus of the Branchioftegi order of fifhes, according to the arrangement of Gmelin; the characters of which are, that the jaws are long, divided at the tip; the branchiæ or gills have a linear aperture; the body is roughened beneath, and the ventral fins are wanting. The fifhes of this genus, like the Chiodon, have the power of inflating their bodies at pleafure, by means of an internal membrane, and during this time the fmall fpines of the fides and abdomen rife fo as to be a defence againft their enemies. They live principally on cruftaceous and teftaceous animals. Gmelin enumerates thirteen fpecies.

SCELERATUS; the Noxious Tetrodon. Tetragonal, with very large head; length two feet or more. Found in the American and Pacific oceans, and confidered as highly noxious, producing, when eaten, very fevere fymptoms.

TESTUDINEUS; a Tortoife-fhell Tetrodon. Abdomen plane, fmooth, and back with white curved futures; length two feet; colour rufous-brown above, marked by numerous round pale blue fpots; beneath bluifh or afh-coloured, beautifully varied by longitudinal brown ftreaks; fins and tail bright ferruginous; the whole abdomen is furnifhed with numerous fmall fpines, which, when the animal is undifturbed, are imbedded in correfponding cavities in the fkin,

but

but elevated, when the fiſh is alarmed and diſturbs its body. Found in the Indian ſeas.

Lagocephalus; Hare Tetrodon. Abdomen aculeated; ſmooth body, and prominent ſhoulders; length twelve inches; thick in front; hinder parts tapering ſuddenly towards the tail; colour above yellowiſh-brown, beneath whitiſh with a ſilvery caſt; acroſs the back marked with ſhort, black, or dark-brown bars, and over the ſides with many, ſcattered, round, blackiſh ſpots; ſides and abdomen beſet with radiated ſpines; fins ſmall, and tail ſlightly rounded. Found in the Indian and American ſeas; and ſtraying into northern latitudes, are taken about the Britiſh coaſts. This fiſh has the power of inflating the abdomen to a large ſize; and derives its name from the reſemblance of its head to that of a hare.

Lineatus. With brown and pale bands; length ten or twelve inches, ſquare ſhape; and when inflated, like the laſt; body beſet with ſmall ſpines; colour grey on the abdomen, with longitudinal, deep-brown ſtreaks; fins and tail as in the laſt ſpecies. Found in the Indian and American ſeas, and alſo in the river Nile.

Electricus. With red, green, and white ſpots; above brown, and beneath ſea-green; yellow at the ſides, and green fins; length ſeven or eight inches; eyes large, with red circles. Found in the Indian and American ſeas, among coral rocks; and when touched with the hand, affecting it with an electric or galvanic ſhock.

Ocellatus. Ocellated on the ſhoulder-band; length ſix or eight inches; thick, ovate ſhape, contracting towards the tail; colour deep green above, paler on the ſides and abdomen, which are whitiſh; acroſs the middle of the back, as far as each pectoral fin, a broad black creſcent, edged with yellow; dorſal fin ſituated on a round black ſpot with yellow edges; lateral line from beneath the eyes to the tail, which is ſmall and roundiſh; under parts beſet with many ſpines. Found in the Indian ſeas and adjoining rivers, particularly thoſe of China and Japan; very poiſonous in its nature, and it is prohibited to be eaten under very ſevere penalties by the emperor of Japan.

Spengleri. Head bearded with many cirri; lengthened ſhape; above brown-coloured, with roundiſh deep brown ſpots; abdomen tumid, whitiſh, and beſet with ſmall ſpines; with cirri or ſoft prominences diſperſed about the upper parts of the body. Found in the Indian ſeas, ten or twelve inches in length

Hankenii. With lower jaw longer than the upper; length eight or ten inches; like the former in general appearance; above brown-coloured, with ſmall whitiſh clouds or ſpots; beneath whitiſh, with ſmall ſpines. Found in the Indian ſeas.

Oblongus. Oblong, with equal jaws; length ſix inches; lengthened ſhape; colour whitiſh, with grey back, marked by many ſemi-decurrent brown bands; fins and tail cinereous; two lateral lines, one near the back, the other near the abdomen. Found in the Indian ſeas.

Rostratus; Snouted Tetrodon. Both jaws elongated to the beak; length a few inches; oblong-ovate ſhape, contracting towards the mouth and tail; ſnout lengthened and ſlightly tubular; colour blueiſh-brown, beneath whitiſh; fore-part of the abdomen beſet with ſpines, few over the back; fins brown. Found in the Indian ſeas.

Lævigatus; Smooth Tetrodon. With the abdomen aculeated in front; a large ſpecies; blueiſh above, with two white ſtripes on each ſide; under parts white; from the mouth to the end of the pectoral fins aculeated; the other parts being ſmooth. Found in the American ſeas.

Hispidus. Entirely hiſpid, with briſtly papillæ; length two feet; ſhape, when inflated, like that of T. lagocephalus; colour whitiſh; upper parts marked acroſs the back by three or four ſemi-decurrent brown bands; whole body beſet with ſmall ſpines. Found in the Mediterranean and Indian ſeas. Small remains of this ſpecies are ſaid to occur among the petrifactions of mount Bolca near Verona.

Mola. Unarmed, ſharp, compreſſed, rounded; a very ſhort rounded tail; dorſal fin annexed to the anal, with oval ſpiracles. (See Sun-*Fiſh.*) Dr. Shaw has made a diſtinct genus of the ſun-fiſh under the name of *cephalus*, the characters of which are, that the jaws are bony, and body terminating abruptly, ſo as to reſemble the head of a fiſh. This genus comprehends the mola, or ſhort ſun-fiſh; the oblong ſun-fiſh, with truncated body, or oblong diodon of Pennant (ſee Sun-*Fiſh*); the variegated, with whitiſh undulations and ſpots; and the Pallaſian C. or ſilvery ſun-fiſh, with browniſh back, and ſpiny carinated abdomen. The mola, or ſhort ſun-fiſh, is a native of the European ſeas. Its general colour is brown, with a ſilvery caſt on the ſides and abdomen; the ſkin rough; the pectoral fins ſmall, rounded, and placed horizontally; the dorſal and anal fins placed oppoſite, and of a lengthened ſhape, with rounded tips continued into the tail-fin. This fiſh is ſometimes ſeen lying on its ſide, on the ſurface of the water, when it may be eaſily taken. In the Northern ſeas it arrives at a vaſt ſize, of the length of eight or even ten feet, and 500 pounds in weight: it is ſuppoſed to feed principally on ſhell-fiſh, and in the night it is ſaid to exhibit a high degree of phoſphoric ſplendour.

Of this there is a variety, *viz.* the *truncatus*, unarmed, ſmooth, compreſſed, oblong, with a very ſhort tail, the dorſal and anal fins annexed, with lunated ſpiracles. This is the oblong ſun-fiſh of Pennant.

Stellatus; Spherical Grey Tetrodon. Whitiſh beneath, with the body beſet with radiated ſpines: the tetrodon etoilé of Cepede. Length twelve or fourteen inches; ſhape, when inflated, nearly ſpherical; colour greeniſh, deeper on the back, marked with duſky ſpecks; under parts whitiſh; vent ſurrounded by a black circle; whole body covered with ſmall ſtellated or radiated ſpines; dorſal fin rounded at the tip, and attached at the baſe by a kind of footſtalk; tail oval. Found in the Indian ſeas. Shaw.

Punctatus; Spherical Brown Tetrodon. With black ſpecks, whitiſh abdomen, and very narrow dorſal fin: the tetrodon pointellé of Cepede. Reſembling the former. Found in the Indian ſeas. Shaw.

Meleagris; Pintado Tetrodon. Brown, ſpeckled with white. Found in the Indian ſeas, and when taken, making a kind of grunting noiſe, like ſeveral others of this and neighbouring genera.

TETSCHIN, or Tetzin, or *Dietſchin*, in *Geography*, a town of Bohemia, in the circle of Leitmeritz, on the river Elbe; 15 miles N. of Leitmeritz. N. lat. 50° 46′. E. long. 14° 17′.

TETSI, a town of Thibet; 27 miles E. of Laſſa.

TETT, a place now in ruins, ſituated to the ſouth of Azamore, on the northern extremity of the bay of Mazagen, in the empire of Morocco; the name ſignifies in Arabic Titus, and is therefore ſuppoſed to denominate the ruins of Titus, founded by the Carthaginians.

TETTER, a diſeaſe among animals, which is of the ring-worm kind, and which runs or ſpreads itſelf upon the ſkin in different directions, whence probably it has received the name. It attacks different parts, but is moſt commonly met with on and about the rump, not unfrequently running down upon the joints of the tail for ſome diſtance.

It is of a ſcabby itchy nature and appearance, and when neglected,

neglected, is said to have sometimes become of the quality of canker, in some sorts of animals. In cases where it fixes upon the more fleshy parts of the bodies of the animals, it is often attended with such troublesome itchings, as to cause them to rub themselves against posts, walls, and other places, until they rub off and destroy the very hair and skin of the parts. Nay, the animals will, it is said, sometimes even tear off the flesh with their teeth, if they can come at the parts.

The cure of the disease may mostly be accomplished by the use of a ball composed of from half a drachm to a whole one of calomel, or more, according to circumstances, in union with some sort of cooling purgative powder: or a powder constituted of crude antimony, æthiops mineral, and cremor of tartar, of each about half an ounce; which should be given once or twice a day in a quart of oat-meal gruel. At the same time, washing the parts well with Goulard water, and afterwards applying a little of an ointment composed of sulphur, blue ointment, and hog's-lard to them.

The animals should be well taken care of while the cure is going on.

TETTIGES, τέττιγες, *grasshoppers*, in *Antiquity*, a title the Athenians assumed to themselves. See Gegenes.

TETTIGOMETRA, in *Entomology*, a name by which the ancients called the nymph of the cicada, or *tettyx*; and they named this nymph, from which they frequently saw that fly hatched, *tettigometra*, which signifies the *mother of the cicada*. See Harvest-*Fly*, Cicada, and Vegetable-*Fly*.

TETTIGONIA, a word used by the ancients to express the smaller species of cicada, with which they were acquainted. They called the larger *acheta*.

It is generally supposed, that the tettigonia was the same with our smallest kind, called by the French *cigalon*; but M. Reaumur observes, that as the ancients knew two kinds of the cicada, we know three; and that our middle one seems to have been their tettigonia or small cicada, and that they were not acquainted with our smallest kind, or cigalon, which is not larger than a hornet.

TETTIGONIÆ of Linnæus. See Gryllus.

Tettigoniæ of Fabricius. See Cicada.

TETTNANG, in *Geography*, a town of Germany, and principal place of a lordship of the same name, united with Montfort, ceded to Bavaria by the peace of Presburg; 8 miles N. of Lindau.

TETTOVA, a town of European Turkey, in Macedonia; 13 miles W. of Skopia.

TETTUA-MOTU, a cape on the E. coast of New Zealand, the N.E. point of Poverty bay. N. lat. 38° 36'. W. long. 181° 30'.

TETUAN, Tetawan, or *Tetteget*, a town of Africa, in the empire of Morocco and province of El Garb, situated near the river Busega, about a league and a half inland from the Mediterranean, and inhabited by Moors and Jews; who for the most part speak a corrupt Spanish, in which language their commercial negociations are transacted. They are genteel in their persons and polite in their manners. The environs of Tetuan are planted with vineyards and gardens, which are kept in good order, and which produce more excellent fruits than those in other parts of the empire. From the raisins and figs the Jews distil an ardent spirit (called Mahaya), which, at the age of a year, resembles the Irish usquebaugh, and it is preferred to English brandy and rum. Of this they drink immoderately, and generally take a glass before eating. Leo Africanus attributes the foundation of this town to the people of Africa. It was afterwards embellished, and the population increased, when the Moors were driven out of Spain. This was the place of residence for many of the consuls of the European powers, till the year 1770, when the reigning emperor, Seedy Mahomed, would no longer permit them to remain, nor again to establish themselves in the place. The port of this town has kept a trading communication with Gibraltar, whence the ships come to victual, when the wind is in the west, and does not allow them to make Tangiers. The shore of Tetuan is only safe when the wind is in the west, at which time ships ride securely; but when it veers to the east, they must remain here no longer. Our fleets often victual and water here, and this was the case with that of the immortal Nelson, previously to his victory in Aboukir bay. Tetuan is said to contain 16,000 people; 30 miles S.E. of Tangiers. N. lat. 35° 30'. W. long. 5° 20'.

TETYAN Head, a cape on the W. coast of the island of Mindanao; near which is a harbour that may be entered without danger. N. lat. 7° 20'. E. long. 124° 36'.

TEVAKUN, a town of Persia, in the province of Khorassan; 45 miles E.S.E. of Meschid.

TAVARA, a town of Naples, in Capitanata; 5 miles N.E. of Volturara.

TEUBER, or Teuberinn, Elisabeth, in *Biography*, a celebrated German opera singer, and élève of the famous Tesi. She was chiefly attached to the court of Vienna, where she resided in 1772. She had sung at Naples in 1769 with great applause; but was peremptorily ordered by her physicians never to sing again. Her health had been so much impaired in Russia, where she had remained three years, that the whole faculty was unanimous in pronouncing that the exercise of her profession would be fatal. However, in spite of this prediction, she afterwards recovered her health and voice sufficiently, in a journey to Italy, to appear again on the stage at Naples in 1785; where, finding that her voice had somewhat lowered its pitch, she performed the principal man's part in contralto, to the entire satisfaction of the public. She was the daughter of a famous violinist in the emperor's service; she had lessons in singing from Hasse, in acting from the Tesi, and often sung in the operas of Haydn at Esterhazi.

TEUCHERN, in *Geography*, a town of Saxony, in Thuringia; 18 miles S.W. of Leipsic.

TEUCHITES, in *Botany*, a name used by some for the *scœnanth* or *schœnanth*, camel's hay, which ought to be written *teuochitis*. There is a city *Teuochis* in Egypt, near the borders of Arabia, and the geographers all mention a lake in the neighbourhood of this city; in this lake it is probable the schœnanth might grow; and being gathered there, and sold in the adjoining city of Teuochis, the purchasers might distinguish it with an epithet formed of the name of the place where they bought it. See Scœnanth.

TEUCHTLACOT-ZANHQUI, in *Zoology*, a name by which the natives of some of the American nations call the rattle-snake.

TEUCRIUM, in *Botany*, an ancient name, whether applied to any species of this genus, or of any other, because the plant was discovered by Teucer the Trojan prince, or dedicated to him, or found in the country of Troy, sometimes called *Teucria*, we must humbly profess our inability to form any opinion or conjecture.—Linn. Gen. 287. Schreb. 384. Willd. Sp. Pl. v. 3. 13. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 606. Prodr. Fl. Græc. Sibth. v. 1. 390. Ait. Hort. Kew. v. 3. 365. Schreb. Unilab. 26. Pursh 405. Tourn. t. 98. Juss. 112. Lamarck Illustr. t. 501. (Polium; Tourn. t. 97. Chamædrys; Tourn. t. 97.)

t. 97.)—Clafs and order, *Didynamia Gymnofpermia.* Nat. Ord. *Verticillatæ*, Linn. *Labiatæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, cloven half way down into five acute, nearly equal, fegments, gibbous on one fide at its bafe, permanent. *Cor.* of one petal, ringent. Tube cylindrical, fhort, ending in an incurved throat. Upper lip erect, acute, divided throughout into two diftant fegments, divaricated towards each fide: lower fpreading, three-cleft; its lateral fegments refembling the upper lip, nearly erect; the central one roundifh, and very large. *Stam.* Filaments four, awl-fhaped, longer than the upper lip of the corolla, afcending, curved, prominent between its divifions; anthers fmall, incumbent. *Pift.* Germen fuperior, deeply four-lobed; ftyle thread-fhaped, agreeing with the ftamens in fize and pofition; ftigmas two, flender, acute. *Peric.* none, the unchanged calyx containing the feeds in its concave bafe. *Seeds* four, roundifh, reticulated or wrinkled.

Eff. Ch. Upper lip of the corolla deeply divided, beyond its bafe, divaricated. Stamens prominent.

Obf. The upper lip of the corolla being fo deeply divided, even below its bafe, into the tube itfelf, and its fegments fo far afunder, there feems to be no upper lip at all. The latter however is more truly the cafe in *Ajuga*, to which, and not to *Teucrium*, belongs the *Chamæpitys* of Tournefort; its upper lip being, in a manner, cut away. *Teucrium* of Tournefort has a bell-fhaped calyx, and the middle fegment of the lower lip of its corolla concave. *Polium* of the fame author has its flowers collected into denfe terminal heads. His *Chamædrys* has axillary flowers, and a tubular *calyx*. *Marum* of Boerhaave has thyme-like leaves, and a peculiarly pungent fmell. *Scordium* of Ray and Rivinus has the odour of garlic. *Iva* of Dillenius has the calyx very protuberant at the lower part. All thefe neverthelefs form together a moft natural and well-defined genus, whofe qualities are more or lefs aromatic or bitter; its habit ufually herbaceous, moftly perennial, often fhrubby; leaves oppofite, fimple, though in fome inftances much divided; pubefcence various, but hardly ever abfent; flowers blue, red, yellow, or whitifh, axillary, folitary or whorled, panicled or capitate; their incurved ftamens and ftyle always very confpicuous between the divifions of the upper lip.

Thirty-five fpecies are enumerated in the fourteenth edition of Linn. Syft. Veg. from which *Chamæpitys*, *Iva* and *falicifolium* are to be removed to *Ajuga*. Willdenow, after making thefe deductions, has fixty-four. He follows Schreber and others, in making many more fpecies out of the allies of *Polium*, than Linnæus would ever allow to be more than varieties. Two new ones from Crete are added in the Prodr. Fl. Græc. The genus is generally European, but not entirely fo, and for the moft part inhabits warm funny climates. No attempt has been made to diftribute it into fections. We fhall indicate fome traces of fuch, as we felect the more curious or remarkable fpecies for illuftration, defcribing all the Britifh as well as the new ones.

T. *campanulatum.* Bell-fhaped Germander. Linn. Sp. Pl. 786. Willd. n. 1. Ait. n. 1. (T. fupinum, perenne, paluftre, apulum, glabrum, foliis laciniatis, flore albo; Till. Pif. 163. t. 49. f. 1.)—Leaves many-cleft, nearly fmooth. Flowers axillary, folitary. Calyx awned. Stem procumbent.—Native of moift fituations, in Italy and the Levant. Miller appears to have cultivated it in 1728, but the true plant is now fcarcely to be feen in our gardens, and is little known to botanifts. The fynonym of Tilli has no right to be marked as a variety, anfwering exactly to the Linnæan fpecimens and defcription, nor do we find any other figure of this fpecies. Schreber feems to have mifled Willdenow, to quote a fynonym of Rivinus, which has no exiftence. This we find tranfcribed into Hort. Kew. with a correction of t. 14 for 24; though nothing but *T. Botrys* is there to be feen. No lefs incorrectly is Rivinus, t. 19, cited by Willdenow, after Schreber, for *T. orientale;* as Dr. Sims has noticed in Curt. Mag. 1279. *T. campanulatum* is a very diftinct, perennial, herbaceous, nearly fmooth, fpecies, whofe *ftems* are fquare, leafy, more or lefs proftrate and creeping. *Leaves* an inch long, twice three-cleft, with bluntifh, notched, flightly revolute fegments. *Flowers* axillary, folitary, oppofite, ftalked, with a large, bell-fhaped, rather pungent-pointed, *calyx*. The *corolla* is faid to be white.

T. *lævigatum.* Smooth Yellow Germander. Vahl Symb. v. 1. 40. Willd. n. 2.—Quite fmooth. Lower leaves many-cleft; upper three-cleft, entire. Flowers axillary, folitary. Segments of the calyx oblong, without awns.—Gathered at Monte Video, by Commerfon, whofe fpecimen is before us. This fpecies is larger in all its parts than the foregoing, and appears to be herbaceous and erect, quite fmooth, except a flight downinefs, here and there, upon the young branches or ftalks. *Leaves* ftalked, an inch and half long, deeply divided into three wedge-fhaped, jagged, blunt, very fmooth and flat, lobes; the upper, or floral, ones much fmaller and narrower, fimply three-cleft. *Flowers* yellow. Segments of the *calyx* oblong-lanceolate, with one central rib and two marginal ones, acute, but not tipped with any awn or briftly point.

T. *orientale.* Great-flowered Germander. Linn. Sp. Pl. 786. Willd. n. 3. Ait. n. 2. Curt. Mag. t. 1279. (T. orientale anguftifolium laciniatum, flore magno fubcæruleo; Comm. Rar. 25. t. 25.)—Leaves deeply three-cleft, many-cleft, linear. Clufters terminal, compound. Flower-ftalks horizontal, longer than the floral leaves.—Native of the Levant. Cultivated by Miller, and recently reftored to our gardens by feeds obtained from Siberia, by Mr. Loddiges. The *root* is perennial. Several decumbent *branches* from the root bear *leaves* divided into many linear fegments; but the foliage of the erect panicled flowering *ftem* is doubly three-cleft below, fimply above. *Inflorefcence* terminal, racemofe, compound, with fmall bracteaceous leaves. *Flowers* numerous, almoft as large as thofe of *T. fruticans* hereafter defcribed, of a light purplifh-blue. All the herbage, and even the *corolla*, is hairy or downy. We have already mentioned, under our firft fpecies, that the citation of Rivinus by Willdenow is an error.

T. *Botrys.* Cut-leaved Annual Germander. Linn. Sp. Pl. 786. Willd. n. 5. Ait. n. 3. Mill. Ic. t. 264. f. 1. (Iva mofchata, folio multifido; Riv. Monop. t. 14. Chamæpitys fœmina; Ger. Em. 525.)—Leaves many-cleft. Flowers axillary, oppofite, in pairs, turned one way. Calyx tubular, inflated and gibbous at the bafe.—Native of Germany, Switzerland, France and Italy, in dry fields. *Root* annual, fibrous. *Herb* hairy, branched from the bottom, erect. *Leaves* deeply pinnatifid, fomewhat three-lobed. *Flowers* ftalked, crimfon, four together, making a fort of half whorl. The *calyx* becomes greatly enlarged after flowering, tubular, remarkably inflated below, and terminating in five triangular, awned, converging teeth.

T. *trifidum.* Trifid-leaved Germander. Retz. Obf. fafc. 1. 21. Willd. n. 7. Ait. n. 5. (T. capenfe; Thunb. Prodr. 95.)—Leaves hoary, in three deep linear fegments. Stalks axillary, three-flowered. Calyx hoary, without awns.—Gathered at the Cape of Good Hope, by Thunberg and Maffon. The latter fent feeds to Kew in 1791. The plant is fhrubby, flowering moft part of the fummer, and kept in the greenhoufe in winter. Its afpect is not unlike Winter Savory, but more hoary. The fegments of the

leaves

leaves are an inch long, revolute, entire. *Flower-ſtalks* half the length of the leaves. Segments of the *calyx* elongated, lanceolate, revolute, ſingle-ribbed, bluntly pointed, not awned. *Corolla* purpliſh. *Seeds* with a net-work of wrinkles over their ſurface.

T. *Pſeudo-chamæpitys*. Racemoſe Slender-leaved Germander. Linn. Sp. Pl. 787. Willd. n. 8; excluding the ſynonym of Cluſius. (Chamæpitys alia; Camer. Epit. 680. Chamæpityos ſpuriæ alterius altera icon; Dod. Pempt. 47.)—Leaves deeply once or twice three-cleft, linear, acute, revolute, hairy. Cluſter terminal, ſimple. Bracteas three-cleft. Calyx hoary, awned.—Native of Spain, Barbary, and the ſouth of France. The *ſtem* is ſhrubby, divided from the bottom into many aſcending, leafy, ſquare, moſtly hairy branches. *Leaves* in very narrow, ſomewhat awned, ſegments, more or leſs hairy. *Flowers* much like thoſe of *T. orientale*, but forming a ſimple terminal *cluſter* at the top of each branch, with deeply three-cleft linear *bracteas*, uſually as long as the *flower-ſtalks*. Lip of the *corolla* externally hairy. The *Pſeudochamæpitys* of Cluſ. Hiſt. v. 2. 185. Lob. Ic. 385. f. 1. Chamæpitys ſpuria altera; Ger. Em. 526; the left-hand figure in Dod. Pempt. 47; all from the ſame wooden block; appears to us a different ſpecies from the above-deſcribed, with which we are unacquainted. There can be no doubt that the *T. mauritanum*, Linn. Sp. Pl. 787, entirely adopted from Shaw's rude figure, n. 575 of his Phyt. Afric. Specimen, is exactly the ſame with the real *Pſeudo-chamæpitys* of Linnæus, which we have from Spain and Barbary, and which the cut of Camerarius, as well as the right-hand one of Dodonæus, clearly repreſents.

All the foregoing ſpecies, with a few more which may be found in Linnæus and Willdenow, apparently conſtitute a ſection of the genus before us, whoſe deeply-divided *foliage* gives them a peculiar and ſtriking character. Their *infloreſcence* nevertheleſs differs conſiderably, and on a more careful examination it will be found, that the racemoſe blue-flowered ones are moſt naturally akin to the *T. fruticans*, notwithſtanding its undivided entire *leaves;* while the others are more related to ſome cut-leaved red-flowered ſpecies, with which we ſhall meet hereafter; inſomuch that no natural ſubdiviſion of this genus could be founded on the above character.

T. *fruticans*. Blue Tree Germander. Linn. Sp. Pl. 787. Willd. n. 9. Ait. n. 6. Sm. Fl. Græc. Sibth. t. 527, unpubliſhed. (T. latifolium; Linn. Sp. Pl. 788. Curt. Mag. t. 245. T. fruticans bœticum; Cluſ. Hiſt. v. 1. 348. Dill. Elth. 379. t. 284. T. bœticum; Ger. Em. 659.)—Leaves ovato-lanceolate, entire; ſnow-white and cottony beneath. Flowers axillary, ſolitary. Segments of the calyx ovate, cottony at the back.—Native of the ſouth of Europe and north of Africa. A hardy and common greenhouſe plant in England, ſometimes bearing our milder winters in the open air, eſpecially near the ſea. The *ſtem* is ſhrubby, buſhy, three or four feet high, with ſtraight, divaricated *branches*, clothed, like the backs of the *leaves* and *calyx*, as well as all the *ſtalks*, with peculiarly white, ſoft, denſe down. The *leaves* vary in ſize and breadth, as may be ſeen in the plate of Dillenius, whoſe fig. 368. miſled Linnæus to make a ſpecies, by the name of *latifolium*, which is but a trifling variety. The upper ſurface of the *leaves*, and inſide of the *calyx*, are dark-green, uſually quite ſmooth. *Flowers* large and handſome, of a fine blue, coming out at all times of the year: the middle ſegment of their lower lip ſometimes deeply cloven.

T. *brevifolium*. Short Hyſſop-leaved Germander. Schreb. Vertic. Unilab. 27. Willd. n. 10. Sm. Fl. Græc. Sibth. t. 528, unpubliſhed. (Roſmarinum ſtœchadis facie; Alpin. Exot. 103. t. 102. Polio retto di Candia; Pon. Bald. 156.)—Leaves lanceolate, revolute, entire, obtuſe, hoary. Flowers ſolitary. Calyx without awns.—Native of rocks in Crete, near the ſea-ſhore. The *ſtem* is ſhrubby, with copious ſpreading, ſquare, leafy branches. *Leaves* about an inch long, of a hoary green on both ſides, veiny. *Flowers* on ſlender, ſolitary, ſimple ſtalks, from the boſoms of the upper leaves. *Corolla* bluſh-coloured, with purple veins. Segments of the *calyx* revolute and blunt. Schreber and Willdenow cite, under this ſpecies, T. frutefcens, ſtœchadis arabicæ folio et facie; Tourn. Cor. 14. Rivin. Monop. t. 20; which is correct as to Tournefort, but no ſuch thing occurs in Rivinus. If we had not conſulted, in ſir Joſeph Banks's library, the moſt perfect copy of his work known to exiſt, we ſhould not ſpeak ſo decidedly on this head.

T. *creticum*. Roſemary-leaved Germander. Linn. Sp. Pl. 788. Willd. n. 11. Sm. Fl. Græc. Sibth. t. 529, unpubliſhed. (T. hyſſopifolium; Schreb. Vertic. Unilab. 28.)—Leaves linear-lanceolate, revolute, entire, obtuſe; white and cottony beneath. Flowers often two or three together. Calyx cottony, ſpinous.—Native of Crete, Cyprus, and Egypt. A taller, larger *ſhrub* than the laſt, ſome of whoſe ſynonyms were confounded with it by Linnæus. Its habit and foliage much reſemble Roſemary. The *flowers* are light purple, or pink, and form long leafy *cluſters*, at the ends of the *branches*, being either ſolitary, or two or three together, on ſhort downy *ſtalks*, from the boſoms of the upper *leaves*. The *calyx* is cottony without; green within; and has ſhort ſpinous points.

T. *Marum*. Marum Germander, or Cat-thyme. Linn. Sp. Pl. 788. Willd. n. 12. Ait. n. 7. (Pſeudo-Marum; Rivin. Monop. Irr. t. 13, not t. 40, which is Thymus Maſtichina. Marum Cortuſi; Bauh. Hiſt. v. 3. 242.)—Leaves ovate, acute, entire, ſtalked, cottony beneath. Flowers racemoſe, in pairs, turned one way. Calyx woolly.—Native of Spain, and the iſles of Hyeres. Frequent in greenhouſes, where it is very hardy, being cultivated for the ſake of its peculiarly pungent ſcent, which powerfully induces ſneezing, and which renders it not leſs grateful to cats than Valerian. The *ſtem* is buſhy, of humble growth, with round hoary branches. *Leaves* a quarter of an inch long, of a hoary green on the upper ſide. *Flowers* crimſon.

T. *quadratulum*. Little Square-leaved Germander. Schreb. Vertic. Unilab. 36. Willd. n. 13. Sm. Fl. Græc. Sibth. t. 530, unpubliſhed. (T. ramoſiſſimum; Desfont. Atlant. v. 2. 4. t. 118.)—Leaves obovate-rhomboid, deeply toothed; cottony beneath. Flowers axillary, ſolitary, deflexed. Calyx woolly.—Native of fiſſures of rocks, in Spain, Barbary, and Crete. A ſmall, decumbent, branching *ſhrub*, whoſe *leaves* are not half an inch long; green above; white beneath. *Flowers* pink, their *calyx* bent down, ſo as to make a right angle with its *footſtalk*, and then recurved. Segments of the upper lip of the *corolla* advanced towards thoſe of the lower in a remarkable degree. *Style* reflexed.

T. *Laxmanni*. Laxmann's Germander. Linn. Syſt. Veg. ed. 13. 439. Willd. n. 16. Ait. n. 10. Marſch. von Bieberſt. Taur. v. 2. 35. "Waldſt. and Kitaib. Hung. v. 1. 71. t. 69."—Leaves elliptic-oblong, villous, ribbed, nearly entire. Flowers axillary, ſolitary, oppoſite, turned one way.—Native of Siberia, Hungary, &c. We notice this ſpecies here merely to expreſs our concurrence with the opinion of the able author of the Flora Taurico-Caucaſica above cited, that it certainly belongs to *Ajuga*, as well as the *T. ſalicifolium*, Linn. Mant. 80, already referred thither by Schreber and Willdenow. The two ſpecies are very nearly akin, and anſwer in character and habit entirely to *Ajuga*, and not to *Teucrium*.

T. *Arduini.* Arduino's Germander. Linn. Mant. 81. Willd. n. 20. Sm. Fl. Græc. Sibth. t. 531, unpubliſhed. (T. foliis ovato-crenatis, ſubhirſutis, petiolatis, caulibus ſpicâ flaveſcente piloſâ terminatis; Arduin. Spec. 1. 12. t. 3. Scutellaria cretica; Linn. Sp. Pl. 836. Willd. Sp. Pl. v. 3. 176. Ait. Hort. Kew. v. 3. 429. Caſſida cretica fruticoſa, catariæ folio, flore albo; Tourn. Cor. 11.)—Leaves ovate, ſerrated, hairy. Cluſters denſely imbricated, cylindrical, with linear bracteas, longer than the flowers. Upper ſegment of the calyx dilated, heart-ſhaped; two loweſt ſetaceous.—Native of Crete, and of the ſhady woods of the Bithynian Olympus. It appears to have been cultivated by Miller in 1729. Although Linnæus, in referring this plant, after Tournefort, to *Scutellaria*, perceived it to be a *Teucrium*, neither he nor any one elſe, till lately, ſuſpected it to be deſcribed twice over in his works. This we diſcovered by a compariſon of original ſpecimens. The *ſtem* is herbaceous, not ſhrubby, ſquare, croſs-branched, leafy, rough with ſpreading hairs. *Leaves* ſtalked, not unlike thoſe of Balm in ſize, form, and colour. *Cluſters* from one to four inches long, near an inch in diameter, ſolitary at the ends of the branches, erect, of innumerable crowded white *flowers*. The *calyx* is hairy, ſuddenly bent downwards at its taper baſe, then horizontal, its border very unequally five-cleft; the upper ſegment broad, as in *Scutellaria*, reflexed at the ſides, tipped with a briſtle; two next ſhort, triangular; two loweſt long, narrow, with pungent points.

T. *canadenſe.* Nettle-leaved Hoary Germander. Linn. Sp. Pl. 789. Willd. n. 21. Ait. n. 13. Purſh n. 1. (Chamædrys canadenſis, urticæ folio, ſubtùs incano; Tourn. Inſt. 205.)—Leaves ovato-lanceolate, ſtalked, ſharply ſerrated, downy on both ſides; hoary beneath. Cluſter terminal, denſe, ſomewhat whorled. Bracteas ovate, ſhorter than the flowers. Segments of the calyx nearly equal.—In low grounds, on the borders of ponds and lakes, from Canada to New York, perennial, flowering in July and Auguſt. The habit of the *leaves* and *infloreſcence* is like that of ſome ſpiked *Veronica*. At the inſertion of each pair of *footſtalks*, the *ſtem* is ſurrounded with a ring of prominent hairs. The *calyx* is bell-ſhaped, with five broad, nearly equal, ſegments. *Corolla* purple.

T. *virginicum.* Viginian Germander. Linn. Sp. Pl. 789. Willd. n. 22. Ait. n. 14. Purſh n. 2. "Schkuhr Handb. t. 160." (T. virginianum meliſſophyllon, floribus cæruleis; Pluk. Almag. 363. Phyt. t. 318. f. 1; with a very faulty repreſentation of the corolla.)—Leaves ovate-oblong, ſerrated, downy; the upper ones ſeſſile. Spikes crowded, whorled. Bracteas the length of the calyx.—In low grounds and bogs, from New York to Carolina, perennial, flowering from June to Auguſt. It very much reſembles the laſt. *Purſh.*—Miller is ſaid to have cultivated both theſe North American ſpecies in 1768. We have ſeen only the former.

T. *abutiloides.* Mulberry-leaved Germander. L'Herit. Stirp. v. 1. 84. Willd. n. 27. Ait. n. 17. Jacq. Hort. Schoenbr. v. 3. 58. t. 358.—Leaves heart-ſhaped, acute, crenate, downy. Cluſters axillary, not longer than the footſtalks.—Diſcovered by Mr. Maſſon in Madeira, from whence it was brought to Kew, in 1777. It flowers in the greenhouſe in April and May, and is conſpicuous for the large ſize of its *leaves*, four or five inches long, on denſely downy *footſtalks*, half that length. The *flowers* are no leſs remarkable for their golden hue, and their ſituation in denſe, ſolitary, lateral, ſtalked *cluſters*, which rarely equal the footſtalks in length.

T. *Scorodonia.* Wood Germander, or Wood Sage. Linn. Sp. Pl. 789. Willd. n. 28. Fl. Brit. n. 1. Engl. Bot. t. 1543. Curt. Lond. faſc. 5. t. 40. Fl. Dan. t. 485. (Scorodonia; Rivin. Monop. Irr. t. 12. S. ſive Salvia agreſtis; Ger. Em. 662.)—Leaves heart-ſhaped, ſerrated, ſtalked, hairy. Stem erect. Flowers leaning to one ſide, in lateral and terminal cluſters.—Very common in dry heathy ground, and ſandy woods, throughout Europe, from Norway to Greece, flowering in July and Auguſt. Linnæus ſeems to have recollected this plant with delight in the fields of Hartecamp, where the garden of his friend Cliffort had been to him a real paradiſe. The *root* is creeping and perennial. *Herb* a foot or two in height, dark green, hairy, bitter, with a ſtrong ſcent like hops, for which it is ſaid to be not a bad ſubſtitute in brewing. We wiſh nothing worſe had ever been uſed. The long aggregate cluſters of *flowers* are rendered conſpicuous by the contraſt of the pale yellow *corolla* and purple *ſtamens*. The upper ſegment of the *calyx* approaches in form and breadth to what we have pointed out as ſo remarkable in *T. Arduini.*

T. *betonicum.* Hoary Germander. Ait. ed. 1. v. 2. 279. ed. 2. n. 19. Willd. n. 30. L'Herit. Stirp. v. 1. 83. t. 40. Curt. Mag. t. 1114. (T. betonicæfolium; Jacq. Coll. v. 1. 145. t. 17. f. 2.)—Leaves ovato-lanceolate, bluntly ſerrated, ſtalked, ſoft and downy; hoary beneath. Stem ſhrubby. Cluſters aggregate, terminal. Bracteas lanceolate, entire. Native of Madeira. A very handſome greenhouſe ſhrub, introduced by ſir Joſeph Banks, in 1775, flowering moſt part of the ſummer, and eaſily propagated by cuttings. The crimſon *flowers* are elegantly contraſted with the hoarineſs of the herbage; the upper ſurface of the *leaves* being greener than the reſt. The ſegments of the upper lip of the *corolla* being broader and blunter than uſual, ſome doubts have been ſtarted whether this ſpecies belonged to *Teucrium* or to *Ajuga*, or whether theſe genera were really diſtinct. To this we would anſwer, that the habit of the latter is peculiar, and its eſſential character no leſs clear, conſiſting in a ſhort notched *upper lip*, inſtead of the remotely-lobed one of *Teucrium*. We believe moreover that the central lobe of the lower lip is always divided and divaricated in *Ajuga*.

T. *maſſilienſe.* Apple-ſcented Germander. Linn. Sp. Pl. 789. Willd. n. 32. Ait. n. 21. Jacq. Hort. Vind. v. 1. 41. t. 94. (T. n. 6; Gerard. Gallopr. 277. t. 11.)—Leaves ovate, rugged, hoary, ſtrongly crenate. Stem erect. Flowers turned to one ſide, in lateral and terminal, upright cluſters.—Native of the iſles of Hyeres, but ſcarcely known in any other country, nor is it often to be ſeen in gardens. The *ſtems* are a foot high. *Leaves* ſtalked, bluntiſh, hardly an inch long. *Flowers* ſmall, light crimſon. Upper ſegment of the *calyx* broad-ovate. The whole *herb* is clothed with a hoary, ſoft, velvet-like pubeſcence, and when touched exhales a very powerful and peculiar ſcent, like mellow apples, and therefore, to many people, not agreeable, though combined with a ſpicy fragrance. Gerard's plate, like the others in his book, is very finely executed.

T. *Scordium.* Water Germander. Linn. Sp. Pl. 790. Willd. n. 34. Fl. Brit. n. 2. Engl. Bot. t. 828. Woodv. Med. Bot. t. 57. Fl. Dan. t. 593. (Scordium; Rivin. Monop. Irr. t. 11. Ger. Em. 661.)—Leaves oblong, ſeſſile, with tooth-like ſerratures. Flowers axillary, ſtalked, in pairs. Stem procumbent.—Native of marſhy places in various parts of Europe, but rare in England, except in the Iſle of Ely. It appears to be the true σκορδιον of Dioſcorides, retaining a ſimilar appellation, among the modern Greeks, and occurring, as Dr. Sibthorp obſerved, in Crete, Zante, and Aſia Minor. The *root* is perennial and creeping. *Herb* decumbent or proſtrate, hairy, and ſomewhat hoary, very bitter, with a ſtrong, unpleaſant, garlic-like ſcent. *Flowers* pale purple, in oppoſite pairs, from the boſoms of moſt of the

the *leaves*. This herb has formerly been celebrated for its deobſtruent and tonic qualities, but is now out of medical uſe, except perhaps in the receſſes of the country.

T. *ſcordioides* of Schreber, Willd. n. 35, ſeems to us, without doubt, a variety of the laſt, as it is made in Prodr. Fl. Græc. v. 1. 393.

T. *Chamædrys*. Wall Germander. Linn. Sp. Pl. 790. Willd. n. 36. Fl. Brit. n. 3. Engl. Bot. t. 680. Woodv. Suppl. t. 243. (Chamædrys; Rivin. Monop. Irr. t. 10. f. 2. Tourn. Inſt. t. 97; a much better figure. C. major latifolia; Ger. Em. 656.)—Leaves nearly ovate, ſtalked, deeply crenate. Flowers axillary, three together, ſtalked. Stem round, hairy.—Found on dry rocks and old walls in the more temperate or warm countries of Europe. It is abundant on the old city wall, on the north ſide of Norwich, as well as here and there in other parts of England, but not univerſally. Dr. Sibthorp obſerved the plant in dry ſtony places, throughout Greece and the iſles of the Archipelago, where it ſtill retains nearly the ſame appellation of χαμαιδρυς, recorded in Dioſcorides. It flowers in July and Auguſt, and has a perennial creeping *root*. The *ſtem* is buſhy, rather diffuſe, and ſlightly ſhrubby, a ſpan high. *Leaves* of a full ſhining green, ſlightly hairy, deeply crenate and cut. *Flowers* crimſon, numerous, more handſome than thoſe of *T. Scordium*, with which ſpecies the preſent has been ſuppoſed nearly to agree in virtues. It is equally bitter, but more agreeably, though leſs powerfully, ſcented.

T. *lucidum*. Shining Germander. Linn. Sp. Pl. 790. Willd. n. 39. Ait. n. 25. Sm. Fl. Græc. Sibth. t. 532, unpubl. (Chamædrys alpina fruteſcens, folio ſplendente; Tourn. Inſt. 205. Magnol. Hort. 52. t. 9.)—Leaves ovate, ſtalked, deeply crenate, ſmooth and ſhining. Flowers axillary, three together, ſtalked. Stem ſquare, erect, nearly ſmooth. —Native of alpine vallies in Savoy and Provence. Found by Dr. Sibthorp on Parnaſſus, and other Grecian mountains, as well as in the iſland of Cyprus. The tall, erect, ſquare *ſtems*, often quite ſmooth; numerous whorls of large crimſon *flowers*; and ſhining *leaves*, of which the upper or floral ones are more numerouſly quite entire; all render this plant, at firſt ſight, decidedly different from the laſt, and yet they are very nearly related, ſo that an eſſential difference is difficult to ſeize, and perhaps none that has yet been indicated is invariably conſtant.

T. *flavum*. Yellow Shrubby Germander. Linn. Sp. Pl. 791. Willd. n. 41. Ait. n. 26. Sm. Fl. Græc. Sibth. t. 533, unpubl. (Teucrium; Rivin. Monop. Irr. t. 10. f. 1. Chamædrys fruteſcens major, floribus ochroleucis; Moriſ. ſect. 11. t. 22. f. 1.)—Leaves ovate, crenate, downy. Whorls ſix-flowered, compoſing terminal cluſters, with ovate, concave, entire bracteas. Stem ſhrubby, downy. —Native of rocks and old walls, in the ſouth of Europe, and north of Africa; abundant in the Archipelago, and on the walls of Rome. The *ſtem* is woody, branched, erect, about two feet high; its *branches* leafy, bluntly quadrangular, clothed with very ſoft, velvet-like, curved pubeſcence, as is the whole of the herbage. *Leaves* ſtalked, hardly an inch long; tapering and entire at the baſe. *Flowers* pale yellow, compoſing long, whorled, erect *cluſters*, with pale-green *bracteas*, about equal to the *calyx*. The teeth of the latter are nearly equal. Upper ſegments of the *corolla* edged with red.

T. *bicolor*. Two-coloured Chili Germander. (T. heterophyllum; Cavan. Ic. v. 6. 56. t. 577.)—Leaves wedge-ſhaped, obtuſe; undivided or cut. Flowers axillary, ſolitary. Calyx nearly regular, with ten ſtrong ribs.—Gathered by Louis Née, in the neighbourhood of Talcahuano, in Chili, flowering in November and December. We have a wild ſpecimen from the late abbé Cavanilles, whoſe ſpecific name we are obliged to change, there being already a *T. heterophyllum*, Willd. n. 37. The *ſtem* is ſhrubby, almoſt ſix feet high, with ſquare leafy *branches*, clothed, like the *calyx*, *ſtalks*, and under ſide of the foliage, with very ſhort denſe pubeſcence. The *leaves* are about an inch long, nearly ſmooth on the upper ſide, various in breadth; the broadeſt deeply and coarſely cut; the reſt undivided and entire; the lower ones on ſhort ſtalks; the upper ſeſſile. *Flowers* from the boſoms of the upper leaves, on ſhortiſh, round, finely downy ſtalks. *Calyx* cut almoſt half way down into five, nearly equal, acute, ovato-lanceolate ſegments, each with a ſtrong mid-rib; its tube having five intermediate ribs beſides. *Corolla* externally hairy, white, the middle of its lower lip of a violet red.

T. *montanum*. Dwarf Mountain Germander. Linn. Sp. Pl. 791. Willd. n. 42. Ait. n. 27. Sm. Fl. Græc. Sibth. t. 534, unpubliſhed. (Ajuga folio integro; Rivin. Monop. Irr. t. 15. Polium ſeptimum; Cluſ. Hiſt. v. 1. 363. f. 1, 2. P. lavandulæ folio; Ger. Em. 655. f. 2, 3.)

β. T. ſupinum. Linn. Sp. Pl. 791. Willd. n. 43. Ait. n. 28. Jacq. Auſtr. t. 417. (P. montanum octavum; Cluſ. Hiſt. v. 1. 363. P. montanum minimum; Ger. Em. 655.)

Corymbs terminal. Leaves linear-lanceolate, ſomewhat revolute, almoſt entire; cottony beneath. Calyx reticulated, ten-ribbed, ſlightly downy, with ſpinous teeth.—Native of dry mountainous or alpine ſituations, in Germany, Switzerland, France, Spain, and Greece; ſometimes, though rarely, preſerved in pots, under a frame, in our more curious gardens. A dwarf buſhy *ſhrub*, like Thyme, with a ſtrong woody *root*, and many diffuſe, downy, leafy *ſtems*. *Leaves* crowded, oppoſite, ſtalked, hardly an inch long, very rarely notched, various in breadth; green, convex, and nearly ſmooth, above; veiny, very white and cottony, beneath. *Flowers* in denſe, ſeſſile, ſolitary corymbs. *Calyx* tubular, pale, with equal, ſpreading, tapering, pungent teeth, from whoſe intermediate ſinuſes the veins ſpread ſtar-wiſe. *Corolla* pale buff-coloured, the ſegments of its upper lip veined with red.

Schreber has long ago united *T. montanum* and *ſupinum*; nor was Linnæus ignorant of their near affinity; though in this inſtance, as in every thing relative to alpine plants of the ſouth of Europe, which he had rarely examined alive, he was diſpoſed to give up his own opinion, to that of practical obſervers. Cluſius having repreſented *T. ſupinum* ſo different in ſize and habit from *montanum*, might help to miſlead following botaniſts; but in truth they hardly deſerve to be diſtinguiſhed as varieties, *ſupinum* being only rather leſs luxuriant, with narrower *leaves*, which indeed vary on the very ſame root. The ſpecies before us has lent a ſpecific name to ſome other plants, as *Andromeda polifolia* of Linnæus, and *Menzieſia polifolia* of Juſſieu, which have no ſimilitude to the true ancient *Polium* hereafter deſcribed, but greatly reſemble this.

T. *pyrenaicum*. Pyrenean Germander. Linn. Sp. Pl. 791. Willd. n. 45. Ait. n. 29.—Corymbs terminal. Leaves orbicular, crenate, hairy; entire and ſlightly wedge-ſhaped at the baſe. Calyx-teeth tapering, fringed.—Native of the Pyrenées. Cultivated by Miller in 1731, at Chelſea garden, where we have ſeen it a few years ſince, yet there ſeems to be no certain figure of this beautiful plant extant. Its habit is ſomewhat like the laſt, but the *leaves* totally different, being almoſt orbicular, and from half an inch to an inch in diameter, flat, green, veiny and hairy. *Flowers* in denſe convex tufts, variegated with pale yellow and purple; the ribs and teeth of the *calyx* fringed with long briſtly hairs.

Whether

Whether Schreber's *T. rotundifolium*, Willd. n. 46, to which the figures of Boccone and Barrelier, cited for the former, are faid to belong, be more than a variety, we have no means of determining.

T. *Polium.* White Poley Germander. Linn. Sp. Pl. 792. Willd. n. 52. Ait. n. 31, Sm. Fl. Græc. Sibth. t. 535, unpublifhed. (T. Teuthrion; Schreb. Unilab. 46. Polium montanum; Ger. Em. 653, 654. P. montanum album ferratum, &c.; Barrel. Ic. t. 1074.)—Heads roundifh, leafy. Leaves feffile, oblong, obtufe, convex, bluntly crenate, denfely woolly. Calyx very woolly, obtufe, pointlefs.—Native of mountains in Italy, Spain, and the fouth of France; very common in Greece, the Archipelago, and throughout the Levant; rarely feen in our gardens, being impatient of wet. The *root* is woody and very ftrong. *Stems* numerous, a fpan long, afcending, erect, or partly decumbent, round, clothed, like the reft of the herbage, with extremely foft, white, woolly down. *Leaves* numerous, oppofite, half an inch or an inch long, thick and woolly, their edges remarkably deflexed, with ftrong, round, recurved teeth; the bafe flightly wedge-fhaped, fcarcely ftalked. *Flowers* numerous, in denfe, feffile, terminal, often aggregate, heads, or fhort fpikes, intermixed with leaves; the lower heads ufually ftalked. *Calyx* very woolly and obtufe. *Corolla* white, with a yellow palate.

Schreber, who is followed by Willdenow, makes numerous fpecies out of the reputed varieties of this plant, of which we are unable, for want of fufficient means of examination, to form an opinion. The characters given do not fatisfy us, nor do the fpecimens we have feen afford better.

The moft ftriking of the whole is *T. aureum*, Schreb. Unilab. 43. Willd. n. 48. Ait. n. 30. Cavan. Ic. v. 2. 16. t. 17, remarkable for the golden tint on its heads and upper leaves. This has ufually a folitary head or fpike, and perhaps the *calyx-teeth* are more flender and acute than in the common *T. Polium*, which merits inquiry. On the other hand, *T. capitatum*, which we fhall next defcribe, approaches nearly to fome of the above-mentioned varieties, fo that perhaps they ought to be referred to it, rather than to *Polium*.

T. *capitatum.* Purple Poley Germander. Linn. Sp. Pl. 792. Willd. n. 56. Ait. n. 32. Cavan. Ic. v. 2. 17. t. 119. Sm. Fl. Græc. Sibth. t. 536, unpublifhed. (Polium monfpeffulanum; Bauh. Hift. v. 3. 299.)—Heads roundifh, leafy, lateral and terminal, ftalked. Stem crofs-branched. Leaves feffile, linear-oblong, obtufe, convex, crenate, hoary. Calyx woolly, oblong, obtufe, pointlefs.—Native of hills in Siberia, Spain, the fouth of France, Zante, Cyprus, and Greece. This is of a more flender habit than the laft, lefs woolly, and more hoary, with purple *flowers*, a more elongated tubular *calyx*, and narrower *leaves*. The tube of the *corolla* alfo is longer, and much lefs bell-fhaped, or inflated in the throat. It is nearly related to *T. Polium*, but furely a diftinct fpecies.

T. *cuneifolium.* Wedge-leaved Poley Germander. Sm. Prodr. Fl. Græc. Sibth. n. 1311. Fl. Græc. t. 537, unpublifhed.—Heads terminal, denfe. Leaves rounded, deeply crenate; wedge-fhaped at the bafe; woolly all over. Calyx blunt, pointlefs.—Gathered by Dr. Sibthorp, on the Sphaciote mountains of Crete. The general outline of the plant anfwers to *T. rotundifolium*, Willd. n. 46; but that is a far lefs woolly plant, with a pointed *calyx*, and not allied to the *Polium* tribe. The prefent has round, trailing, fhrubby, crofs-branched *ftems*, a foot or more in length. Every part of the herbage is covered with thick, white, foft, woolly or velvetty down. *Leaves*, with their ftalks, an inch long. *Flowers* fnow-white, in aggregate terminal heads. *Calyx* tubular, with fhort rounded teeth. Segments of the upper lip of the *corolla* large, as long as the *ftamens*, which they embrace, and partly conceal. *Anthers* red.

T. *alpeftre.* Sharp-toothed Alpine Poley Germander. Sm. Prodr. Fl. Græc. Sibth. n. 1312. Fl. Græc. t. 538, unpublifhed.—Flowers axillary, folitary. Leaves wedge-fhaped, rounded, deeply crenate, downy. Stem tufted, much branched.—Found by Dr. Sibthorp, upon the moft lofty fummits of the Spachiote mountains of Crete. The *root* is woody, dividing at the crown into innumerable ftrong, woody, depreffed *ftems*, which bear a denfe tuft of afcending, leafy, downy *branches*, hardly a finger's length. *Leaves* ftalked, greyifh, about half an inch long, obtufe. *Flowers* oppofite, on fhort ftalks, from the bofoms of two or three of the uppermoft pair of leaves. *Calyx* tubular, finely downy. Tube, throat, and upper lip of the *corolla*, pale yellow; lower lip white, its middle fegment deeply concave.

T. *pumilum.* Rofemary-leaved Poley Germander. Linn. Sp. Pl. 792. Willd. n. 61. (Polium montanum pumilum rubrum; Barrel. Ic. t. 1092, 1093.)—Heads terminal, folitary, feffile, leafy. Leaves crowded, feffile, linear, revolute, fmooth; downy beneath. Stems afcending, woolly. Calyx pointed.—Native of hills in Spain, flowering in July and Auguft.—From the woody perennial *root*, fpring feveral, more or lefs erect, fimple or branched, leafy *ftems*, three or four inches long, clothed with denfe, foft, white wool. The *leaves* are hardly an inch long, crowded and fomewhat imbricated, in four rows, narrow, ftrongly revolute, obtufe; convex, green and polifhed on the upper fide; concave, with a downy rib, juft vifible beneath. *Calyx* ribbed, downy, with fhort, thick, fpinous points. Tube of the *corolla* flender, downy, as well as the outfide of the limb.

We are quite unable to imagine how *T. Libanitis* of Schreber, Willd. n. 60. Cavan. Ic. v. 2. 17. t. 118, came to be diftinguifhed from *pumilum*, as there does not appear to be the leaft difference between them, except the *ftem* of *Libanitis* being more erect; but that circumftance is evidently variable. *T. verticillatum*, Cavan. t. 198. Willd. n. 59, feems alfo but a variety; though we prefume not to determine this without feeing a fpecimen.

T. *fpinofum.* Thorny Germander. Linn. Sp. Pl. 793. Willd. n. 64. Ait. n. 33. Sm. Fl. Græc. Sibth. t. 539, unpublifhed. (Chamædrys fpinofa; Bauh. Prodr. 117. Scordium fpinofum odoratum; Cornut. Canad. 123. t. 124. Barrel. Ic. t. 202. S. fpinofum; Cavan. Ic. v. 1. 19. t. 31.)—Stem and branches fpinous, hairy. Flowers axillary, oppofite. Upper fegment of the calyx ovate; the reft awl-fhaped, fpinous.—Native of fields and hilly places in Spain and Portugal. Dr. Sibthorp met with it in fields between Smyrna and Burfa. The *root* is annual. *Stem* branched copioufly from the very bottom, about a foot high, bufhy, the *branches* oppofite, croffing each other in pairs, fpreading, fquare, clothed with very foft prominent hairs, tipped with ftrong fpines, and furnifhed with fmaller lateral ones, particularly at the infertion of the leaves and flowers. *Leaves* feffile, deflexed, fmall, oblong, obtufe, notched, green, hairy. *Flowers* numerous, folitary or in pairs, from the bofoms of the diminifhed or upper leaves, each on a fhort, round, hairy *ftalk*. *Calyx* deflexed and bent at the bafe, then horizontal and fomewhat bell-fhaped; its upper fegment very broad, ribbed, fpinous-pointed, erect, or rather reflexed, the four others fhorter, prominent, afcending, pungent. *Corolla* white, with red ftripes on its upper lip; the middle fegment of the lower very large, flightly concave; the bafe of the tube globular.—The *flowers* are by no means reverfed, *refupinati*, in Sibthorp's figure of this fpecies, though

Lœfling

Lœfling fo defcribes them, and led Linnæus to adopt that character. His *T. mucronatum*, Sp. Pl. 793, differs in no refpect from the *fpinofum*, to which therefore we have transferred its fynonyms.

TEUCRIUM, in *Gardening*, furnifhes plants of the underfhrubby and herbaceous kinds, among the great number of which, the fpecies following are the moft generally cultivated: the yellow-flowered fhrubby germander (T. flavum); the fage-leaved germander, or wood-fage (T. fcorodonia); ths nettle-leaved germander (T. canadenfe); the dwarf mountain germander (T. montanum); the Pyrenean germander (T. pyrenaicum); the poley (T. polium); the round-headed germander (T. capitatum); the dwarf germander (T. pumilum); the narrow-leaved tree-germander (T. fruticans); the broad-leaved tree-germander (T. latifolium); the Cretan germander (T. creticum); and the common marum or cat-thyme (T. marum).

There is a variety in the firft fort which is hairy, with yellow flowers, with pale white flowers, and with purple flowers.

In the fourth fort there is likewife a variety with much fmaller leaves, which are hoary on their under fide.

Alfo in the fixth fort there are feveral varieties; as the common yellow poley, which has the ftalks rather herbaceous and trailing, about fix inches long, and hoary: leaves woolly, about half an inch long, fome wedge-fhaped, others oblong, ending in obtufe points, and crenate towards their ends: the flowers collected in oblong thick fpikes at the end of the branches, of a deep yellow colour, and appearing at the beginning of June. This grows naturally in Spain. The narrow-leaved yellow poley, which has woody ftalks, erect, branching, and covered with a hoary down, rifing fix or eight inches high; the leaves linear, woolly, about half an inch long, having fometimes two or three flight indentures on their edges; the flowers collected in roundifh fpikes at the end of the branches; they are bright yellow, have woolly calyces, and appear in June and July. It grows naturally in Spain and Portugal. The white poley, which has the ftems a foot long, and trailing: the leaves are a little cottony, entire on the fides, but toothed at the end: the flowers are pretty large, white, tinged a little with purple. It is a native of the fouth of France. There is alfo the purple poley.

And there is a variety in the feventh fort which has an erect branching ftalk, that rifes a foot high; the lower part becomes woody, but the upper is herbaceous: the leaves are linear-lanceolate, about an inch long, crenate, of a pretty thick confiftence, and a little woolly: the flowers collected in a corymb at the end of the branches, white, appearing in July and Auguft.

The ninth contains a variety which is a little more branched, and has fmaller fhorter leaves: the flowers are paler, the ftamens fomewhat longer, the anthers fmaller and brown; whereas in the larger fort they are violet: and another with variegated leaves.

Method of Culture.—All the herbaceous and ligneous kinds may be readily increafed by parting the roots, by flips of the young branches, and feeds: the roots may be divided in the autumn, or early fpring, and the flips of the branches be taken off in the fpring and fummer, being planted out in moift fhady fituations, and well rooted, they may be removed to where they are to remain, though it is beft to plant them at once where they are to grow: the feeds may be fown in a bed or border of common earth in the early fpring feafon.

But in the polium kinds, the feeds fhould be fown in a bed of light earth, and the plants be either put out in nurfery-rows, or fet where they are to remain, in the latter end of fummer.

The fhrubby forts may likewife be increafed by flips or cuttings of the young fhoots of the branches, which fhould be planted in pots filled with light mould, in the fpring and fummer months, in order to be removed under the protection of the greenhoufe in winter, being afterwards managed as other greenhoufe exotics.

Thefe plants are all of the perennial kind, and fome of them are durable in the ftems and branches for feveral years.

The firft forts afford variety in the borders, &c. and the latter in affemblage with greenhoufe plants.

TEUDERIUM, in *Ancient Geography*, a town of Germany, in the vicinity of Bogadium and Mediolanium. Ptolemy.

TEVENDEZ, in *Geography*, a mountain in the S.E. part of Fez; being part of the Atlas.

TEVERONE, a river of Italy, which joins the Tiber near Rome.

TEVESAR, a town on the W. coaft of the ifland of Celebes. S. lat. 2° 2′. E. long. 119° 21′.

TEUFFEL'S BRUCK, or *Devil's Bridge*, a bridge over the Reufs, formed of a fingle arch, about twenty-two feet radius, fupported by two rocky peaks, nearly perpendicular, between which the river runs at the depth of fome hundred feet; 3 miles from Urferen.

TEUFFEN, a town of Switzerland, in the canton of Appenzel; 6 miles N.N.W. of Appenzel.

TEUFING, or TAUZIM, a town of Bohemia, in the circle of Pilfen; 22 miles N.W. of Pilfen. N. lat. 50° 2′. E. long. 13° 5′.

TEUGA, in *Botany*, the name given in the Hortus Malabaricus to a genus of plants, called by Linnæus and others *coccus*.

TEUGLASSA, in *Ancient Geography*, an ifland which Thucydides feems to place on the coaft of Afia Minor, in the neighbourhood of the Doride.

TEVIN, in *Geography*, a town of Perfian Armenia, on a fmall river which runs into the Aras; 15 miles S.E. of Erivan.

TEUKE, a town of Perfia, in the province of Khoraffan; 32 miles E. of Tabas-kileki.

TEUMES, in *Ancient Geography*, a river of Greece, in Bœotia, which watered the town of Thebes, according to Hefychius.

TEUMESSUS, a borough of Bœotia, upon a mountain E. of Thebes, and near a fmall river called Thermodon. Here was a temple of Diana Telchinia. It was notorious for the fuperftitious credulity of its inhabitants.—Alfo, a mountain of Greece, in Bœotia.

TEVO, ZACCARIA, in *Biography*, author of an ample treatife on mufic, written in Italian, and publifhed at Venice, in fmall quarto, 1706, entitled "Il Mufico Teftore;" (*teftore* literally means a weaver; but metaphorically, a compofer, an author;) the mufician's *text*, or guide. The work is divided into four parts, twenty chapters in each, the titles of which are very promifing; but his ftyle is not very pleafant, nor are his definitions or inftructions very fatisfactory. The author had read much, but his digeftion was not fo good as his appetite. He fwallowed, without due maftication, all the old ftories about the invention and miraculous powers of mufic. He affigns to Orpheus, the fon of Apollo, the invention of the violin, and to Sappho that of the bow; affuring us that fhe was the firft who ufed it in the prefent manner! He not only finds the inventor of every species of instrument, but the time when and place where it was first constructed. There is little science, and still less ingenuity, in the examples of composition given in illustration of the rules of counterpoint: so that if the young student, who peruses this work for instruction, is not a conjurer before he begins the task, he will not be made one by the mysteries which it unfolds.

Yet with patient perseverance, a young student who has little leisure, and few books to read, may become superficially learned with little trouble by this book. Tevo quotes authority for all that he advances; but his authorities are not always good, nor does he distinguish good from bad. Several obscure and even contemptible authors are quoted in the same solemn manner as the best. But in citing so many writers indiscriminately, the chief part are now so scarce and difficult to be found, that in search of them all the great libraries of Europe may be visited in vain. To save the student's time, and form his taste in literature, as well as judgment in music, the author should have quoted none but writers of the first authority, or have told his young readers what stress was to be laid on the rest.

But since the time of Tevo, so many better authorities in composition and didactic works, both on the theory and practice of music, have appeared, that we can hardly recommend the "Musico Testore" to the perusal of any but those who have much time to spare, who read every thing, and are curious to know the history and state of the art at every period of time.

TEUOCHIS, in *Ancient Geography*, a lake and town of Egypt.

TEVOEN-SOUSON, in *Geography*, a town of Chinese Tartary; 12 miles N.W. of Teldom.

TEUPITZ, a town of Brandenburg, in the Middle Mark, on a lake; 20 miles S. of Berlin. N. lat. 52° 5′. E. long. 13° 30′.

TEURERT, or TEVRERT, a town of Fez, on the borders of Algiers; 40 miles E.N.E. of Teza. N. lat. 34° 2′. W. long. 3° 30′.

TEURISCI, in *Ancient Geography*, a people placed by Ptolemy in the northern part of Dacia, between the Anerti and the Cistoboci.

TEURISTÆ, a people of Germany, placed by Strabo in the vicinity of the Danube and the Alps.

TEURNIA, a town of Norica, S. of the Danube, between Virunum and Idunum. Ptol. and Plin.

TEURTEVILLE, in *Geography*, a town of France, in the department of the Channel; 6 miles N. of Valognes.

TEUSCHNITZ, a town of Bavaria, in the bishopric of Bamberg; 34 miles N.E. of Bamberg. N. lat. 50° 23′. E. long. 11° 30′.

TEUSHANUSHSOUGGOGHTA, an Indian town of Pennsylvania, on the Alleghany river.

TEUTATES, in *Mythology*, a name or attribute of the Supreme Being, which was worshipped by the Gauls and Britons as a particular divinity. It is evidently compounded of the two British words "Deu-tatt," which signify God the parent or creator, a name properly due only to the one true God, who was originally intended by that name. Thus Lucan, l. i. v. 445.

> "Et quibus immitis placetur sanguine divo
> Teutates; horransque feris altaribus Hesus."

When these ancient nations sunk into idolatry, they degraded Teutates into the sovereign of the infernal world, the same with the Dis and Pluto of the Greeks and Romans (or, as others think, with Mercury); and worshipped him in such a manner as could be agreeable to none but an infernal power.

TEUTHEA, in *Ancient Geography*, a considerable town of the Peloponnesus, in Achaia, W. of Tritæa.

TEUTHIS, a town of the Peloponnesus, in Arcadia, in which were a temple of Venus, and another of Diana.

TEUTHIS, in the Linnæan system of *Ichthyology*, a genus of the abdominal fishes; the characters of which are, that the head is a little truncated on the fore-part; that the branchiostege membrane has five rays; and that the teeth are equal, rigid, and near each other, and forming a regular chain. Linnæus and Gmelin mention two species; *viz. hepatus*, and *javus* or *java*. This genus is now annulled, and the species are transferred to Acanthurus and Chætodon.

HEPATUS; Acanthurus Teuthis; Blue Acanthurus. With the middle of the body paler, and a spine on each side of the tail. This is a native of the Indian and American seas, ten or twelve inches long, or more; resembling in shape the chætodons, the head sloping in front from the origin of the dorsal fin; the colour, when recent, a deep or blackish-blue; on each side of the body is a very large, oblong-ovate whitish patch or spot, surrounded by a border of a deeper cast; the skin is roughened by very small scales; the tail is slightly lunated, dusky on the upper and lower part, and marked towards the base by a whitish ovate spot; the teeth are crenated; and on each side of the base of the tail is a very strong spine, capable of elevation at the animal's pleasure, to an horizontal direction, from the channel in which it lies. The fish figured by Catesby in his Natural History of Carolina, under the name of *Teng*, is supposed to be this species.

JAVA or JAVUS; Chætodon Guttatus. Whitish-grey, with oblong body, sprinkled with very numerous, round, rufous spots; length about ten or twelve inches; colour grey, with a dusky tinge on the upper parts, and every where sprinkled, except on the head, pectoral, ventral, dorsal and anal fins, with numerous, small, round, rufous spots; scales small, none at the bases of the fins; gill-covers smooth; dorsal and anal fin of moderate breadth; tail slightly inclining to a forked, or rather lunated shape, and speckled like the body. Native of Java. This species is supposed by Bloch and Cepede to be the *teuthis javus* of Linnæus. But Dr. Shaw remarks, that Linnæus's description does not agree in the disposition of its colours with those of the C. guttatus, as it is expressly said to be marked with longitudinal streaks: so it is figured by Gronovius. See CHÆTODON *Guttatus*, changing Japan in the close of that article to Java.

TEUTHOPHACE, a word used by the ancients to express a sort of food made of beet-roots and lentils, often prescribed as a good diet for the sick.

TEUTHRANIA, in *Ancient Geography*, a town and small country of Mysia, situated towards the E., and near the source of the Caicus. Herodotus says that it was once a gulf, and it was gradually formed by the accumulation occasioned by the Caicus.

TEUTHRONA, a town of Laconia, in a small bay, on the Laconic gulf, N.E. of Pyrrhicus.

TEUTLAN, in *Geography*, a town of Mexico, in the province of Guadalajara; 50 miles N.N.W. of Guadalajara.

TEUTLEBEN, a town of Germany, in the principality of Gotha; 4 miles W. of Gotha.

TEUTONES, in *Ancient Geography*, a people of Germany, who at the time when the Romans became acquainted with them, were politically connected with the Cimbri, if they

they were not actually a tribe of the same people; and settled at no great distance from them. (See CIMBRI.) They are said to have worshipped a divinity called *Thaut*, who is supposed to have been one of their ancestors deified. The Teutones were known before the Cimbri, and uniting with them, overran the territories that were subject to the Romans; and it has been affirmed that they inhabited the banks of the *Codani Sinus*, and the island called *Codania Insula*, whence they assumed the appellation of "Codani." Pytheas of Marseilles, according to Pliny, is the first author who mentions the Teutones; and Pomponius Mela says, that their habitations were near the gulf *Codanus*. It is very probable that they extended themselves through the country that bordered on the Baltic sea; and that from thence they engaged in many warlike emigrations; transporting themselves with their arms and baggage, their wives and children, through other countries which they pillaged. It was in the year of Rome 640 that they first became known to the Romans; having advanced south of the Danube to the country called Noricum, where they were encountered by the consul C. Papirius Cursor, who obstructed their passage towards the borders of Italy. They then proceeded towards Gaul, and made their ingress among the Helvetians. Having arrived in Gallia Narbonnensis, the Cimbri were there defeated by the consul Aurelius; but the Teutones made an attempt to invade Italy by the Western Alps. They were, however, resisted by Marius, and in a desperate engagement, in which the latter proved victorious, the Teutones left upon the field an almost incredible number of slain; which, including the Gauls who had fallen in a combat which took place some days before, amounted, according to historians that have not been chargeable with exaggeration, to 100,000 persons. Marius also defeated the Cimbri in Italy.

TEUTONIC, something belonging to the *Teutones*, an ancient people of Germany, inhabiting chiefly along the coast of the German ocean. See GOTHIC.

TEUTONIC *Language*, is the ancient language of Germany, which is ranked among the mother-tongues.

The Teutonic is now called the *German*, or *Dutch*, and is distinguished into *upper* and *lower*.

The *upper* has two notable dialects; *viz.* 1. The Scandian, Danish, or perhaps Gothic; to which belong the languages spoken in Denmark, Norway, Sweden, and Iceland. 2. The Saxon, to which belong the several languages of the English, Scots, Frisian, and those on the north of the Elbe.

To the *lower* belong the Low Dutch, Flemish, &c. spoken through the Netherlands, &c.

The learned Mr. Whitaker has lately, in his History of Manchester, controverted the opinion of those who affirm the English language to be genuine and unmixed Teutonic, and asserted it to be of Celtic origin. Mr. Drake, in his Essay on the Origin of the English Language, Archæol. vol. 5. has endeavoured to support the former opinion, by comparing part of Ulphila's Gothic version of the gospel of St. John, executed above 1400 years ago, with the same in our present translation, and evincing the striking affinity between the two languages; notwithstanding the different mediums through which they have descended, and the many ages that have elapsed since they have been separated. Every circumstance, he observes, that constitutes the true genius of a language, is visibly derived to the English from the Goths and Saxons. The articles, flexure of the genitive case, prepositions and auxiliary verbs, are all absolutely Teutonic. The English, he says, is clearly the natural descendant of the Gothic or Teutonic; and he challenges the deepest enquirer into the Celtic to produce so decisive a proof of any affinity of that tongue with ours. The British, he adds, has little or no resemblance to the English. Many of their terms may have gained admission among us, as, from the vicinity and long intercourse we have had with that people, may necessarily be imagined, but their idioms and genius are as radically and essentially different as any two languages can possibly be.

TEUTONIC *Order*, a military religious order of knights, established towards the close of the twelfth century; and thus called, because it consisted principally of Germans, or Teutones.

The origin, &c. of this order were thus: the Christians, under Guy of Lusignan, laying siege to Acre, or Acon, a city of Syria, on the borders of the Holy Land; at which siege were present, Richard king of England, Philip Augustus of France, &c. some Germans of Bremen and Lubèc, touched with compassion for the sick and wounded of the army, who wanted common necessaries, set on foot a kind of hospital under a tent, which they made of a ship's sail; and here betook themselves to a charitable attendance on them.

This started a thought (about the year 1190) of establishing a third military order, in imitation of the Templars, and the Hospitalers.

The design was approved by the patriarch of Jerusalem, the archbishops and bishops of the neighbouring places, the king of Jerusalem, the masters of the Temple and the Hospital, and the German lords and prelates then in the Holy Land; and, by common consent, Frederic duke of Suabia, who was then at their head, sent ambassadors to his brother Henry, king of the Romans, to solicit the pope to confirm the new order.

Calixtus III. who then governed the church, granted it by a bull of the 23d of February, 1192, and the new order was called "The Order of Teutonic Knights of the House of St. Mary of Jerusalem."

The habit of this order was a white mantle, with a black cross.

The pope granted them all the privileges of the Templars, and the Hospitalers of St. John; excepting that they were to be subject to the patriarchs, and other prelates; and that they should pay tithe of what they possessed.

The first master of the Teutonic order, Henry Walpot, elected during the time of the siege of Acre, after the taking of that city, purchased a garden, in which he built a church, and an hospital, which was the first house of the Teutonic order.

Such is the account given by Peter of Duisbourg, a priest of this order.

Jaques de Vitty differs a little from this account; and relates, that the Teutonic order was established at Jerusalem before the city of Acre was besieged.

The order made no great progress under the three first grand-masters; but under the fourth, Herman de Salza, it became very powerful; insomuch that Conrade, duke of Mazovia and Cujavia, about the year 1230, sent an embassy to him, to solicit his friendship and assistance, offering him and his order the provinces of Culme and Livonia, with all the lands they could recover from the idolatrous Prussians, who harassed him exceedingly with their continual incursions, and against whom he intended this new militia; his own knights of the order of Christ, or of Dobrin, instituted for the like purpose, being found too weak.

De Salza accepted the donation, and Gregory IX. confirmed it; and, to aid the knights in reducing the Prussians,

 sians,

ſians, Innocent IV. publiſhed a croiſade. With this help, in a year's time, they ſubdued the provinces of Warmia, Natangia, and Barthia; the inhabitants of which renounced the worſhip of idols; and, in the courſe of fifty years more, they reduced all Pruſſia, Livonia, Samogitia, and Pomerania, &c.

In 1204, duke Albert had founded the order of Sword-bearers, Port-glaives, which now became united to the Teutonic knights, and the union was approved by pope Gregory IX.

The order, thus maſters of all Pruſſia, built the cities of Elbing, Marienburg, Thorn, Dantzick, Koningſberg, and ſome others: the emperor Frederic II. permitted them to add to the arms of their order, the imperial eagle; and St. Louis, in 1250, allowed them to quarter the fleur-de-lis.

After the city of Acre had been recovered by the infidels, the grand-maſter of the Teutonic order removed his ſeat from that city to Marienburg. As the order grew in power, the knights took more ſtate on them; and at length, inſtead of friars, brothers, as at firſt, would be called *lords*. And though the grand-maſter Conrade Zolnera, of Rotenſteine, oppoſed this innovation, his ſucceſſor Conrade Wallerod not only approved it, but even procured himſelf to be treated with honours only rendered to the greateſt princes.

Diviſions being got into the order, the kings of Poland made their advantage of them: the Pruſſians revolted to them: and after ſeveral wars between the knights and the Poles, the former yielded to king Caſimir the Upper Pruſſia, and did homage to him for the Lower.

At the time of the Reformation, Albert, marquis of Brandenburg, then grand-maſter, becoming a Lutheran, renounced the dignity of grand-maſter, diſſolved the commanderies, and drove the knights out of Pruſſia.

Moſt of the knights followed his example, and embraced the reformation: the reſt transferred the ſeat of their order to Margentheim, or Mariendahl, in Franconia, which they ſtill retain.

They there elected Walter of Cromberg their grand-maſter, formed a proceſs againſt Albert, and the emperor put him to the ban of the empire. The order, however, could never recover their domains; and are now little more than the ſhadow of what they formerly were, having only three or four commanderies, ſcarcely ſufficient for the ordinary ſubſiſtence of the grand-maſter and his knights.

The officers of the Teutonic order, when in its ſplendor, were the grand-maſter, who reſided at Marienburg: under him were the grand-commander; the grand-marſhal, who had his reſidence at Koningſberg; the grand-hoſpitaler, who reſided at Elbing; the draper, who took care to furniſh the habits; the treaſurer, who lived at the court of the grand-maſter; and ſeveral commanders, as thoſe of Thorne, Culme, Brandenburg, Koningſberg, Elbing, &c.

They had alſo their commanders of particular caſtles and fortreſſes; advocates, proveditors, intendants of mills, proviſions, &c.

Waiſſelius, in his Annals, ſays they had twenty-eight commanders of cities, forty-ſix of caſtles, eighty-one hoſpitalers, thirty-five maſters of convents, forty ſtewards, thirty-ſeven proveditors, ninety-three maſters of mills, ſeven hundred brothers or knights to take the field, one hundred and ſixty-two brothers of the choir, or prieſts, and ſix thouſand two hundred ſervitors or domeſtics.

TEUTSCH Leipsh, in *Geography*, a town of Hungary 5 miles E. of Roſenberg.

Teutsch *Pron*, a town of Hungary; 10 miles N.W. of Kremnitz.

TEUTSCHDORF, a town of Hungary; 5 miles N.W. of Caſchau.

TEUTSDORF, a town of Pruſſia, in the province of Oberland; 10 miles E.N.E. of Holland.

TEUVRENT, a town of Africa; 145 miles E.N.E. of Fez.

TEUW, a ſmall iſland in the Eaſt Indian ſea. S. lat. 7° 11′. E. long. 129° 20′.

TEUXUNTA, in *Ancient Geography*, a town of Sicily, which had been built by Micythus, king of Rhegium and Zancle, according to Diodorus Siculus.

TEWANTAPAGUE, in *Geography*, a town of Mexico, in the province of Guaxaca; 135 miles E.S.E. of Guaxaca.

TEWKESBURY, anciently *Teodechesberie*, a large and reſpectable borough and market-town, in the lower diviſion of the hundred of the ſame name, in Glouceſterſhire, England, is ſituated in the vale of Eveſham, on the eaſtern banks of the Avon, near its confluence with the Severn, at the diſtance of 8 miles N.N.E. from Glouceſter, and 104 miles W.N.W. from London. This town was rendered famous in hiſtory, from a battle fought near it, between the Yorkiſts and Lancaſtrians, wherein Edward IV. gave a total overthrow to Henry VI. Three thouſand of the Lancaſtrians were reported to have been ſlain in the field, and queen Margaret, with many others, was taken priſoner. The ſeveral circumſtances which occurred during the engagement, and the events ſubſequent to the victory, are very fully related in the hiſtories of England. Tewkeſbury was again the ſcene of another action in the civil wars of Charles I. It was at different periods in poſſeſſion of both parties; and the final capture of it by the parliamentary forces was of great conſequence as a frontier town, ſecuring that ſide of the county, and commanding great part of Worceſterſhire.

Tewkeſbury was firſt incorporated by charter in the 17th of Elizabeth, under the title of "bailiffs, burgeſſes, and community of the borough of Tewkeſbury." Other charters were granted by James I. and James II.; the latter, in the ſecond year of his reign, re-incorporated them by the name of "mayor, aldermen, and common council;" but this charter was not acted upon: and the government of the town, as a corporation, was dormant till 13 William III. when the preſent charter was obtained, under which the town is governed by twenty-four principal burgeſſes, who, with twenty-four aſſiſtants, act independent of the magiſtrates of the county. From theſe are annually elected two bailiffs and four juſtices, who, with the recorder, form the magiſtracy of the corporation. The privilege of ſending members to parliament was firſt obtained 7 James I. The right of election is in the freemen and freeholders within the borough: the latter of whom have a vote generally for the county. The number of voters amount to about 500, and the bailiffs are the returning officers. The principal manufacture for the employment of the inhabitants is ſtocking-frame work knitting, particularly cotton. This ſupplies work for the Houſe of Induſtry, which is a modern building, well adapted for the purpoſe of rendering the poor cleanly, moral, and induſtrious. The markets, which were eſtabliſhed as early as the Conqueſt, are held on Wedneſday and Saturday: and here are ſeven annual fairs. The town-hall, which is a handſome edifice, was erected by ſir William Codrington in 1788, at an expence of 1200*l*. The ground-floor is appropriated for holding

holding the quarter-feffions; the upper floor for a banquetting room, and for the meeting of the corporation. Among the charitable eftablifhments are a free grammar-fchool, a charity-fchool, and feveral alms-houfes. The Anabaptifts, Quakers, Independents, and Methodifts, have each a meeting-houfe in the town. The population, according to the returns of the year 1811, amounted to 4820; the number of houfes being 1003: the latter are chiefly of brick, and principally ranged in three fpacious ftreets. Since the year 1786, when an act was paffed for paving and lighting the town, many improvements have been made; and the buildings have affumed an air of refpectability.

The Abbey.—A monaftery was firft erected here, and endowed by two brothers, Oddo and Doddo, dukes of Mercia, A.D. 715, to the honour of the Bleffed Virgin, which having undergone many calamities during the civil and Danifh wars, about 980 became a priory, fubject to Cranbourn in Dorfetfhire: but Robert Fitzhamon, a noble Norman, who came to England with the Conqueror, enlarged the buildings and increafed the poffeffions of Tewkefbury fo much, that the monks of Cranbourn chofe, about 1102, to remove to this place, leaving only a prior and two monks behind, and made Cranbourn in future fubject to the abbey of Tewkefbury. From this time it became a great eftablifhment of Benedictine monks; and at the fuppreffion, the annual revenues amounted to 1598*l.* 1*s.* 3*d.*, exclufive of 136*l.* 8*s.* 1*d.* granted by the convent for fees and annuities: its plate alfo was very valuable, the facrifty alone containing 1421 ounces. After the diffolution, the deftruction of the monaftic buildings was rapid and complete, through the ineffectual oppofition of the monks to the vifitors appointed by the king, who, in revenge, deftroyed the Lady chapel, cloifters, chapter-houfe, and other appendages by fire. The remains of the buildings were afterwards purchafed by the inhabitants: and the Abbey Church was made parochial. This magnificent ftructure difplays an interefting example of early Norman architecture, combined with fpecimens of later ftyles, and is in other refpects well calculated to arreft the attention of the antiquary. It is built in the cathedral form, and confifts of a nave, choir, tranfept, and central tower, with the addition of feveral chapels, ranged round the aifle of the choir. The nave and choir are feparated from the aifles by eighteen maffive columns, fuftaining the roof, and four fubftantial piers which fupport the tower. At the weft end is a large window with a pointed arch, which appears to have been introduced within a femicircular arch in 1656. There were cloifters on the fouth fide of the nave, where fome fragments yet remain; and appear to have been highly ornamented in a fimilar ftyle to thofe at Gloucefter. The tower, according to the Abbey chronicles, was once terminated by a wooden fpire, which fell down on Eafter-day, 1559. The moft remarkable fpecimens of the architecture are three tiers of arcades in the upper part; the arches of the middle tier have interefting mouldings. The length of the church is 300 feet; of the tranfept 120; the breadth of the choir and fide-aifles is 70 feet; of the weft front 100; the height from the area to the roof is 120 feet; the height of the tower 152 feet. The monuments, which are numerous, have attracted the attention of various antiquaries, particularly Mr. Gough and Mr. Lyfons; the latter of whom has taken great pains in affigning the different tombs to the real perfons they were intended to commemorate: many miftakes, in this refpect, having been committed on traditional authority by former writers. Near the weft end of the church is the Abbey Gate-houfe, which appears of the age of the fifteenth century: it is embattled and ornamented with grotefque figures, projecting from a cornice; beneath which is a canopied niche between two fquare windows.—Dyde's Hiftory, &c. of Tewkefbury, 8vo. 1798. Rudge's Hiftory of Gloucefterfhire, vol. i. 1803. Beauties of England and Wales, vol. v. Gloucefterfhire; by J. Britton and E. W. Brayley.

TEWKESBURY, called *Wamefit*, or *Pawtucket*, by the Indians, a townfhip of Maffachufetts, in the county of Middlefex, containing 943 inhabitants; 24 miles N. of Bofton.

TEXALI, in *Ancient Geography*, the inhabitants of the fea-coafts of Aberdeenfhire; who had a town, called Devana, at the mouth of the river Deva (Dee), where old Aberdeen now ftands.

TEXAS, in *Geography*, a province of New Spain, which properly forms part of Louifiana. This province is claimed by Spain as part of the internal provinces, and included in the vaft intendancy of San Louis Potofi: It is bounded E. by the ftate of Louifiana, S. by the gulf of Mexico, W. by an imaginary limit, and N. by Red river, and contains an area exceeding 100,000 fquare miles. The capital of this province is the garrifon of San Antonio de Bejar, ridiculoufly called the New Philippines. It was founded in 1731, confifting of a captain, a lieutenant, and one company of foldiers. The ftation of Cenis in this province, is now a mere Indian village, with the ruins of a fort built by the French. That called Natchitoches, from an Indian tribe, friends of the French and enemies of the Spaniards, was a fmall fort, built on an ifland of the Red river by fome French veterans. But the ftation of Adayes, or Adaes, is regarded by the Spanifh writers as the extreme fortrefs in this quarter: it is feated in a fertile country, at the diftance of two leagues from a lake of the fame name, which abounds in fifh, and which in fome parts is five leagues in diameter, and probably ten in circumference, with a gulf which may be navigated by large veffels. In the middle of the lake is a hill, or rock, of a pyramidal form, more than 100 yards in circumference, the ftone of which refembles cryftal in its reflection of the folar rays, and it is the higheft in the diftrict. The vicinity abounds in wild cattle, bears and beavers; and the foil is fertile in maize and other grain. Pinkerton.

TEXEIRA, JOSEPH (PETER), in *Biography*, a Portuguefe hiftorian, was born in 1543, entered among the Dominicans, and became prior of the monaftery at Santarem in 1578. When Philip II. of Spain took poffeffion of Portugal, Texeira attached himfelf to Don Antonio, who had been proclaimed king by the Portuguefe, and accompanied him into France. In 1582 he was taken prifoner by the Spaniards, but made his efcape from Lifbon. He became confeffor to Don Antonio, and, in procefs of time, preacher and almoner to the French king Henry III. He afterwards attached himfelf to Henry IV., and in 1596 affifted at the abjuration of Calvinifm by the princefs of Condé. He was fent on one miffion to England, and favourably received by king James. He died at Paris in 1604, as fome fay; but according to another account, in 1620.

In 1582, Texeira printed his "Compendium de Portugalliæ ortu Regni initiis, &c." This work was anfwered by order of the king of Spain; and Texeira replied, in 1592, by a "Confutatio, &c." which profeffed to refute the hereditary right of Philip to the crown of Portugal, and to vindicate that of Don Antonio;—probably the fame work that is entitled "De Electionis Jure quod competit Viris Portugallenfibus inaugurandis fuis Regibus," Lyons, 1589.

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As a genealogist, under which character he was distinguished, he published in 1590, "Exegesis Genealogica Arboris Gentilitiæ Henrici IV., Gallorum Regis," enlarged in 1598, with the addition of the princess of Condé's abjuration. In token of the indignation he felt at the seizure of his country by Philip, he affirmed, as it is said, in one of his sermons, that "we were bound to love all men, of whatever religion, sect or nation, even if they were Castilians." Bayle. Moreri.

TEXEL, or Tessel, in *Geography*, an island of Holland, about 11 miles in length, and six in its greatest breadth; situated at the mouth of the Zuyder See, with a capacious and good harbour, and a fort, which commands the entrance; besides a town of the same name, it contains six villages: the land is fertile in pasture, and the whole well secured with dikes of prodigious strength and height. Near this island was the celebrated sea-fight, between the fleet of Holland, under admiral Martin Harpertz Tromp, and that of England, under admiral Blake, in the year 1653, in which Tromp was killed. In the year 1673 a battle was fought between the fleet of Holland and the united fleets of England and France, in which the victory was doubtful. N. lat. 53° 5'. E. long. 4° 40'.

TEXEUIT, or Teyent, a town of Morocco; 100 miles W.N.W. of Morocco.

TEXT, a relative term, contradistinguished to *gloss* or *commentary*; and signifying an original discourse, exclusive of any note or interpretation.

Infinite pains have been taken by the critics, to restore, reconcile, settle, explain, &c. the text of the bible, and that of the classics. See Bible.

Mr. Whiston accounts for all those misunderstandings between the Old and New Testament, particularly as to the prophecies in the Old, cited as fulfilled in the New, from the corruption of the text of the Old Testament; and to obviate objections made against Christianity on that head, has published an "Essay towards restoring the true Text of the Old Testament." See Prophecy.

This restoration he attempts to effect from the Samaritan Pentateuch, the Roman Psalter, the Apostolical Constitutions, &c.

It sufficiently appears from the learned and acceptable labours of the late Dr. Kennicott, in collating the Hebrew manuscripts of the Old Testament, that the alterations introduced into the text, &c. are mostly of a trivial nature, and by no means affect the authority of the sacred writings.

Text is particularly used for a certain passage of scripture chosen by a preacher, to be the subject of his sermon.

A collection of texts appropriate to different subjects, and judiciously arranged, has been published by Dr. Enfield for the use of preachers in the composition of their discourses, and also of biblical readers and students.

Anciently, the lawyers began all their pleadings with like texts of scripture.

A text-book, in several universities, is a classic author written very wide, by the students, to give room for an interpretation dictated by the master or regent, to be inserted in the interlines.

In this sense, the French say, proverbially, *Glosse d'Orleans plus obscure que le texte.*

The Spaniards gave the name text to a kind of little poem, or set of verses placed at the head of a gloss, and making the subject of it: each verse being explained, one after another, in the course of the gloss.

Text, in *Ancient Law Authors*, is appropriated to the book of the Four Gospels, by way of eminence. These were written in gold letters, and carefully preserved in the churches.

"Codex aurato conseptus grammate scriptus.
Auctus evangelicum conservat corpore textum."

TEXTUARIES, Textuarii, a name given to the sect of the Caraites, among the Jews.

Hillel shone among the traditionaries, and Schammai among the textuaries.

The civil and canon lawyers sometimes also call a book containing the bare text, without any gloss or commentary, a textuary, *textuarium.*

TEXTURE, Textura, formed of *texo*, *I weave*, properly denotes the arrangement and cohesion of several slender bodies or threads interwoven or entangled among each other: as in the webs of spiders, or in cloths, stuffs, &c.

Texture is also used in speaking of any union or cohesion of the constituent particles of a concrete body; whether by weaving, hooking, knitting, tying, chaining, indenting, intruding, compressing, attracting, or any other way.

In this sense, we say a close, compact texture; a lax, porous texture; a regular or irregular texture, &c.

A great deal depends on the texture of the component parts of a body: hence most of its particular properties, its specific gravity, colour, &c.

TEXTUS Roffensis, is an ancient manuscript, containing the rights, customs, tenures, &c. of the church of Rochester, granted by the laws of Ethelbert, Hholthere, Eadred, and Withred, kings of Kent, collected by Ernulf, the venerable bishop of Rochester, about the year 1100.

TEYA, in *Geography*, a river of Austria, which rises about three miles N. from Germs, passes through a part of Moravia, and runs into the Marsch, 11 miles N.E. of Zistersdorf.

TEYN, a town of Bohemia, in the circle of Boleslau; 12 miles W.N.W. of Jung Buntzel.

TE-YUEN, a town of Asia, in the kingdom of Corea; 93 miles N.E. of King-ki-tao.

TEZA, a town of Africa, in the kingdom of Fez, with a castle. It was once a populous city, but is now much decayed, yet is still the residence of a governor and a garrison; 20 leagues N.N.E. of Fez.

TEZCUCO, or Tetzcuco, a lake of Spanish America, in the province of Mexico. The conjunct lakes of Tezcuco and Chalco are found to be about 30 British miles in length, and the former is about 15 miles in breadth; but as the latter is partly drained, so as to be at the distance of a league from the city, it is probably about twelve miles in breadth. This lake is celebrated in history, as originally containing the city of Mexico, and also as remarkable for the qualities of the water, partly fresh, and partly saline. The Chalco, or fresh-water lake in the south, appears to flow by a narrow channel into the salt lake of Tezcuco. See Mexico, substituting for Tezeuco, *Tezcuco.*

TEZELA, a town of Africa, in the kingdom of Algiers; 5 leagues S.W. of Oran.

TEZERGBE, a town of Africa, in the kingdom of Fez; 100 miles E.S.E. of Teza.

TEZOUT, or Tessot, a town of Africa, in the kingdom of Fez; 35 miles S. of Melilla.

TFENI, a town of Egypt, on the Nile; 10 miles S.E. of Rosetta.

TFUOI, in the *Chinese Manufactory of Porcelain*, a word used to express a particular sort of varnish for that ware, with

with violet-colour and gold. The ufual method of doing this at firft, was by mixing gold with the common varnifh, breaking the leaves very fmall, and then adding the common blue and the powder of calcined agate of a coarfe kind, found in great plenty on the fhores of their rivers. But they have fince found that the brown varnifh called *tfekin* fucceeds much better, for when the blue is mixed with this, its brown colour is loft, and the gold lies on much better than it would any other way.

They had once a method of a varied varnifh, which was very beautiful, but is much neglected now; this was the giving a veffel the brown varnifh on the outfide with a large portion of gold, and the common white varnifh within. They alfo varied the degree of colour on the outfide, by laying on more or lefs of the varnifh; and gave this way a variety, even in the fame colour. Obferv. fur les Coûtumes de l'Afie, p. 308.

TGIDT, in *Geography*, a town of Arabia, in the province of Oman; 48 miles N. of Fartach.

THABBA, in *Ancient Geography*, a town of Arabia Felix, fituated between Menambis and Seba, now *Ebba*. Ptol.—Alfo, an ancient town of Africa, in the vicinity of Tichafa.

THABET EBN KORRA, in *Biography*. See THEBIT BEN CORAH.

THABILIACA, in *Ancient Geography*, a town of Albania, between the rivers Gerrus and Soanes. Ptol.

THABIR, in *Geography*, a mountain of Arabia; 20 miles S. of Medina.

THABOR, in *Ancient Geography*. See TABOR.

THABORITES. See TABORITES.

THABRACA COLONIA, *Tabarka*, in *Ancient Geography*, a town and Roman colony of Africa, in Numidia, according to Ptolemy. It was fituated on the weftern bank, and near the mouth of the river Tufca. Some veftiges remain of walls and cifterns.

THABUCA, a town of Spain, in the interior of the Tarragonenfis, belonging to the Varduli. Ptol.

THACAS, θακας, in *Antiquity*, a general name given to the place or feat where the augurs made their obfervations.

THACCONA, in *Ancient Geography*, a town of Afia, in Babylonia, upon an arm of the Euphrates. Ptol.

THACES, a people of Scythia, on this fide of the Imaus, and near it. Ptol.

THACK TYLES. See TYLE.

THÆMA, in *Ancient Geography*, a town in the interior of Arabia Deferta. Ptol.

THÆNA, or THÆNÆ, a town placed by Strabo, Pliny, and Ptolemy, on the coaft of Africa, towards the commencement of the Leffer Syrtes.—Alfo, a town of Afia, in Syria, fituated, according to Ptolemy, in Cyrrheftica.

THAGIA, in *Geography*, a town of Africa; 100 miles S.S.W. of Fez.

THAGORA, TINGORAN, in *Ancient Geography*, a poft of India, at the bottom of a fmall gulf, in the eaftern part of the peninfula, beyond the Ganges.

THAGULIS, a town of Africa, fituated between the Two Syrtes. Ptol.

THAHAR KIAMEN, in *Geography*, a poft of Chinefe Tartary; 15 miles N.E. of Tcitcicar.

THAHATH, in *Ancient Geography*, the place of the 23d ftation of the Ifraelites, where they encamped, after having left Mauloth; fituated in the defert of Arabia, S. of Mauloth.

THAINEE, in *Geography*, a town of Africa, in the kingdom of Tunis, near the eaft coaft, but without a harbour, at a fmall diftance from the mouth of a river of the fame name; 120 miles S. of Tunis.

THAIS, a town of France, in the department of Paris; 2 leagues S.S.E. of Paris.

THAIS, a name given by Ægineta to a cofmetic cerate, intended to give a beautiful red to the face. Galen ufes the fame word to exprefs a fort of bandage.

THALA, *Ferre Anach*, in *Ancient Geography*, a town of Africa, in Numidia, according to Salluft and Tacitus.—Alfo, a mountain of Africa, in Interior Libya, and the people inhabiting its vicinity were called Thalæ.

THALACH, in *Geography*, a river of Bavaria, which runs into the Schwarzach; 5 miles W. of Greding.

THALAMEGUS, among the *Ancients*, a fhip of pleafure, or yatch ufed by princes. It was always provided with a good cabin, or bed-chamber. See SHIP.

THALAMI *Nervorum Opticorum*, in *Anatomy*, twio emnences in the brain. See BRAIN.

THALAMIA, in *Botany*, fee LICHENES, one of whofe kinds of *Apothecium*, or receptacle, is fo denominated by Acharius.

THALAMII, among the *Ancients*, thofe rowers who fat in the loweft part of the fhip. See the next article.

THALAMITÆ, in the *Naval Architecture of the Ancients*, a term ufed to exprefs thofe rowers in the polycrote galleys, or thofe who contained feveral feries of rowers, who fat on the thalamus of the veffel, and made the loweft row. Thefe moved their oars and hands under the feats of the row that fat next above them. See POLYCROTA.

THALAMIUM, among the *Ancients*, a port-hole, through which the oars of the rowers in the bottom of the fhip went.

THALAMUS, in *Botany*, a term ufed to exprefs that part of the flower in the capitated or flofculous-flowered plants, where the embryo fruits of every feparate flofcule are lodged, and where afterwards the feeds are contained. This is the bottom of the cup, in the central part of which it adheres to the ftalk.

THALASSAR, in *Ancient Geography*, a province of Afia, between Mefopotamia and Armenia.

THALASSOMELI, the name of a medicine ufed as a purge among the ancients. It was compofed of equal parts of honey, fea-water, and rain-water, expofed to the fun in the dog-days, in a veffel pitched on the infide. It purged in the fame manner that fea-water alone would do, but only in a milder way.

THALASSUS, in *Ancient Geography*, a town or port in the fouthern part of the ifle of Crete.

THALATHA, a town of Afia, in Babylonia, on the banks of the Tigris, and S. of Apamea.

THALATTA, a lake or marfh, at the foot of mount Caucafus, in the environs of the people called "Coraxi." It difcharged its waters into the Euxine fea, near a place called Beithea-Ponti.

THALBIS, a river of Albania, between the Gerrus and the Soanes. Ptol.

THALEA, a town of Paleftine, in the tribe of Simeon, according to the book of Jofhua.

THALER. in *Commerce*. See RIXDOLLAR.

THALES, in *Biography*, the founder of the Ionic fchool, and of the fcientific method of philofophifing among the Greeks, was born of Phœnician parents, at Miletus, in the firft year of the 35th Olympiad, or about the year 580 B.C. He acquired wealth and diftinction among his countrymen, and was employed at an early age in public affairs. He declined involving himfelf by marriage in the cares of a family, that he might devote his whole time and attention to the ftudy of philofophy; alleging, as it is faid, to his mother, who urged him to marry, at an early age "it "it is too soon," and at a more advanced period "it is too late." In order more entirely to disengage himself from every avocation that would divert his mind from his favourite pursuits, he committed the care of his estate to his sister's son, whom he adopted. In search of wisdom, he travelled to Crete, and afterwards to Egypt. From the priests at Memphis in the latter country, he is said by several writers to have gained his knowledge of philosophy and mathematics. But it is more probable that he was more indebted to his own talents and assiduity in the exercise of them, than to any communication from them; and accordingly it has been affirmed, that he taught them how to measure the height of their pyramids. Upon his return to Miletus, he was universally respected for his extraordinary wisdom and learning; and his acquaintance was eagerly courted by all who wished to improve in knowledge or to be ranked among philosophers. He was not prevented, however, by these engagements from prosecuting his mathematical, philosophical, and metaphysical studies. In this course of improvement and usefulness, and of imparting, as well as of acquiring knowledge, he protracted his life to the great age of ninety years, and died, through mere infirmity, whilst he was attending the Olympic games. Thales was ranked among the seven wise men of Greece, and might justly be reckoned one of this number, whether we consider his scientific attainments, or the moral maxims and aphorisms which are ascribed to him. Of these maxims, we shall select the following: "Neither the crimes, nor the thoughts, of bad men are concealed from the gods. Health of body, competent fortune, and a cultivated mind, are the chief sources of happiness. What is the most difficult thing? To know one's self. What the easiest? To give advice to others. How shall we best attain to virtue? By abstaining from all that we blame in others. Parents may expect from their children that obedience which they paid to their own parents. Take more pains to correct the blemishes of the mind, than those of the face. Stop the mouth of slander by prudence. Be careful not to do that yourself, which you blame in another. Friends should be remembered when absent, as well as when present." Laertius. Brucker by Enfield, vol. i. For an account of his philosophical doctrines and other particulars, we refer to the article IONIC *Sect*.

THALETAS *of Crete*, a famous lyric poet, celebrated by all antiquity as a *medical* musician, is said to have delivered the Lacedæmonians from the pestilence by the sweetness of his lyre; but credulity in the powers of music must be very strong indeed, in those who could believe it possible for music to drive away the pestilence. Thaletas, however, was universally believed to have possessed this power; but it is impossible to render the fact credible, without qualifying it by several circumstances omitted in the relation. In the first place, it is certain that this poet was received among the Lacedæmonians during the plague, by command of an oracle; that by virtue of this mission, all the poetry of the hymns which he sung, must have consisted of prayers and supplications, in order to avert the anger of the gods against the people, whom he exhorted to sacrifices, expiations, purifications, and many other acts of devotion; which, however superstitious, could not fail to agitate the minds of the multitude, and to produce nearly the same effects as public fasts, and, in Catholic countries, processions, at present, in times of danger, by exalting the courage, and by animating hope.

The disease having, probably, reached its highest pitch of malignity when the musician arrived, must afterwards have become less contagious by degrees; till, at length, ceasing of itself, by the air wafting away the seeds of infection, and recovering its former purity, the extirpation of the disease was attributed by the people to the music of Thaletas, who had been thought the sole mediator, to whom they owed their happy deliverance.

This is probably what Plutarch means, who tells the story; and what Homer meant, in attributing the cessation of the plague among the Greeks, at the siege of Troy, to music.

"With hymns divine the joyous banquet ends,
The Pæans lengthen'd till the sun descends:
The Greeks restor'd, the grateful notes prolong;
Apollo listens, and approves the song."
Pope's Homer's Iliad, book i.

For the poet, in this passage, seems only to say, that Apollo was rendered favourable, and had delivered the Greeks from the scourge with which they were attacked, in consequence of Chryseis having been restored to her father, and of sacrifices and offerings.

This poet-musician has been confounded by some writers with Thales the celebrated Milesian philosopher; but according to Plutarch (in Lycurg.) he was cotemporary with Lycurgus the Spartan legislator, and lived about three hundred years after the Trojan war. Plutarch also informs us, that though Thaletas was only styled a lyric poet and musician, he was likewise a great philosopher and politician; insomuch that Lycurgus brought him from Crete, when he returned from his travels, to Sparta, in order to have assistance from him, in establishing his new form of government. His odes, continues Plutarch, were so many exhortations to obedience and concord, which he enforced by the sweetness of his voice and melody. Plato, likewise, describes his captivating manner of singing; and Plutarch, in his Dialogue on Music, ascribes to Thaletas many musical compositions and inventions: such as Pæans, and new measures in verse, as well as rhythms in music, which he had acquired from the flute-playing of Olympus, whom he at first had imitated. Porphyry, in his Life of Pythagoras, says that this philosopher used to amuse himself with singing the old Pæans of Thaletas; and Athenæus likewise tells us, that the Spartans long continued to sing his airs; and, according to the scholiast on Pindar, this poet-musician was the first who composed the Hyporchemes for the armed, or military dance.

There was another poet and musician of the name of Thaletas, who was likewise a Cretan, but who flourished much later than the cotemporary and friend of Lycurgus.

THALFANG, in *Geography*, a town of France, in the department of the Sarre; 11 miles S.S.W. of Traarbach.

THALHEIM, a citadel of Bavaria, in the territory of Nuremberg; 6 miles S.E. of Hersbruck.

THALIA, in *Botany*, was so named by Linnæus, in memory of John Thalius, a physician at Nordhausen, in Germany, who wrote *Sylva Hercynia*, a catalogue of the plants of the Hercynian forest towards Saxony, which accompanies the *Hortus Medicus* of Joachim Camerarius, both having been printed together at Francfort on the Maine in 1588; and they are both illustrated by excellent wooden cuts. Thalius died in 1587, of a fractured thigh, in consequence of a fall from his carriage. His work abounds with original descriptions and remarks; but as Haller observes, it is not easy to ascertain all the numerous species or varieties of which he treats. The genus before us was originally called CORTUSA by Plumier; but that name remains with a very different plant, as the reader will find its proper place.—Linn. Gen. 4. Schreb. 6. Will[illegible] Pl. v. 1. 15. Ait. Hort. Kew. v. 1. 3. Roscoe T[illegible]

[illegible] Doc.

Soc. v. 8. 340. t. 20. f. 3. Brown Prodr. Nov. Holl. v. 1. 307. Purſh 584. Juſſ. 63. (Cortuſa; Plum. Gen. 26. t. 8. Peronia; Redout. Liliac. v. 6. 342.)—Claſs and order, *Monandria Monogynia.* Nat. Ord. *Scitamineæ*, Linn. *Cannæ*, Juſſ. *Canneæ*, Brown.

Gen. Ch. *Cal.* Perianth ſuperior, of three equal, ovato-lanceolate, permanent leaves. *Cor.* of one petal, irregular. Tube none. Limb double: the outer divided to the baſe into three equal, oblong, concave ſegments, much longer than the calyx: inner two-lipped; its upper lip convolute, abrupt, ſlightly three-lobed, hardly ſo long as the outer limb; lower twice as long, deeply three-lobed, with two awl-ſhaped appendages, the central lobe contracted in the middle. *Stam.* Filament one, declining, linear, depreſſed, the length of the upper lip, and attached to one of its edges; anther ſimple, ovate, of one cell, opening inwards. *Piſt.* Germen inferior, roundiſh; ſtyle cylindrical, longer than the ſtamen, revolute; ſtigma irregular, ringent, perforated, beardleſs. *Peric.* Berry oval, of one cell, with a thin pulp. *Seed* ſolitary, large, oval, with a large horny albumen, and a ſolitary, central, curved embryo, accompanied by an empty cell.

Eſſ. Ch. Calyx of three leaves. Corolla of one petal, in five deep unequal ſegments, without a tube. Anther ſimple, ovate. Style recurved. Stigma ringent, perforated. Berry with one ſeed.

Obſ. The characters and ſtructure of the flower have in few genera been involved in ſo much uncertainty as in *Thalia.* We have endeavoured to draw up as correct a deſcription as we could, from Mr. Sowerby's excellent plate of *Thalia dealbata*, publiſhed in 1794, by the late Mr. Fraſer, and delineated under our inſpection. Mr. Brown's learned remarks have aſſiſted us as to the ſeed. The above deſcription will be found to agree with Plumier's account of the original ſpecies, as far as any thing can be underſtood from thence; leaving little doubt that the two plants in queſtion form one genus. Linnæus has left many manuſcript corrections of his generic characters of *Thalia*, we know not from whence derived, which, though they accord as far as they go with our obſervations, do not ſuperſede them. The preſent genus, no doubt, is next akin to Maranta, but their differences will appear evident from a compariſon of their deſcriptions. They both belong to the new order of *Cannæ*, or *Canneæ*, recently ſeparated by Mr. Roſcoe and Mr. Brown from the Linnæan Scitamineæ. See that article.

1. T. *geniculata.* Diſtant-flowered Thalia. Linn. Sp. Pl. 3. Willd. n. 1. Swartz Obſ. 9. (Cortuſa arundinacea, amplis cannacori foliis; Plum. Gen. 26. Ic. 98. t. 108. f. 1.)—Leaves ovate. Flowers remote, alternate. Bracteas oblong.—Native of the Weſt Indies, but hitherto ſeen by Plumier only. His figures are our only certain authority for this ſpecies; for Dr. Swartz has well obſerved, that the ſynonyms which authors have accumulated, do not belong to it; and that what Rottboll has deſcribed and figured, ſeems more akin to *T. cannæformis*, hereafter mentioned. We have indeed ſpecimens, gathered by Mr. Fraſer in 1810, in Cuba, near the Havannah, which greatly reſemble Plumier's figure, and may be his plant, though from the impoſſibility of examining their fructification, we dare not aſſert them to be ſo. Nevertheleſs we ſhall deſcribe them, that botaniſts may form their own opinion. The *ſtem* is ſeveral feet in height, erect, round, ſmooth, leafy, alternately branched. *Leaves* alternate, ovate, pointed, ſmooth, above a foot long, with one rib, and many fine tranſverſe curved veins. *Footſtalk* ſheathing, compreſſed, half as long as the leaf, with an oblong cylindrical knot at the ſummit. *Panicle* ſubdivided, with long linear, obtuſe, flat, erect *ſcales*, or *general bracteas*, at each ſubdiviſion. *Flower-ſtalks* zigzag, knotty, round, two or three inches long. *Partial bracteas* two at each knot, the outermoſt much the largeſt, embracing and concealing the other, an inch in length, elliptic-oblong, green, finely ribbed, clothed with ſcattered ſhining hairs. Between theſe *bracteas* is ſituated a pair of *flowers*, whoſe dried *corolla* is partly purple, and whoſe pale, much convoluted and wrinkled lip bears ſome reſemblance to Plumier's figure.

2. T. *dealbata.* Mealy Thalia. Roſcoe Tr. of Linn. Soc. v. 8. 340. Dryand. in Ait. n. 1. Purſh n. 1. Fraſer's ſingle plate. Curt. Mag. t. 1690. (Peronia ſtricta; Redout. Liliac. t. 342.)—Leaves ovate. Flowers crowded. Bracteas ovate, mealy.—Native of impenetrable ſwamps in South Carolina, flowering in Auguſt and September. Mr. Purſh ſays it was firſt diſcovered there by T. Millington, eſq. Living plants were brought to England by the late Mr. Fraſer in 1791, by which this handſome and curious ſpecies firſt became known to botaniſts. Its *root* is of courſe perennial. *Stem* four or five feet high, erect, round, ſmooth; leafy at the bottom; panicled at the top, covered with a ſilvery mealineſs, which clothes alſo the general as well as partial *bracteas*, and is eaſily rubbed off by a touch. *Leaves* light green, ſmooth, above a foot long, on round ſheathing *ſtalks*, with a knot at the top. *General bracteas* lanceolate, concave, convolute, a ſpan long. *Flower-ſtalks* aggregate or compound. *Partial bracteas* crowded, in pairs, much more tumid, ovate, and ſhorter than in the foregoing, each pair containing two purple *flowers*, whoſe ſtructure is detailed in our generic character. *Fruit* purple, the ſize of a hazel-nut, ſlightly pulpy.

3. T. *cannæformis.* Elliptical Thalia. Forſt. Prodr. 1. Willd. n. 3. Buchanan in Symes's Embaſſy to Ava, ed. 2. v. 3. 305. t. 21.—Leaves elliptical. Partial bracteas linear-lanceolate, ſhorter than the divided partial flower-ſtalk.—Native of moiſt woods in the remote iſlands of the Eaſt Indies, and the New Hebrides, flowering in March and April. The *ſtem* is ſolid, branched, round, ſmooth, leafy, divaricated at the joints. *Leaves* alternate, broadly elliptical, pointed, ſmooth, on round ſheathing *ſtalks. Panicle* terminal, with long, ſlender, pendulous branches, upon which the *flowers* are arranged pretty cloſely. Every pair of long narrow *partial bracteas* contains a divided ſtalk, bearing two large white *flowers*, each with the rudiment of another at its baſe. The *corolla* is ſomewhat tubular, and the lower lip of its inner limb has two large equal lobes, but in other reſpects the parts of fructification ſeem to anſwer well enough to the generic character. The *fruit*, however, which muſt ſettle that point, is unknown.

Our learned and highly valued friend Mr. Roſcoe has ſuggeſted, that the *Maranta Cachibou*, Jacq. Fragm. Bot. 52. t. 69 and 70, of which we have a ſpecimen gathered by Mr. Maſſon at St. Kitt's, may probably be a *Thalia.* Its *ſeed* certainly confirms this opinion, but the parts of the *flower* are not yet ſufficiently deſcribed to authorize any concluſion, nor can we unravel their ſtructure from the dried plant. Whatever becomes of this ſpecies, the *Maranta Caſupo*, t. 63. f. 4, of the ſame work, and *M. Caſupito*, t. 64. f. 2, muſt aſſuredly be referred to the ſame genus.

Thalia, in *Mythology*, one of the nine Muſes, who preſided over comedy and paſtorals. She is diſtinguiſhed from the other Muſes by her maſk, and from the tragic Muſe by her ſhepherd's crook; her aſpect is likewiſe meaner than that of Melpomene, and her dreſs ſhorter and leſs noble than that of the other Muſes.

Thalia was alſo the name of one of the Graces.

THALICTRUM, in *Botany*, may poſſibly be, as generally ſuppoſed, the θαλικτρον of Dioſcorides, from whom the name is adopted. That point, however, was not determined by Dr. Sibthorp, though he noticed five ſpecies of this genus in Greece or its neighbourhood. The above name is, by Ambroſini and others, derived from θαλλω, *to be green and flouriſhing*. Some old authors occaſionally write it *Thalietrum*.—Linn. Gen. 280. Schreb. 277. Willd. Sp. Pl. v. 2. 1295. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 583. Prodr. Fl. Græc. Sibth. v. 1. 378. Ait. Hort. Kew. v. 3. 346. Purſh 388. Juſſ. 232. Tourn. t. 143. Lamarck Illuſtr. t. 497. Gærtn. t. 74.—Claſs and order, *Polyandria Polygynia*. Nat. Ord. *Multiſiliquæ*, Linn. *Ranunculaceæ*, Juſſ.

Gen. Ch. *Cal.* none, except the corolla be taken for ſuch. *Cor.* Petals four or five, roundiſh, obtuſe, concave, deciduous. *Stam.* Filaments numerous, dilated upwards, compreſſed, longer than the corolla; anthers terminal, oblong, erect. *Piſt.* Germens ſuperior, numerous, moſtly ſtalked, roundiſh; ſtyles none; ſtigmas thickiſh. There are alſo ſeveral very ſhort imperfect piſtils. *Peric.* none. *Seeds* ſeveral, ovate, furrowed, without any appendage.

Eſſ. Ch. Calyx none. Petals four or five. Seeds naked, without appendages.

Obſ. Linnæus remarks, that his *T. tuberoſum* and *cornutum* have five petals; *dioicum* has the ſtamens and piſtils on ſeparate plants; *aquilegifolium* and *contortum* have ſtalked pendulous ſeeds, furniſhed with three dilated or winged angles; moreover, that the number of ſtamens and piſtils differs in the different ſpecies, being ſometimes leſs than the characters of the claſs and order require.

This is a very diſtinct well-marked genus of perennial herbaceous plants, all natives of the cold or temperate climates of Europe and North America. The *leaves* are compound, with roundiſh, rarely oblong, lobed or notched *leaflets*; paler, or glaucous, underneath; uſually ſmooth. *Infloreſcence* panicled. *Flowers* white or yellowiſh, with ſome ſlight tinge of purple, generally of an elegant feathery appearance. Fourteen ſpecies are deſcribed in Linn. Sp. Pl.; twenty-one in Syſt. Veg. ed. 14. Willdenow has twenty-three. Four are Britiſh. Nineteen are enumerated in Mr. Aiton's *Hortus Kewenſis*. Their qualities in general are believed to be of an acrid nature, like thoſe of *Ranunculus* and *Clematis*; but milder.

We have ſome additions and corrections to make, which require a compendious review of the whole genus.

1. T. *alpinum*. Alpine Meadow-Rue. Linn. Sp. Pl. 767. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 262. Lightf. 286. t. 13. f. 1. Fl. Dan. t. 11. (T. minimum montanum atro-rubens, foliis ſplendentibus; Raii Syn. 204. Boerh. Ind. Alt. v. 1. 44. t. 1.)—Stem perfectly ſimple, and almoſt naked. Cluſter ſimple, terminal.—Native of moiſt black bogs, or the turfy margins of alpine rills, on the loftieſt mountains of Lapland, Scotland, and Wales, flowering in June. The *root* is perennial, creeping, with a few ſimple fibres. *Stem* erect, about ſix inches high, round, glaucous or purpliſh, with one leaf, more or leſs compound, about the middle. *Radical leaves* ſeveral, ſtalked, erect, half as tall as the ſtem; firſt ternate; then either again ternate, or pinnate; the leaflets roundiſh, or wedge-ſhaped, veiny; glaucous beneath. *Cluſter* at firſt drooping, then erect, of eight or ten alternate *flowers*, whoſe *petals*, and eight or ten *filaments*, are either white or purple; their *anthers* orange. *Germens* two or four only, roundiſh, green, each with a whitiſh, broadly-lanceolate, divaricated, downy *ſtigma*, about its own length. Linnæus deſcribes twelve *ſtamens*, and eight *piſtils*.

2. T. *fœtidum*. Fœtid Meadow-rue. Linn. Sp. Pl. 768. Willd. n. 2. Ait. n. 2. "Waldſt. et Kitaib. Hung. v. 2. 190. t. 174." (T. minimum fœtidiſſimum; Bauh. Prodr. 147. Pluk. Phyt. t. 65. f. 4. Moriſ. ſect. 9. t. 20. f. 13. T. n. 1140; Hall. Hiſt. v. 2. 58.)—Stem panicled, round, leafy. Leaves triply compound, minutely downy on both ſides. Flowers drooping. Petals ſlightly hairy. Stigmas auricled at the baſe.—Native of France, Switzerland, and Siberia, flowering in May. A ſpecies of a delicate aſpect, and glaucous hue, about a foot high, with innumerable, ſmall, rounded, lobed, tender *leaflets*. The *petals* are externally reddiſh, eſpecially in the young plant, and finely downy or hairy. *Stamens* long and capillary. *Seeds* ovate, ſtrongly furrowed, crowned with the permanent ſhrivelled *ſtigmas*, whoſe dilated or auricled baſe is diſtinguiſhable in our Swiſs ſpecimens. This laſt character is, in the *Supplementum*, p. 271, made the peculiar mark of *T. ſtyloideum*, there deſcribed from a Siberian ſpecimen, which Linnæus did not recognize as his own *T. fœtidum*. The *ſtyloideum*, Willd. n. 22, is therefore to be ſtruck out. Several Swiſs botaniſts have confounded the ſpecies before us with *T. minus*, hereafter deſcribed, which is Haller's n. 1139. That eminent writer had ſome doubts reſpecting the difference between the two, which we ſhall attempt to remove when we come to the other, Linnæus having placed them far aſunder. The *fœtidum* is ſaid to exhale a very bad and powerful odour, like *Geranium robertianum*, or, as Haller ſays, the urine of cats.

3. T. *tuberoſum*. Tuberous-rooted Meadow-rue. Linn. Sp. Pl. 768. Willd. n. 3. Ait. n. 3. Mill. Ic. v. 2. 177. t. 265. f. 2. (Oenanthe Myconi; Dalech. Hiſt. 785. Ranunculus thalictri folio minor, aſphodeli radice; Moriſ. ſect. 4. t. 28. f. 13.)—Leaflets rounded, glaucous, ſmooth. Petals five. Root tuberous.—Native of Spain and the Pyrenees. A hardy perennial in our gardens, flowering in June, but confined to the more curious collections. The *root* conſiſts of ovate knobs. *Herb* ſmooth, a foot or more in height, of a light glaucous green. *Flowers* panicled, not numerous, diſtinguiſhed by their five large, ovate, white *petals*, and ſmall *ſtigmas*. Moriſon's figure is badly copied from that of Dalechamp.

4. T. *Cornuti*. Canadian Meadow-rue. Linn. Sp. Pl. 768. Willd. n. 4. Ait. n. 4. Purſh n. 1. (T. canadenſe; Cornut. Canad. 186. t. 187. T. femine triquetro, foliis aquilegiæ; Moriſ. ſect. 9. t. 20. f. 15.)—Leaflets rounded, three-lobed, glaucous, ſmooth. Panicles terminal. Flowers dioecious. Petals five. Root fibrous.—On the banks of rivers, and in wet meadows, from Canada to New England, flowering in June and July. *Root* perennial. *Stem* from two to three feet high. *Flowers* ſmall, greeniſh-yellow. *Purſh*. Cornuti ſays the unexpanded *petals* are pale purple; the *ſtamens* white, numerous, with yellow *anthers*. *Seeds* triangular. The dioecious nature of the *flowers*, which we have had no opportunity of obſerving, was firſt noticed in *Hort. Kew.*

5. T. *dioicum*. Dioecious Early Meadow-rue. Linn. Sp. Pl. 768. Willd. n. 5. Ait. n. 5. Purſh n. 2. Muhlenb. Cat. 54.—Leaflets heart-ſhaped, many-lobed, very ſmooth. Panicles axillary. Flowers dioecious. Petals not longer than the filaments or germens. Stigmas almoſt capillary.—Native of ſhady woods and the banks of rivers, from Canada to Virginia, flowering from May to July, according to Purſh, who ſays the *flowers* are white. He conceives his plant to be the ſame with *T. lævigatum* of Michaux, Fl. Boreali-Amer. v. 1. 322, who confeſſes his inability to determine the North American *Thalictra*, they being almoſt all dioecious. Specimens from the late Dr. Muhlenberg, now before us, and agreeing exactly with thoſe ſent by Kalm to Linnæus,

Linnæus, as recorded in Sp. Pl., are certainly dioecious, about a foot high, very fmooth, with thrice-ternate *leaves*, whofe lobes are ufually from five to feven, blunt, and rather fhallow; both their furfaces reticulated with flightly prominent veins. *Panicles* folitary or in pairs from the bofoms of the leaves, fomewhat umbellate, on long ftalks, and often accompanied by a long-ftalked folitary flower. *Petals* of the *male flowers* white or reddifh, ovate, ribbed, the length of the very flender numerous *filaments*, whofe *anthers* are yellow, very narrow, pointed: thofe of the *female flowers* much fmaller and rounder, white or greenifh, hardly fo long as the little, oval, ribbed *germens*. The *ftigmas* are very flender, and remain in a prominent, almoft capillary, form, on the ovate-oblong, ftriated *feeds*.

6. T. *elatum*. Tall Meadow-rue. Jacq. Hort. Vind. v. 3. 49. t. 95. Willd. n. 6. Ait. n. 6.—Leaflets ovate, three-lobed, fmooth, fomewhat notched. Panicle much branched, terminal. Flowers erect. Filaments capillary. Stigmas ovate, fhort.—Native of Hungary. Introduced into England by Mr. Hunnemann in 1794. A hardy perennial, flowering from June to Auguft. *Aiton*. An unnamed fpecimen in the Linnæan herbarium manifeftly agrees with Jacquin's plant, which is four feet or more in height. The *ftem* is more furrowed in our fpecimen than he reprefents. The *leaves* are ternate from their very bafe, then twice or thrice pinnate, glaucous, incorrectly three-lobed, and fomewhat cut befides. *Flowers* white, erect, in an upright compound panicle. *Petals* ovate, rather fmall, fometimes purplifh. *Filaments* of equal thicknefs throughout, about thrice the length of their oblong, linear, pointed *anthers*, which Jacquin reprefents rather fhorter and rounder than we find them. *Germens* angular. *Seeds* elliptic-oblong, glaucous, furrowed, crowned with the fhort fhriveled *ftigmas*.

7. T. *majus*. Greater Meadow-rue. Jacq. Auftr. v. 5. 9. t. 420. Willd. n. 7. Fl. Brit. n. 3. Engl. Bot. t. 611. —Leaflets roundifh, fomewhat heart-fhaped, three-cleft; glaucous beneath. Panicle leafy, with aggregate branches. Flowers drooping.—Native of woods and bufhy places in Auftria, Hungary, Mount Athos, and the north of England, perennial, flowering in June and July. The late Mr. Robfon of Darlington found it at Baydales, near that town, as well as on the margin of Ulls-water, Cumberland. This is about the fize of the laft, but the *leaves* are of a darker green on the upper fide, very glaucous beneath. The branches of the *panicle* grow feveral together, from the bofoms of the upper leaves, and the *flowers*, at leaft their *ftamens*, are pendulous, with longer *anthers* than the preceding. The *petals* moreover are green. In the *germens* and *ftigmas* we perceive no particular diftinction.

8. T. *medium*. Intermediate Meadow-rue. Jacq. Hort. Vind. v. 3. 50. t. 96. Willd. n. 8. Ait. n. 8.—Leaflets oblong-wedge-fhaped, three-cleft, notched; the uppermoft lanceolate. Panicle much branched, flightly leafy. Stamens fpreading.—Native of hilly fituations in Hungary. A hardy perennial, flowering in June and July, introduced at Kew, by Mr. Hunneman, in 1789. Specimens in the herbarium of Linnæus, from the Upfal garden, which he fufpected might be *T. tuberofum*, n. 3, appear rather to belong to the prefent fpecies, which differs from the two laft in the narrownefs of its *leaflets*, agreeing with them in the *germens* and *ftigmas*. The *panicle* is more like *elatum* than *majus*. The *ftamens* are not pendulous, but divaricated. *Petals* elliptical, greenifh. *Leaves* light green, fomewhat glaucous.

9. T. *minus*. Leffer Meadow-rue. Linn. Sp. Pl. 769. Willd. n. 9. Fl. Brit. n. 2. Engl. Bot. t. 11. Fl. Dan. t. 732. Jacq. Auftr. v. 5. 9. t. 419. Segu. Veron. 476. Vill. Dauph. v. 3. 713. Ger. Em. 1251. (T. alpinum minus faxatile, rutæ folio, ftaminibus luteis; Segu. Veron. 476. t. 11.)—Leaflets roundifh, three-cleft, notched, fomewhat glaucous on both fides. Panicle flightly leafy. Flowers pendulous.—Native of various parts of Europe, from Sweden to Greece, generally on a limeftone or chalky foil, flowering in June and July. Our Britifh plant precifely agrees with what was found in Gothland by Linnæus, though he fubfequently confounded "things innumerable, both fmall and great," under *T. minus*. The true one is a bufhy fpreading herbaceous perennial, of humble growth, generally but a foot high, fmooth, of a glaucous hue, with tints of violet. *Leaflets* rather fmall, various in breadth. *Panicle* moderately branched. *Flowers* pendulous, though the ftalks become more erect when in feed. *Petals* elliptical, concave, light purple, fometimes jagged or fringed. *Stamens* capillary. *Anthers* long, linear, pointed, as in the laft. *Germens* and *feeds* fmall. Linnæus's fpecific definition, *foliis fexpartitis*, has puzzled every body, and is inapplicable to any thing ever taken for the prefent fpecies. He perhaps meant that each *leaf* confifted of fix primary divifions, which is moftly the cafe.

10. T. *rugofum*. Rugged Meadow-rue. Ait. ed. 1. v. 2. 262. ed. 2. n. 10. Willd. n. 10. Purfh n. 3. Muhlenb. Cat. 54.—Leaflets ovate or lanceolate, rugged, veiny, bluntly lobed. Stem round, ftriated. Panicle corymbofe. Flowers erect.—On the banks of rivers, and in fwamps, from Pennfylvania to Carolina, flowering from June to Auguft. Perennial, very tall, fometimes above five feet high. *Flowers* white. *Purfh*. The habit of this plant is more like fome of the large fpecies hereafter defcribed, with a large terminal denfe, almoft leaflefs, tufted *panicle*. *Stamens* capillary. *Anthers* linear.

11. T. *fibiricum*. Siberian Meadow-rue. Linn. Sp. Pl. 769. Willd. n. 11. Ait. n. 11. (T. orientale minimum, fumariæ folio; Tourn. Cor. 20. *Willd.*)—"Leaves in three divifions; leaflets fomewhat reflexed, fharply cut. Flowers drooping."—Found by Gmelin in Siberia; and by Tournefort, if we are right in his fynonym, in Armenia. Linnæus doubtingly cites a fynonym of Seguir, which, after Haller, we have referred to *T. minus*. His account of the prefent fpecies, of which we know nothing, is, that its habit accords with *T. minus*, or *purpurafcens*, but the *leaflets* are fmall, but one-fixth as large as thofe fpecies, glaucous like Rue or Fumitory. *Stem* green, copioufly panicled. *Panicle* brown at its divarications. It flowers later, at the fame time as *flavum* and *dioicum*.

12. T. *fquarrofum*. Squarrofe Meadow-rue. Willd. n. 12.—"Leaflets three-cleft or undivided. Footftalks membranous, winged, clafping the ftem. Flowers drooping."—Native of Siberia. Differs from all the foregoing fpecies which have drooping *flowers*, in the ftructure of its *footftalk*. The *leaves* are repeatedly compound, as in the reft; their lateral *leaflets* moftly ovate, acute, and entire, but the terminal, and even the uppermoft lateral ones, are divided or three-cleft. *Footftalk* greatly dilated at the bafe, with orbicular membranous wings, toothed at the margin. There are alfo leffer orbicular toothed *auricles*, upon the partial footftalks, by which mark the fpecies is eafily known. *Willdenow*. We have met with nothing anfwering to this defcription.

13. T. *purpurafcens*. Purplifh Meadow-rue. Linn. Sp. Pl. 769. Willd. n. 13. Ait. n. 12. Purfh n. 5.—(T. virginianum elatius glaucum, florum ftaminulis purpurafcentibus; Morif. v. 3. 324.)—"Stem twice as tall as the leaves. Leaflets roundifh, three-cleft, cut. Panicles

 nearly

nearly naked. Flowers drooping. Stamens coloured."— On dry funny hills, in Pennfylvania and Virginia. Perennial, flowering in May and June. A fmall plant. *Stem* and *filaments* purple. *Purſh.* Linnæus contrafts this with *T. minus*, a fpecies concerning which his ideas were too vague, for us to learn any thing from fuch a comparifon, nor does his herbarium lend us any certain aid. There is, however, an unmarked fpecimen, which he affociated with *T. dioicum*, but which may poffibly be the *purpurafcens*. It has broad ivy-like *leaflets*, but is more particularly diftinguifhed by fhort elliptical *anthers*, whofe *filaments* are gradually dilated upwards, approaching to thofe of *T. ſtamineum* hereafter defcribed.

14. T. *pubeſcens*. Downy Polygamous Meadow-rue. Purfh n. 4. Muhlenb. Cat. 54.—Leaflets ovate, fomewhat heart-fhaped, or wedge-fhaped; three-lobed at the end; flightly downy beneath. Panicles terminal. Flowers polygamous. Anthers linear. Styles awl-fhaped, twice as long as the germens.—On the banks of ditches and rivulets, in Pennfylvania and Virginia, flowering from June to Auguft. A tall fpecies, with white *flowers*. Purfh. We have this from our late venerable correfpondent, the Rev. Dr. Muhlenberg. The *leaflets* are rather large; dark green, and fomewhat rugged, above; paler, reticulated with prominent veins, and minutely downy, at the back. *Flowers* neareft to thofe of *T. dioicum*, and like them diftinguifhed by long tapering *ſtigmas*. The *anthers* are linear-oblong; their *filaments* almoft equally flender throughout.

15. T. *anguſtifolium*. Narrow-leaved Meadow-rue. Linn. Sp. Pl. 769. Willd. n. 14. Ait. n. 13. Jacq. Hort. Vind. v. 3. 25. t. 43.—Leaflets linear-lanceolate, or linear, moftly undivided, entire. Panicle much branched, denfe. Flowers erect. Stigmas heart-fhaped, half the length of the germens. Native of Switzerland and Germany, but not frequent any where. Dr. Sibthorp, however, gathered it on the Bithynian Olympus. Miller feems to have cultivated it, in his time, at Chelfea, but we have fcarcely ever feen a living fpecimen, and we are much inclined to concur in opinion with thofe who judge it a variety of the following, their habit, inflorefcence, and *flowers*, being exactly the fame, however different the breadth of their *leaflets*. Bauhin's fynonym, uniformly referred to this, certainly belongs to *T. ſimplex*, n. 17.

16. T. *flavum*. Common Meadow-rue. Linn. Sp. Pl. 770. Willd. n. 15. Fl. Brit. n. 4. Engl. Bot. t. 367. Fl. Dan. t. 939. (T. nigricans; Jacq. Auftr. v. 5. 10. t. 421. Willd. n. 16. T. nigrius, caule et femine ftriato; Bauh. Hift. v. 3. 486. T. majus, foliis rugofis trifidis; Morif. fect. 9. t. 20. f. 3.)—Leaflets rounded or oblong, three-cleft. Panicle much branched, denfe. Flowers erect. Stigmas heart-fhaped, half the length of the germens.—Found in moift meadows, and the reedy margins of rivers, throughout Europe, from Sweden to Greece, flowering in July. The *root* is yellow, perennial. *Stem* three feet high, erect, fmooth, leafy, furrowed or angular, fimple below. *Leaves* nearly feffile, twice ternate, with a fhort fheathing bafe, or *footſtalk*; *leaflets* flightly glaucous, moft fo beneath; either undivided or three-cleft, entire, veiny, varying extremely in breadth, length, and fharpnefs. *Panicle* terminal, erect, denfe, corymbofe, much branched, fomewhat leafy. *Flowers* and *ſtamens* erect, yellowifh-white, with oblong, flightly pointed, yellow *anthers*. *Stigmas* oblique, heart-fhaped, downy. *Seeds* deeply furrowed. The vague refemblance of this plant to the garden rue, and its place of growth, feem to have given the Englifh name of the whole genus. Jacquin's *nigricans*, found frequently in England, differs merely in the elongation and comparative narrownefs of its *leaflets*, which approach in thofe refpects to the *anguſtifolium*, laft defcribed.

17. T. *ſimplex*. Simple-ftalked Meadow-rue. Linn. Mant. 78, excluding the fynonym. Willd. n. 17. Ait. n. 15. Fl. Dan. t. 244. Ehrh. Phytoph. 15. (T. anguftifolium; Villars Dauph. v. 3. 712. T. anguftiffimo folio; Bauh. Prodr. 146. Morif. fect. 9. t. 20. f. 8.)—Leaflets linear. Stem angular, fimple. Panicle branched, compound, lax, fomewhat racemofe. Flowers pendulous. Stigmas roundifh-heartfhaped.—Native of Sweden, Denmark, Switzerland, and France. Introduced at Kew by the very eminent cultivator and botanift M. Thouin, in 1778. It is a hardy perennial, flowering in May and June. This is unqueftionably akin to the laft, but effentially diftinct. The whole plant is but half as large, with a much more angular *ſtem*. The *leaflets* are extremely narrow, and revolute, unaccompanied by any of the partial ftipulary fcales, feen on the leaves of *T. flavum*. The *panicle* is more oblong and lax, not corymbofe. *Flowers* fmaller, drooping, or rather quite pendulous, not erect. *Petals* green, not white or yellowifh. *Stigmas* remarkably round and convex. We have fpecimens from Villars, which prove the correctnefs of Willdenow refpecting his fynonym. We have alfo from profeffor Lachenal a fpecimen gathered at Michelfeld, which fhews this to be the plant of Bauhin, cited by Linnæus and others for *T. anguſtifolium*. Indeed Bauhin's wooden cut, copied by Morifon, fufficiently evinces this, though, being delineated perhaps from a dried fpecimen, it is not exact in the pofition of the *flowers*. *T. gallioides*, Willd. Enum. Hort. Berol. 585. we believe is a very narrow-leaved variety of *ſimplex*.

18. T. *lucidum*. Shining-leaved Meadow-rue. Linn. Sp. Pl. 770. Willd. n. 18. Ait. n. 16. (T. minus lucidum, libanotidis coronariæ foliis; Pluk. Phyt. t. 65. f. 5.)—"Stem leafy, furrowed. Leaflets linear, flefhy."—Said to be a native of France and Spain. Miller had fomething in his garden which paffed for this plant, and hence it is enumerated in Hort. Kew. We have never feen a fpecimen, nor did Linnæus know any more of the matter than what Dalibard, whofe fpecific character we more exactly copy, has given in his *Fl. Paris.* 162. The late Mr. Davall fent us a Swifs *Thalictrum* for *lucidum*, which anfwers to the character, but is indubitably the *ſimplex* in a luxuriant ftate. Linnæus thought the *lucidum* was probably a variety of *flavum*. We prefume various things have been taken for this plant, but in reality that it has no exiftence as a fpecies.

19. T. *aquilegifolium*. Columbine-leaved Meadow-rue, or Feathery Columbine. Linn. Sp. Pl. 770. Willd. n. 19. Ait. n. 17. Jacq. Auftr. v. 4. 10. t. 318. Curt. Mag. t. 1818. (T. atropurpureum; Jacq. Hort. Vind. v. 3. 34. t. 61. T. majus, florum ftaminibus purpurafcentibus; Bauh. Pin. 337. Morif. fect. 9. t. 20. f. 16.)—Leaflets rounded, lobed, and cut. Stem round. Panicle corymbofe. Flowers erect. Stamens dilated upwards. Germens ftalked. Fruit pendulous, with three dilated wings.—Native of Sweden, Germany, Switzerland, Thrace, and Greece, common and hardy in our gardens, flowering from May to July. The *ſtem* is three or four feet high, round, fomewhat ftriated, leafy, fmooth, either glaucous or purple. *Leaves* large and fpreading, much refembling thofe of *Aquilegia vulgaris*, though often more acute. *Flowers* large and elegant, white or pale violet; their *petals* reflexed; their very numerous *ſtamens* moderately dilated upwards, flattened, of the hue of the petals, with fhort yellow *anthers*. *Germens* triangular, on long ftalks, at length deflexed or pendulous, and becoming fomewhat obovate, obtufe, ftraightifh *ſeeds*, with three unequal, much dilated, fmooth wings.

wings. Retzius, in his *Obs. Bot. fasc.* 6. 30. sect. 52, justly indicates the identity of Jacquin's *T. atropurpureum* and the Linnæan *aquilegifolium*, confessing he could not decide concerning the *aquilegifolium* of Jacquin. We have a wild Swiss specimen of the latter, Haller's n. 1141, precisely answering to the plate in *Fl. Austrica*, and certainly not differing in any essential character from the true plant of Linnæus, so frequently cultivated for ornament, and preserved in his herbarium.

20. T. *contortum*. Twisted-seeded Meadow-rue. Linn. Sp. Pl. 770. Am. Acad. v. 4. 47. Willd. n. 20. Ait. n. 18.—"Fruit pendulous, triangular, contorted. Stem rather two-edged."—Native of Siberia. Linnæus thought it a hybrid offspring of *aquilegifolium* impregnated by the *minus*. His specimen is not to be distinguished from the former, and we cannot but agree with Willdenow's remark, that the contortion of the *seeds* is merely a sign of imperfection. Neither can any more solid dependance be had on the comparative number of the parts of fructification, on the white colour of the *flowers*, or the humbler stature of the herbage. We conclude this supposed species therefore to be scarcely even a variety of the last.

21. T. *petaloideum*. Daurian Meadow-rue. Linn. Sp. Pl. 771. Willd. n. 21. Ait. n. 19. (T. stamineum; Linn. Suppl. 271.)—Leaflets rounded, obtuse; partly three-lobed. Stem nearly leafless. Panicle somewhat umbellate. Stamens much dilated, linear-obovate. Germens sessile.—Native of Siberia. Mr. Loddiges is said to have introduced this curious and very distinct species to the knowledge of our cultivators, in 1799. It has a perennial *root*, with long, simple, rather fleshy fibres. *Stem* simple, about a foot high, striated, purple at the bottom, leafless, except an occasional leaf, accompanying a small lateral branch. *Radical leaves* two, spreading, thrice compound, on purplish stalks; *leaflets* very much like Common Rue, but smaller. *Flowers* white, large but not numerous, in a sort of *corymb*, or imperfect *umbel*, accompanied by a few small leaflets. *Petals* roundish, deciduous. *Stamens* very numerous, white, flat, and singularly dilated, with a mid-rib; their *anthers* yellow, narrow and short. *Germens* ovate, ribbed, with awl-shaped recurved *stigmas*. Willdenow makes *T. stamineum* a variety, little supposing that the very identical specimens, so minutely and accurately described in the *Species Plantarum*, could be again described, without a reference, in the *Supplementum*.

We have to exclude *T. japonicum*, Thunb. Tr. of Linn. Soc. v. 2. 337. Willd. n. 22, a specimen from Thunberg himself proving it to be no other than *Coptis asplenifolia* of Mr. Salisbury, Tr. of Linn. Soc. v. 8. 306, a circumstance as wonderful as that its discoverer should ever have thought this plant similar to a *Salvia*. See *Fl. Jap.* 364.

T. ranunculinum, Willd. Enum. Hort. Berol. 585. Pursh n. 6, having simple *leaves*, and being not noticed as a *Thalictrum* by Muhlenberg himself, who is quoted for it, is, we presume, best omitted here; as well as *T. concinnum*, Willd. Enum. 584, which is probably comprehended under some of the foregoing species.

Thalictrum, in *Gardening*, contains plants of the hardy, herbaceous, fibrous-rooted, perennial kinds, among the number of which the species mostly cultivated are; the tuberous-rooted meadow-rue (T. tuberosum); the Canadian meadow-rue (T. cornuti); the fetid meadow-rue (T. fœtidum); the narrow-leaved meadow-rue (T. angustifolium); the shining-leaved meadow-rue (T. lucidum); and the columbine-leaved meadow-rue, or feathered columbine (T. aquilegifolium).

In the second sort there is a variety, which is smaller, with pale purple filaments, than the common kind.

Also in the sixth sort there are varieties with a green stalk and white stamens, and with a purple stalk and stamens. Besides, there are other sorts that may be cultivated for variety.

Method of Culture.—All the sorts are readily increased by parting the roots, and planting them out in the autumn when the stems decay, or in the spring before the new ones are set forth, the strongest where they are to remain, and the weaker ones in nursery-rows for further growth: they may also be raised from seeds, which should be sown in a bed or border in the spring: when the plants rise, they should be kept clean, and be planted out where they are to remain, in the following autumn. They are all hardy durable plants that succeed and grow well in any common soil and exposure in the open ground, but which flourish most in moist shady situations. They afford variety in the borders, and other parts of ornamented grounds, when set out in a properly varied manner, requiring but little trouble or attention in such situations.

THALINA, in *Ancient Geography*, a town of Asia, in the Greater Armenia, upon the banks of the Euphrates. Ptol.

THALLABA, Talaban, a town of Asia, in Mesopotamia, upon the banks of the river Chaboras, situated E.S.E. of Resæina.

THALLAND, in *Geography*. See Dalia.

THALLITE, in *Mineralogy*; *Epidote*, Haüy; *Delphinite*, Saussure; *Shorl vert du Dauphiny*, Romé de Lisle; *Acanticene*, Dendrada; *Pistacit*, Werner. Few minerals have received so many names as this: it is at present better known by the name of epidote or thallite. It has frequently been confounded with actinolite or strahlstein, and with green hornblende and green asbestus. Some account of this mineral is given under Pistacite. We shall here add its distinctive characters and constituent parts. From actinolite it may be distinguished by the colour, the latter being generally a lighter green. The structure of the massive varieties of actinolite is generally radiated, that of epidote compact or foliated. Both the joints of actinolite are distinctly seen; but in epidote, frequently one joint only is seen. Epidote melts into a blackish scoria before the blowpipe, and is harder than actinolite or hornblende; the latter has generally a different shade of green: the fracture of hornblende is also less vitreous than that of epidote. Green asbestus is soft when pounded; the powder of epidote is harsh and rough. Thallite or epidote occurs both massive and crystallized. The joints are in two directions, one of which is more obvious than the other. The alternate angles are about $114\frac{1}{2}°$ and $65\frac{1}{2}°$; the cross fracture is splintery. The primitive form of the crystal is a prism with rhomboidal bases. The most common forms are six or eight-sided prisms, of which four are larger than the others. These prisms are terminated by several oblique planes, and are often flatly acuminated: the terminating planes of the crystals are smooth, and have a high natural polish; they are sometimes convex. The lateral planes, or sides of the crystals, are striated. This mineral is found in beds and veins, and sometimes as a constituent part of rocks. It is associated with augite, garnet, hornblende, quartz, calcareous spar, and magnetic iron-stone. The varieties that occur in veins are of a lighter colour, and the crystals are more acicular than those which are found in beds. The veins contain felspar, axinite, rock-crystal, chlorite, and other minerals; the epidote forming only a small part of the substance of the vein. It is found in several parts of the Scotch Hebrides, and in various alpine districts, in sienite, porphyry, and granitic rocks. The finest crystals have been procured at Arundel in Norway. The constituent

stituent parts of this mineral, from different situations, agree more nearly than is frequently the case with other minerals.

	From the Valais.	From Oisans.	From Arundel.
Silex - -	37.0	37.0	37
Alumine - -	26.6	27.0	21
Lime - -	20.0	14.0	15
Oxyd of iron -	13.0	17.0	24
Oxyd of manganese	0.6	1.5	1.5
Water - -	1.8	3.5	1.5
Loss - -	1.	0	0

It differs in chemical composition from hornblende and actinolite, by the absence of magnesia, and by the large proportion of alumine which it contains.

THALLOPHORI, θαλλοφοροι, in *Antiquity*, the old men and women, who, in the procession of the festival *panathenæa*, carried olive-boughs in their hands.

THALLUS, in *Botany* and *Vegetable Physiology*, θαλλος, *an olive bud*, or *a green bough;* from θαλλω, *to be verdant*, *to shoot forth*, or *spread abroad;* a term aptly enough chosen by the distinguished professor Acharius, for the frond, or foliage, of a *Lichen*, whether that part be of a leafy, fibrous, scaly, or crustaceous nature. But this term, however apt, is superfluous, *frons*, used by Linnæus, being synonimous with it, and sufficient for every requisite purpose. See Lichen and Lichenes; also Frond.

THALMANSFELD, in *Geography*, a town of Germany, in the marggravate of Anspach; 4 miles W. of Thalmessing.

THALMESSING, or Thalmessingen, a town of Germany, in the principality of Anspach; 31 miles S.E. of Anspach. N. lat. 49° 1′. E. long. 11° 10′.

THALMIS, or Talmis, in *Ancient Geography*, a town of Egypt, between Taphis and Tutzis. Anton. Itin.

THALPUSA, a town of the Peloponnesus, in Arcadia; which belonged to the Orchomenians.

THALSEA, or Thelsea, a town of Phœnicia, marked on the route from Remmaris to Neapolis, between Geroda and Damascus.

THALUDA, a river of Africa, in Mauritania Tingitana, the mouth of which is placed by Ptolemy on the coast of the Iberian sea, between Jagath and the promontory Oleastrum.

THALYSIA, θαλυσια, in *Antiquity*, a sacrifice offered by the husbandmen after harvest. For the origin and ceremonies of which, see Potter, Archæol. Græc. tom. i. p. 400.

THAMALAPATHRA. See Folium *Indicum*.

THAMAR, a word used by the Arabian physicians to express a date. Hence a pectoral decoction, made with dates and other ingredients, was called *diathamyron;* and the word was afterwards corruptly written *dicameron*.

Thamar, in *Ancient Geography*, a town of Judea, near Malis or Malath, which, according to Eusebius, had a Roman garrison.

THAMARITA, a town of Africa, in Mauritania Cæsariensis.

THAMARO, a town of Palestine, on the western side of Jordan. Ptolemy.

THAMASCHALTIS, a town of Africa Propria, on the route from the Greater Leptis to Tacapæ, between Thramusdisis and Thentei. Anton. Itin.

THAMBES, in *Geography*, a mountain of Algiers; 30 miles S. of Bona.

THAME. See Team.

Thame, or *Tame*, in *Geography*, a market-town in a hundred of the same name, and county of Oxford, England, is situated on the banks of the river Thames (whence it derives its name), at the north-eastern extremity of the county adjoining to Buckinghamshire, 13 miles E. from Oxford, and 46 miles N.W. by W. from London. Dr. Stukeley calls this place Tamese, and it is unquestionable that a Roman military road went through the town, though it was by degrees neglected in the latter times of the empire. Thame was a place of some consequence in the tenth century; for we find that Wulferc, king of Mercia, granted a charter "in the vill called Thama;" and in the year 970, Osketyl, archbishop of York, is known to have died here. In 1010, when the Danes over-run these parts of the kingdom, this town, among others, suffered severely. The Domesday record describes the manor of Thame as a part of the bishop of Lincoln's extensive possessions in Oxfordshire. Leland says, "about Alexander, bishop of Lincoln's time, the town of Tame, being the king's, was given for rent, in fee-farm to the bishop of Lincoln and his successors." To the patronage of the bishops the town was indebted for numerous advantages. By them the church was erected, the vicarage and a prebend endowed, and a neighbouring abbey reared. Through their interest the fairs and market were granted; and Henry Lexington, bishop in Henry the Third's reign, rendered an important service, by turning the high road through the middle of the town. Thame continued dependant on the bishops till the reign of Edward VI., when the see was dismembered of many of its valuable possessions. Sir John Williams obtained a grant of the estate, which descending by marriages to the family of Bertie, it became vested in the earls of Abingdon, the present possessors. During the civil wars of the seventeenth century, Thame was surrounded by garrisons of the contending parties, and consequently experienced its full share of the miseries of that period. The town consists principally of one long and spacious street, gently rising from the river. The church is a large, well-built structure, of the cruciform description, and comprises a nave, two aisles, a north and south transept, and a chancel; with an embattled tower supported by four massy pillars. The interior exhibits numerous tombs and memorials of families once important in this neighbourhood. Near the church are the remains of the prebendal house, which evince considerable former grandeur, and consist of nearly three sides of a quadrangle. A school, once of great celebrity, was founded here by John, lord Williams: the house is a spacious building, and the school of noble dimensions. Through the whole of the seventeenth century, this establishment maintained a high character: but has now fallen into disuse; though the building is in excellent preservation. There is likewise a charity-school of an humble description for the education of twenty-five boys. Thame has a good weekly market on Tuesdays, and two annual fairs: the market is of ancient date, for we find that the prior of Rufford was restrained from holding a market at Haddenham, to the prejudice of that of Thame. In the year 1811, the number of houses was returned as 460; the population as 2328, of which more than half were paupers receiving alms from the parish. By the return of the expences attending the maintenance of the poor in 1811, those of this parish amounted to 3686*l.*, a sum exceeding the expenditure of any other parish in the county. The parish contains about 4600 acres of land, and is divided into six hamlets or liberties, Old Thame, New Thame, Priest End, Thame Park, Moreton, and North Weston: the town comprises the three first. In Thame park, about a mile from the town, stood an abbey of some importance, established by bishop Alexander in 1138. At the dissolution, the society consisted of an abbot and sixteen monks; and the annual revenue was 256*l.* 14*s.* 7*d.* The abbey, with all its possessions, was surrendered to the crown by Robert Kyng, the last abbot, who, for his ready compliance, was on the erection of the see of Oxford appointed its first bishop. On the scite of a part a part of the abbey the preſent manſion was built by Philip, the father of the late lord Wenman. Conſiderable fragments of the abbey ſtill remain, which are protected by the modern elevation. The park contains about 220 acres, and is ſkirted with woodland.

Sir John Holt, the celebrated chief juſtice of the court of king's bench, was born at Thame in 1642, and died in 1709. (See Holt, *Sir* John.)—Beauties of England and Wales, vol. xii. Oxfordſhire; by J. N. Brewer.

THAMES, the name of the moſt important river of Great Britain, is pre-eminently diſtinguiſhed for its commercial conſequence, the ſcenery, edifices, and towns on its banks; for the bridges which are raiſed acroſs its channel; for the vaſt docks, quays, and warehouſes which are annexed to it; and for the variety and intereſt of the hiſtoric occurrences which are connected or aſſociated with its name. Yet, though ſo eminent at the preſent time, it was neglected in former ages; and it is ſingular to remark, that its ſource and early progreſs have occaſioned much doubt and diſpute. Some topographers have aſſigned its origin to a ſpot in Oxfordſhire, near the town of Thame; while others, with more regard to probability and record, have traced its ſource to a ſpring near Cricklade, in Wiltſhire. In that diſtrict three or four ſtreams emerge from the earth, and each of theſe has been honoured with the appellation of Thames-head: but at preſent it is very generally admitted, that this name ſtrictly belongs to a fine ſpring, which riſes in the pariſh of Kemble, in Wiltſhire, about five miles N.W. of Cricklade, and two and a half miles S.W. of the town of Cirenceſter. Some writers ſtate that the ſpring-head is in the pariſh of Cotes, and county of Glouceſter. As a proof that this ſtream was deſignated as the Thames, or Tems, at an early period, we may refer to a Saxon charter of Malmſbury Abbey, wherein it is named "Temis," as the boundary of certain lands. Again, ſome of the old Monkiſh hiſtorians ſtate that the Danes croſſed the Thames at Cricklade in the early part of the tenth century.

It has been erroneouſly ſaid, that the name of this river is the *Iſis* till it arrives at Dorcheſter, and receives the waters of the Thame, where it attained the compound name of *Thameſis*. Some old Oxford poets have given currency and celebrity to this ſtory. Pope, in his "Windſor Foreſt," ſpeaking of the union of various ſtreams with this river, thus ſings:

"First the famed authors of its ancient name,
The winding Iſis, and the fruitful Thame;
The Kennet ſwift, for ſilver eels renowned;
The Loddon ſlow, for verdant alders crowned;
Cole, whoſe dark ſtreams his flowery iſlands lave,
And chalky Wey, that rolls a milky wave."

Denham, the poetical encomiaſt of "Cooper's Hill," thus characteriſes the Thames.

"My eye deſcending from the hill, ſurveys
Where Thames among the wanton vallies ſtrays.
Thames the moſt loved of all the Ocean's ſons
By his old ſire to his embraces runs;
Haſting to pay his tribute to the ſea,
Like mortal life to meet eternity."

The nature of the preſent work will not allow of a particular deſcription of the courſe of this river, with brief accounts of all the prominent objects on its banks. It muſt ſuffice to ſpecify the names of the towns, chief ſeats, and prominent features; and refer to the former, under their reſpective names in the Cyclopædia, for further information, and to ſuch books wherein the beſt accounts are to be obtained. One characteriſtic of this river is entitled to notice; and which ſhews, that at the original formation of ſhires, and ſubdiviſion of lands in England, the Thames was at that time a noted and conſiderable ſtream. From the town of Cricklade, to its junction with the ſea at Sheerneſs, this river is a boundary, or natural line of ſeparation, to counties. Soon after its ſource, it divides the counties of Wilts and Glouceſter; next, thoſe of Oxford and Berks, and Buckingham and Berks; afterwards Middleſex and Surrey; and, laſtly, Kent and Eſſex. The Thames is alſo a navigable river nearly the whole of its courſe, and thus affords an eaſy and cheap paſſage for heavy goods from the ocean, and the port of London, to the interior parts of the iſland. By means of a canal, extending from the town of Lechlade, in a north-weſterly direction, to the river Severn, the latter great weſtern river and the Briſtol Channel are joined by a navigable courſe to the Engliſh Channel. See Canal, Thame, and Severn.

As nearly the whole courſe of the Thames is through a plain or level country, we find its current is conſequently ſlow and irriguous: for fifteen or twenty miles it is only a narrow and ſmall ſtream, but after receiving the waters of ſeveral rivulets, it aſſumes a river-like appearance at Lechlade, and is capable of ſuſtaining barges of 100 tons burthen. From that town (about 138 miles by water from London) to Sheerneſs, it is ſtrictly a navigable river. In its courſe to the ſea, the following rivers, beſides ſeveral ſmaller ſtreams, pour their waters into the Thames: the Wainruſh, Evenlode, Cherwell at Oxford, Thame, Kennet, Loddon, Coln, Wey, Mole, Brent, Lea, Roding, Dart, and Medway.

The following cities, towns, and large villages are ſeated on the banks of this river: *viz.* the cities of Oxford, London, and Weſtminſter; the towns of Cricklade, Lechlade, Abingdon, Wallingford, Henley, Great Marlow, Maidenhead, Windſor, Staines, Kingſton, Richmond, Brentford, Greenwich, Woolwich, and Graveſend; the villages of Pangbourn, Wargrave, Eton, Datchet, Old Windſor, Shepperton, Walton, Sunbury, Moulſey, Hampton and Hampton-Court, Twickenham, Iſleworth, Barnes, Chiſwick, Fulham, Putney, Hammerſmith, Chelſea, Blackwall, &c. The banks of this river are alſo ornamented with the palaces of Windſor, Hampton-Court, Kew, Fulham, and Lambeth: likewiſe the following diſtinguiſhed ſeats of Engliſh nobility and gentry, beſides ſeveral ſmaller villas, &c.; Nuneham-Courtney, Baſildon Houſe, Combe Lodge, Purley, Park Place, Fawley Court, Culham Court, Temple Houſe, Harleyford Houſe, Biſham Abbey, Taplow, Cliefden, Cookham, The Willows, Beaumont Lodge, Oatlands, Garrick's Villa and Pope's Villa at Twickenham, Strawberry Hill, Thames-Ditton, Marble-Hill Cottage, the duke of Buccleugh's, lord viſcount Sidmouth's, and Mr. Keen's at Richmond, Keppel Houſe, Sion Houſe, Brandenburgh Houſe, and Ingreſs. Among the numerous bridges which croſs this national river, the following are juſtly noted either for their beauty or extent. The firſt ſtone bridge on its courſe is at Enſham, and the next at Lechlade; Oxford, Abingdon, Shillingford, Wallingford, Caverſham, Henley, Maidenhead, Eton, Staines, Walton, Kingſton, Richmond, Kew, Fulham, Batterſea, Vauxhall, (finiſhed 1816,) Weſtminſter, the Waterloo and Southwark (now erecting from deſigns by that ſcientific enigneer, John Rennie, eſq.), Blackfriars, and London. The laſt ſix may be ſaid to belong to the metropolis. The juriſdiction of the lord mayor of London over the river Thames, extends from Coln-Ditch, near Stains, to Yendal or Yenlech, near Sheerneſs, and alſo includes parts of the rivers Lea and Medway. A very intereſting account of the ſcenery and various objects on this river, with numerous beautiful etchings by

W. B.

W. B. Cooke, and George Cooke, is published in a work in 2 vols. entitled "The Thames, or Graphic Illustrations of Seats, Villas, &c. on the Banks of that noble River." See also an account of the "Police of the River Thames," by P. Colquhoun, esq. a magistrate of London; 8vo. 1800; and Skrine's "Account of Rivers of Note in Great Britain," 8vo. 1801. S. Ireland published "Picturesque Views on the River Thames," 2 vols. imp. 8vo. Boydell also published a work in 2 vols. folio, consisting of history and description by Dr. Combe, and views from drawings by Farringdon.

Under the word CANAL will be found an ample account of the commerce and navigation of this river, divided under the heads of THAMES RIVER (*lower part*); THAMES RIVER (*middle part*); THAMES and ISIS NAVIGATION; THAMES and MEDWAY CANAL; and THAMES and SEVERN CANAL.

THAMES, a river of New Zealand. Capt. Cook, Mr. (now sir Joseph) Banks, and Dr. Solander, sailed up this river in a pinnace; at about fourteen miles from the entrance, it is as wide as the Thames at Greenwich, and the tide at flood is as strong; it is not quite so deep, but has water enough for vessels of more than a middle size, and a bottom of mud so soft, that nothing could take damage by running ashore. The course is from south to north, and the entrance between Cape Colville and Point Rodney.—Also, a river of Upper Canada, which runs into lake St. Clair, N. lat. 42°45′. W. long. 82° 10′.—Also, a river of Connecticut, which runs into the sea, 4 miles below New London.

THAMESIS, called *Jamissa* by Ptolemy, in *Ancient Geography*, a river of the isle of Albion. See THAMES.

THAMETHIS, a town of Egypt. See DAMIETTA.

THAMMUZ, in *Mythology*, is a name under which the Phœnicians worshipped Adonis or Osiris.

THAMMUZ, in *Chronology*, a name given by the Jews to the tenth month of the civil year, containing twenty-nine days, and answering to our June.

THAMNA, in *Ancient Geography*, a celebrated town of Palestine, on the road from Diospolis to Jerusalem. It was the capital of the Thamnitic toparchy.

THAMNATH-SAAR, a town of Palestine, in Samaria, in the tribe and upon the mount of Ephraim, N. of mount Gaas. This town was built by Joshua, and his tomb was there in the time of Jerome.

THAMNERIA, a town of Asia, in Media, in the neighbourhood of the country belonging to the Cadusii. Xenophon.

THAMNIUM, in *Botany*, θαμνιον, *a little shrubbery*, from θαμνος, *a shrub*, a name chosen by Ventenat, in his *Tableau du Regne Vegetal*, v. 2. 35, for the shrubby kinds of Lichen, of which he makes a genus. Its character is

Stems branched in the form of a shrub. Tubercles fungous, coloured.

Lichen rangiferinus, and *L. Roccella*, are mentioned as species of this genus, which is now, like the rest of the author's labours in this department, disregarded, the whole tribe having been so much better studied and arranged by Acharius. See LICHENES.

THAMNOCHORTUS, so called by Bergius, from θαμνος, *a shrub*, and χορτος, *a grass*, alluding to the hard shrubby habit, and natural affinity, of the plant. Berg. Cap. 353. t. 5. f. 8. This genus is now sunk in RESTIO (see that article); and the particular species is *R. scariosus* of Thunb. Prodr. 15, and Willd. Sp. Pl. v. 4. 723, though those authors have used *Thamnochortus* as the specific name of another plant, immediately preceding this in Willdenow, who enumerates thirty species of *Restio*.

THAMSBRUCK, or THOMASBRUCK, in *Geography*, a town of Saxony, in Thuringia; 8 miles S.E. of Mulhausen. N. lat. 51° 5′. E. long. 16° 42′.

THAMUNDACANA, in *Ancient Geography*, a town of Asia, in Interior Libya, S. of the river Niger. Ptol.

THAMYRIS, a town of Mœsia, near the Danube. It was built, according to Jornandes, by Thamyris, queen of the Getæ.

THAMYRIS, in *Mythology*, called by Homer Κιθαριστης, one who plays on the cithara, was the son of Philammon. (See his article.) Plutarch, in his Dialogue on Music, tells us that Thamyris was born in Thrace, the country of Orpheus, and had the sweetest and most sonorous voice of any bard of his time. Homer, in his catalogue of ships, where he speaks of the cities under the dominion of Nestor, mentions Dorion as the place where Thamyris contended with the Muses, whom he had the arrogance to challenge to a trial of skill in poetry and music. The conditions and consequences of this contention are fully described by the poet.

"And Dorion, fam'd for Thamyris' disgrace,
Superior once of all the tuneful race,
Till, vain of mortals empty praise, he strove
To match the seed of cloud-compelling Jove!
Too daring bard! whose unsuccessful pride
Th' immortal Muses in their art defy'd:
Th' avenging Muses of the light of day
Depriv'd his eyes, and snatch'd his voice away;
No more his heav'nly voice was heard to sing,
His hand no more awak'd the silver string."

Iliad, book ii.

Homer availed himself of the popular story concerning the blindness of Thamyris, and embellished it by his versification. Probably the whole allegory of this blindness had its rise from his having injured the organ of sight by too intense an application to the study of music and poetry. And it is the opinion of Pausanias, that there was no other difference between his misfortune and that of Homer, than that Thamyris was wholly silenced by it, and Homer, without being discouraged, continued his poetical and musical occupation long after his blindness.

THAN, in *Geography*, a town of Hindoostan, in Guzerat; 55 miles N.N.E. of Junagur.

THANÆ, in *Ancient Geography*, a town of Palestine, in the half-tribe of Manasseh, on this side of Jordan.

THANE, or THAIN, *Thanus*, the name of an ancient dignity among the English, or Anglo-Saxons.

Skene makes thane to have been a dignity equal with that of the son of an earl: Camden will have it, that thanes were only dignified by the offices which they bore.

There were two kinds or orders of thanes; the *king's* thanes, and the *ordinary* thanes. The first were those who attended our English-Saxon kings in their courts, and who held lands immediately of the king: whence, in Domesday-book, they are promiscuously called *thani*, and *servientes regis*.

Soon after the Conquest this name was disused; and instead of it, they were called the *king's barons*, *barones regis*.

Their origin is referred to king Canutus, who, taking the chief of the Danish nobility, to the number of three thousand, for his guard, and arming them with battle-axes and sabres with gilt handles, called them *thing lith*, from the two Danish words *theing* or *thein*, *body of nobility*, and *lith*, *order of battle*.

The *ordinary* thanes, or *thani minores*, were the lords of manors, who had particular jurisdiction within their limits, and over their own tenants.

These changed their name for that of barons; and hence their courts are called *courts baron* to this day.

In old authors, charters, &c. we also meet with thane as signifying fignifying a nobleman; though fometimes only a freeman, and fometimes a magiftrate.

THANE *Lands*, were lands granted by charter of the Saxon kings to their thanes.

THANET, *Ifle of*, in *Geography*, is a tract of land on the fouthern coaft of the county of Kent, England, confifting of about 27,000 acres, and is feparated from the remaining part of the county by the narrow channel of the river Stour, and the fmaller ftream called the Nethergong. The marfhes which border thefe ftreams are extenfive, and afford rich pafturage for cattle, but the higher grounds are principally appropriated to the growth of corn. The ifle is in fhape a long oval, being about nine miles in length from eaft to weft, and nearly five miles broad from north to fouth. Solinus, who is quoted by Camden, calls it Athanatos, and in fome copies Thanatos, which probably gave origin to the Saxon appellation Tenet, or Tanetlond; though Lewis derives this from Tene, a fire or beacon; and he fuppofes the ifle to have been fo named on account of the beacons or fires which were kept here to give notice of Danifh or other pirates, to whofe ravages it was greatly expofed. Thanet is bounded on the north and eaft fides by the ocean; a circumftance which, connected with the falubrity of its air, and its convenient diftance from the metropolis, has led to the eftablifhment of feveral watering-places; and thefe, in the fummer and autumnal feafons, occafion a continual influx of vifitants, whofe expenditure adds greatly to the wealth of the fixed inhabitants. The chalk cliffs which furround the coaft abound in foffils; and among them, the cornua ammonis has been found, meafuring upwards of three feet in diameter. The whole of Thanet is divided into the two capital manors of Minfter and Monkton, by St. Mildred's Lynch, a narrow ftrip of land, left unploughed, and extending quite acrofs the ifle, from Weftgate by Woodchurch, to Sheriff's Hope near Monkton. The ifle anciently contained eleven parifhes; but thofe of Sarre and All Saints have been united to St. Nicholas, and that of Woodchurch to Birchington. The parifhes of Minfter, Monkton, and Stonar, with parts of thofe St. Nicholas and St. Lawrence, are under the jurifdiction of two conftables; the other parifhes, namely St. John's, including the town of Margate; Birchington, with Gore's End, St. Peter's, and Wood or Woodchurch, the ville of Ramfgate, and the ville of Sarre, with the remainder of St. Nicholas and St. Lawrence, are all members of, and fubject to the controul of the ports of Dover and Sandwich. The population return of the year 1811 ftated the inhabitants of the ifle to be 16,156; the number of houfes 3209. (See MARGATE, RAMSGATE, and RECULVER.)—Beauties of England and Wales, vol. xiii. Kent; by E. W. Brayley.

THANN, or DANN, a town of France, in the department of the Upper Rhine; 13 miles N.N.E. of Befort.

THANN. See TANNA.

THANNHAUSEN, or TANNHAUSEN, a town of Germany, in the circle of Swabia, and principal place of a lordfhip of the fame name, on the river Mindel; 14 miles N. of Mindelheim.

THANNURIS, in *Ancient Geography*, a town of Afia, in Ofrhoene; and another in Mefopotamia.

THANTIA, a town of Paleftine, in Batanæa, eaftward towards the mountains, S.E. of Adraa.

THANWALD, in *Geography*, a town of Silefia, in the principality of Breflau; 13 miles N.W. of Breflau.

THAOUAOUIS. See TAVAVIS.

THAPAUA, in *Ancient Geography*, a town fituated in the interior of Arabia Felix. Ptol.

THAPSA, a town of Paleftine, in the tribe of Ephraim.

THAPSACUS, or AMPHIPOLIS, a large and flourifhing town of Afia, in Syria, on the banks of the Euphrates. When Alexander, after leaving Egypt, came to Thapfacus, he found here two bridges over the Euphrates. Xenophon tells us that Cyrus fojourned here five days; and that it was here that he informed the Greeks of his intention to march to Babylon. The foldiers mutinied, but were afterwards appeafed by his promifes. Thapfacus is now a village, called "El-Der." The channel of the river is here about half a mile in breadth, and would appear to have been fordable from the earlieft times to the prefent day. It was paffed on foot by Cyrus and his whole army, and, as fome fay, by that of Alexander the Great.

THAPSIA, in *Botany*, a name adopted from the ancient Greeks, whofe θαψια, if not precifely a fpecies of our prefent genus, was certainly, like it, a large umbelliferous plant, yielding a gummy exudation, and bearing yellow flowers, fucceeded by broad feeds. Such is the defcription given by Diofcorides, who moreover adds, that his θαψια, fo named from the ifland of Thapfos, where it grew, was in every refpect like *Ferula*, but with a more flender ftem, and leaves nearly akin to fennel. The root was large; white within, black on the outfide, with a thick acrid bark. He attributes various virtues to its gum or juice, either taken as a purge, in oppreffions of the cheft; or applied externally, along with honey, wax, or frankincenfe, for cutaneous complaints, tumours, &c.—Linn. Gen. 144. Schreb. 193. Willd. Sp. Pl. v. 1. 1464. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 2. 156. Sm. Prodr. Fl. Græc. Sibth. v. 1. 201. Juff. 220. Tourn. t. 171. Lamarck Illuftr. t. 206. Gærtn. t. 21.—Clafs and order, *Pentandria Digynia*. Nat. Ord. *Umbellatæ*, Linn. *Umbelliferæ*, Juff.

Gen. Ch. *General Umbel* large, with about twenty rays, of nearly equal length; *partial* of as many, nearly equal, rays. *Involucrum* none, neither *general* nor *partial*. *Perianth* fcarcely difcernible. *Cor. Univerfal* uniform; all the flowers fertile; *partial* of five lanceolate incurved petals. *Stam.* Filaments five, capillary, the length of the corolla; anthers fimple. *Pift.* Germen inferior, oblong; ftyles two, fhort; ftigmas obtufe. *Peric.* Fruit oblong, encompaffed longitudinally with a membranous border, feparable into two parts. *Seeds* two, very large, oblong, convex, pointed at each end, encompaffed at each fide with a large, flat, entire-edged border, which is emarginate at each extremity.

Eff. Ch. Involucrum neither general nor partial. Fruit oblong, encompaffed with a membranous border. Petals uniform, lanceolate, inflexed. Flowers all fertile.

1. Th. *villofa*. Villous Deadly Carrot. Linn. Sp. Pl. 375. Willd. n. 1. Ait. n. 1. (Th. prima; Cluf. Hift. v. 2. 192. Th. latifolia Clufii; Ger. Em. 1030.)—Leaflets toothed, villous; confluent at the bafe.—Native of ftony ground, in Spain, Portugal, and the fouth of France. Dr. Sibthorp found it in the fields of Patmos and Cyprus, and Dr. Brouffonet at Algiers. The *root* is perennial, tap-fhaped, faid to be of an extremely fœtid, acrid, and naufeous quality, which has given rife to the Englifh name. Gerarde applies to this fpecies what Diofcorides fays of *T. garganica*, that exhalations from the root or plant exulcerate the fkin. The *ftem* is three or four feet high, erect, round, fmooth, leafy, branched at the top. *Leaves* large and fpreading, twice or thrice pinnate; their leaflets feffile, obtufe, pinnatifid, notched, confluent at the bafe, in the manner of a fern; hairy on both fides; whitifh and downy at the back. *Umbels* feveral, ftalked, terminal, large, fmooth, naked. *Flowers* yellow, rather fmall. *Fruit* about half an inch long, and a quarter broad, with four ribs at each

each ſide, and a thin, brown, membranous double wing at each margin.

2. Th. *fœtida.* Stinking Deadly Carrot. Linn. Sp. Pl. 375. Willd. n. 2. Ait. n. 2. (Th. vulgaris; Ger. Em. 1031. Th. vulgaris, carotæ effigie; Lob. Ic. 780. Moriſ. ſect. 9. t. 18. f. 7.)—Leaflets many-cleft, acute; contracted at the baſe.—Native of Spain, as well as of Zante and Cyprus. Gerarde had this plant in his garden, and it is ſtill, like the foregoing, to be ſeen in curious botanical collections, though not very commonly. It differs from the *villoſa* in having more finely, acutely, and deeply divided *leaflets*, which are wedge-ſhaped, not dilated at the baſe. The ſize of the whole plant is ſmaller, and the *ſtem* more branched.

3. Th. *Aſclepium.* Fine-leaved Deadly Carrot. Linn. Sp. Pl. 375. Willd. n. 3. Sm. Fl. Græc. Sibth. t. 286, unpubl. (Th. apula, foliis millefolii; Moriſ. ſect. 9. t. 18. f. 9. Panax Aſclepium Dioſcoridis et aliorum, gummiferum; Columm. Ecphr. p. 1. 87. t. 86.)—Leaves digitate; leaflets doubly pinnate, in many briſtle-ſhaped ſegments.—Native of the ſouth of Italy, and of the Levant; unknown in our gardens. Dr. Sibthorp met with this plant in Greece, Rhodes, and near Conſtantinople. The *root* is tapering, perennial, brown, gummy, crowned with briſtly fibres. *Stem* ſolitary, erect, a yard high, ſlightly branched, round, ſmooth, the thickneſs of a gooſe-quill, almoſt deſtitute of foliage, except about the bottom. *Leaves* on long ſtalks, of five principal unequal leaflets, radiating from the baſe, which are doubly, or almoſt triply, pinnate, their ſmall *leaflets* being divided very deeply into fine acute ſegments, one-eighth of an inch long, ſmooth, and of a bright green. *Flowers* yellow, in ſpreading long-ſtalked *umbels*. *Petals* dilated at the baſe, ſo as to be, from the inflexion of the point, almoſt heart-ſhaped. *Seeds* with broad, linear, obtuſe wings.

4. T. *garganica.* Garganian, or rather Greek, Deadly-Carrot. Linn. Mant. 57. Willd. n. 4. Ait. n. 3. Gouan. Illuſtr. 18. t. 10. Sm. Fl. Græc. Sibth. t. 287, unpubl. (Th. thalictri folio; Magn. Monſp. 287. t. 286. Th. ſive Turbith garganicum, ſemine latiſſimo; Bauh. Hiſt. v. 3. p. 2. 50.)—Leaves radiato-pinnate; leaflets deeply pinnatifid, with linear decurrent ſegments. Native of Barbary, the ſouth of Italy, and the Levant. Dr. Sibthorp finding it very common throughout Greece, and the neighbouring iſlands, juſtly concluded this ſpecies to be the true θαψια of Dioſcorides, with whoſe deſcription it agrees better than any of the reſt. It is a ſtately perennial plant, whoſe ſeeds were probably obtained from the garden of Montpellier, by our Britiſh cultivators, towards the year 1680. The firm round leafy *ſtem*, as well as the ſheathing baſes of the *footſtalks*, and the ripening *ſeeds*, are tinged with a fine glaucous purple. *Leaves* large, deep green; ſmooth above; glaucous, and ſometimes hairy, below; their ſegments near an inch long, linear, entire. *Common footſtalks* long, round, ſometimes very hairy. *Umbels* very large, yellow. *Petals* lanceolate, involute. *Fruit* an inch long, with broad, ſhining, brown wings; its ſides finely ribbed.

For *Th. trifoliata*, Linn. Sp. Pl. 376, ſee SMYRNIUM n. 6, *cordatum*.

Th. polygama, Desfont. Atlant. v. 1. 261. t. 75. Mart. Mill. Dict. n. 6, found on the ſea-coaſt of Barbary, cannot belong to this genus, having a general, as well as partial, *involucrum*, and abortive central *flowers*. It ſhould ſeem to be a LASERPITIUM. See that article.

THAPSIS, in *Ancient Geography*, a river of Scythia, in the environs of the Palus Mæotides, according to Diodorus Siculus.

THAPSOS, in the *Materia Medica of the Ancients*, a name given to a kind of wood of a pale yellow colour, uſed of old in dyeing of linen and woollen cloths. The Greek *Thapſos* ſignifies a pale dead yellow colour, and is applicable either to the ſubſtance, or the juice or tincture of all theſe.

The people of Crete at this time uſe the lycium-wood in dyeing a yellow colour, and it is probable that the *thapſos* was this very tree. Dioſcorides tells us, that the wood of this tree was alſo uſed in his time to tinge the hair yellow, which was a favourite colour with the Greeks. The lycium is of a colour ſomewhat deeper than our box-wood, and parts with its ſtain ſo eaſily, that it ſeems very proper for ſuch a purpoſe.

THAPSUM, among the old *Roman Writers*, a common name for the verbaſcum, or mullein; but as there were many other plants, very different in their nature, yet whoſe names reſembled this; ſuch as the *thapſia*, or deadly carrot, and the *thapſum* or *geniſtella tinctoria;* it was ſoon found neceſſary to add ſome other name, and it was then called *thapſum barbatum*, or *barbaſſum*.

The reaſon of the geniſtella being called *thapſum*, was, that its flowers were yellow, and were uſed to colour the ladies' hair; that being the favourite colour of thoſe days. The flowers of mullein are yellow, and ſeem more fit for the colouring of the hair than thoſe of the geniſtella; their colour being more eaſily ſeparated, and continuing on ſo well, that the glovers of many parts of England uſe them in the ſeaſon for colouring their yellow gloves.

It is probable, that the ladies of old uſed this, as well as the geniſtella, for this purpoſe: and it might hence obtain the common name *thapſum*. The other part of its diſtinction, *barbatum*, ſeems owing to the leaves being ſo coloured with a woolly down that they look bearded. And when this word is written *barbaſſum*, it may probably be given as the name of ſome of thoſe ſpecies of mullein which are not hairy, as our black or ſage-leaved mullein, and be a corruption of the word *verbaſcum*. This black mullein has no leſs title than the white or bearded kind to the name *thapſum;* its flowers being of a yet finer yellow than thoſe of that kind, and being as fit for the uſe of ſtaining. The glovers in ſome places uſe this ſpecies for their leather-gloves.

THAPSUS, DEMASS, in *Ancient Geography*, a maritime town of Africa, upon a tongue of low land, S. of the Leſſer Leptis. The place abounds with ruins.

THAPSUS, or *Tapſus*, in *Botany*, ſee VERBASCUM. This name ſeems to have originated with Gerarde, who gives no explanation, nor do we find any authority for the opinion of De Theis, that it alludes to the iſle of Thapſos, as the native country of the plant. Such indeed is the acknowledged derivation of THAPSIA, ſee that article; with which this *Verbaſcum*, a φλομος of the Greeks, has no relationſhip whatever.

THAR, in *Ancient Geography*, a town of Arabia Felix, belonging to the people called Themi.

THARAND, in *Geography*, a town of Germany, in the circle of Upper Saxony, and circle of Erzgeburg; 10 miles E.N.E. of Freyburg.

THARE, in *Ancient Geography*, a place of the encampment of the Iſraelites, whence they went to Methea. (Numb. xxxiii. 27.) Thare, ſituated in Arabia Deſerta, was the 24th ſtation of the Iſraelites.

THARELA, a town of Paleſtine, in the tribe of Benjamin.

THARGELIA, θαργελια, in *Antiquity*, an Athenian feſtival in honour of the ſun, and his attendants, the

 Hours:

Hours: or, as others think, of the Delian Apollo and Diana. For an account of the ceremonies of this solemnity, see Potter Archæol. Græc. lib. ii. cap. 20. tom. i. p. 400. seq.

THARGELION, Θαργηλιων, in *Chronology*, the eleventh month of the Athenian year. It contained thirty days, and answered to the latter part of our April, and the beginning of May.

It took its name from the festival Thargelia, kept in it.

THARNAU, in *Geography*, a town of Silesia, in the principality of Neisse; 1 mile N. of Grotkau.

THARO, in *Ancient Geography*, an island, situated, according to Ptolemy, in the Persian gulf.

THARPA, a town of India, beyond the Ganges, in the Golden Chersonesus. Ptolemy.

THARRANA, a town of India, beyond the Ganges, on the coast of the Great gulf. Ptol.

THARSIA, a town of Africa propria, or one of those which Ptolemy points out between Bagradas and the town of Thabraca.

THARSIS, Tharshish, or *Tarshish*. See Ophir.

THASO, in *Geography*, an island of the Grecian Archipelago, situated in the gulf of Contesa, anciently called *Æria*, or *Æthria*, being famous, even to a proverb, for its rich gold-mines. It has a town or village of the same name. N. lat. 40° 34′. E. long. 42° 30′.

THASSUS, Thassos, or *Thasus*, in *Ancient Geography*, an island situated on the coast of Thrace, opposite to the mouth of the river Nestus. Thasus, son of Agenor, king of the Phœnicians, is said to have remained many years in this island, to have peopled it, and to have given it his name. It was afterwards increased by a Greek colony. The Athenians made themselves masters of this island, and treated the inhabitants with great rigour; but they were expelled by the Macedonians, and these again by the Romans.

THATCH, in *Rural Economy*, prepared straw which is intended to be laid on the top of a building, rick, &c. to keep out the wet. There are many different sorts of materials that may be made use of as thatch, but those which are most commonly employed are the straw of different sorts of grain, as wheat, rye, &c. reed, stubble, heather, &c. The straw of wheat and rye, when well prepared and laid, probably forms the neatest and most secure covering for general purposes. It has indeed been stated, that the most suitable material for the purpose is that of good wheat-straw that has been much bruised in threshing out the grain. But when this cannot be had in sufficient quantity, rye-straw may be substituted in its place; however, from its rough and stubborn quality, it is neither so neat in its appearance, so durable, nor affords so secure a covering. And that barley and oat straw are sometimes made use of for the purpose, but they form very indifferent coverings, and such as are not by any means lasting. The former, when strong, is however preferable to the latter.

The reed is a highly valuable article for the purpose of thatch, where a lasting roof is required; but is much too expensive and stubborn for common purposes. It has been remarked by Mr. Marshall, in the Rural Economy of Norfolk, that there, the favourite material for roofs, and that which is the most eligible after good slate for farm purposes, is reed. And that a reed roof properly laid, will lie fifty years without touching; and thirty or forty more, with only adjusting (driving) it, and levelling the hollows with a little fresh reed. At an hundred years old it may be relaid; and will then, if laid upon the upper parts of the roof, last through a considerable part of another century. The reed is, he says, principally cut from the margins of the *broads*, (large pieces of water,) and is carried, perhaps, forty or fifty miles into the central and northern parts of the county. And it is added, that though a covering of reed is, in the first instance, costly; when its durability, and the high degree of preservation in which it keeps the roof, are taken into the account, it is of all other the cheapest covering; besides its being, whether in the extreme of heat or cold, the most comfortable.

And it is stated, that the price of reed, in the place of its growth, is from three pounds to three guineas a hundred, containing six score fathoms; each fathom (composed of five or six sheaves) measuring six feet in circumference. A hundred of reed will cover five squares of roof: the laying is a halfpenny a yard, or four shillings and twopence a square; and the tar rope and rods for fastening it on cost eighteen pence a square: so that a covering of new reed costs about eighteen shillings a square, containing 100 square feet; besides carriage, and what is called *roofing*; namely, a cap of wheat-straw placed upon the ridge, in a somewhat similar manner, and for the same purpose, as ridge-tiles are put on. This capping, which is done in a most effectual, but in a tedious and expensive manner, costs, in materials and workmanship, about sixteen pence each foot in length: which, upon a roof of sixteen feet and a half spar, is an additional expence of four shillings each square of reeding.

With regard to the carriage, it is in proportion to the distance. Taking twenty miles as a medium distance, and one shilling a mile as a medium price; the expence is, he says, twenty shillings a 'load' of sixty fathoms, or forty shillings a hundred; which laying five squares is a further addition of eight shillings a square: therefore, the whole expence of a covering of reed fetched twenty miles, may, he supposes, be laid at thirty shillings a square. The writer has been thus minute, he says, in his account of this material, as it has been much overlooked in other districts, where it may be found useful.

This material is a great deal more expensive in every respect which has any relation to this object, at the present time, than it was then.

And with respect to the stubble, it is said to be a material that may be made use of with propriety and advantage in some situations. This is the stubble of such wheat or other crops as have been cut at a great height; which, after being mown close to the ground and raked up, serves this purpose, especially for the more common purposes of the farm, such as covering hay and straw stacks, &c. the thatching potatoes when hogged in the ground, and many other such cases.

The last material, heather, is also found a highly valuable article for the purpose of thatch in districts where it grows in abundance, as it is extremely durable. See Heather.

The thatch which is removed from the stacks or buildings may be used as a litter for various purposes.

The modes of preparing and applying these different matters to the roofs of stacks and buildings will be pointed out in speaking of the operation of securing such roofs by means of such substances. See Thatching.

Where straw of the rye or wheat kind is very strong, it is often termed *reed* or *straw reed* by the thatcher, and used for covering large hay-stacks very commonly in many districts.

THATCHAM, in *Geography*, a village and parish in the hundred of Reading and county of Berks, England, is situated 3 miles E. from Newbury, and 53 miles W. from London. It appears to have been formerly a town of some consequence, from the Domesday Survey, and other records,

cords, in which it is defcribed as an ancient borough; but it does not appear ever to have fent reprefentatives to parliament. From a very early period it had a market on Sundays, which was confirmed to the abbot and convent of Reading by a charter of Henry II. The market-day was changed by Henry III. in 1218 to Thurfday; but the market has long been difcontinued. Two annual fairs are ftill held. The manor of Thatcham was given to the abbot and convent of Reading by Henry I. At the diffolution it was granted, in 1539, to John Winchcombe, fon of the celebrated Jack of Newbury: it is now the property of William Mount, efq. of Wafing. A charity-fchool was founded here, in 1707, by lady Frances Winchcombe, who endowed it with 53*l. per annum.* The fchool had been long difcontinued, and its revenue loft to the parifh; when Mr. Thompfon, a late vicar, inftituted a fuit for their recovery, and after a long conteft fucceeded in the re-eftablifhment of the fchool, with an income for the mafter increafed to 200*l. per annum;* forty boys are now clothed and educated, and fix of them annually apprenticed with premiums of 10*l.* each. The parifh of Thatcham is the moft extenfive of any in the county, excepting Lamborn, and includes fix townfhips. The population, according to the parliamentary report of the year 1811, was eftimated at 2104; the number of houfes at 424.—Lyfons's "Magna Britannia," vol. i. Berkfhire.

THATCHER, a rock in the Englifh Channel, on the north fide of Torbay.

Thatcher, in *Rural Economy*, a perfon who performs the bufinefs of thatching.

THATCHING, the operation of covering the roofs of buildings, ftacks, and other things, with fome fort of thatch. For this purpofe, articles of the ftraw kind are prepared in the following manner: After being well moiftened with water, they are drawn out in handfuls perfectly ftraight and even into regular lengths, and the fhort ftraw feparated from them, leaving them placed in convenient ranges for forming bundles to be carried to the thatcher by the perfon who has the ferving of him.

In regard to the application of the thatch to ftacks of hay or corn, there are different methods purfued, according to the nature of the materials employed. Where long ftraw is made ufe of, the operator or workman ufually begins at the eaves or bottom part of the roof, depofiting it in handfuls in regular breadths till he reaches the top, the different handfuls being fo placed endways as to overlap each other, the upper ends being conftantly pufhed a little into the bottom parts of the fheaves or other matters. In this manner he gradually proceeds, breadth after breadth, till the whole of the roof is covered, which is ufually done to the thicknefs of about four or five inches. And in order to retain the thatch in its place, fhort fharp-pointed fticks, termed *prods* in fome places, are occafionally thruft in, in a flanting direction upwards; and fometimes fmall fticks, often called *fpelks*, fharpened at the ends, are bent and thruft in along the top parts and fides. But as the water is apt to follow the courfe of the fticks, it is perhaps a better practice to make ufe of ropes of twifted ftraw for this purpofe. In fome cafes, thefe are applied only round the bottom parts of the roof and the fides; while in others, which is a much better and more fecure method, they are applied in fuch a manner over the whole ftacks, as to form a fort of coarfe net-work of nine or twelve inches in width in the niches, the ends being well faftened either to belt-ropes paffed in fuitable directions for the purpofe, or to different parts of the ftraw of the ftack.

In the application of ftubble as a thatch, it is moftly, after being prepared, put on by fticking one of its ends into the roof of the ftack in a regular and exact manner, fo as that it may ftand out very clofe and thick; when the other, with fuch loofe ftraws as may occur, is to be cut over or pared off, with a very fharp tool for the purpofe, fo as to form a neat and impenetrable thatch, having the appearance of a newly thatched houfe roof; the whole being well fecured in its place by fhort pegs made for the purpofe, fomewhat in the fame way as in the thatch of other ftacks.

In the thatching of the roofs of houfes or other buildings with any of the different forts of ftraw, the materials are to be laid on to a confiderable thicknefs, and firmly fecured. They are applied in regular narrow flips, or what in fome diftricts are termed *gangs*, from the eaves of the building to the ridges, the ladder being moved forward as the work proceeds. The thatch is fecured by fhort fharpened fticks, as above, thruft in where neceffary. And bended fticks, fharpened at each end, are likewife fometimes made ufe of near the ridges, being thruft in at each end. In finifhing the work, the thatcher moftly employs an iron-toothed rake, with which the whole is raked and trimmed over from top to bottom, fo as to render it completely fmooth and even, and take away all the fhort ftraws, and other irregular matters.

The method of thatching with reed, according to Mr. Marfhall, in his account of the Rural Economy of Norfolk, is this: no laths being made ufe of, in laying it, a little of the longeft and ftouteft of the reed is fcattered irregularly acrofs the naked fpars, as a foundation to lay the main coat upon: this partial gauze-like covering is called the "fleaking." On this fleaking the main covering is laid, and faftened down to the fpars by means of long rods, provincially "fways," laid acrofs the middle of the reed, and tied to the fpars with rope-yarn, or with "bramble bonds," formerly much ufed, but now pretty nearly laid afide. In laying on the reed, the workman begins at the lower corner of the roof, on his right hand, for inftance, and keeps an irregular diagonal line, or face, until he reaches the upper corner to his left, a narrow eaves-board being nailed acrofs the feet of the fpars, and fome fleaking fcattered on; the thatcher begins to "fet his eaves," by laying a coat of reed, eight or ten inches thick, with the heads refting upon the fleaking, and the butts upon the eaves-board. He then lays on his *fway* (a rod about the fize of a fmall edder) about fix or eight inches from the lower point of the reed; whilft his affiftant, on the infide, runs a needle, threaded with rope-yarn, clofe to the fpar; and, in this cafe, clofe to the upper edge of the eaves-board. The thatcher draws it through on one fide of the fway, and enters it again on the contrary fide, both of the fway and of the fpar: the affiftant draws it through, unthreads it, and with the two ends of the yarn makes a knot round the fpar; thereby drawing the fway, and confequently the reed, tight down to the roof: whilft the thatcher above, beating the fway and preffing it down, affifts in making the work the firmer. The affiftant having made good the knot below, he proceeds with another length of thread to the next fpar, and fo on, till the fway be bound down the whole length; namely, eight or ten feet. This being done, another ftratum of reed is laid on upon the firft, fo as to make the entire coat eighteen or twenty inches thick at the butts; and another fway laid along, and bound down, about twelve inches above the firft.

The eaves being thus completely fet, they are adjufted and formed, not fquare with the fpars, but nearly horizontal: nor are they formed by cutting, but by "driving" them with a "legget," a tool made of a board eight or nine inches fquare, with a handle two feet long, fixed upon the back of it, it, obliquely, in the manner of the tool ufed by gardeners in beating turf. The face of the legget is fet with large-headed nails, to render it rough, and make it lay hold of the butts of the reeds. Then another layer of reed is laid on, and bound down by another fway, fomewhat fhorter than the laft, and placed eighteen or twenty inches above it; and above this another, and another, continuing to fhorten the fways, until they be brought off to nothing, and a triangular corner of thatching formed. After this the fways are ufed their whole length, whatever it happens to be, until the workman arrives at the finifhing corner.

In order to give a finifh to the ridge, a *cap* (provincially a "roof") of ftraw is fet on in a mafterly, but in an expenfive manner. In this operation, the workman begins, it is obferved, by bringing the roof to an angle, with ftraw laid the long way upon the ridge, in the manner in which a rick is topt up; and to render it firm, to keep it in its place, and to prevent the wind from blowing it off, or ruffling it, he pegs it down flightly with "double broaches;" namely, cleft twigs, two feet long, and as thick as the finger, fharpened at both ends, bent double, and perhaps with the twifting of the crown, and perhaps barbed, by partial chops on the fides, to make them hold in the better. This done, the workman lays a coat of ftraight ftraw, fix or eight inches thick, acrofs the ridge; beginning, on either fide, at the uppermoft butts of the reed, and finifhing with ftraight handfuls evenly acrofs the top of the ridge. Having laid a length of about four feet in this manner, he proceeds to faften it firmly down, fo as to render it proof againft wind and rain. This is done by laying a "broachen ligger" (a quarter-cleft rod as thick as the finger, and four feet in length) along the middle of the ridge, pegging it down at every four inches with a double broach, which is firft thruft down with the hands, and afterwards driven with the legget, or with a mallet ufed for this purpofe. The middle ligger being firmly laid, the thatcher fmooths down the ftraw with a rake and his hands, about eight or nine inches on one fide, and at fix inches from the firft lays another ligger, and pegs it down with a fimilar number of double broaches, thus proceeding to fmooth the ftraw, and to faften on liggers at every fix inches, until he reach the bottom of the cap. One fide finifhed, the other is treated in the fame manner; and the firft length being completed, another and another length is laid, and finifhed as the firft, until the other end of the ridge be reached. He then cuts off the tails of the ftraw fquare and neatly with a pair of fhears, level with the uppermoft butts of the reed; above which the cap (or moft properly the *rooflet*) fhews an eaves of about fix inches thick. And laftly, he fweeps the fides of the main roof with a bow of holly, when the work is completed. This, when well performed, muft be a durable and ufeful mode of thatching, and at the fame time one which has a neat appearance.

In thatching with heather, that material moftly undergoes fome fort of preparation, fo as to render it as equal as poffible in fize and ftrength, being laid and faftened upon the roofs then in fomewhat the fame manner as that of ftraw. It is afterwards fwept, cleaned, and finifhed off in a neat and exact manner, fo as to look extremely well.

In fome of the more expofed fituations in the northern parts of the ifland, they have other modes and practices of thatching buildings with ftraw in ufe, fuch as performing it with clay, or thin turf and that material.

If the roof be covered with thin turf or divots, the workman is to twift the upper part of the ftraw into a fort of knot; then, with a ftick prepared for the purpofe, to force the knot thus formed either under or through the turves or divots, fo that it may have a firm hold of the roof; after which, to fpread the lower part of the bundle of ftraw nicely on the roof, continuing to do the fame to the very top of the roof; and then to clay it all over, and begin another tier, gang, or row of the thatch. In this way, the thatch fhould not be laid thinner than fix inches, and when it is laid eight inches thick, it is the more durable. Thin turf, or divots, were originally thought the beft foundation; but it has been fince found by experience, that they rot the ftraw, and that ftraw alone, when ftitched on with rope-yarn, lafts much longer. If ftraw alone be ufed in this manner, it will laft twenty years; but the ftraw muft be laid on two inches thicker than when clay is added. A roof that is thatched with divots, ftraw, and clay, in the common way, will laft from feventeen to twenty years; and is alfo capable of being mended without raifing any part of the roof that is entire. The above kind of roof is much lefs liable to catch fire than ftraw roofs without clay. The clay that anfwers the purpofe beft is that which has a due proportion of fand in it. If ftiff clay fhould be ufed, it will be neceffary to add one cart-load of fand to every two of the clay.

This fort of claying may, of courfe, be ufeful and advantageous in thatching the roofs of buildings in many fituations and places.

THAU, in *Geography*, a lake of France, in the department of the Herault, near the Mediterranean, between Frontignan and Agde.

THAUANA, in *Ancient Geography*, a town fituated in the interior of Arabia Felix.

THAUBA, a town in the interior of Arabia Felix. Ptol.

THAUGHTS, or THOUGHTS, in a *Boat*, are the benches on which the rowers fit to row.

THAUMASIUS MONS, in *Ancient Geography*, a mountain of Arcadia, N.W. of Mantinea, above the river Moloffus.

THAUMATURGUS, formed from θαυμα, *wonderful thing*, and εργον, *work*, *worker of miracles*; an appellation which the Romanifts gave to feveral of their faints, eminent for the number and greatnefs of their miracles.

St. Gregory, called *Thaumaturgus*, or Gregory of Neocæfarea, was a difciple of Origen about the year 223, and afterwards bifhop of Cæfarea, in Pontus; and in that capacity he affifted at the firft council of Antioch, and at that of Ephefus, againft Paulus Samofatenus. St. Leo of Catanea is alfo called *Leo Thaumaturgus*. He lived in the eighth century; and his body is ftill honoured at Rome, in the church of St. Martin de Tours. St. Francis Paul, and St. Francis Xavier, are the great Thaumaturgi of thefe laft ages.

THAWING, the refolution of ice into its former fluid ftate, by the warmth of the air.

THAXTED, in *Geography*, an ancient market-town in the hundred of Dunmow, and county of Effex, England, is fituated 19 miles N.N.W. from Chelmsford, and 43 miles N.N.E. from London. The town was known in the Saxon times, as the church is recorded to have belonged, in the reign of Edward the Confeffor, to the college of St. John Baptift, at Clare, in Suffolk. Thaxted was incorporated by charter of Philip and Mary, which was confirmed by queen Elizabeth; under this the civil government is vefted in a mayor, recorder, two bailiffs, and twenty principal burgeffes. In the reign of James II. the corporation experienced a temporary fufpenfion; for being ferved with a writ of quo warranto, the corporate officers, either through fear or poverty, thought fit to retire from their offices. The market was granted by Edward II., but was difcontinued for a long period: it has been recently revived, and is now held on Fridays. Here are alfo two annual fairs. In the population return of the year 1811, Thaxted was ftated to contain 390 houfes, occupied by 1733 perfons. The church is a very large and beautiful ftructure, and appears, from the various arms and cognizances on feveral parts, to have been built at different times in the fourteenth and fifteenth centuries. The whole fabric is embattled, and fupported by ftrong buttreffes, terminated by canopied niches, and curioufly purfled pinnacles. At the weft end is an embattled tower, fuftained by buttreffes, and furmounted by a neat octagonal fpire, rifing to the height of 181 feet. The interior confifts of a nave, tranfept, chancel, and fide aifles: the arches of the nave are pointed, and fupported by eight cluftered columns on each fide. The expence of the erection of this church was principally defrayed by the noble families of Clare and Mortimer, who then poffeffed the manor, with fome affiftance from king Edward IV. A chantry, befides various chapels and altars, were ufed here before the reformation. The charitable benefactions for the ufe of the poor inhabitants of Thaxted are confiderable. An eftate, called Yendleys, deriving its name from Thomas Yendale (who refided on it temp. Henry VI.) was, on his death, vefted in truft for his four fons and their iffue; and in default of fuch iffue, to be fold for the benefit of the church and poor. The fons all dying childlefs, the eftate was fold 5 Henry VII. and the produce is applied to the fupport of a fchool, repairing the church, improving the highways, &c. In 1698, William, lord Maynard, bequeathed 4000*l.* in truft, the produce to be applied for increafing the minifter's falary, repairing the church, marrying poor young women, binding out apprentices, and relieving poor people overburthened with children. Among other benefactions are endowments for alms-houfes in feveral parts of the town: one of the buildings appropriated for that purpofe is the old chantry-houfe. The ancient guildhall is now the parifh workhoufe: the mote-hall is ufed for a public fchool.—Beauties of England and Wales, vol. v. Effex; by J. Britton and E. W. Brayley. Morant's Hiftory, &c. of Effex, 2 vols. folio.

THEA, in *Ancient Geography*, a town of the Peloponnefus, in Laconia.

Thea, in *Botany*, the Tea-tree, a name of barbarous derivation, originating in the Chinefe *Tcha*, or Japanefe *Tsja*, of which the various nations of Europe have made, according to their fancy, Chaa, Tea, Thé, &c. and which Kæmpfer has formed in Latin into *Thea*. This laft has been admitted by Linnæus, for the fake of its Greek orthography, exactly that of θεα, *a goddefs*, a coincidence highly welcome to thofe who honour the cordial beverage of tea as it deferves.—Linn. Gen. 269. Schreb. 361. Willd. Sp. Pl. v. 2. 1180. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 3. 303. Juff. 262. Lamarck Illuftr. t. 474. Gærtn. t. 95.—Clafs and order, *Polyandria Monogynia*, Linn. Rather *Monadelphia Polyandria;* fee Sm. Introd. to Bot. ed. 3. 335. Nat. Ord. *Columniferæ*, Linn. *Aurantiis et Meliis affine*, Juff.

Gen. Ch. *Cal.* Perianth inferior, fmall, of one leaf, in five deep, rounded, obtufe, permanent fegments. *Cor.* of one petal; tube none; limb in fix, or more, deep, unequal, rounded, concave, imbricated fegments, much longer than the calyx; the outer ones fmalleft. *Stam.* Filaments numerous, about two hundred, thread-fhaped, fhorter than the corolla, united at the bafe into a fhallow cup-like tube, inferted into the receptacle, and connected with the bottom of the petal; anthers peltate, fimple, nearly globofe. *Pift.* Germen fuperior, globofe, with three obtufe angles; ftyle triangular, with three furrows, the length of the ftamens, fplitting into three parts; ftigmas three, linear-oblong, deflexed. *Peric.* Capfule three-lobed, three-celled, burfting along the upper fide of each lobe. *Seeds* folitary, globofe, fomewhat angular.

Eff. Ch. Calyx in five deep rounded fegments. Corolla in fix, or more, deep imbricated fegments. Capfule fuperior, three-lobed. Seeds folitary.

Obf. Gærtner remarks that there are rudiments of four or fix feeds in each cell of the germen. The genus is, doubtlefs, nearly related to Camellia, (fee that article,) and fhould ftand next to it in the artificial, as well as natural fyftem. Whether the connection of the ftamens varies, or whether we have fometimes in our gardens Thunberg's *C. Safanqua* for the true Tea-plant, is extremely difficult to determine. The flowers in England are certainly never fo large as in his plate of *Safanqua*, which latter may poffibly be a fpecies of *Thea*, though very diftinct from the Linnæan fpecimens marked *T. Bohea*, and from all we have ever examined in gardens. Plukenet's Fruticis Theæ fpecies altera Sinarum, Amalth. t. 405. f. 3, may belong to this *Safanqua*. The fpecies of *Thea* are involved in much obfcurity. Linnæus was led to defcribe two, under the popular names of *Bohea* and *viridis*, which he diftinguifhed by the former having fix *petals*, or rather fegments of the *corolla*, and the latter nine. But for thefe characters he is indebted to Hill, whofe authority is little to be relied on. We have never feen perfect fpecimens of more than one fpecies, which anfwers to the definition of the *Bohea*, with fcarcely any variation; nor do the leaves of common green or black tea, when expanded by hot water, betray any difference in their ferratures, veins, or other refpects, from that or from each other. The *Pekoe*, whofe filky young branches are confpicuous in the tea-cheft for their whitenefs, agrees in that particular with our garden fpecimens of *Thea*, and not with *Camellia Safanqua* fent by Thunberg, for this laft is hairy in a very different manner. Such being the ftate of the cafe, we can undertake to defcribe only one fpecies of *Thea*.

1. T. *viridis*. Green Tea. Gærtn. v. 2. 83. t. 95. f. 1. Linn. Sp. Pl. 735. Willd. n. 2. (T. bohea; Linn. Sp. Pl. 734. Amœn. Acad. v. 7. 253. t. 4. Willd. n. 1. Ait. n. 1. Thea; Kæmpf Am. Exot. 605. t. 606. Woodv. Med. Bot. fuppl. 116. t. 256. T. chinenfis; Curt. Mag. t. 998. T. cantonienfis; Lour. Cochinch. 339. Thée; Barth. Act. v. 4. 1. t. 1. Tea-tree; Letfom Monogr. t. 1.)—Native of China and Japan. The late Mr. John Ellis is faid to have firft raifed it from feed in England, about the year 1768. The fhrub is propagated by cuttings, and will bear our winters with a flight degree of fhelter, though it rarely flowers, except in a greenhoufe or ftove. The *ftem* is from three to fix feet high, bufhy, with numerous, alternate, round, leafy branches, fmooth, except at the very extremity, where the youngeft fhoots are finely filky, with clofe-preffed hairs. *Leaves* alternate, on fhort, thick, channelled, fmooth *footftalks*, evergreen, elliptic-oblong, with a blunt emarginate point, copioufly ferrated, except at the bafe, with inflexed pointed ferratures, fmooth on both fides, with one rib and many tranfverfe veins, interbranching towards the margin; paler beneath; their length two or three inches; their breadth about one inch: the young ones finely filky before expanfion, with a deciduous point. *Stipulas* none. *Flowers* axillary, or, on the lateral fhoots, nearly terminal, white, not unlike thofe of a Myrtle, but rather larger, and on fhort, thick, recurved, round, fmooth *ftalks*, ufually two together, accompanied by a few alternate, fhort, ovate, deciduous *bracteas*. The two outer fegments of the *corolla*, fmaller than the reft, are green, or purplifh, at the back. *Anthers* and *ftigmas* yellow.

For the economical hiftory of this plant, fee Tea. We have

have been greatly at a lofs for a fpecific name, and have adopted *viridis* to avoid any needlefs change, thinking it rather preferable to *Bohea*, which is a partial name, and of corrupt orthography. Dr. Sims, in *Curt. Mag.*, has ufed *chinenfis*, but this is liable to objection, as the name of a country to which the plant is not quite peculiar; and Loureiro's *cantonienfis* is therefore ftill more exceptionable. This laft author concurs in the opinion that all the common Chinefe teas belong to one fpecies. He defcribes indeed two others, *T. cochinchinenfis*, which feems a trifling variety of the above; and *T. oleofa*, growing wild near Canton, faid to bear a yellow *berry*, whofe feeds fupply the Chinefe with lamp-oil.

Thea, in *Gardening*, furnifhes plants of the exotic fhrubby kind, the fpecies of which chiefly in ufe is the tea-tree (thea).

This tree, as it is commonly defcribed, differs in height, in its native climate, from five or fix feet to thirty, and even one hundred and fifty, or more, when let grow to its full fize and dimenfions.

And in refpect to the varieties of it, Martyn has confidered them all as forming one fpecies, in which he is, he afferts, fupported by the beft authorities. Kæmpfer, he contends, attributes their difference to foil, culture, age of the leaves, and method of curing them. Mr. Ellis alfo directly afferts, that the green and bohea tea are one and the fame fpecies; and that it is the nature of the foil, the culture, and manner of gathering and drying the leaves, that make the difference. So alfo fir George Staunton maintains, that every information received concerning the tea plant concurred in affirming, that its qualities depended upon the foil in which it grew, and the age at which the leaves were plucked off the tree, as well as upon the management of them afterwards. See Tea and Thea.

The bohea tea-trees now introduced into many botanic gardens near London, exhibit very obvious varieties: the leaves are of a deeper green colour, and not fo deeply ferrated; and the ftalk is ufually of a darker colour: but the botanical characters are the fame. Thunberg alfo diftinguifhes two varieties from the leaves, which in one are fmaller, flat, darker green, with ftraight ferratures, and in the other larger, waved, brighter green, with finuate ferratures: but they can fcarcely be confidered as diftinct fpecies. Loureiro obferved little difference in the fou-chong which he examined: both thefe have a brown colour, but are more odoriferous and precious than the common bohea of the province Fo-kien, which he had not an opportunity of feeing in a living ftate, though it is the moft common and cheapeft of all. He examined the dry flowers of the green-tea from the province of Kiang-fi, and obferved the fame inconftancy as to the number of parts in the calyx and corolla, as in the bohea. Upon the whole, he concludes that all the differences of Chinefe tea form only one botanical fpecies, owing their variation to foil, culture, and method of preparation; all retaining the fame inconftancy in the parts of the flower, which gave occafion to Linnæus to confider them as two fpecies. Befides, it is evident that many varieties of tea are known in China, which arife from mixture and management.

The diftinctions chiefly regarded in Europe are the following.

Green Teas.—1. Bing, imperial or bloom tea, with a large loofe leaf, of a light green colour, and a faint delicate fmell.

2. Hy-tiann, hikiong, hayffuen or heechun, known to us by the name of hyfon tea: the leaves are clofely curled and fmall, of a green colour verging towards blue. Another hyfon tea, with narrow fhort leaves, is called hyfon-utchin. There is alfo a green tea named globe, with long narrow leaves.

3. Song-lo or finglo, which name it receives, like feveral others, from the place where it is cultivated.

Bohea Teas.—1. Soo-chuen, fut-chong, fou-chong, or fu-chong, called by the Chinefe faa-tyang, and fact-chaon or fy-tyann, is a fuperior kind of cong-fou tea. It imparts a yellowifh-green colour by infufion, and has its name from a place or province in China. Padre futchong has a finer tafte and fmell: the leaves are large and yellowifh, not rolled up, and packed in papers of half a pound each. It is generally conveyed by caravans into Ruffia: without much care it will be injured at fea. It is rarely to be met with in England.

2. Cam-ho or foum-lo, called after the name of the place where it is gathered: a fragrant tea with a violet fmell; its infufion is pale.

3. Cong-fou, congo, or bong-fo: this has a larger leaf than the following, and the infufion is a little deeper coloured. It refembles the common bohea in the colour of the leaf.

There is alfo a fort called lin-kifam, with narrow rough leaves. It is feldom ufed alone, but mixed with other kinds. By adding it to congo, the Chinefe fometimes make a kind of pekoe tea.

4. Pekao, pecko, or pekoe, by the Chinefe called back-ho or pack-ho: it is known by having the appearance of fmall white flowers intermixed with it.

5. Common bohea or black tea, called moji or mo-ee by the Chinefe, confifts of leaves of one colour. The beft is named Tao-kyonn. An inferior kind is called An-kai, from a place of that name. In the diftrict of Honam, near Canton, the tea is very coarfe, the leaves yellow or brownifh, and the tafte the leaft agreeable of any. By the Chinefe it is named honam-te, or kuli-te.

But befides thefe, tea, both bohea and green, is fometimes imported in balls, from two ounces to the fize of a nutmeg and of peas. The Chinefe call it poncul-tcha. The fmalleft in this form is well known under the name of gunpowder tea.

And fometimes the fucculent leaves are twifted like pack-thread, an inch and a half, or two inches long; three of thefe are ufually tied together at the ends by different coloured filk threads. Both green and bohea teas are prepared in this manner.

The manner of gathering and preparing the leaves, as practifed in Japan, according to Kæmpfer, as far as our information reaches, is in a great meafure conformable to the method ufed by the Chinefe. See Tea.

Whether the Chinefe collect the tea precifely at the fame feafons as in Japan, we are not well informed; but moft probably the tea harveft is nearly at the fame periods, the natives having frequent intercourfe, and their commercial concerns with each other being very extenfive.

For an account of the preparation of the tea-leaves, &c. fee Tea.

The country people cure their tea-leaves in earthen kettles, which anfwer every neceffary purpofe, at lefs trouble and expence than by the procefs defcribed under the article Tea, and they are thus enabled to fell them cheaper. After the tea has been kept for fome months, it is taken out of the veffels in which it was ftored, and dried again over a very gentle fire, that it may be deprived of any humidity which remained, or it might have fince contracted.

The

The common tea is kept in earthen pots with narrow mouths; but the beſt ſorts, uſed by the emperor and nobility, is put into porcelain or china veſſels. The coarſeſt tea is kept by the country people in ſtraw baſkets, made in the ſhape of barrels, which they place under the roofs of their houſes, near the hole that lets out the ſmoke.

Method of Culture.—Theſe plants may be raiſed in this country by ſeeds, layers, and cuttings of the young branches. The editor of Miller's Dictionary adviſes that the ſeeds ſhould be procured from China, and that care ſhould be taken that they be freſh, ſound, ripe, white, plump, and moiſt internally. After being well dried in the ſun, they may be incloſed in bees-wax, or, left in their capſules, they may be put into very cloſe caniſters of tin or tutenague. Thouin, in his directions to Perouſe, it is ſaid, recommends theſe and other ſeeds to be placed in alternate layers of earth or ſand, in tin boxes, cloſed up exactly, and placed in ſolid caſes, covered with waxed cloth; the boxes to be placed in a part of the ſhip the leaſt acceſſible to moiſture, and the moſt ſheltered from extreme heat or cold. And Mr. Sneyd, it is added, was very ſucceſsful in having ſeeds packed up in abſorbent paper, and ſurrounded by raiſins or moiſt ſugar, which kept them in a ſtate fit for vegetation. American ſeeds are frequently brought over, by putting them into a box, not made too cloſe, upon alternate layers of moſs, in ſuch a manner as to admit the ſeeds to vegetate. This might be tried with the ſeeds of the tea-tree; and to ſucceed more certainly, ſome of the ſeeds might be ſown in pots or boxes, when the veſſel arrives at St. Helena, and after paſſing the tropic of Cancer, near the latitude of thirty degrees north. But the beſt method ſeems to be, to ſow ripe ſeeds in good light earth in boxes, at leaving Canton, covering them with wire, to prevent rats and other vermin from getting to them; and taking care that the boxes be not expoſed to too much air, nor to the ſpray of the ſea. A little freſh or rain-water ſhould be ſprinkled over them now and then; and when the ſeedling plants appear, they ſhould be kept moiſt and out of the burning ſun. If young plants can be procured in China, they may be ſent over in a growing ſtate in boxes, forty inches long by twenty broad, and as much in depth, having a few holes bored through the bottom. When the trees arrive here, they muſt be kept in a greenhouſe during the winter, and in the open air during the ſummer; and if they come in bad condition, it may not be amiſs to plunge the pots into which they are tranſplanted in a gentle hot-bed, or to ſet them in a tan-pit, to make them ſtrike and ſhoot more freely. It is further remarked, that though the tea-tree will not at preſent bear the rigour of our winters in the open air, yet it is not impoſſible but it may gradually become naturalized to our climate, like the magnolia, among ſeveral other trees and ſhrubs; eſpecially if it were to be brought from the coldeſt provinces of China, where it grows, or from the parts of Europe a little to the ſouthward of us, when it has been naturalized there. It is increaſed freely from cuttings, when managed in the ſame manner as gardenias: and it alſo ſometimes grows from layers laid down in the autumn or ſpring.

Some of theſe plants ſhould be always kept in pots, to be removed under the ſhelter either of a greenhouſe, glaſs caſe, or deep garden frame, in winter; and others be planted in a dry, well-ſheltered, warm, conſpicuous part of the ſhrubbery, to be afforded occaſional covering from rigorous froſts.

They afford variety in greenhouſe collections, as well as in the ſhrubberies.

Although in this country, plants of this kind are only cultivated for the purpoſe of curioſity, variety, and diverſity among greenhouſe and other collections, in ſmall quantities; in China, where they are natives, they are raiſed in vaſt abundance in plantations of very great extent for their leaves, which form a great and valuable article of merchandize to that country for the ſupply of England and moſt other parts of Europe, they being employed, in their different prepared ſtates, for the making of an infuſion with boiling water, which is called tea, and which is very generally in uſe, eſpecially in this and ſome other countries. For other particulars, ſee TEA.

THEAK, in *Rural Economy*, a word provincially uſed to ſignify thatch.

THEAKIKI, in *Geography*, a river of North America, which runs into lake Illinois, N. lat. 40° 52′. W. long. 89° 15′.

THEAME, in *Ancient Geography*, a town of Aſia, in Babylonia, on the confines of Arabia Deſerta. Ptol.

THEANDRIC, θεανδρικος, *dei-virile;* a term ſignifying divine and human, formed from Θεος, *God*, and ανηρ, *man*.

St. Dionyſius, biſhop of Athens, firſt uſed the word *theandric*, to expreſs a double operation, or two operations united in Jeſus Chriſt; the one divine, the other human. The Monophyſites afterwards abuſed it, to ſignify the one only operation which they admitted in Jeſus Chriſt; in whom they believed there was a mixture of the divine and human nature, whence reſulted a third nature, which was a compound of the one and the other, whoſe operations followed the eſſence and qualities of the mixture, and were neither divine nor human, both at once, or, in one word, *theandric*.

Θεανδρικη ενεργεια, *theandric*, or *dei-virile* operation, in the ſenſe of Dionyſius and Damaſcenus, is thus exemplified by Athanaſius. When Chriſt healed the perſon who was born blind, the ſpittle he voided was human, but the opening of the eyes was done by his divine power. And thus, in raiſing Lazarus, he called as man, but awaked him from the dead as God.

The term theandric, and the dogma of theandric operations, were examined with great care and attention, at the council of Lateran, held in 649, where pope Martin ſolidly refuted the notion of theandric operations, and ſhewed, that the ſenſe in which St. Dionyſius firſt uſed the word was Catholic, and quite remote from that of the Monophyſites and Monothelites.

THEANGELA, in *Ancient Geography*, a town of Aſia Minor, in Caria.

THEANO, or TEANO, in *Geography*, a town of Italy, in the kingdom of Naples, and province of Lavora; the ſee of a biſhop, ſuffragan of Capua; 15 miles N. of Capua.

THEANTHROPOS, Θεανθρωπος, formed from Θεος, *God*, and ανθρωπος, *man*, denominated *God-man*; a term ſometimes uſed in the ſchools to ſignify Jeſus Chriſt, who was regarded as God-man; or repreſented by ſome ſcholaſtic theological writers, as comprehending two natures in one perſon.

THEANUM, in *Ancient Geography*, a town of Italy, in Campania, upon the Latin way, S.E. of Caſinum. See THEANO.—Alſo, a river of Italy.

THEATER, or THEATRE, *Theatrum*, formed from θεατρον, *ſpectacle*, of θεαομαι, *I ſee*, among the *Ancients*, a public edifice, for the exhibition of ſcenic ſpectacles or ſhows to the people.

Under the word *theater* was comprehended, not only the eminence on which the actors appeared, and the action paſſed,

paſſed, but alſo the whole area or extent of the place, common to the actors and ſpectators.

In this ſenſe, the theater was a building encompaſſed with porticoes, and furniſhed with ſeats of ſtone, diſpoſed in ſemicircles, aſcending gradually over one another; which encompaſſed a ſpace called the *orcheſtra*, in the front of which was the proſcenium, or pulpitum, on which the actors performed, and which is what we diſtinctly call the theater, or ſtage. The proſcenium was divided into two parts; the one higher, on which the actors declaimed, and the other lower, on which the chorus was commonly placed. This latter was raiſed ten or twelve feet above the pit, from which there was an aſcent to it; and thus ſituated, the chorus might eaſily turn either towards the actors or towards the ſpectators.

On the proſcenium ſtood the ſcena, a large front, adorned with orders of architecture, behind which was the poſtſcenium, or places where the actors made themſelves ready, retired, &c. So that the ſcena, in its full extent, comprehended all the part belonging to the actors. In the firſt ages of the Roman commonwealth, theaters were only temporary, and formed of wood: the moſt celebrated of theſe was that of M. Scaurus, mentioned by Pliny. The firſt fixed theater was erected by Pompey the Great, who built it very magnificently with ſquare ſtone.

In the Greek theaters, the orcheſtra made a part of the ſcena, but in the Roman theaters, none of the actors ever deſcended into the orcheſtra; which was taken up by the ſeats of the ſenators.

The moſt celebrated theaters remaining of antiquity, are the theater of Marcellus, and that of Pompey; which are alſo called *amphitheaters*.

At Athens are ſtill ſeen the remains of the temple of Bacchus, which was the firſt theater in the world, and was a maſter-piece in architecture. All theaters were conſecrated to Venus and Bacchus.

Theater, among the *Moderns*, more peculiarly denotes the ſtage, or place on which the drama, or play, is exhibited; anſwering to the proſcenium of the ancients.

In its full latitude, however, the theater includes the whole play-houſe: in which ſenſe it is a ſpacious room, or hall, part of which is taken up by the ſcena, which comprehends the ſtage, the decorations, and the machines; and the reſt is diſtributed into a ſpace, called the *pit*, or *parterre*, which is covered with ſeats, boxes, &c. and terminated with an elevation of one or two galleries, diſpoſed into benches aſcending over one another. See Dramatic *Scenery*, Play-*Houſe*, and Scenography.

Theater is alſo uſed in *Architecture*, chiefly among the Italians, for an aſſemblage of ſeveral buildings, which, by a happy diſpoſition and elevation, repreſents an agreeable ſcene to the eye.

Such are moſt of the vineyards at Rome; but particularly that of Monte Dragone, at Freſcati; and in France, the new caſtle of St. Germain en Laye.

Theater, *Anatomical*, in a ſchool of *Medicine* and *Surgery*, is a hall, with ſeveral rows of ſeats, diſpoſed in the circumference of an amphitheater, having a table, bearing on a pivot, in the middle, for the diſſection of bodies.

Such is the anatomical theater of the royal garden at Paris.

The Theater at Oxford is a beautiful building, erected by archbiſhop Sheldon, for the uſe of ſcholaſtic exerciſes. See Oxford.

THEATINES, an order of nuns, under the direction of the Theatins.

There are two kinds of Theatines, under the title of "Siſters of the Immaculate Conception," who form two different congregations, the one engaged by ſolemn vows, and the other only by ſimple vows. Their common foundreſs was Urſula Benincaſa. Thoſe who make the ſimple vows are the moſt ancient, and are called abſolutely "Theatines of the Congregation:" they had their riſe at Naples in 1583.

The others are called "Theatines of the Hermitage:" the whole buſineſs of theſe is praying in retirement, and an auſtere ſolitude, to which they engage themſelves by ſolemn vows.

The Theatines of the firſt congregation take care of the temporal concerns of theſe laſt. Their houſes ſtand together, and communicate by a large hall. Their foundreſs drew up their conſtitutions, and laid the foundation of their houſe at Naples; but died before it was finiſhed.

Gregory XV. who confirmed the new inſtitute under the rule of St. Auguſtine, appointed that they ſhould be under the direction of the Theatins. Urban VIII. revoked this article by a brief in 1624, and ſubjected them to the nuncio of Naples: but Clement IX. annulled this brief, and ſubmitted them anew to the Theatins by a brief in 1668.

THEATINS, a religious order of regular prieſts: thus called from their firſt ſuperior Don John Pietro Caraffa, archbiſhop of Chieti, in the kingdom of Naples, which was anciently called *Theate*.

The ſame archbiſhop became afterwards pope, by the name of Paul IV. after having been a companion of Gaetan, or Cajetan, a Venetian gentleman, the firſt founder of this order, at Rome, in 1524.

The Theatins were the firſt who aſſumed the title of *regular clerks*. They have not only no lands, or fixed revenues, either in common, or in propriety; but they do not even aſk or beg any thing; but wait for what Providence ſhall ſend them for their ſubſiſtence.

They employ themſelves much in foreign miſſions; and in 1627, they entered upon Mingrelia, where they have an eſtabliſhment: they have had the like in Tartary, Circaſſia, and Georgia; but this they have ſince abandoned.

Their firſt congregation appeared at Rome in 1524, and was confirmed in the ſame year by Clement VII Their conſtitutions were drawn up at a general chapter in 1604, and approved by Clement VIII. They wear the prieſt's habit.

THEATRE. See Theater and Amphitheater.

THEATRIC Bandages, a term uſed by Hippocrates, to expreſs the parade of ſurgery in applying bandages for ſhow, when there was no real uſe in them. All ſuch bandages he called *theatric*, only proper to be looked at.

THEAUA, in *Ancient Geography*, a town of Spain, in the interior of the Tarragonenſis.

THEAVE, a term applied in ſome diſtricts to an ewe of the firſt year. It is ſometimes written *thave*, and alſo *thief* in different diſtricts.

THEBÆ, or Thebes, in *Ancient Geography*, a conſiderable, and in ſome reſpects the principal, town of Bœotia, ſituated towards the middle of the country, near the river Iſmené, S.E. of the lake Copais. This town owed its origin to Cadmus; but being conſiderably augmented, the part of the town which was ſeated upon an eminence, and which was called Cadmæa from the name of its founder, was regarded as a citadel in reference to the lower town. Here was a ſpring, which conveyed water to the city by ſubterraneous channels. Amphion and Zethus, having taken poſſeſſion of the country, joined the upper and lower towns, and called the place Thebes. According to Homer it had ſeven gates, the intervals being occupied by walls. It is

ſaid

faid to have been 43 ftadia (1 league 1563 toifes) in circumference. Its environs are embellifhed by two rivers, by meadows and gardens. Myron of Byzantium fays, that Amphion was the firft perfon who erected an altar to Mercury, and that the god recompenfed his zeal by giving him a lyre. The Thebans carried on various wars with the Platæans for afcertaining their refpective limits; and againft the Athenians at Platæa for having fought the friendfhip of the king of Perfia againft the common intereft of the Greeks. In procefs of time, the Thebans avenged themfelves by defeating the Athenians at Delium, near the Tanagra. The Macedonians, after the battle of Cheronæa, placed a garrifon at Thebes, where it remained till after the death of Philip. Alexander having taken the city, and expelled its inhabitants, who retired to Athens, Caffander, the fon of Antipater, re-eftablifhed them there, with the affiftance of the Athenians, the Meffenians, and the Megalopolitans. Sylla at length reduced them to extreme mifery, for having declared in favour of Mithridates.

In the time of Paufanias, the whole lower part of the town was in ruins, except the temples, and the citadel only was inhabited and denominated Thebes. The temple of Apollo was feated on an eminence near one of the gates, and the river Ifmené, which paffed by it, gave to the god and the hill on which his temple ftood the name of Ifmenius. Mercury and Minerva had each a ftatue of marble at the entrance of the veftibule of this temple: that of Mercury was the work of Phidias, and that of Minerva was executed by Scopas. The ftatue of Apollo in the temple was wrought of cedar-wood. In this temple were alfo brazen tripods of excellent workmanfhip. Hercules Promachus had a temple near another of the gates of the city, in which was his ftatue of marble; a coloffal figure by Alcamenes, and his labours by Praxiteles. The temple of Ammon had a ftatue executed by Calamis and dedicated by Pindar. Here was alfo the temple of Fortune, and the goddefs held Plutus in her arms under the form of an infant. The temple of Ceres Thefmophorus, or the legiflator, had been anciently the houfe of Cadmus, in which was exhibited a buft of the ftatue of the goddefs. The theatre was near another gate, and near it a temple of Bacchus Lyfius. The temple of Diana Euclea was in the fame quarter; the ftatue of the goddefs was the work of Scopas. Jupiter, furnamed the *Higheft*, had a temple near the gate of this appellation. Here were a place of exercife and a ftadium; and in the midft of the ftadium was the tomb of Pindar. The river Irce paffed near Thebes, and beyond it were the ruins of the houfe of Pindar, and a kind of chapel which this poet had built in honour of Cybele. Her ftatue was formed of Pentelic marble. Entrance into the chapel was allowed only one day in the year. The temple of Themis was near one of the gates of Thebes, and her ftatue was of white marble. Jupiter Agoreus and the Parcæ had alfo their temples. The ftatue of Hercules Rhinocolustes was in full view in this part of the city. The facred wood of Ceres Cabiria and of Proferpine lay at about 25 ftadia from Thebes. The temple of the Cabiri was at the diftance of feven ftadia. According to Paufanias, there was feen at Thebes a ftatue of Venus Urania, which was faid to have been formed of parts of the fhips that brought Cadmus into Greece. It was the moft ancient ftatue in Greece. The population of this city was very confiderable. When it was taken by Alexander, more than 6000 perfons perifhed, and more than 30,000 were fold for flaves. Some priefts were fpared and many citizens fled. Hence we may prefume, that the number of inhabitants in Thebes and its diftrict might amount to 50,000 of all ages and fexes, without including flaves. The inhabitants, like thofe of Athens, were divided into three claffes; the firft compofed of citizens, the fecond of naturalized foreigners, and the third of flaves. The Thebans were deemed to be courageous, infolent, and vain; and murders were frequently the confequence of the moft frivolous quarrels. The women were both well made and generally of a fair complexion, of a noble carriage, and not inelegant drefs; their voice was remarkably fweet and tender; and that of the men harfh and difagreeable, and in fome meafure fuited to their character. The "facred battalion" of Thebes is famous in hiftory. It confifted of a body of young warriors, brought up together, and maintained at the public expence, in the citadel. Their exercifes, and even their amufements, were regulated by the melodious founds of the flute; and in order to prevent their courage from degenerating into blind fury, care was taken to infpire them with the nobleft and moft animated fentiments. Each warrior chofe from the band a friend, to whom he remained infeparably united. Thefe 300 warriors were anciently diftributed in troops at the head of the different divifions of the army. Pelopidas, who had frequently the honour of commanding them, having made them fight in a body, the Thebans were indebted to them for almoft all the advantages they gained over the Lacedæmonians. Philip deftroyed this hitherto invincible cohort at Cheronæa; and the prince, feeing thofe young Thebans ftretched on the field of battle, covered with honourable wounds, and lying fide by fide on the ground on which they had been ftationed, could not reftrain his tears, but bore a noble teftimony to their virtue as well as their valour. Travels of Anacharfis, vol. iii. See THIVA.

THEBÆ, a town of Upper Egypt, on the right bank of the Nile. According to the ideas given us of this town by Homer, it was the moft celebrated of antiquity. Ancient authors have given very different accounts of its extent. In the time of Strabo, this city had been deftroyed. It had been ravaged by Cambyfes; it was afterwards defpoiled of its riches by Ptolemy Philometer; and under the reign of Auguftus, it was feverely treated by Gallus on account of its rebellion. From this time it fell into a ftate of decline, from which it has not recovered. Tacitus mentions it as a town in ruins; and Juvenal fpeaks thus of it: This city extended on both fides of the Nile, although it was more particularly fituated on the right bank of this river: a confiderable portion of it lay to the left, which, according to Strabo, bore the name of "Memmonium." For a further account of this city, fee THEBES.

THEBÆ was a name given to many ancient towns. *Thebæ* was a town of Afia, in Cilicia hypoplaciana, fituated on a plain, at the foot of mount Placion.—Alfo, a town of Judea, in the half-tribe of Manaffeh, on this fide of Jordan.—Alfo, a town of Macedonia, in the Phthiotide, 100 ftadia from the town of Alos, according to Strabo.—Alfo, a town of Afia Minor, in Ionia, in the vicinity of Miletus.—Alfo, a town of Greece, in Attica.—Alfo, a town of Afia, in Cataonia.—Alfo, a town of Afia, in Syria.—Alfo, a town of Paleftine, in the tribe of Ephraim.—Alfo, a town of Arabia Felix, upon the coaft of the Red fea, in the country of the Cinædocolpites. Ptolemy.

THEBAID, THEBAIS, a famous heroic poem of Statius, the fubject of which is the civil war of Thebes between the two brothers Eteocles and Polynices; or Thebes taken by Thefeus.

Statius was twelve years in compofing his Thebaid, which confifts of twelve books: he wrote under Domitian. He is cenfured by the beft critics, as Boffu, &c. for a vicious multiplicity of fables and actions, for too much heat and extra-

extravagance, and for going beyond the bounds of probability.

Several Greek poets had compofed Thebaids, or poems of this name, before him; the principal were Antagoras, Antiphanes of Colophon, Menelaus the Ægean; and an anonymous author mentioned by Paufanias, lib. ix.

Ariftotle, praifing Homer for the fimplicity of his fable, oppofes to him the ignorance of certain poets, who imagined that the unity of fable or action was abundantly provided for by the unity of the hero, and who compofed Theifeids, Herculeids, &c. in each of which, they collected every thing that had ever happened to their principal perfon.

THEBAIS, or Thebaid, called alfo *Said*, in *Ancient Geography*, a name given to Upper Egypt, from its principal city Thebes. It is in fcripture called Pathros. This is the moft fouthern part of Egypt next to Æthiopia, and is almoft as extenfive as all the other parts of Egypt, including the country on both fides of the Nile down to the Heptanomis or Middle Egypt; its beft city, according to the ancients, being Lycopolis, (fee Siut,) on the weftern, and Antæopolis on the eaftern fide of the river. Thefe dimenfions agree pretty exactly with the prefent extent of Al Said, the moft northern city of which is Manfelût. In this part of Egypt there were formerly feveral cities of great note; fuch as Lycopolis, on the fcite of which is fuppofed to be the prefent Manfelût; Hypfele, or Aboutig, about a mile W. of the Nile; Aphroditopolis; Ptolemais; Abydus, once the fecond city of the Thebaid, famous for the magnificent palace of Memnon, but in the time of Strabo only a village; Little Diofpolis, probably the prefent *Hou* (which fee); Tentyra, the inhabitants of which were famous for their enmity to the crocodile, the ruins of which are ftill to be feen at *Dendera* (which fee); Latopolis, or *Efneh* (which fee); Great Apollinopolis, on the fcite of which Etfu is now fuppofed to ftand (fee Apollinis Urbs, and Etfu); and Elephantine, on an ifland of that name, where are the ruins of a fmall temple. On the eaft fide of the Nile are Antæopolis, on the fcite of which Siout is fuppofed to have been built; Paffalus, conjectured to be the prefent Gava-Kiebre, where is feen a very beautiful portico of a temple, with eighteen pillars, in three rows; Panopolis and Cheramis, fuppofed to be the fame city, but diftinguifhed by Herodotus; the fcite of Panopolis is faid to be that of the prefent Akraim, about a mile from the river; Chenobofcia; Cæne or Neapolis, perhaps the prefent Kene, a fmall town on an eminence, about a mile from the river Coptos or Kept, and called by Pliny the emporium of commodities brought from India and Arabia; Coptos, where Chriftians were formerly very numerous (fee Coptos); Apollinopolis (fee Apollinis Urbs, or *Apollinopolis Parva* or *Kous*); and *Thebes*; which fee. To the fouth of Thebes, and on the fame fide of the river, were the following cities: *viz.* Chnumis or Cnuphis; Elethya or city of Lucina; Onebos, now Comombo, or the hill of Ombo, on which are feen the ruins of an ancient temple (fee Comombo); Syene; Philæ, (fee Philoe,) an ifland deemed facred from an opinion that Ofiris was buried there. The Thebaid in the firft ages of the church was rendered famous by the number of hermits who reforted thither.

Thebais, a river of Afia Minor, in Caria. Pliny fays that it traverfed the town of Trallis.

THEBAN Harp. See Harp.

THEBANUS Ophites, in *Natural Hiftory*, a name given by fome of the ancients to that fpecies of the ophites, or ferpentine marble, more commonly called *ophites niger*, the black ferpentine.

THEBARMAI, in *Ancient Geography*, *Ormed*, a town of Afia, S.W. of lake Spauta, and at fome diftance from it, lies between a mountain and a fmall river that falls into this lake. The worfhip of fire prevailed in this province, under a perfuafion that the firft pyræum was kindled by Zoroafter himfelf.

THEBES, the capital city of the Thebais, or Upper Egypt, which was defervedly reckoned one of the fineft cities in the world. It was alfo called Diofpolis, or the city of Jupiter, and was built, as fome fay, by Ofiris, but according to others, by Bufiris. Its length, in the time of Strabo, was eighty furlongs, or ten miles; but this was very inconfiderable, compared with its ancient extent, before it was ruined by Cambyfes, which, we are told, was no lefs than 420 ftadia, or $52\frac{1}{2}$ miles. Its wealth was fo great, that, after it had been plundered by the Perfians, what was found, on burning the remains of the pillage, amounted to above 300 talents of gold, and 2300 of filver. The 100 gates of Thebes are mentioned by Homer, and, after him, by many others; but fome think that this was not the number of the gates, but of the temples; and that from them the city had the epithet Hecatompylos, expreffing a definite for an indefinite number. Pomponius Mela, and others, by the 100 gates, underftand fo many palaces of princes, each of whom could, on any occafion, arm and fend out 20,000 fighting men, and 200 chariots. A modern traveller could obferve no figns or remains of walls round Thebes: and if it had none, we muft conclude, that by 100 gates, were meant the gates of the temples, or rather the palaces of great men. In Strabo's time the city ftood chiefly on the eaft fide of the river. At Thebes there were anciently four remarkable temples; one of them is faid, by Diodorus Siculus, to have been $1\frac{1}{2}$ mile in circumference, and 45 cubits in height, with walls 24 feet thick.

The venerable ruins of this city, probably the moft ancient in the world, fays Mr. Browne (Travels, &c.), extend for about three leagues in length along the Nile. Eaft and weft they reach to the mountains, a breadth of about $2\frac{1}{2}$ leagues. The river here is about 300 yards broad; the circumference of the ancient city muft therefore have been about 27 miles. In failing up the Nile, the firft village that occurs within the precincts is Kourna, on the W., with few houfes, as the people chiefly live in the caverns. Next is Abuhedjodj, a village, and Karnac, a fmall diftrict, both on the E. The largeft portion of the city ftood on the eaftern fide of the river. On the S.W. Medinet-Abu marks the extremity of the ruins; for Arment, which is about two leagues to the S., cannot be confidered as a part. Modern authors have ftyled the fcite of Thebes, "*Luxor*" (which fee); and others have denominated it "Akfor;" both which terms are, in Mr. Browne's opinion, corruptions of "El Kaffur," the appellation ftill applied to the ruins by the Arabs. The moft confiderable ruins are thofe on the E. of the Nile. The chief of thefe is the "great temple," an oblong fquare building of vaft extent, with a double colonnade, one at each extremity. The maffy columns and walls are covered with hieroglyphics. The "great temple" ftands in the diftrict called Karnac. Next to this in importance is the temple at Abu-Hedjadj, and here are numerous ruins, avenues marked with fphinxes, &c. On the W. fide of the Nile appear two coloffal figures, apparently of a man and woman, formed of a calcareous ftone like the reft of the ruins:—remains of a large temple, with caverns excavated in the rock:—the magnificent edifice ftyled the "palace of Memnon," fome of the columns being about 40 feet high, and about $9\frac{1}{2}$ in diameter: the columns and walls are covered with hieroglyphics: this ftands at Kourna. Behind the palace is the paffage denominated "Bibân-

"Bibân-el-Molûk," leading up the mountain; at the extremity of which paſſage, in the ſides of the rock, are the celebrated caverns known as the ſepulchres of the ancient kings. Theſe ſepulchres, which have lately been diſcovered, are particularly deſcribed by Mr. Browne. In the cells or receſſes of the paſſage of the largeſt of theſe, appear the chief paintings, repreſenting the myſteries, which, as well as the hieroglyphics covering all the walls, are very freſh. Our traveller particularly obſerved the two harpers deſcribed by Bruce, but his engraved figures, he ſuggeſts, ſeem to be from memory. Although Pococke and many others are of opinion that Thebes was never ſurrounded by a wall, Mr. Browne inclines to a contrary opinion, from ſome faint remains which are ſtill viſible.

We are principally indebted to Denon (Travels in Upper and Lower Egypt, in 3 vols. 8vo. tranſlated by Aikin), for an intereſting account of the magnificent ruins of Thebes, as well as of other places in Egypt, illuſtrated by beautiful engravings. Four large hamlets (ſays Denon) divide amongſt them the remains of the ancient monuments of Thebes, whilſt the river, by the ſinuoſity of its courſe, ſeems ſtill proud of flowing among its ruins. In croſſing the ground occupied by the ancient Thebes, Denon found nothing but temples; not a veſtige of the 100 gates ſo celebrated in hiſtory; no walls, quays, bridges, baths, or theatres; not a ſingle edifice of public utility or convenience. Temples indeed were numerous, and walls covered with obſcure emblems and hieroglyphics, which atteſted the aſcendancy of the prieſthood, who ſtill ſeemed to reign over theſe mighty ruins. The ſpace occupied by this incomprehenſible town now enfolds four villages and as many hamlets, thinly ſcattered over immenſe fields. Paſſing through the territory of Thebes on another occaſion, Denon ſaw at the diſtance of three-fourths of a league from the Nile, the ruins of a large temple not before noticed by any traveller, which may give an idea of the immenſity of that city, ſince, if we ſuppoſe that it was the laſt edifice on the eaſtern ſide, it is more than $2\frac{1}{2}$ leagues diſtant from Medinet-Abu, where the moſt weſtern temple is ſituated. The temple, on the ſcite of which the village of Karnac has been built, is of ſuch a circumference, that it would require half an hour to walk round it. Herodotus has given us a more correct idea of its grandeur and magnificence. Diodorus and Strabo, who examined it in its ruinous ſtate, appear to have furniſhed a deſcription of its preſent condition, but none of the travellers who have copied the accounts of theſe writers have preſumed (ſays Denon) to prefer to this temple that of Apollinopolis at Etfu, that of Tentyra, and the ſimple portico at Eſneh. It is probable (ſays this writer) that the temples of Karnac and Luxor were built in the time of Seſoſtris, when the flouriſhing condition of the Egyptians gave birth to the arts among them, and when theſe arts were diſplayed to the world for the firſt time. Of the 100 columns of the portico of the temple of Karnac or *Carnac* (which ſee), the ſmalleſt are $7\frac{1}{2}$ feet in diameter, and the largeſt 12. The ſpace occupied by its circumvallation contains lakes and mountains. This edifice is now in a degraded ſtate. The ſphinxes have been wantonly mutilated; and the avenue that leads from Karnac to Luxor, nearly half a league in extent, contains a ſucceſſion of chimerical figures to the right and left, with fragments of ſtone walls, of ſmall columns, and of ſtatues.

Luxor (which ſee), the fineſt village in theſe environs, is alſo built on the ſcite of the ruins of a temple, not ſo large as that of Karnac, but in a better ſtate of preſervation, the maſſes not having as yet fallen through time, and by the preſſure of their own weight. The moſt coloſſal parts conſiſt of fourteen columns of nearly eleven feet in diameter, and of two ſtatues in granite, at the outer gate, buried up to the middle of the arms, and having in front of them the two largeſt and beſt preſerved obeliſks known.

A peculiarity belonging to the temple of Luxor, is, that a quay, provided with an epaulement, ſecured the eaſtern part, which was near the river, from the damages the inundations might otherwiſe have occaſioned. The epaulement, which ſince its original ſtructure has been repaired and augmented in brick-work, proves that the river has not changed its bed; and its preſervation is an evidence that the Nile has never been banked by other quays, ſince no traces of ſimilar conſtructions are elſewhere to be met with.

Nothing can be more grand, and at the ſame time more ſimple, than the ſmall number of objects of which this entrance is compoſed. No city whatever makes ſo proud a diſplay at its approach as this wretched village, the population of which conſiſts of two or three thouſand ſouls, who have taken up their abodes on the roofs and beneath the galleries of this temple, which has, nevertheleſs, the air of being in a manner uninhabited.

Denon has particularly deſcribed the tombs above-mentioned, in the village of Kurnu, the ancient Necropolis of Thebes; and he concludes with remarking, that the myſtery and magnificence obſervable within theſe excavations, and the number of ſlaves by which they are protected, indicate, that the religious worſhip which had ſcooped out and decorated theſe grottoes, was the ſame as that which had raiſed the pyramids; but our limits forbid a farther detail.

THEBET, in *Chronology*. See TEBET.

THEBIT BEN CORAH, or THABET EBN KORRA, in *Biography*, an Arabian teacher of philoſophy and mathematics, was a native of Harran, and belonged to the ſect of the Sabæans, and on this account was ſurnamed "Al-Sabi-Al-Harrani." The time in which he flouriſhed is uncertain. Some ſay that he was born in the 221ſt year of the Hegira, or A.D. 835; others refer him to the 10th century; and others again have placed him in the 12th or 13th century. He was ſecretary to the caliph Mothaded; and was diſtinguiſhed by his ſkill in the mathematics, and by his knowledge of aſtronomy. He is ſaid to have obſerved the declination of the ecliptic, which he fixed at $23°\cdot 33' 30''$: and from this circumſtance it has been concluded, that he lived in the 12th or 13th century, or that he was contemporary with Almeon and Profalius, who about that period aſſigned to the ecliptic the ſame declination. To Thebit has been aſcribed the origin of the aſtronomical ſect, which maintained the trepidation of the fixed ſtars. It was his opinion, founded on ſome erroneous obſervations, that the fixed ſtars moved for ſome time according to the order of the ſigns; that they afterwards proceeded in a retrograde direction and returned to their former places, after which they aſſumed a direct motion; and that then they had an irregular motion, which was rapid for a certain period, then became ſlower, and at laſt inſenſible. According to Thebit, the obliquity of the ecliptic was variable, and ſubject to ſimilar periods of increaſe and decreaſe. His opinions prevailed for a conſiderable time, not only among the aſtronomers of his own nation, but among ſome Chriſtians. Montucla Hiſt. de Math. Pococke, p. 377. Fabr. Bib. Græc. v. ii. p. 354.

THECA, SHEATH, in *Anatomy*, hollow organs, ſerving to contain others. The thecæ of the fingers are ſtrong ſheaths binding down the flexor tendons. The theca vertebralis is the ſheath of dura mater lining the vertebral canal, and containing the medulla ſpinalis.

Theca, in *Botany*, the Latin word for a *cell*, *ſheath*, or *caſe*, is uſed occaſionally by ſome botaniſts in their deſcriptions of ſeed-veſſels; and eſpecially by Acharius, for thoſe minute vertical parallel cells, in the diſk of the ſhields or tubercles of a *Lichen*, in which its ſeeds are lodged. See Lichenes and Peziza.

THECHES, in *Ancient Geography*, a mountain of Aſia, in Armenia, according to Xenophon, who ſays that the Greeks, after leaving Gymnias, arrived on the fifth day at the ſacred mountain called Theches, and from thence they for the firſt time perceived the Euxine ſea, which occaſioned loud exclamations of joy.

THECUA, a town of Paleſtine, in the tribe of Juda; ſituated 12 miles S. of Jeruſalem, according to Euſebius and Jerome. Joſephus ſays that it was in the vicinity of Herodium. See Tekoa.

THEDINGHAUSEN, in *Geography*, a town of Germany, in the county of Hoya; 12 miles N.N.W. of Hoya.

THEDO, in *Ichthyology*, a name given by Figulus and others to the trout.

THEFT, Furtum, in *Law*, an unlawful, felonious taking away another man's moveable and perſonal goods, againſt the owner's will, with an intent to ſteal them. See Larceny.

Open theft from the perſon, or in the preſence of the owner, is properly called *robbery;* which ſee.

THEFTBOTE, the receiving of a man's goods again from a thief, or other amends, by way of compoſition, and to prevent proſecution, that the felon may eſcape unpuniſhed; the puniſhment of which is now fine and impriſonment.

This is frequently called compounding of felony. By 25 Geo. II. c. 36. even to advertiſe a reward for the return of things ſtolen, with no queſtions aſked, or words to the ſame import, ſubjects the advertiſer and the printer to a forfeiture of 50*l.* each.

THEIFENEGE, in *Geography*, a town of Carinthia; 3 miles N.E. of Wolfsberg.

THEIMSDORF, a town of Luſatia; 6 miles E. of Rothenburg.

THEINRED, in *Biography*, precentor of the monaſtery of Dover, and author of a treatiſe on muſic, in Latin, preſerved among the MSS. of the Bodleian Library, in three books, written about the year 1371.

The firſt book treats of muſical proportion; "De Proportionibus Muſicorum Sonorum." This is a very early treatiſe upon harmonics, in which, when he ſpeaks of the major and minor ſemitone, and of the different portions into which they are diviſible, his doctrine is illuſtrated by many numerical tables, and nice ſplittings of tones into commas; "De Comatis; alia Proportio ejuſdem Comatis, &c." which prove a *temperament* of the ſcale to have been then in uſe.

The ſecond book treats of muſical concords; "De Conſonantiis Muſicorum Sonorum." Here, after ſpecifying the different kinds of concords, he informs his reader, that in *organiſing*, major and minor thirds, as well as ſixths, are admiſſible in ſucceſſion.

The third book contains diagrams and ſcales innumerable of different ſpecies of octave, in a literal notation. No muſical characters, or examples of practical muſic in common notes, appear throughout the treatiſe.

The praiſes beſtowed by Pits, Bale, Tanner, and others on Theinred, whoſe name is ſometimes written Thaured, and Thinred, make it neceſſary to acquaint ſuch of our readers as may be inclined to take the trouble of examining this tract themſelves, that, like many other muſical writings of the middle and lower ages, it but ill rewards the drudgery of an entire and careful peruſal; for after perſeverance has vanquiſhed the abbreviations, and the barbariſm and obſcurity of the Latin, the vain ſpeculations and uſeleſs diviſions of the ſcale, with which this work ſo much abounds, and which could have been but of ſmall utility to practical muſic, at the time when it was written, are ſuch, that now, ſince the theory of ſound is ſo much better underſtood and explained by the writings of Galileo, Merſennus, Holder, Smith, and many others; our old countryman, Theinred, may henceforth remain peaceably on his ſhelf, without much loſs to the art or ſcience of muſic. Bodl. 842. 1. De legitimis ordinibus Pentachordorum et Tetrachordorum, Pr. Quoniam Muſicorum de his Cantibus frequens eſt diſtinctio, &c. 46 folios, ſmall ſize. Walther in his Lexicon calls this work a Phœnix.

THEIOCRUS, in the *Materia Medica of the Ancients*, a name given by ſome to the melanteria.

The name *theiocrus* ſignifies only ſulphur-coloured, and was at firſt uſed with the name of vitriol, as expreſſive of the difference of this kind from others; but in time it became common to uſe it alone.

THEISM. See Deism.

THEISOA, or Thisoa, in *Ancient Geography*, a town of the Peloponneſus, in Arcadia.

THEIUM, a town of Greece, in Athamenia.

THEIUS, a river of the Peloponneſus, in Arcadia, which diſcharged itſelf into the Alphæus.

THEKA, in *Botany*, the Malabar name of the Teak tree, retained as generic by Juſſieu. See Tectona.

THEKUPHÆ. See Tekuphæ.

THELA, in *Botany*, ſo named by Loureiro, Cochinch. 119, from θηλη, *a nipple*, in alluſion to the little glandular prominences which cover the calyx, appears, by his deſcription, to be the ſame genus with the Linnæan Plumbago. See that article.

THELARY, in *Geography*, a town of Hindooſtan, in Bahar; 18 miles S.W. of Bahar.

THELBALANA, in *Ancient Geography*, a town of Aſia, in the Greater Armenia. Ptol.

THELBENCANA, a town of Aſia, in Babylonia, on an arm of the Euphrates.

THELDA, a town of Aſia, in Meſopotamia, on the banks of the Euphrates. Ptol.

THELE, a word uſed by ſome to expreſs the nipple, and by others for the whole breaſt.

THELEBOÆ, in *Ancient Geography*, a people of Epirus, in Acarnania, who paſſed into Italy, and eſtabliſhed themſelves in the iſland of Caprea.

THELEBOLUS, in *Botany*, from θηλη, *a nipple*, and βολος, *a caſt*, or *throw*, becauſe the little veſicle, lodging the ſeeds, reſembles a nipple, and is thrown off with a degree of elaſticity. The name was originally written *Theleobolus*, but the above is juſtly preferred.—Tode Mecklenb. v. 1. 41. Perſ. Syn. 116.—Claſs and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi angiocarpi*.

Eſſ. Ch. Receptacle cup-like, ſomewhat globoſe, entire at the edge, diſcharging a papillary, nearly naked, ſeed-veſſel.

1. Th. *ſtercoreus*. Small Nipple-fungus. Perſ. n. 1. Tode n. 1. t. 7. f. 56.—Found by Tode on the dung of ſwine, after rainy weather in June and July. He compares it to the roe of fiſh in appearance, and to poppy-ſeed nearly in ſize. The colour is a tawny yellow. Each individual is globular, attached at the bottom by capillary roots, and crowned with a ſmall papillary tubercle, of a more

more orange or golden hue than the reft. This is at length thrown off, with a fudden and ftrong elaftic force, leaving a minute, bordered, vifcid pit, or cup, which gradually dilates into a level furface.

The minute fungus above defcribed is clofely related to SPHÆROBOLUS, and ftill more nearly perhaps to PILOBOLUS. (See thofe articles.) Whether it might be allowable to comprehend them under one genus, may admit of much difpute. Even the many-cleft *receptacle*, or *involucrum* of *Sphærobolus* can hardly be deemed a fufficient important difference to fuperfede this meafure, and ftill lefs the elongated figure, or pellucid fubftance, of *Pilobolus*. Botanifts who beftow their concentrated attention exclufively on particular tribes of plants, are prone to multiply diftinctions; but they are not rafhly to be corrected by thofe who have not looked fo clofely, nor, perhaps, fo well.

THELEDA, in *Ancient Geography*, a town of Afia, in Syria, fituated on a plain W. of Seriana, and E. of Capparæ.

THELEPHORA, in *Botany*, from θηλη, *a nipple*, and φερω, *to bear*, becaufe of the generally papillary covering of the under furface.—Willd. Berol. 396. Perf. Syn. 565. Schrad. Spicil. 182. (Craterella; Perf. Obf. Mycol. v. 1. 39. Corticium; ib. 37.)—Clafs and order, *Cryptogamia Fungi*. Nat. Ord. *Fungi gymnocarpi*.

Eff. Ch. Head coriaceous, dilated; minutely papillary, briftly, or fmooth, beneath. An ample, and, in our opinion, rather vague genus of the fungus tribe, of which Perfoon reckons up forty-feven fpecies, ranged under three fections, once confidered by him as diftinct genera. We fhall, after our ufual manner, felect a few examples of each.

Sect. 1. CRATERELLA. *Head undivided, hollow or funnel-fhaped above, with a fhaggy difk.* Two fpecies.

Th. *pallida*. Pale Thelephora. Perf. n. 1. "Ic. et Defcr. Fung. 3. t. 1. f. 3, fub *Craterella*."—"Aggregate, corky, pale. Head concave, fhaggy with fcales."—Rarely found on the ground in moift woods. The *ftalk* is very fhort; villous at the bafe. *Head* rough beneath, with little briftles, vifible under a magnifying glafs. *Perfoon.*

Th. *caryophyllea*. Carnation Thelephora. Perf. n. 2. Albert. and Schwein. Nifk. 272. (Craterella ambigua; Perf. Obf. Mycol. v. 1. 39. t. 6. f. 8—10. Helvella caryophyllea; Schæff. Fung. v. 4. 115. t. 325. Dickf. Crypt. fafc. 1. 20. Auricularia caryophyllea; Bulliard. t. 278. 483. Sowerb. Fung. t. 213.)—Head funnel-fhaped, thin, purplifh-brown, fringed, varioufly jagged or crifped.—Found on the ground in fir woods. Mr. Woodward firft met with this fpecies in Britain, near Bungay, Suffolk. Continental botanifts ufually fpeak of it as rare, but Mr. Sowerby fays it is "a very common parafite on the expofed fantaftic roots of old firs, in autumn." The fubftance is tough and fomewhat woody; the colour a chocolate-brown. The plants often grow in maffes, attached by their upper fide to fticks, old bark, &c., and are from one to three inches in diameter. Sometimes the fhaggy edge is white. Perfoon in his Obf. Mycol. above quoted feems difpofed to think the prefent fungus may vary fo much as to become *Ramaria palmata* of Holmfkiold, Fung. Dan. v. 1. 106. t. 33; but furely the multiplied divifions and ramifications of the latter, as well as its fmoothnefs and colour, preclude fuch an idea.

Sect. 2. STEREUM. *Head halved, finally horizontal.* Thirteen fpecies.

Th. *terreftris*. Ground Thelephora. Perf. n. 3. Ehrh. Crypt. n. 179. (Th. mefenteriformis; Willd. Berol. 397. t. 7. f. 15.)—Somewhat imbricated, dull brown. Head flattened, fhaggy with fibres. On fandy ground. This feems to us a mere variety of the laft, or rather its moft ufual form, as reprefented in Mr. Sowerby's t. 213. Yet Perfoon cites this plate, with doubt, under his fourth fpecies, *Th. laciniata*. He feems to lay too much ftrefs on the abfence or prefence of a ftalk, and perhaps makes too many diftinctions.

Th. *rubiginofa*. Rufty Thelephora. Perf. n. 6. (Th. fragilis; Ehrh. Crypt. n. 238. Helvella rubiginofa; Dickf. Crypt. fafc. 1. 20. Auricularia ferruginea; Bulliard. t. 378. Sowerb. Fung. t. 26.)—Imbricated, rigid, rufty-brown, fmooth on both fides, with fcattered, rather large, knobs.—Not uncommon on gate-pofts or pales, generally placed fo low as to be partly hid by the earth and neighbouring plants, as Mr. Sowerby remarks. It is very diftinct from the foregoing, foft like velvet to the touch; the under fide bearing fcattered, roundifh prominences, which, however, do not appear concerned in the fructification. The edge is ufually pale. No part is hairy or fhaggy. The diameter of each plant is about an inch.

Th. *ferruginea*. Snuff-coloured Thelephora. Perf. n. 9. Albert. and Schwein. Nifk. 273. (Auricularia tabacina; Sowerb. Fung. t. 25.)—Wavy, fomewhat reflexed, bright brown. Head thin, nearly even, flightly downy; hairy underneath.—Frequent on ftumps and rotten branches, in various fituations. The plants are feffile, attached by the back, projecting over each other, of an elegant undulated figure; the colour of both fides a bright reddifh-brown, efpecially the upper, elegantly contrafted with the light-yellow border.

Th. *hirfuta*. Common Hairy Thelephora. Perf. n. 11. Willd. Berol. 397. Albert. and Schwein. Nifk. 274. (Th. pallida; Ehrh. Crypt. n. 169. Auricularia reflexa; Bulliard. t. 274. Sowerb Fung. t. 27.)—Aggregate, rounded, coriaceous, convex, fomewhat zoned, yellowifh; fhaggy above; fmooth and tawny beneath.—Frequent on rotten ftumps, pofts, pales, tubs, &c.; either growing folitary, and roundifh, about an inch in diameter; or in continued, confluent, fomewhat imbricated maffes. The under fide is yellow or tawny; the upper of a pale yellowifh-brown, marked with different concentric fhades, and rough with imbricated foft fhaggy hairs. The whole is often tinged with black, as if fmoked. It varies in fize as well as colour, and often confifts of an expanded orange-coloured furface, clofely preffed by its back to the wood, previous to its acquiring any projection by which the upper fide is expofed. In this ftate it might be referred to the next fection. *Auricularia papyrina*, Bulliard t. 402, feems nearly akin to this.

Sect. 3. CORTICIUM. *Plant laid entirely on its back, indeterminate in form, papillary, various in fubftance.*—Thirty-two fpecies, divided into fubordinate fections, according to the colour, whether pale or dark red, yellowifh, brown, grey, or white.—It is very neceffary to trace the progrefs of the fpecies of this divifion, in order to be certain they do not, at any period, acquire a diftinct upper furface, fo as to range under the preceding.

Th. *quercina*. Oak Thelephora. Perf. n. 16. Albert. and Schwein. Nifk. 276. (Th. carnea; Ehrh. Crypt. n. 269. (Auricularia corticalis; Bulliard t. 436. f. 1.)—Oblong, coriaceous, rugofe, pale flefh-coloured; the margin fomewhat involute, of a blackifh-brown at the back.—Found running longitudinally along decayed branches of oak. Each plant is two or three inches in length, fomewhat oval, of a light flefh-coloured hue, with a powdery or downy furface, which water will not moiften, and which is befprinkled with round depreffed protuberances, obfcurely repre-

repreſenting the ſhields of a *Lichen*. The margin ſoon becomes elevated and inflexed, eſpecially by drought or cold, and diſplays the blackiſh under ſide, which ought to be the upper.

Th. *cruenta*. Blood-red Thelephora. Perſ. n. 24.—"Smooth, coriaceous, tuberculated, blood-red."—An elegant ſpecies, found on the branches of trees, and communicated by Ludwig from Miſnia. *Perſoon*.

Th. *ſanguinea*. Gory Thelephora. Perſ. n. 25. (Tremella cruenta; Engl. Bot. t. 1800.)—"Widely ſpreading on the ground, ſomewhat gelatinous, blood-coloured, ſmooth."—"This ſingular ſpecies," ſays Perſoon, "grows in the ſtreets of towns, about the walls of houſes, looking at a diſtance like blood poured on the ground. By drying it becomes paler. Is it not rather to be referred to the order of *Algæ*?" In this laſt ſuggeſtion we readily concur. The whole is truly an expanded maſs of minute, uniform, gelatinous, pellucid granulations, with nothing of a coriaceous or fungous texture, nor any other character of the preſent genus.

Th. *hydnoidea*. Awl-bearing Thelephora. Perſ. n. 28. Albert. and Schwein. Niſk. 279. (Corticium hydnoideum; Perſ. Obſ. Mycol. v. 1. 15.)—Spreading, concealed, orange-yellow, bearing awl-ſhaped elongated prominences.—This ſpreads under the ſeparated cuticle of decayed dry branches of beech, which it ſometimes totally encircles, extending to the length of four or ſix inches. Its great peculiarity conſiſts in the awl-ſhaped projections, thrown out from its ſurface, to the height of two or three lines, which either penetrate, or force off, the ſuperjacent cuticle of the tree, and, except in their great irregularity of ſize and figure, reſemble the prickles of a *Hydnum*.

Th. *umbrina*. Umber-brown Thelephora. Perſ. n. 36. Albert. and Schwein. Niſk. 281.—Spreading on the ground, ſoft, of an umber brown; the margin whitiſh and rather downy.—Found on the ground, in a ſandy ſoil, ſpreading to the extent of two or three inches, and not of a very thin ſubſtance. Perſoon ſpeaks of it as very rare, hut the obſerving authors of the *Fungi Niſkienſes* find it not unfrequently, in Auguſt and the following months, in ſhady ſandy places.

Th. *cæſia*. Grey Ground Thelephora. Perſ. n. 40. (Corticium cæſium; Obſ. Mycol. v. 1. 15. t. 3 f. 6.)—Orbicular, on the ground, nearly ſmooth, of a greyiſh aſh-colour.—Not unfrequent in autumn, on the bare ground, from one and a half to three inches broad, with a white, fibrous, rounded, ſcolloped edge. The grey ſurface is beſprinkled with minute powdery *ſeeds*, regularly diſpoſed in ſpots, four together. *Perſoon*.

Th. *lactea*. Milk-white Fir Thelephora. Perſ. n. 45.—"Nearly orbicular, of a livid white; ſomewhat fleſhy in the middle; fibrous at the margin."—Rarely found on the bark of the Spruce Fir. The ſurface is ſmooth. The colour becomes paler by drying. *Perſoon*.

Albertini and Schweiniz deſcribe ſeveral more ſpecies of this genus, to which every thing of a membranous texture, and fungous aſpect, ſeems to be referred by authors. Some ſuch may poſſibly be imperfect vegetable productions, whoſe growth, when completed, might prove them of a different nature. When their ſmooth ſurface diſcharges powdery *ſeeds*, they are to be conſidered as perfect ſpecies of *Thelephora*.

THELIGONUM. See Thelygonum.

THELMENISSUS, in *Ancient Geography*, a town of Aſia, in Syria, on an immenſe plain on the E. of the Orontes, N. of Apamea, and S.W. of Chalcis.

THELONIUM, Telonium, ſignifies toll.

Among the Romans, *telonium* denoted a cuſtom-houſe, or place where the toll was collected.

Thelonio, *Breve eſſendi quieti de*, a writ lying for the citizens of a city, or burgeſſes of a town, that have a charter or preſcription to free them from toll, againſt the officers of any town or market, who would conſtrain them to pay it, contrary to the ſaid grant or preſcription.

Thelonio *rationabili habendo pro dominis habentibus dominica regis ad firmam*, a writ lying for him that hath of the king's demeſne in fee-farm to recover reaſonable toll of the king's tenants there, if his demeſne hath been accuſtomed to be tolled.

THELOTREMA, in *Botany*, from θηλη, *a nipple*, and τρημα, *an orifice*, in alluſion to the pierced protuberances of the cruſt; a genus of the order of *Lichen s*, inſtituted by Acharius, in his *Methodus*, 130. The original type of this genus is *Lichen pertuſus* of Linnæus, which is reduced, by the writer of the preſent article, to Endocarpon, (ſee that article,) in *Prodr Fl. Græc.* v. 2. 304. The reſt of the ſuppoſed ſpecies may perhaps be in like manner diſpoſed of, or referred to *Urceolaria*.

THELPUSA, in *Ancient Geography*. See Thalpusa.

THELSEA. See Thalsea.

THELYGONUM, in *Botany*, a name of very whimſical derivation, concerning which Linnæus has fallen into an error, like profeſſor Martyn and M. De Theis, who have both of them been leſs penetrating than uſual in their enquiries. They all deduce it from θηλυ, *female*, and γονυ, *a joint*, or *knee*; and the laſt of them ſuppoſes the original plant, which was our Mercurialis, (ſee that article,) to have been called θηλυγονον, becauſe its ſwelled joints reſembled the knees of a woman. This we modeſtly preſume to be a very unanthorized compariſon; and Pliny, from whom the name is borrowed, leads us to a leſs injurious, if not a wiſer, ſolution His ſapient pages aſſure us that Arſenogonon (αρσενογονον, or αρρενογονον) was taken to procure male children, its fruit reſembling a part of the male organs; while *Thelygonon*, which, though otherwiſe the ſame, bore no ſuch fruit, was ſuppoſed to cauſe the production of females. The word therefore is compoſed of θηλυ, and γονος, *generation*, or *offspring*, φυλλον, *a leaf*, being underſtood, a confirmation of which may be found under the 6th ſpecies of our article Mercurialis, above-mentioned. If we may be allowed to play further upon this word, we ſhould remark that its own generation is truly *anile*. Yet hence aroſe Bauhin's *Mercurialis teſticulata, ſive mas*, and *ſpicata, ſive fœmina*; appellations perverſely beſtowed on the two ſexes of our *Mercurialis annua*, as well as of *perennis*. How Linnæus came to transfer *Thelygonum* to the genus which now bears it, can no otherwiſe be accounted for, than from the ſuppoſed affinity of the plants to each other, and both having borne the name of *Cynocrambe*, or Dog's Cabbage; a name retained by Gærtner, after Tournefort, and liable to no objection, except being compoſed of one already eſtabliſhed, which doubtleſs cauſed Linnæus to reject it. The imaginary affinity juſt alluded to has apparently ſtamped a poiſonous character on the herb before us, which, conſidering its natural order, is probably undeſerved.—Linn. Gen. 494. Schreb. 644. Willd. Sp. Pl. v. 4. 420. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 5. 285. Sm. Prodr. Fl. Græc. Sibth. v. 2. 237. Juſſ. 405. Lamarck Illuſtr. t. 777. (Cynocrambe; Tourn. t. 485. Gærtn. t. 75.)—Claſs and order, *Monoecia Polyandria*. Nat. Ord. *Scabridæ*, Linn. *Urticæ*, Juſſ.

Gen. Ch. Male, *Cal.* Perianth of one leaf, turbinate, coloured, cloven half way down into two revolute ſegments. *Cor.* none. *Stam.* Filaments numerous, from ſix to twelve or or more, capillary, prominent, as long as the calyx, anthers verfatile, linear, ftraight.

Female, on the fame plant, *Cal.* Perianth minute, of two erect, lanceolate, acute, lateral leaves, permanent. *Cor.* none. *Pift.* Germen fuperior, globofe; ftyle lateral, between the calyx-leaves, thread-fhaped, much longer than the germen; ftigma fimple, curved. *Peric.* none. *Seed* folitary, globofe, feated on a callous annular *receptacle*, which falls off with it.

Eff. Ch. Male, Calyx in two revolute fegments. Corolla none. Stamens about twelve.

Female, Calyx lateral, of two leaves. Corolla none. Style one. Seed naked, on a deciduous annular receptacle.

1. Th. *Cynocrambe.* Dog's Mercury. Linn. Sp. Pl. 1411. Willd. n. 1. Ait. n. 1. Sm. Fl. Græc. Sibth. t. 941, unpublifhed. (Cynocrambe Diofcoridis; Bauh. Prodr. 59. C. alfinefolia; Barrel. Ic. t. 335. Alfines facie planta nova; Column. Phyt. 28. t. 30. ed. alt. 120. t. 36.)—The only known fpecies, found in wafte ground and the fiffures of rocks, efpecially in fhady or moift places, in the fouth of Europe, as well as in Afia, flowering at almoft all feafons. About Rome and Naples it is very frequent. Its feeds may have been brought, from time to time, into our curious botanic gardens, but the plant has no charms, nor any known quality, to render it a popular favourite. The *root* is annual, fimple, cylindrical, with many fibres below. *Stems* feveral, fpreading or proftrate, a fpan long, leafy, fcarcely branched, round, very fmooth and fhining, moftly purplifh. *Leaves* alternate, ftalked, each with an axillary tuft of fmaller ones, ovate, rather fucculent, an inch, or thereabouts, in length, of a bright fhining green, very fmooth on both fides; roughifh at the edges. *Footftalks* almoft as long as the leaves, dilated at the bafe into an annular toothed *ftipula*. *Flowers* fmall, whitifh, from the bofoms of the upper leaves. The *calyx* of the males is not unlike the *corolla* of a honey-fuckle in miniature. *Seed* purplifh-brown, furrowed, not much bigger than muftard-feed. The general afpect of the plant evinces its affinity to *Parietaria*, though the *flowers* in detail are extremely different.—Dr. Sibthorp's figure has but fix *ftamens*. We have ufually found more, and authors defcribe from twelve to nineteen.

That this herb is the κυνια, or κυνοκραμβη, of Diofcorides, there can fcarcely be a doubt. He defcribes it fufficiently well, and informs us that it was fometimes called Wild Male Mercury; which renders the name of *Thelygonum* ftill more unfuitable; but Linnæus did not always fearch deeply into fuch matters, though he will commonly be found quite as learned as moft of his critics or correctors. Diofcorides fpeaks of the plant in queftion as a gentle purge. This probably caufed the *Mercurialis* to be taken with the fame intention, though at the peril of the patient's life, as we have already mentioned in its proper place; where alfo it may be feen that fome of the earlier European botanifts took that very plant for the κυνοκραμβη.

THELYMITRA, from θηλυ, *female*, and μιτρα, *a diadem*, or *ornament for the head.* This name of Forfter's, not one of the moft happy, alludes to the cap or hood, ornamented with a pair of plumy tufts, and covering the immediate organs of fructification.—Forft. Gen. t. 49. Swartz Act. Holm. 1800. 228. t. 3. f. L. Ejufd. in Schrad. Neues Journ. v. 1. 56. t. 1. f. L. Sm. Exot. Bot. v. 1. 55. Brown Prodr. Nov. Holl. v. 1. 314. Willd. Sp. Pl. v. 4. 79. Ait. Hort. Kew. v. 5. 200.—Clafs and order, *Gynandria Monandria.* Nat. Ord. *Orchideæ.*

Gen. Ch. *Cal.* Perianth of three equal, ovato-lanceolate, coloured leaves, exactly refembling the petals. *Cor.* Petals two, ovato-lanceolate, the fize of the calyx, and exactly like it. Nectary a feffile lip, of the fhape, fize, and appearance, of the petals and calyx, without a fpur. *Stam.* Anther parallel to the ftigma, permanent, of two cells clofe together, attached to the central lobe of a three-cleft hooded appendage to the column; "maffes of pollen powdery, pendulous by a thread from the gland of the ftigma." *Brown. Pift.* Germen inferior, obovate; ftyle fhort, united with the hood; ftigma in front, obtufe. *Peric.* Capfule obovate, furrowed, with one cell and three valves. *Seeds* numerous, chaffy.

Eff. Ch. Calyx-leaves coloured, the fize and figure of the petals and lip. Column encompaffed by a three-lobed hood. Anther parallel to the ftyle, permanent.

1. Th. *Forfteri.* Forfter's Thelymitra. Swartz Act. Holm. 1800. 228. t. 3. f. L, c. Willd. n. 1. (Th. longifolia; Forft. Gen. t. 49. Serapias regularis; Forft. Prodr. 59.)—Lateral fegments of the hood plumous: intermediate one vaulted. Clufter many-flowered.—Gathered by Forfter in New Zeeland. The *ftem* is above a foot high, round, ftriated, fomewhat fpiral, clothed with a few fheathing lanceolate *leaves*. *Clufter* terminal, erect, three inches long, of about a dozen upright *flowers*, fcarcely half the fize of the next fpecies, each accompanied by an elliptic-lanceolate acute *bractea*, longer than the partial ftalk. Of the colour of the *flowers* we have no information. Their *hood* appears, by the dried fpecimen, as well as Forfter's figure, to have its middle fegment vaulted, convex, and undivided.

2 Th. *ixioides.* Large-flowered Thelymitra. Swartz Act. Holm. 1800. 228. t. 3. f. L, a, b, d—g. Willd. n. 2. Br. n. 1. Ait. n. 1. Sm. Exot. Bot. v. 1. 55. t. 29.—Lateral fegments of the hood plumous: intermediate one three-cleft; its lateral lobes jagged; central one fhorteft, cloven, crefted at the back. Clufter many-flowered.—Found in the neighbourhood of Port Jackfon, New South Wales, from whence we received fpecimens and drawings about the year 1790. Mr. G. Caley fent out plants to Kew in 1810, but they do not appear to have fucceeded there. This is a larger taller fpecies than the foregoing; its *flowers* above an inch in diameter, very handfome, of a fine blue, fpotted, according to Mr. Brown, with a deeper colour. The *hood* is fringed with hairs, juft below the fummit, and overtopped by its two lateral, ftalked, plumous tufts. The *calyx*, *petals*, and *lip*, fpread almoft equally in both thefe, and, we believe, all the following fpecies, except our n. 9, Mr. Brown's *venofa*.

3. Th. *media.* Intermediate Thelymitra. Br. n. 2.—"Outer fegments of the hood plumous; intermediate one naked at the back, three-cleft; its central lobe emarginate, half the length of the others. Spike (or clufter?) many-flowered."—Gathered by Mr. Brown, near Port Jackfon.

4. Th. *canaliculata.* Channelled Thelymitra. Br. n. 3.—"Outer fegments of the hood plumous: intermediate one naked at the back, many-cleft; lobes corrugated; the outer one longeft and moft remote. Spike many-flowered."—Found by Mr. Brown, in the tropical part of New Holland.

5. Th. *pauciflora.* Few-flowered Thelymitra. Br. n. 4.—"Hood half the length of the petals: its outer fegments plumous: intermediate one naked at the back, emarginate, with rounded entire lobes. Spike of few flowers."—Gathered by Mr. Brown, near Port Jackfon.

6. Th. *nuda.* Naked Thelymitra. Br. n. 5.—"Hood half the length of the petals; its outer fegments plumous; intermediate one naked at the back, emarginate, with rounded entire lobes. Spike many-flowered."—Gathered in the ifland of Van Diemen, by Mr. Brown. By the above definition,

nition, this species differs from the last only in having more numerous *flowers*.

7. Th. *angustifolia*. Narrow-leaved Thelymitra. Br. n. 6. —" Outer segments of the hood plumous; intermediate one naked at the back, emarginate, with toothed lobes. Spike of few flowers. Leaf as tall as the flower-stalk."—Found by Mr. Brown, in the neighbourhood of Port Jackson.

8. Th. *carnea*. Flesh-coloured Thelymitra. Br. n. 7. —" Calyx and petals spreading. Outer segments of the hood finely toothed, beardless. Stalk with one or two flowers."—Found by Mr. Brown, near Port Jackson. A drawing in our possession, which seems to belong to this species, represents the *stalk* about four inches high, with a light-red terminal *flower*, above an inch wide, and a few short, radical, lanceolate *leaves*.

9. Th. *venosa*. Veiny Thelymitra. Br. n. 8.—" Calyx and petals converging. Outer segments of the hood beardless, spirally involute."—Gathered also near Port Jackson, by Mr. Brown.

10. Th. *tigrina*. Tiger-spotted Thelymitra. Br. n. 9. —" Lateral segments of the hood distinct, with tufted beards; intermediate one shorter, crested. Leaves linear, channelled." —Discovered by Mr. Brown, on the south coast of New Holland. The *flowers* are yellow, with darker spots.

11. Th. *fusco-lutea*. Brownish-yellow Thelymitra. Br. n. 10. —" Lateral segments of the hood converging, connected, fringed; intermediate one erect, naked. Leaves lanceolate." —Gathered by Mr. Brown, in the same country with the *tigrina*. He describes the yellow colour of the *flowers* as peculiar to these two last species; all the rest, as far as hitherto discovered, having them generally blue, sometimes white, or flesh-coloured. We have necessarily, for want of authentic specimens, except of the first two species, adopted the specific characters of the excellent author whose name we have cited.—He establishes a genus under the name of EPIBLEMA, which appears to differ from *Thelymitra*, in having a stalked lip with tufts of fibres at its base; an appendage to the base of the column, connected with the claw of the lip underneath; and the anther accompanied at each side by a petal-like lobe. Of this there is only one species, *E. grandiflorum*, found on the south coast of New Holland. Its *flowers* are large, blue, and handsome.

THELYPHONON, from θηλυς, *female*, and φονος, *murder*, or *destruction*, the name of an herb mentioned by Pliny, book 25, chap. 10, which he says is by some called Scorpion, from the resemblance of its root to a scorpion, and the touch of which is fatal to that animal, as a remedy for whose sting it is given internally. He adds, that the same root kills any sort of quadruped, if applied to the parts of generation; and that its leaf, which resembles that of *Cyclamen*, produces the same effect within the course of a day. His description answers to the *Doronicum scorpioides*, Willd. Sp. Pl. v. 3. 2114; *D. latifolium*, Clus. Hist. v. 2. 16; Great Leopard's-bane, Ger. Em. 759; but there is apparently much superstition, mistake, or exaggeration, intermixed in his relation.

THELYPTERIS, from θηλυς, *female*, and πτερις, *a fern*, a name by which Pliny designates a species of the Fern tribe, whose habit appears to be more delicate than that of his *Filix mas*, or Male Fern. The latter should seem, by his description, to be our *Pteris aquilina*. (See PTERIS.) The name of *Filix mas*, however, has remained with a large species of *Aspidium*, Sm. Fl. Brit. 1121. Engl. Bot. t. 1458; and that of *Filix fœmina* with a more slender and finely-divided one of the same genus, Engl. Bot. t. 1459: while a third, whose texture is more thin and tender than either, has received the appellation of *Aspidium Thelypteris*. They were all referred by Linnæus, under the same specific names, to POLYPODIUM. (See that article.) Our present *Thelypteris*, therefore, must not be taken for that of Pliny, being rather a north-country plant, not hitherto noticed in Greece by any botanical traveller.

THEMA, in *Ancient Geography*, a town of Syria, in the Chalibonitide territory; and also of Arabia Deserta.

THEMAN, a town of Arabia Petræa, 5 miles from Petra, which had a Roman garrison.—Also, a town of Judea, in the half-tribe of Manasseh, on the other side of Jordan; famed for the wisdom of its inhabitants. Eliphaz, one of Job's three friends, came from this place.

THEMAR, in *Geography*, a town of Germany, in the county of Henneberg, on the Werra; 12 miles S.E. of Meinungen.

THEME, THEMA, a subject or topic, upon which to write or compose.

THEME, among *Astrologers*, denotes the figure they construct when they draw the horoscope; representing the state of the heavens for a certain point, or moment, required; *i. e.* the places of the stars and planets for that moment.

The celestial theme consists of twelve triangles, inclosed within two squares, and called the *twelve houses*.

THEME, in *Grammar*, denotes a verb, considered in its primary and absolute sense, and not limited to any particular mode or tense: or it is the verb in its primitive radical state, whence its different formations are derived.

THEME, in *Music*; *Thema*, Lat.; *Tema*, Ital.; *Mottivo*, *Soggetto*, is a series of notes selected as the text or subject of a new composition, or an old favourite and well-known air to grace and embellish with variations. About the middle of the last century, the musical world was overwhelmed with dull, unmeaning, and monotonous variations to old and new tunes, which consisted of nothing more than a regular multiplication of notes, without fancy, taste, or harmonical resources; till Haydn, in the slow and graceful middle movements of his quartets and symphonies, by a richness of imagination, by double counterpoint, and inexhaustible resources of melody and harmony, rendered variations the most ingenious, pleasing, and heart-felt of his admirable productions *à grand orchestra*; and Mozart, in a totally different style, and for a totally different purpose, has rendered little favourite French, Italian, German, and English airs the most beautiful, amusing, and useful compositions for the piano forte that have ever been produced since the invention of that instrument. More than twenty of these have been printed in England that were brought from Vienna by Mrs. Peploe, who played them, as she did all other music, with a firmness, accuracy, and spirit, which neither dilettante nor professor has ever exceeded.

These themes seem to have been a series of lessons, composed expressly to form the hand and taste of some disciple of the author, who promised to be a great performer. In every one of these themes, there are some peculiar difficulties of execution, refinement, and expression to vanquish, at which it is in vain for mediocrity to aspire.

THEMEDA, in *Botany*, a genus of grasses, so called from its Arabic name *Thæmed*.—Forsk. Ægypt-Arab. 178. Juss. 447.—It is found in Yemen, near Hadîe. Forskall names the only species *T. triandra*, and describes it as follows.

" A polygamous grass. *Spikelets* proceeding from a sheath, capitate; the outer ones whorled, male. *Calyx* of one valve, single-flowered. *Corolla* of two valves. *Styles* and *awns* wanting. In the middle of the head of flowers arises a short stalk, bearing two stalked male *spikelets*, and a sessile hermaphrodite one; the *calyx* is of one valve, *corolla* of two; *awn* proceeding from the receptacle, much longer than the flower.

Stems racemose. *Sheaths* compressed, broad, sword-shaped, concealing the branches, and the heads of *flowers*, before expansion. All the *heads* are originally concealed in the sheath of a leaf."

This can only be the Linnæan *Anthistiria*, a genus which Mr. Brown, in his Prodr. Nov. Holl. v. 1. 200, asserts to have been first described by Forskall, but he gives no reference to the *Themeda*, which omission has caused us much trouble, and after all, leaves the matter in some uncertainty. Desfontaines, in his Fl. Atlant. v. 2. 380, has reformed the character of *Anthistiria*, and has given a figure, t. 254, of *A. glauca*, called by some authors *Stipa paleacea*, which agrees, as nearly as possible, with Forskall's description. It does not appear that Vahl, Willdenow, or any other author, has adverted to *Themeda*, except Jussieu, who has merely admitted it, on Forskall's authority, into his appendix, without examination or elucidation.

We presume here to observe, that every correct writer ought invariably to cite the page of his author; especially in referring to a confused posthumous work, without an index, like that of Forskall.

THEMIS, in *Ancient Geography*, a town of Africa Propria, situated between Tabraca and the river Bagradas.

Themis, in *Geography*, a river of Transylvania, which runs into the Alaut, near Marienburg.

Themis, in *Astronomy*, a name given by some to the third satellite of Jupiter.

Themis, in *Mythology*, the daughter of Cœlum and Terra, or of Uranus and Titaia, the eldest sister of Saturn, and aunt of Jupiter.

Themis, according to Diodorus, established divination, sacrifices, the laws of religion, and every regulation that contributed to maintain order and peace among men. She also applied herself to astrology, issued predictions, and after her death temples were erected to her, in which oracles were delivered. She had a temple on mount Parnassus, and another in the citadel of Athens.

THEMISCYRA, in *Ancient Geography*, a town of Asia Minor, in the kingdom of Pontus, situated in the open country to which it gave name, upon the banks of the river Thermodon, towards its mouth in the Euxine sea. Diodorus Siculus says that it was a royal city of the Amazons, and that they founded it.

THEMISONIUM, a town and country of Asia, in Phrygia.

THEMISSUS, a town of Asia Minor, in Caria.

THEMISTEAS, a promontory of Asia, in Carmania.

THEMISTIUS, surnamed *Euphrades*, or the fine speaker, in *Biography*, an Eclectic philosopher, was born in an obscure village of Paphlagonia, about the year 317, and having fixed his residence at Constantinople, taught eloquence and philosophy with great reputation and success. His disciples, both Pagan and Christian, were numerous; to the former class belonged Libanius, and to the latter, Gregory Nazianzen. By the emperors he was highly esteemed, and they conferred upon him distinguished honours. In the year 355, Constantius admitted him into the senate; and in return for an eloquent eulogium, presented him with a brazen statue. Julian corresponded with him as a friend; and in 362, appointed him præfect of Constantinople. His character and eloquence induced other emperors to bestow upon him peculiar favours. When Jovian issued his edict of toleration, Themistius was deputed by the senate to express its loyalty; and on this occasion he expatiated with elegance and liberality on the rights of conscience, and the independence of the human mind. Of his candour and liberality, the following memorable instance is recorded by Socrates, Sozomen, and other ecclesiastical historians. The emperor Valens, who favoured the Arian party, treated the Trinitarians with great severity. Themistius, disapproving the measures which the emperor pursued, addressed him in an eloquent speech, stating that the diversity of opinions among Christians was inconsiderable, compared with that of the Pagan philosophers; and urging upon his attention, that this diversity could not be displeasing to God, since it did not prevent men from worshipping him with true piety. By such arguments, Themistius, it is said, prevailed upon the emperor to treat the Trinitarians with greater lenity. What an example does this Pagan philosopher exhibit even to Christian divines! In the year 376 Themistius visited Rome, but though solicited to take up his abode there, he preferred returning to Constantinople. It redounds very much to the honour of this philosopher, and also to the liberal sentiments of Theodosius the Great, that during his visit to the Western empire, the emperor entrusted Themistius, notwithstanding difference of religion, with the care and education of his son Arcadins. Themistius was no less distinguished by gentleness of temper and urbanity of manners, than by his eloquence and wisdom, and ability in the conduct of public affairs. After a long course of civil honours, he withdrew about the year 387, at an advanced age, from public business; and soon after died. Themistius, the subject of this article, who does not appear to have ever deserted the Pagan schools, should be distinguished from a Christian deacon of the same name, who lived after the council of Chalcedon, held in the year 551, and who was the head of the sect called *Agnoetæ*; which see. As a philosopher, Themistius illustrated several of the works of Aristotle, particularly the Analytics, the Physics, and the book on the Soul, in commentaries, written with great perspicuity and elegance. His "Orations," which were thirty-six, and of which thirty-three are still remaining, are strongly marked with the same characters. The best editions of his Orations are those of Petau, Gr. and Lat. Paris, 4to. 1618; and of Hardouin, Gr. and Lat. Paris, fol. 1684. Fabr. Bib. Græc. Brucker by Enfield. Gibbon. Lardner's Works, vol. viii.

THEMISTOCLES, an Athenian statesman and commander, the son of Neocles, a person of middle rank at Athens. At a very early age he manifested, both in his amusements and in his literary pursuits, those views and inclinations, which marked the character and destiny of his maturer years. To those who ridiculed him on account of his apparent contempt of ornamental accomplishments, he replied, "It is true, I never learned how to tune a harp, or play upon a lute; but I know how to raise a small state to a great one." Ambition seems to have been his ruling passion, and he lost no opportunity of acquiring military and political distinctions. He sought popularity with a view to his personal advancement; and less pure and disinterested in his principles than Aristides, his solicitude for the glory of his country was subservient to his own reputation and eminence. After the defeat of the Persian invasion by the battle of Marathon, an event which interested his feelings and roused into exercise his predominant love of glory, he foresaw that the attempt might be renewed by sea as well as by land; and he therefore exerted his influence in rendering the Athenian state a naval power. With this view, he induced his countrymen to appropriate the revenue accruing from the silver mines to the equipment of a number of galleys; and as he possessed the chief authority at Athens, in consequence of the banishment of Aristides, he found no obstacle to the execution of his design. In the course of three years after this event, the hostile preparations of Xerxes for an expedi-

tion

tion into Greece to enforce the demand of fubjection, furnifhed him with a plea for urging the Grecian ftates to compromife their mutual diffentions, and to unite in defending themfelves againft the invader. In the choice of a general, with whom the command fhould be intrufted in this emergency, the Athenians favoured the claims of a democratical orator, named Epicydes, who had fafcinated them by his eloquence; but Themiftocles induced him to furrender his pretenfions to an office for which he was totally unqualified by a bribe, and thus fecured the appointment for himfelf without a competitor. When news arrived that the Perfian army, conveyed by a fleet, was approaching the ftraits of Thermopylæ, Themiftocles propofed that the Athenians fhould fit out their galleys and fail to meet them; but this counfel being rejected, he took the command of their troops, and having joined the Lacedæmonians, marched towards Tempé. In the mean while, intelligence was received that the paffage of the ftraits had been forced, and that Bœotia had fubmitted to the invaders; and upon this alarm the army returned without feeing the enemy. In thefe circumftances of apprehended danger, the Athenians, according to their cuftomary practice, had recourfe for counfel to the Delphic oracle. The anfwer, probably fuggefted by Themiftocles himfelf, was, that they fhould rely folely on their fleet. It was now propofed, that the city fhould be wholly abandoned to the Perfians, without any attempt for its defence; that the women, children, and aged fhould be removed to fome place of fecurity; and that all who were able to bear arms, fhould embark on board the galleys, and watch the event. A decree was obtained, after much fruitlefs oppofition, to this purpofe; and this was followed by another, which permitted all exiled citizens to return. Ariftides was one of this number, who nobly facrificing, in the moment of his country's danger, all private animofities, concurred in all the fpirited meafures of his former rival.

Eurybiades, a Spartan, to whom the command of the confederate fleet was affigned, and who was very unequal to the office, differed with Themiftocles as to the meafures proper to be purfued; and behaved with an infolence, which, probably for the fake of the public fervice, the latter did not think proper to refent. Eurybiades was pacified by the gentlenefs and felf-command of Themiftocles, and convinced by his reafoning. Finding it prudent, however, to change the meafures which he originally contemplated, he employed a ftratagem to induce the Perfians to advance and make an attack. This was followed by the famous battle of Salamis, which took place in the year B.C. 480, and which terminated in the fignal defeat of the Perfian navy. The victory has been chiefly afcribed to the fkill and valour of Themiftocles; and having thus fucceeded, he advifed the confederates to fail immediately to the Hellefpont, in order to deftroy the bridge of boats by which the army of Xerxes had paffed over, and thus to intercept his communication with Afia; but being overruled in this propofal, he difpatched a fecret meffenger to the Perfian king, with information that the Greeks intended to break his bridge, and advifing him to retreat immediately before the defign was executed. The policy of Themiftocles, as we may judge from this inftance, was not always uniform and confiftent; and in another cafe, which remains to be mentioned, on the authority of Plutarch, it was inexcufably flagitious. When the combined Grecian fleet was wintering at Pegafa in Magnefia, he informed the Athenians, that he had conceived a project which would be of infinite fervice to the republic, and at their defire, he would communicate it to Ariftides. This virtuous man told them, that the fcheme of Themiftocles would be highly advantageous, but that nothing could be more unjuft; upon which, very much to their honour, they determined not to adopt it. The plan was to burn all the fhips of the fleet, except thofe of Athens, by which fhe would remain complete miftrefs of the feas.

The victory at Salamais advanced the name and character of Themiftocles to the higheft pitch of glory throughout Greece. On his vifit to Sparta, he was received with every token of refpect; and whilft the firft prize of valour was decreed by the people to their countryman Eurybiades, the olive wreath of fuperior wifdom was placed on the head of the Athenian; and they alfo prefented him with a magnificent chariot, and ordered three hundred of their youth to attend him back to the borders. At the next Olympic games, the eyes of the whole affembly were fixed upon Themiftocles, and he was pointed out to ftrangers as the moft interefting object at the fpectacle. Themiftocles himfelf acknowledged, that this was the nobleft day of his life. When the conftitution of Athens was about to be re-eftablifhed, after the rebuilding of the city, Themiftocles, in conformity to the political principles which he had adopted, propofed that every citizen fhould have an equal right to participate in the government, and that the members fhould be chofen from the body of the people, without diftinction; and in his propofals the people unanimoufly acquiefced. He alfo propofed to fortify the city; but as the Lacedæmonians objected to the propofal, he was deputed upon an embaffy to Sparta with a view of conciliating them. He contrived, however, by various artifices, to prolong the negociation, fo that the Athenians had conftructed their walls before the Spartans were duly apprized of the fact. Themiftocles vindicated this artifice by alleging, "that all things are lawful in ferving our country;" and the Spartans, admiring his patriotifm, filently acquiefced. In the following year, his fcheme for rendering the Pyræum the principal port of Athens, and connecting it with the city by long walls, was adopted and accomplifhed.

Independently of the deceits which Themiftocles had practifed with regard to the Lacedæmonians, another circumftance had occurred which increafed their enmity againft him. He had fuccefsfully oppofed their fending deputies to the Amphictyonic council, and thus degraded their authority in Greece. Incenfed againft him, they joined his rivals at Athens, and ufed all their influence to deftroy his reputation. His own conduct alfo had excited jealoufy and refentment; for he had caufed to be erected near his own houfe a temple to "Diana Ariftobule," or "of the beft counfel," thus intimating, that his counfels had been the beft for the Grecian community. His enemies prevailed, and procured his banifhment from Athens by the fentence of Oftracifm. During his exile at Argos, his enemies gained an additional advantage over him. Apprized of the treafonable defigns of Paufanias, the Spartan, againft the liberty of Greece, he declined the difclofure of them; and after the detection and death of Paufanias, letters of Themiftocles were found, which proved that they had conferred on this bufinefs. The Lacedæmonians preferred an accufation againft him to the Athenians; and they called him to account in the prefence of the ftates of Greece. Dreading a trial, he fled to Corcyra, and thinking himfelf infecure there, he withdrew to Epirus: and at length was reduced to the neceffity of feeking the protection of Admetus, king of the Moloffi, whom he had formerly offended. The vengeance of the Spartans purfued him, and Admetus was threatened with a war, if he protected the criminal. The king difmiffed him with money acrofs the continent to a port in the Ægean fea, whence he reached Afia in fafety. In the year B.C. 462, he arrived at the Perfian court; but here his

his name was so obnoxious, that a reward of 200 talents had been offered for apprehending him. Here he appeared in disguise, and pretending that he had important information which he wished to communicate to the king in person, he was admitted to the royal presence, and favourably received: the 200 talents, which were the price of his head, were paid to himself, and a more ample recompence was offered to him, if he would give useful information concerning Greece. He was granted time for acquiring the Persian language, and after a year he appeared at court like a native. The king and royal family treated him with distinction; and it is said that the revenues of three cities, *viz.* Magnesia, Lampsacus, and Myus, were assigned him, under the name of bread, wine and meat; and as some say, two more, for lodging and wardrobes. In this state of luxury and magnificence he was joined by the members of his family, who had been conveyed to him by his friends, and to them he expressed a kind of satisfaction with his condition, which proves that moral meanness may accompany exalted talents.

The close of his life is involved in obscurity. Plutarch relates, that upon the revolt of Egypt, supported by the Athenians, against the Persian dominion, the Greek king, resolving to send an expedition into Greece, dispatched an order to Themistocles at Magnesia, reminding him of his promises, and claiming the fulfilment of them: upon which it is said, that, in order to avoid the disgrace of bearing arms against his country, after sacrificing to the gods and taking solemn leave of his friends, he drank poison, and died in that city at the age of sixty-five years. Thucydides, his contemporary, says that he died of a distemper; and others again report, that he poisoned himself, because it was not in his power to accomplish what he had promised. The Magnesians honoured his memory with a sumptuous tomb; but his remains, according to his own orders, were privately conveyed to Attica, where they were interred. It is further said, that the Athenians, repenting of their treatment of him, raised a tomb for him in the Pyræum, which was an interesting object to all who visited that port. His singular talents, and the services which he rendered to his country, must be acknowledged; and those who think favourably of him, ascribe his desertion of them to unjust persecution. But in Themistocles we look in vain for the virtues of an Aristides; and he can only be allowed the honour of a distinguished general and statesman. Thucydides. Plut. in Them. Ancient Un. Hist.

THEMNA, Timna, or *Thamnata*, in *Ancient Geography*, a town of Palestine, in the tribe of Dan. Josh. xix. 43.—Also, a town of Arabia Deserta, on the confines of Mesopotamia.

THEN, in *Geography*, a river of France, which runs into the Weze, near Francremont.

THENA, in *Ancient Geography*, an ancient town of Africa, situated N.E. of the Tanais and near it, and two miles in circuit.—Also, a town of Samaria, in the vicinity of Sichem.

THENAC, or Thanac, a royal town of Judæa, in the half-tribe of Manasseh, on this side of Jordan. It was given to the Levites of this tribe, and its king was one of those who were vanquished and slain by Joshua.

THENÆ, a town of the isle of Crete, near Cnossus.

THENAR, in *Anatomy*. The eminence in the palm of the hand, formed by the muscles of the thumb, has been called thenar: and some of the muscles have been described under the same name.

The thenar of Riolan and Winslow includes the abductor pollicis brevis, and the opponens pollicis.

THENEATE *el Gannim*, the *Sheep Cliffs*, in *Geography*, mountains of Africa, in Sahara; 90 miles S. of Algiers.

THENEZAY, a town of France, in the department of the Two Sevres; 10 miles N.E. of Partenay.

THENGEN, a town of Germany, which gives name to a principality, situated in the Hegau, bordering on Schaffhausen; 8 miles N. of Schaffhausen.

THENON, a town of France, in the department of the Dordogne; 6 miles miles N.W. of Montignac.

THENONGOUN, a town of the Birman empire; 4 miles S.W. of Ava.

THENOPSYCHITES. See Thnetopsychites.

THENSA, among the Romans, a veil or canopy, used in the chariots of games; and likewise to cover a seat of state.

Thensæ could not be granted to any but by the express allowance of the senate. Hist. Acad. Inscript. vol. i. p. 359.

THEOBALD, Lewis, in *Biography*, a professed writer, was the son of an eminent attorney at Sittingbourn, in the county of Kent, and is here noticed as one of the numerous editors of Shakspeare. Of his various works, critical, poetical, and dramatic, it is needless to give any account, as they have sunk into oblivion. He had the misfortune of becoming, to an undue degree, the object of Mr. Pope's contempt and satire, and of having the first place assigned him in the Dunciad, though he was afterwards superseded by Cibber. His edition of Shakspeare was preceded by a work entitled "Shakspeare restored," and published in 1726; and also by that of Mr. Pope. It is thus characterized by Dr. Johnson: "Pope was succeeded by Theobald, a man of narrow comprehension and small acquisitions, with no native and intrinsic splendour of genius, with little of the artificial light of learning, but zealous for minute accuracy, and not negligent in pursuing it. He collated the ancient copies, and rectified many errors. A man so anxiously scrupulous might have been expected to do more; for what little he did was commonly right." Of the tragedy which he brought on the stage, and which is entitled "The Double Falsehood," the greater part is ascribed by him to Shakspeare; but Dr. Farmer has proved that this is a mistake.

THEOBROMA, in *Botany*, the Chocolate-tree, received that name from Linnæus, who probably, like the president Bachot, cited by De Theis, was fond of the delicious produce of this tree; for the word is formed of θεος, *a god*, and βρωμα, *food*. A French writer, M. Tussac, in his magnificent Flore des Antilles, has objected to the above generic name, for a reason which we confess to have been one of the last we should have thought of; that "it carries with it the signification of a quality, and seems therefore more fit for the name of a species." Surely nothing can be more desirable than a generic appellation which conveys information; on which account *Amaranthus*, *Artocarpus*, *Biserrula*, are excellent; we need not run through the botanical alphabet in search of numerous others. Such probably was the origin of most names, in every language, and who can tell that the American word *Cacao*, substituted, or rather restored, by Tussac, may not express some quality of the plant? Neither is it an objection to any significative generic names, that they express merely some general property or peculiarity, not found in every one of the species, witness *Urtica*. The idea of stinging is associated with the name of a Nettle; like redness with that of a Rose; though there are Dead Nettles, and White Roses.—Linn. Gen. 391, with an erroneous description, corrected in Linn. Suppl. 341. Schreb. 513. Willd. Sp. Pl. v. 3. 1422. Mart.

Mill. Dict. v. 4. Ait. Hort. Kew. v. 4. 408. Juss. 276. Lamarck Illustr. t. 635. (Cacao; Tourn. t. 444. Gærtn. t. 122.)—Class and order, *Polyadelphia Decandria*. Nat. Ord. *Columniferæ*, Linn. *Malvaceæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of five ovato-lanceolate, acute, spreading, coloured, deciduous leaves. *Cor.* Petals five, rather longer than the calyx; their claws dilated, concave, hooded, marked internally with two ribs from the base, and one from the summit: their borders roundish-ovate, pointed, spreading, each contracted at the base into a narrow, erect and recurved stalk, connected with the claw. Nectary short, cup-shaped, crowned with five long, erect, awl-shaped, pointed, equal, converging segments. *Stam.* Filaments five, thread-shaped, erect, recurved at the upper part, concealed in the hollow claws of the petals, inserted into the outside of the nectary between its segments, but not above half so long; anthers two to each filament, (one on each side, at the summit,) vertical, two-lobed, one lobe over the other. *Pist.* Germen superior, nearly sessile, ovate, with five furrows; style cylindrical; stigma in five awl-shaped segments. *Peric.* Berry elliptic-oblong, beaked, coated, of one cell. *Seeds* large, ovate, smooth, numerous, in five rows: their cotyledons in many deep lobes.

Eff. Ch. Calyx of five leaves. Petals five, vaulted at the base. Nectary cup-shaped, with five taper points. Anthers two to each filament. Stigma five-cleft. Berry coated. Seeds ovate.

Obs. Gærtner observes that he could find no traces of the five cells attributed by authors to this fruit. It is probable, however, from analogy, that they may exist in the germen, and Aublet's account is sufficiently explicit of their presence in the fruit. The drawing in the Linnæan herbarium, which appears to have been sent by Allamand from the West Indies, has led us to suppose each filament bore four anthers; but it seems there are only two, each of two round, distinct, vertical lobes, as represented by Aublet, t. 275, and copied by Lamarck. The order of *Decandria* must therefore be restored in the class *Polyadelphia*. See Sm. Intr. to Bot. ed. 3. 340. Linnæus's characters of *Theobroma* in Gen. Pl. were taken chiefly from Plumier's *Guazuma*, the Bubroma of Schreb. Gen. 513; see that article. He has left a more correct description in manuscript, from which perhaps his son composed what is given in the *Supplementum*. From these sources, with the help of Allamand's drawing, and what is to be found in Aublet and Schreber, we have drawn up our account, having no opportunity of examining a flower.

1. Th. *Cacao*. Smooth-leaved Chocolate-tree. Linn. Sp. Pl. 1100. Suppl. 341. Willd. n. 1. Ait. n. 1. (Th. n. 2 and 3; Browne Jam. 306. Cacao; Merian. Surin. t. 26 and 63. C. Theobroma; Tussac Flore des Antilles, t. 13. Arbor cacavifera americana; Pluk. Almag. 40. Phyt. t. 268. f. 3.)—Leaves entire, smooth on both sides.—Native of South America. Miller appears to have had this plant alive at Chelsea, but it has never long succeeded in our stoves; being extremely tender, even in some parts of the West Indies. Browne says the Chocolate-trees, though naturalized in the woods of Jamaica, are very delicate, and rarely survive when once they are loosened in the ground by hurricanes. (See Chocolate.) These trees are the size of a middling apple-tree, but seldom exceed six or seven inches in diameter. They are very beautiful, especially when laden with *fruit*, which is dispersed, on short stalks, over the *stem*, and round principal *branches*; its yellow hue and warty surface somewhat resembling a citron. The *leaves* are alternate, stalked, drooping, a foot long, and three inches broad, elliptic-oblong, pointed, entire, slightly wavy, very smooth on both sides, with one mid-rib, and many transverse ones, connected by innumerable, minute, reticulated veins. *Footstalks* round, hairy, an inch long. *Stipulas* minute, deciduous. *Flowers* small, several together in tufts, at the sides of the branches, on simple stalks, only one in each tuft, commonly producing fruit. *Calyx* light rose-coloured. *Petals* yellow.

2. Th. *guianensis*. Downy-leaved Chocolate-tree. Willd. n. 1. Ait. n. 1. (Cacao guianensis; Aubl. Guian. v. 2. 683. t. 275.)—Leaves wavy, and somewhat toothed; downy beneath.—Native of marshy woods in Guiana, bearing flowers and fruit in September. Of rather more humble growth than the foregoing. The *leaves* are, at most, but eight inches in length, and three in breadth; their margin wavy, or rather bordered with shallow teeth, towards the extremity; their upper surface smooth and green; the under clothed with short, ash-coloured, or rusty pubescence, and reticulated with fine veins. *Footstalks* short, channelled, downy. *Flowers* situated like the former. *Calyx* green without, yellow within. *Petals* yellowish. *Fruit* elliptical, with five angles, and clothed with short rusty down. Aublet says it has five cells, separated by membranous partitions; the *seeds* enveloped in a gelatinous, white, melting substance; their kernel white, very good eating when fresh. He speaks of this species as the Chocolate of Guiana, though he mentions a *Cacao sativa*, with entire leaves, as a cultivated kind, under which he cites *Theobroma Cacao* of Linnæus, and its acknowledged synonyms.

Aublet has also a *Cacao sylvestris*, v. 2. 687. t. 276, with entire *leaves*, downy beneath, and a downy *fruit*, without ribs. Willdenow asserts, we know not on what authority, that this last is *Duroia Eriopila*, Linn. Suppl. 209, of which we, unfortunately, have met with no specimen. A branch of Aublet's plant, communicated from his own herbarium by sir Joseph Banks, appears a variety of the last, its *leaves* being obscurely toothed in a similar manner; but for want of *flowers* we cannot say how far it answers to *Duroia*, between which and *Theobroma* there is no affinity in that respect. Aublet clearly describes his as a *Theobroma*, and we cannot help suspecting some error in Willdenow, as well as, possibly, a disagreement between Aublet's figure and our above-mentioned specimen, which latter may be, as above hinted, his *Cacao guianensis*. At any rate, the two species of *Theobroma* which we have described, are certainly and permanently distinct.

Theobroma, in *Gardening*, contains a plant of the exotic tree kind, of which the species usually cultivated is the chocolate nut-tree (T. cacao).

In its natural state, this tree produces a nut or fruit which is smooth, of a yellow, red, or of both colours, about three inches in diameter: it has a fleshy rind, near half an inch in thickness, which is flesh-coloured within: the pulp being whitish, of the consistence of butter, separating from the rind in a state of ripeness, and adhering to it only by filaments, which penetrate it, and reach to the seeds. Hence it is known when the seeds are ripe by the rattling of the capsule when it is shaken: the pulp has a sweet and not unpleasant taste, with a slight acidity; it is sucked and eaten raw by the natives; it may be easily separated into as many parts as there are seeds, to which it adheres strongly, and they are wrapped up in it, so that each seed seems to have its own proper pulp: the seeds are about twenty-five in number: when fresh, they are of a flesh-colour: gathered before they are ripe, they preserve them in sugar, and thus they are very grateful to the palate: they quickly lose their power of vegetation, if taken out of the capsule, but kept in it, they preserve that power for a long time: the tree

 bears

bears leaves, flowers, and fruit all the year through; but the usual seasons for gathering the fruit are June and December: in two years from the seed, the tree is above three feet high, and spreads its branches, not more than five of which are suffered to remain. Before its third year is complete, it shews for fruit; a tree yields from two to three pounds of seed annually. Such trees are of course very productive.

Method of Culture.—It is increased by seed obtained from abroad, sowing it as soon after its arrival as possible, in pots filled with light earth, and plunging them in a bark-bed, where they will soon come up; and when the plants are about three inches high, potting them off separately, and replunging them in the bark-bed in the stove, managing them as other woody exotics of the stove kind afterwards. They afford an agreeable variety in stove collections.

This tree is cultivated to considerable extent, and with very great attention in its native situations in the hot parts of America, for the sake of its fruit, the kernels of which are much used in the making of chocolate there, as well as in this country. In this intention, they are first brought to a pulverizable state by drying or roasting in a proper apparatus; they are then reduced into a fine powder by mills or other contrivances: after which, this fine powder is wrought up into a paste with orange-water, milk, and other liquids, and has sugar, different sorts of aromatic spices, and some aromatic perfumes, mixed and incorporated with it, when it is formed into cakes, or made into pretty large rolls, for exportation and sale in the European and other markets, if prepared in the places of its native growth.

It is employed somewhat in the manner of coffee as a fine rich breakfast article of diet, and used pretty extensively for that purpose in this and some other countries.

THEOCATAGNOSTÆ, formed from Θεος, *God*, and καταγινωσκω, *I judge*, or *condemn*, a sect of heretics, or rather of blasphemers, who presumed to find fault with certain words and actions of God, and to blame many things in the Scriptures.

Marshal, in his Tables, places these heretics in the seventh century; for what reason we know not. Damascenus is the only author that mentions them, but without taking any notice of the time of their appearance.

THEOCRACY, formed from Θεος, *God*, and κρατος, *power*, *empire*, a state governed by the immediate direction of God alone.

According to Josephus, the ancient government of the Jews was theocratic; God himself ordering and directing every thing belonging to the sovereign authority.

By the oracle of Jehovah himself, all laws were enacted, war was proclaimed, and magistrates were appointed; in which three particulars the *summa potestas*, or sovereign authority, of any state, consists. And as Jehovah was the king, as well as the God of Israel, the priests and Levites, who were the stated attendants on his presence, and to whom the execution of the law in many cases was committed, were properly ministers of state and of civil government, as well as of religion. The sacrifices also, beside their religious use, were intended for the support of the state, and civil government.

This theocracy lasted till the time of Saul; when the Israelites, weary of it, desired they might have a king like other nations; and thence forward the state became monarchic.

There was also a kind of imaginary theocracy at Athens: while the sons of Codrus were disputing the succession, the Athenians, wearied out with the miseries of an intestine war, abolished the royalty, and declared Jupiter the only king of the people at Athens.

THEOCRITUS, in *Biography*, a Greek poet, esteemed as the model of pastoral poetry, was a native of Syracuse, and the son of Praxagoras and Philina. The time in which he flourished is ascertained by two of his poems, one addressed to Hiero, king of Syracuse, who began his reign about the year B.C. 265, and the other to Ptolemy Philadelphus, whose reign comprehended the interval between 281 and 246 B.C. Although Hiero is reported to have been a patron of literature, persons of rank, as we may infer from Theocritus's poem, did not follow his example, at least in granting encouragement to poets; and therefore Theocritus left Sicily, and visited the court of Ptolemy Philadelphus at Alexandria, on whom he pronounces a splendid eulogy. The compositions of this poet are denominated "Idylls;" they are written in the Doric or rustic dialect, and few of them are pastorals, though most of them relate to rural life and manners. The purely pastoral are distinguished by the truth and simplicity of the manners, descending sometimes even to coarseness, and the pleasing description of natural objects, drawn from the life. To those who have a taste for genuine simplicity, and the beauties of nature, says one of his biographers, the poetry of Theocritus is highly agreeable. The most esteemed editions of his works, are D. Heinsius's, 4to. Commel. 1604; R. West's, Oxon. 8vo. 1699; Th. Warton's, Oxon. 2 vols. 4to. 1770; Valkenaer's, cum Bione et Moscho, Lugd. Bat. 8vo. 1779. Suidas. Vossius. Gen. Biog.

THEODOLITE, or THEODOLET, is an instrument used for measuring horizontal and vertical angles in land-surveying. This instrument was at first made on a small portable scale, supported by a tripod that will shut up into the form of a walking-stick, when the mechanism of brass-work is dismounted: and the state of dividing circles is now brought to that perfection in England, that small portable theodolites are still in use among land-surveyors, who confine themselves to the planning of single estates, for which these instruments are competent; but for surveys on a large scale, such as county surveys, or trigonometrical measurement of distant stations, theodolites of an enlarged construction have been used with corresponding advantage. Out of the numerous modifications of this instrument, that different artists have contrived, we propose to select two for particular description, which are generally considered as the best for accurate surveys; one by Ramsden, and the other by Troughton. We will begin with that large instrument already referred to in a former article, which was made by Ramsden, in the year 1777, for the use of general Roy, when he undertook his grand trigonometrical operations, and which is described in the 80th vol. of the Philosophical Transactions of London (1790), with all the constituent parts given separate in four large plates. A similar instrument, by the same maker, has since been used for the grand general survey of the different counties, by Messrs. Mudge and Dalby. *Plate* VIII. *fig.* 1. *of Surveying*, shews the perspective view of this masterpiece of workmanship, nearly as represented in general Roy's third plate; but his account, having reference to the several plates, will not answer our purpose. The stand on which the instrument is placed for use, is a four-legged mahogany stool A B C, braced as seen in the figure, with an octagonal top perforated at the centre by a hole of nine inches diameter. This stool or stand, when used, has its feet screwed fast to the tops of four piles driven into the ground, and nicely levelled, before the instrument is placed

placed on it, and one of the four faftening fcrews may be feen at B, at the junction of the bracing bars. Upon this ftool another, but larger, octagonal board of mahogany, D E, refts, which has a ring or circular curb on its plane, about half an inch from the fides of the octagon: this upper octagonal board may be fixed to, or releafed from, the top of the ftand by four vertical fcrews, which penetrate both boards, but which allow one to flide over the other, fo as to be either concentric or excentric, as the adjuftment of a plumb-line to the mark or hole under the inftrument may require, for the exact place of the ftation, over which the centre of the inftrument muft be exactly fixed. The four horizontal fcrews of adjuftment, of which three are feen at F, F, and F, carried by the board D E, are fo contrived as to effect this adjuftment by preffure againft the edge of the ftand, after which the two octagonal boards are made faft together by the faid four vertical fcrews not fhewn. The upper octagonal D E has an open conical focket of brafs, three inches in diameter, in its centre. Next above the board D E, thus adjufted and fecured, comes the third board, which is circular, and which forms the bafis of the inftrument. In the centre of this bafe another brafs conical focket, three inches and a quarter in diameter, is made faft, and flips over the fmaller conical focket of the board D E of adjuftment for central pofition, fo that the centre of the inftrument being concentric with this board partakes of the adjuftment, while the plumb-line defcends through both fockets down towards the ground. The large mahogany circle G H, of more than three feet in diameter, is fupported by feveral pillars connected with the circular board, which we have called the bafe of the inftrument, and forms with them a baluftrade, that protects the inftrument, as feen in the figure. A brafs circle of three feet diameter, within the baluftrade, is attached by ten ftrong conical radii to the large vertical hollow axis, formed into the fruftum of a cone, of twenty-four inches in height above the metallic wheel, which we fhall in future denominate the graduated circle, when confidered with its radii and hollow axis attached to it. This axis, by way of diftinction, may be called the *exterior* axis; it has a collar of caft-fteel driven faft into the cavity of its inferior or thicker end, and a plate of bell-metal, with a floping edge, furmounts the fuperior end, which plate may be raifed or lowered by means of five fcrews acting vertically. The inftrument ftands on three fhort feet near D and E, and at an equidiftant point not feen behind, which feet are firmly united together, at the place where they branch off, by a circular ftrong plate of bell-metal, upon which is carried an attached vertical cone of metal fmaller than the former one, and as it fills the cavity of the other, we will call it the *interior* conical axis; the exterior one being moveable round the interior one without the leaft perceptible liberty, beyond what is neceffary for rotatory motion. On the vertex of this interior axis is inferted a caft-fteel pivot with floping cheeks, which, entering the central hole of the bell-metal plate, exactly fits its cheeks there, while the bell-metal bafe of the interior axis fits the caft-fteel collar inferted into the lower extremity of the exterior conical axis. This mode of centering allows the wheel to be taken off and put on without injury, and is alfo free from the objection that applies to thofe large inftruments that have the fuperior end of the vertical axis fupported in a frame that is liable to alter in its dimenfions by expofure to the fun; of which imperfection, as we have noticed in our article Circle, Piazzi had great reafon to complain. Befides, this kind of centre-work allows of carriage from one place to another, without any danger of injury being done to the inftrument when properly packed. There are two achromatic telefcopes with double object-glaffes of each thirty-fix inches focus, with eye-pieces of different powers both for erect and inverted pofitions. One of thefe telefcopes lies acrofs the body of the inftrument, with the ends feen between the oppofite pillars of the baluftrade, the ufe of which is to watch the pofition of the inftrument during the time of an obfervation being made; and, therefore, it requires but little elevation in altitude: the other is mounted, exactly like a tranfit-inftrument, over the top of the exterior vertical axis, and has a femi-circle attached to the extreme end of its horizontal axis of motion, of fix inches radius, and graduated for fhewing angles of altitude or of depreffion. The Y's in which the pivots of the upper telefcope move, are fupported by the horizontal bar I K, which is braced by the ladder-pieces attached to the thick part of the exterior conical axis, and made faft to the top of this axis by its focket, as feen in the fection in *fig.* 4; which fection exhibits moreover the internal fittings of both the internal and external axes at their fuperior ends. This upper telefcope has a fpirit-level with the ufual adjuftments at the Y's, and at the bar of fufpenfion for the horizontal pofition; and, as it will reverfe in the Y's, and has moveable wires in the focus of the eye-piece, it may alfo be adjufted by a horizontal mark for collimation, and for taking exact altitudes, (as well as for taking minute angles of elevation without the femi-circle by the motion of the micrometrical wires,) when the level is applied to a rod on the *fide* of the tube, as is the cafe in our drawing. When thefe adjuftments are made, by dividing the errors between the proper fcrews, as ufual, the level is hung to the crofs-bar I K to watch its pofition while this telefcope is ufed, and when both telefcopes continue to bifect the fame diftant mark during an obfervation, with the bubble of the level in the middle, it is a proof that the inftrument keeps its pofition. When a ftar or other object is viewed by night, the illuminating lamp K throws light into the axis of the telefcope, which has a diagonal perforated reflector, as is ufual in tranfit telefcopes. A fyftem of darkening prifms is alfo applied to the fame end of the axis to regulate the quantity of light that fhall come to the eye. All thefe adjuftments and appendages have been minutely explained under our articles Circle and Transit-*Inftrument*, and therefore need not be detailed in this article; but it may be proper to obferve, that the femi-circle has a moveable clamping-piece, bearing the fteel arbor of a vertical fcrew, the lower end of which falls on a polifhed piece of fteel on the plane of the horizontal bar I K, the ufe of which clamp and fcrew is not only to give a flow motion in altitude, but to allow the preponderating eye-end of the telefcope to reft fteady thereon, while the obfervation has been read and repeated. The obfervation in altitude is read by the compound microfcope at I, which is nine inches long, and which, by means of its micrometrical fcrew, reads the divifions of the femi-circle to the accuracy of 5″, when an allowance of 12″ is made for excentricity.

When this theodolite was firft brought into ufe, it was found that the fcrew L, with an ivory thumb-piece, moved the circle in azimuth by jerks, on which account the apparatus for flow motion, feen in *fig.* 2, was fubftituted, in which two crown-wheels and a Hooke's joint are introduced to give motion to the tangent-fcrew; which addition not only remedied the jerks, but allowed the obferver to reach the handle while his eye remained at the upper telefcope. The large brafs horizontal circle is divided into quarters of a degree, and the fubdivifions are made by the vertical micrometrical microfcopes, the divided heads of which read exact feconds, when properly adjufted for zero, for

for diſtinct viſion, and for power. The ſcrew of the vertical micrometers has ſeventy-two threads in the inch, and the notches that indicate the fifteen minutes on the micrometrical ſcale of ſteel, are formed by this ſcrew, which we mention particularly, becauſe this mode of reading was probably an original mode, though now become common. Theſe vertical microſcopes, G and H, have each a ſtage, repreſented by *Plate* IX. *fig.* 4; and a *dot* made on a thin ſlip of gold, called a *gold tongue*, lies under the object-lens in ſuch a ſituation, that the capſtan ſcrews can adjuſt it to a given place in the field of view of each microſcope, ſo as to become a *mark* for making the adjuſtments by, and for biſecting the circle at reverſed oppoſite readings. The poſition of the three glaſſes of each microſcope is ſeen in *fig.* 3. of the ſame plate, together with the magnified appearance of the notched ſcale and diviſions of the circle. In *fig.* 5. the general plan of the micrometer is exhibited, and in *fig.* 6. is the plan of the ſtage where the pillars enter, that ſupport the microſcope. *Fig.* 7. ſhews the lower or ſteel ſlide, and *fig.* 8. the upper or braſs ſlide, that ſeparate the wires of the micrometer; while *fig.* 9. is a repreſentation of the long horizontal microſcope that reads the diviſions of the ſemi-circle above noticed, at the letter I in the large figure of *Plate* VIII. As it was not eaſy to deſcribe the conſtruction of the three feet, two of which, we have ſaid, only are viſible, oppoſite to D and E, we have added *figs.* 3. and 5. in *Plate* VIII. to illuſtrate their poſition. In *fig.* 3. the piece F F, as before, is a portion of the ſtand, and D E a portion of the octagonal board, to which the ſcrew F is attached, that preſſes againſt the angular corner of the ſtand, into which a piece of braſs is let for the ſcrew to preſs againſt, an end ſection of which is ſhewn in *fig.* 5, with the ſame letters of reference to the ſame parts: M N is a ſection of the baſe of the inſtrument, and O one of the three braſs branches that bears the foot-ſcrew P, and its two ſide ſcrews or tightening ſcrews Q, R, as ſeen in *fig.* 5. At S is a curved piece of box, faſt to M N, which bears the principal part of the weight laid on this ſcrew, and does not gall the parts on which it ſlides, when a circular motion is given; but, to take off a part of the weight, a cylindrical roller near S is put to a horizontal ſpring bearing the central pin of the roller, which ſpring preſſes the roller even with the face of the curved block of box, and may be made to take more or leſs of the weight by a ſcrew preſſing upon it from above, and giving it more or leſs tenſion. Hence all the parts of this large inſtrument are ſtrong, and yet the moving parts are made to go freely and ſmoothly; and the only alteration that can apparently be made for the better, is the addition of a third vertical microſcope, for which the conſtruction is peculiarly adapted; for each branch of the triple bar that carries the three feet, being braced firmly, is made as though each was intended to have a microſcope over it, which is the caſe with only one; and an additional foundation for the ſecond ſtage is made to receive the ſecond microſcope, as we think, unneceſſarily; for if three equidiſtant microſcopes had been uſed inſtead of two oppoſite ones, not only would the errors of diviſion and of eccentricity have been leſſened thereby, but in the reverſed poſition new parts of the circle would have been pointed to, equidiſtant from the former three, ſo that ſix portions of the circle would thus have been employed in meaſuring a reverſed obſervation, which the preſent aſtronomer royal firſt pointed out to be an advantage peculiar to three readings on a horizontal circle. We have been informed, that it is yet intended to have three microſcopes attached to the horizontal circle of this large inſtrument, to be uſed as we have here ſuggeſted. For the advantage of a triple reading, ſee our table for three verniers in the article Circle.

After having given a deſcription of Ramſden's great theodolite, we proceed, in the next place, to explain how its different adjuſtments are made, for putting it into a ſtate proper for uſe, which we cannot do better, than by adopting the directions laid down by general Roy himſelf.

The Adjuſtment of the Axis Level.—The axis of the upper or tranſit teleſcope, being brought over any one of the feet, and the circle being clamped, hang the axis level on the pivots, or anſæ of the teleſcope, and bring the bubble to the two indices; then reverſe the level, that is, turn it end for end, and note the difference. Biſect this difference, one half by the level's adjuſting ſcrew, and the other half by that foot-ſcrew only which is in a line with the axis. This operation being repeated until the difference wholly vaniſhes, the level will be truly adjuſted, that is to ſay, the bubble will reſt between the ſame points in both poſitions.

Adjuſtment of the Elevation Level.— This level being ſuſpended on the rod attached to the outſide of the tranſit teleſcope, ſcrew the erect eye-tube on, to make that end preponderate. Adjuſt the bubble to the indices by the ſteel finger-ſcrew at the tail of the ſemi-circle's clamp, reverſe the level, and note the difference. Then biſect that difference, and correct one half by the finger-ſcrew, and the other half by the proper adjuſting ſcrew under the level, and ſo on, repeatedly, until the difference wholly vaniſhes. The level may then be hung on the two pins that project from the horizontal bar which carries the teleſcope, where, being parallel to the axis level, it will ſhew, when that is removed (as is commonly the caſe when terreſtrial objects only are obſerved) whether the plane of the inſtrument ſuffers any alteration. If this ſhould have happened, the level on the horizontal bar is at all times ſufficient to correct it.

To ſet the vertical Axis perpendicular.—This may be done by either level, but beſt with the axis level, which, being ſuſpended on its pivots, muſt be brought parallel with two of the feet of the inſtrument; and by the ſcrews of theſe two feet, the bubble is to be brought between its indices. The circle being then turned round 180°, if the bubble changes its place, half the difference is to be corrected by one of the feet-ſcrews, and the other half by two capſtan-headed ſcrews, that act againſt each other, under and belonging to one of the Y's, or ſupports, in which the pivots reſt. When the bubble is found to be juſt in theſe two poſitions, turn the circle 90°, which will neceſſarily bring the axis over the third foot of this inſtrument: then correct any error there may be by that foot-ſcrew. In this manner the circle will be made to revolve again and again, without any alteration whatever of the bubble, which ſhews that the vertical axis is then truly perpendicular to the horizon.

To make the Line of Collimation in the Teleſcope at right angles with the tranſverſe Axis.—The pivots reſting in their Y's, direct the teleſcope to ſome diſtant well-defined object, and let the circle be clamped. Then reverſe the axis, that is, turn the teleſcope upſide down. If the interſection of the wires does not coincide with the object in both poſitions, half the difference muſt be corrected by the motion of the circle with the Hooke's joint, and the other half by the motion of the braſs ſlide in the eye-end of the teleſcope, by applying the milled-head key in the ſmall ſocket ſeen in the figure; and ſo repeatedly until the difference wholly diſappears.

To ſet the Rod on which the Elevation Level hangs parallel to the Line of Collimation.—The vertical axis being ſuppoſed to

be

be nearly vertical, hang the level on its rod, and rectify the bubble by the finger-fcrew of the clamp. Set the horizontal wire on the fteel flide, to interfect the centre of the oblique wires, and place the dart or index at zero on the micrometer head. Then obferve fome diftant diftinct object covered by the horizontal wire. Invert the femicircle, that is, turn the azimuth circle 180°, and the telefcope upfide down, fo as to bring the wire upon, or nearly upon, the fame object. Now, if the level be not right, rectify it by the finger-fcrew at the tail of the clamp. If the telefcope does not now accurately cover the fame object, as in the former pofition, bifect the difference by the finger-fcrew of the clamp, and then rectify the bubble by the captan-nuts under one end of the rod. Repeat this operation until the level is right, when the telefcope fees the fame object in both pofitions, and thereby the rod will be brought parallel in altitude to the line of collimation, or axis of vifion.

We have defcribed other and more recent conftructions of large circular inftruments, under the word Circle, that have all the properties of the theodolite which we have here defcribed, and fome of which have the advantage of a large vertical circle, that renders their ufe in aftronomy co-extenfive with their application to geodetical operations, and which therefore we recommend in preference to the bulky inftrument with which the Englifh trigonometrical furveys were performed.

A theodolite of a portable fize, and of Troughton's beft conftruction, is exhibited in *Plate* IX. *fig.* 1. *of Surveying*, fuch as is adapted for land-furveying, or for the furveying of harbours. A, B, C, are the three mahogany legs of a tripod, furmounted with brafs joints which allow the legs to form one entire cylinder, about four feet long. The brafs-work above the three joints has a male fcrew, upon which a focket, under the brafs circular plate D E, fcrews, and bears the inftrument, which is almoft entirely of brafs. This plate D E has four fockets made faft into it, projecting both above and below, as feen in the figure, in which are exhibited three out of the four, with as many fcrews with milled heads, that afcend and defcend as they are turned round, forwards or backwards, by means of their connection with their refpective fockets, that have each a female fcrew: the heads of thofe fcrews prefs againft the inferior face of the upper circular brafs plate F G, to which a ball, ending with a vertical axis, is attached, and is embraced by the upper portion of the focket of plate D E, within the four fcrews. The intention of the ball and focket, and of the two plates with the four intervening fcrews, is to place the axis of the ball in a vertical pofition, and to keep it in that pofition while the parts above are employed in making an obfervation; which office this mechanifm will perform on floping as well on level ground. The axis of the ball, however, is made hollow, to admit of a fmaller folid axis within it, and has alfo two fockets or tubes furrounding it; all which have feparate motions, when the ball is made faft by the preffure of the four fcrews. The inner tube is attached to the graduated circle L M, of eight inches diameter, the chamfered edge of which circle is folid filver, that receives the dividing ftrokes read by the microfcope K: and the clamping piece, feen feparately in *fig.* 2, will fix the faid tube and graduated plate in any given fituation by means of the fcrew F, after which the fcrew G with the milled head, attached to the plate F G, will produce the flow motion when neceffary. The lower telefcope H I turns on two pivots not feen, one of which pivots has its hole in a cock, borne by a fmaller circular plate under the graduated plate, into which the two fcrews H and I enter, and the other pivot enters the outermoft tube; fo that an elevation or depreffion of about 20° can be effected by this telefcope, before its motion is limited by the fuperior and inferior plates. This telefcope has a proper motion in azimuth, independently of the graduated plate, which motion is produced by the thumb-fcrew H, the axis of which has a pinion acting with a concealed wheel made faft to the graduated plate; but when the clamping-fcrew I is made faft, then the telefcope and graduated plate have but one common motion, which is commanded by the tangent-fcrew G of the clamping-piece F G. The ufe of the feparate motion of this telefcope will be explained prefently. Above the graduated plate L M, and in clofe contact with it, the vernier-plate revolves with the folid or innermoft axis, that is faft to it, and its clamp and fcrew of flow motion are hid from the fight by the fuperincumbent frame. This plate, which has four oppofite verniers, each reading to the accuracy of 15″, will move feparately, or may be clamped to the graduated plate, as occafion may require. Upon the plane of this vernier-plate, two fpirit-levels are placed with their proper adjufting-fcrews, one of which is feen at N; but the other, which ftands at right angles to this, is concealed in the drawing by the frame-work. A compafs and magnetic needle are alfo concealed within the frame, but may be conceived to be concentric with the vernier-plate within the faid frame. The tail-piece of the revolving microfcope K fits into a circular groove under the graduated plate L M, and, without having a centre of motion, will flide along the groove into any of the four pofitions, where the verniers require to be read, without interfering with any of the other motions. The inftrument now before us has been fome years in ufe, and is drawn on an enlarged fcale, that all the parts may be the better defcribed; but the moft recent theodolites of this conftruction have only three verniers, in preference to four, by reafon of the property, which this number has, of meafuring at *fix* different and equidiftant points on the graduated limb, when the meafurement of an angle is repeated in a reverfed pofition of the fuperior telefcope; fo that whatever errors of excentricity or of graduation may exift in the horizontal circle, they will be made to vanifh, in a great meafure, by their counteraction in the reverfed pofition of the verniers. Upon the plane of the vernier-plate is fcrewed, by three fcrews, forming an ifofceles triangle, the frame which fupports the pivots of the horizontal axis of the femi-circle P Q, on which the upper telefcope T U is placed. The arm, which bears the microfcope O for reading the altitude or depreffion meafured by the femicircle, has a tube that flides upon the projecting horizontal axis, that allows of fome degrees of motion between the end-bars of the frame; and another arm, that clamps the oppofite end of the faid axis, has a tangent-fcrew of flow motion at R, which finifhes the final contact of the interfecting point of the fpider's lines, within the eye-end of the telefcope, with the object viewed. The vernier for the femi-circle is fcrewed to the frame, after fpanning over the compafs-box; and its exact place may be adjufted by the fcrew of the frame above M, which ftands at the apex of the ifofceles triangle formed by the three fcrews. The level, that is feen under and parallel to the upper telefcope, is attached to it by two pairs of fcrews, one pair of which adjufts for the elevation or depreffion of one end of the tube that holds the bubble, and the other pair adjufts laterally for true parallelifm in this refpect: when the pins T and U are removed, the upper femi-circle of each ring, V and W, will turn back each on a hinge, and allow the telefcope to be taken out of its Y's, for the purpofe of being reverfed in pofition;

pofition; and in both fituations the telefcope is capable of having a circular motion, that carries the attached level round with it an entire revolution. During this revolution, an eye obferving the interfected point of the field of view, as projected on a diftant point, will fee whether or not any adjuftment of the fpider's lines is neceffary, and in what refpect. The aperture of each telefcope is an inch and a half, and the ordinary magnifying powers are from ten to eleven, with nearly fourteen inches of tube; but the upper or meafuring telefcope has a fecond eye-piece of the pofitive kind, which produces a magnifying power of twenty times. There are three fpider's lines in each eye-piece, one horizontal, and two croffing it fo as to include a fmall angle between them; which method of fixing the lines, allows the obferver an opportunity of bifecting the faid fmall angle by a vertical ftaff erected at a diftance, which is better than covering the ftaff with a vertical line, that would difappear upon the plane of fuch ftaff. Before we proceed to explain how this theodolite is ufed in the field, it will be requifite to fhew how the previous adjuftments are to be performed.

When the inftrument is fcrewed to the head of the tripod, the legs muft be opened wide enough to enfure a firm pofition, and the points muft be preffed into the ground equally, exactly over the hole into which a ftation ftaff has been, or is intended to be, inferted; fo that the plumb, fufpended from a pin at the junction of the legs, will fall exactly upon the faid hole; in which fituation the *ftation*, marked ⊙, is faid to be taken.

When the theodolite has been properly fixed in its ftation, the firft adjuftment that will require to be made, is that which regards the *line of collimation*. When all the parts of the inftrument are properly in their places, let the upper telefcope be pointed in a horizontal line, that paffes over two of the four fcrews of plate D E, and note what point in a diftant object is covered by the horizontal fpider's line, near the middle of the field of view; then turn the telefcope half round in the Y's, till the level lies above it, and obferve if the fame point is again cut by the faid line; if not, elevate or lower the horizontal line by the proper fcrews in the eye-piece, releafing one and fcrewing up the other, till the diftance between the two points, correfponding to the two pofitions, is bifected by the horizontal fpider's line: and if, when the telefcope is turned back to its original pofition, with the level under it, the fpider's line covers the point adjufted to, the line of collimation in altitude or depreffion will be correct; but if not, the operation muft be repeated delicately, till the horizontal line covers the fame diftant point in both pofitions. The fame operation will alfo put the vertical line correct, or rather the point of interfection, when there are two oblique lines inftead of a vertical line, as in Troughton's theodolite; and the adjuftments will be known to be complete, when the point of interfection continues on the fame diftant point, while the telefcope is made to revolve round the line of collimation as an axis.

The fecond adjuftment is that which puts the long *level* parallel to the rectified line of collimation. While the telefcope remains parallel to the line that joins two oppofite fcrews of plate D E, adjuft thofe two fcrews by turning them in oppofite directions, until the bubble is obferved to be in the middle of its tube under the telefcope: then, the femi-rings V and W being previoufly turned back, reverfe the ends of the telefcope, and alfo of the level attached to it; and if the bubble will refume its former fituation in the middle of the tube, both the line of collimation and the level will be truly horizontal, and confequently parallel to each other; but if the bubble recedes to one end, bring it back one half by the fcrews that elevate or deprefs one end of the level, and the other half by the fcrews of plate D E. Let this operation be repeated till the bubble will remain in the middle of the tube, after the telefcope has been reverfed into both pofitions. The adjuftment of the level, however, is not yet complete; for though the axes of the two tubes may be equidiftant at both ends of the level, yet may they be inclined fo as to form an horizontal angle with each other at fome diftance, and in this cafe the bubble will run to the higher end of its tube, when the telefcope rotates; there are therefore two lateral fcrews, which adjuft the parallelifm of the two tubes, fo that the bubble will remain in the middle, in every part of a rotation of the telefcope round its line of collimation, which adjuftment muft now be made; and if this lateral adjuftment fhould be found to derange the vertical one before made, it muft be re-adjufted, and the level will then be in a proper ftate for ufe, provided the Y's are alike, and alfo the cylinders that reft in them; but if not, the bubble will not reft in the middle in both of the reverfed pofitions, till they are made fo.

The third adjuftment that we propofe to explain, is that which puts the line of collimation exactly at right angles to the axis of the femi-circle's vertical motion, which has not yet been defcribed, but which is effentially neceffary to be attended to, more particularly by the maker. Let the upper telefcope be directed to fome horizontal well-defined mark, that is included within the angular fpace formed by the two oblique lines, juft where the vertical line would have been, if fuch line had been ufed, while zero of the vernier coincides with zero ($360°$) of the horizontal limb of plate L M; then all the fcrews being faft, except the one which allows the vernier-plate to revolve, turn $180°$ in azimuth, and reverfe the telefcope by taking it out of its Y's, into its original pofition with refpect to the mark; and if this is feen in precifely the fame fituation in the angular fpace, (though not perhaps with refpect to altitude, if the axis of the vernier-plate was not previoufly adjufted,) the line of collimation will be at right angles to the axis of the vertical motion; but fhould this not prove to be the cafe, one of the Y's will require to be altered laterally, but the adjuftment of the level will not be deranged thereby. This alteration of one of the Y's had, however, better be effected by a regular workman, and fhould never be neglected by the maker.

The fourth adjuftment, which might have preceded the third without inconvenience, is that which makes the common *axis* of motion of the vernier-plate and horizontal graduated circle truly *vertical*. This is done partly by the fcrews that fix the ball and focket, inferted into plate D E, and partly by the adjufting-fcrew R of the vertical femicircle. Hitherto the upper telefcope has lain over two of the four fcrews only, and in a horizontal line, with the bubble in the middle. Let it now be turned along with the vernier-plate juft $90°$, till it lies over the other pair of oppofite fcrews, and fee if the bubble be now alfo in the middle, if not, make it fo by thofe fcrews; and if, after this operation, the bubble will remain in the middle during a whole revolution of the vernier-plate, in both the reverfed pofitions of the telefcope, the vertical axis of motion will be truly adjufted.

The fifth adjuftment relates to the levels fixed to the plane of the horizontal graduated circle, which are ufeful in watching the horizontal pofition of the inftrument, while an obfervation is making; thefe, which are at right angles to each other horizontally, muft alfo be feparately at right angles to the vertical axis that carries them round. When this axis has been adjufted, as we have juft explained, by the level of the upper telefcope, the bubbles of both the

the fixed levels muft be brought to the middle of their refpective tubes by their proper fcrews, fo that the bubbles of all the three levels may remain ftationary in every part of the revolution of the vernier-plate, which they will do if its axis is truly vertical.

The fixth adjuftment is that which puts the axis of the femi-circle's motion truly horizontal, or at right angles to the vertical axis of the horizontal circles: this is known to be fo, when the point of interfection of the fpider's lines will cover a long plumb-line, fufpended at a diftance, as the angle of elevation increafes, from the inferior to the fuperior end of the fufpended line; and ftill better by trying if the pole ftar, and its reflected image, feen in a bafon of quick-filver, will be fucceffively covered by the faid point of interfection of the fpider's lines. In fome theodolites, the horizontal axis lies in adjuftable Y's, like thofe of a tranfit-inftrument; but in the inftrument before us, the adjuftment was made permanent by the maker.

Laftly, the adjuftment of the vernier to zero of the femi-circle is made by the fcrew near M, which elevates or depreffes the whole frame in which the telefcope and femi-circle move, and confequently alters the fituation of the level, which has its bubble brought back again by the fcrew R, that gives flow motion to the femi-circle, when the clamp at the fuperior end of the arm is made faft to the axis of motion; but it is not effential that zero of the vernier fhould be at zero of the femi-circle when the level is right, becaufe when an altitude or depreffion is repeated in the reverfed pofitions of the telefcope, the two readings will have equal and oppofite errors; and one half of the difference of thofe readings will be the conftant index error, which may be afcertained with great precifion from an average of a number of reverfed obfervations.

The lower telefcope, being placed as a guard to watch any azimuthal alteration in the pofition of the inftrument, requires no adjuftments, except that for diftinct vifion, after it is brought to its object by its proper vertical and horizontal motions, in which fituation its horizontal motion is clamped by the fcrew I under the horizontal plate.

After the adjuftments are all made, or examined, the theodolite may be ufed for meafuring either horizontal or vertical angles in the following manner. Let us fuppofe two ftaves erected vertically on level ground, one towards the eaft and the other towards the fouth of the ftation where the inftrument ftands in a ftate of adjuftment; and let it be required to afcertain the angle fubtended at the centre of the inftrument by a line joining thefe ftaves: in the firft place, the lozenge of the vernier No. 1. muft be clamped to 360° on the horizontal circle, and the clamping fcrew F muft be releafed, fo that the upper telefcope, vernier-plate, and graduated horizontal circle, may all move in azimuth together, till the ftaff to the eaft is feen in the field of view; this clamp F may then alfo be made faft, and the fcrew of flow motion, G, will bring the ftaff to bifect the angle formed by the fpider's lines, in which fituation zero of the meafuring circle is truly placed: in the next place, bring the lower telefcope, by its proper fcrew H, into precifely the fame fituation, and fix it there by the fixing fcrew I: then, having examined that the upper telefcope has not moved from the ftaff by any accident, releafe the clamping fcrew that held the vernier-plate, and turn the upper telefcope, till the fecond ftaff in the fouth bifects the angle of the fpider's hairs; which may firft be done roughly before clamping, and afterwards more exactly, by the tangent-fcrew of the clamp; then, having examined the pofition of the lower telefcope again, let all the four (or three) readings of the vernier-plate be put down, and take the fourth (or third) part of their amount as the true angle, and fee that both telefcopes have their ftaves bifecting their refpective angular fpaces as at firft, after the meafures are read, and then the average thus afcertained will be nearly the true angle: but to prove the exactnefs of the meafure thus taken, and alfo the accurate conftruction of the inftrument, the telefcope refting in the Y's may now have its pofition reverfed, and then No. 3. of the four verniers muft be clamped to the point 360° of the graduated circle, and the fame operation muft be repeated, when another average of four meafures will be had, and an average of thefe two refults with oppofite index errors, may be confidered as very near the truth; and more particularly if there are only three verniers; for then, as we have ftated above, the readings will be at fix equidiftant points of the circle, and will correct for excentricity as well as inequality of divifions, if any exift. In ordinary meafurements of angles, in fmall furveys of land, this attention to extreme accuracy may be fuperfluous, where the inftrument is well centered and graduated: but where the lines to be meafured are long, the angles cannot be taken with too much care; particularly when any fide of a triangle is to be determined, or checked, by the oppofite angle.

In taking an angle of altitude or of depreffion with the femi-circle of the theodolite in queftion, very great accuracy is not to be expected, feeing there is but one vernier; but by proper attention to the previous adjuftment of the level of the upper telefcope, and by ufing the telefcope in the reverfed pofitions, two meafures will be obtained with oppofite errors, that counteract each other's effects, fo as to render the meafure true to 15″. It is hardly neceffary to add, that the meafure of a vertical angle is taken by the horizontal fpider's line, and that the lower telefcope is of no ufe in taking fuch meafure.

We proceed, laftly, to exemplify the ufe of a common theodolite by an actual furvey of a fmall eftate, fuch as will come within the limits of one of our plates, and by an explanation of the manner in which a *field-book* is kept in practice, and its contents transferred to the formation of a map, agreeably to the moft approved methods of meafuring and plotting an eftate of any affigned dimenfions. For this part of our article we are indebted to Mr. James Wadmore, whofe experience and acknowledged fkill, in his profeffion of land-furveyor, eminently qualify him for communicating the requifite information which we have referved for this place, to render the fubject of *furveying* complete.

" Preparatory to making a furvey with the affiftance of a theodolite, I confider it indifpenfably neceffary, (fays Mr. Wadmore,) that the furveyor fhould feel well affured that his inftrument is in a perfect ftate of adjuftment, and alfo that his chain is correct, otherwife no dependance can be placed upon the moft particular and minute field-book he could make; for if thefe primary things are not attended to, the refult of his labours, on plotting his dimenfions, will turn out to be only fo much time loft, as well as that which he may have beftowed upon his furvey.

" In order to obviate thefe difficulties in fome meafure, I moft earneftly recommend to the young practitioner, that, in choofing his theodolite, as well as his protractor, cafe of inftruments, plotting fcales, &c. on which every thing depends to enable him to complete his furveys with correctnefs, that he be not fparing of a little money in purchafing thofe that are good, and can be relied upon for accuracy; as the being furnifhed with fuch, in the firft inftance, will be the means of enfuring to him that ultimate difpatch in the progrefs of his profeffion, which will lead him to the moft fatisfactory refults.

" As nearly the whole of the profeffion of furveyors have fome material or nice diftinctions in keeping their field-books, arising either from the peculiar methods they have been taught, the instruments they use, the methods the more experienced have been led to adopt; from the more enlarged and enlightened views they may have taken to ascertain the best possible mann r of facilitating the desired object, that of making a correct survey; or from the more improved state of mathematical science; I trust I may be permitted to offer the following method of taking dimensions, the form of keeping a field-book, and the method to be adopted in plotting the same. Having made use of the theodolite, and endeavoured, by practical experience, to avail myself of its most beneficial services, I have no doubt but the specimen I now submit will be most readily comprehended, and the most intricate and difficult surveys accomplished by the same means; *viz.* with the assistance of the theodolite, where other methods, by possibility, may be found partially (if not wholly) to fail.

"On commencing a survey, I have always found it necessary to look out for an intelligent labourer, well acquainted with the locality of the neighbourhood, with whose assistance, and another to carry the theodolite, I usually commence; invariably taking the chain myself after the leader: and here it may not be amiss to remind the young practitioner, that, in following, he must be most particular in directing his chain-leader in a straight line, otherwise the relative bearings of the stations forward, taken by the theodolite, will be rendered incorrect, and the protractor in plotting will not fail to convince him of his error, to his great chagrin and disappointment. I must also remind him of the necessity of keeping his chain-hand, and also directing that of his chain-leader to be kept as near the surface as conveniently can be done, and the chain properly stretched, by which means he will obtain more correct lengths in measuring from station to station, insuring thereby the greater accuracy in his survey (particularly if it be large); as he will very early find, in the course of his practice, that errors, when once begun, will rapidly increase; to prevent which, it will be found very convenient to plot every day's work on his return home, before he commences another, when, if any error is found, it can be rectified on the following day.

"Many other necessary cautions might be given to the young surveyor, which by some may be thought superfluous, but the following I cannot help recommending to his attention; *viz.* that of being exceedingly particular in marking and describing his exterior boundaries, having myself, more than once, seen litigation prevented by the production of correct surveys, where the boundaries of estates in dispute were clearly defined. And let him not be fearful of taking too many offsets, or dimensions; for by trusting observations necessary to his survey to memory, he cannot but fail to omit some; whereas by a copious field-book, not even the slightest bend in a fence, or object of any sort, can possibly be omitted. Above all, let him feel well satisfied of the correctness of his chain; to enable him to do which, he should always have a spare one, on a large survey, to correct by; as it is well known that accidents will happen by the breaking of the same, by loss of rings, &c.; and the offset staff, from being too short, cannot be depended upon for this purpose.

"Having said thus much, I now proceed to shew the method I have practised in surveying with the theodolite; in doing which, I shall first premise that I have always considered it advantageous to take a view of the estate to be surveyed, by doing which, I have been enabled to avail myself of studying the best stations, and to judge how the business may be accomplished with the greatest facility.

"The theodolite which I have been accustomed to use is a very good one, made by Cary, about five inches diameter on the limb, which is finely graduated, with a vernier reading minutes, and with degrees numbered from 1 to 360; it has an achromatic telescope and vertical arc, for the purpose of ascertaining the angles of elevation and depression in hilly surveys, on one side, and the corresponding deductions to be made in the chain lines on the other, and moves by rack-work.

"The method adopted by me, after some years' practice, in keeping a field-book, perhaps may be thought singular, namely, that of commencing at the bottom of the last page of the same, and working upwards therefrom; but it will readily be seen, on reference to the accompanying field-book in *Plate* X. to be the best way, as in proceeding, you meet the objects you have to describe in succession as you advance, and it affords a much greater facility in laying off the offsets from the chain-lines, than in the other way.

"It is well known that the needle is frequently affected, in the first place, by the atmosphere, and liable to get out of order; in the second, the chain being made of iron as well as the arrows, and their not being moved a sufficient distance in general, when the theodolite is planted for taking an angle, it may thereby be very materially affected; in the third, articles of iron or steel may be about the persons attending the survey, which may have the same effect; in the fourth, it may not be found improbable, from the very nature of the ground on which a survey may be carried on, that veins of iron, or metallic ore, may exist under the surface, which will not fail to influence the polarity, to the utter detriment of ascertaining the true bearings; and, lastly, without a vernier, the angle cannot be read with sufficient accuracy.

"Trusting that the foregoing remarks will suffice to convince those, who may be carrying on surveys by the needle alone, of the danger of trusting to this method, as well as to prevent the student in the profession from so doing, I now proceed to shew, that by taking the included angles of the survey upon the limb of the theodolite, and by carefully noting them in the field sketch, (as seen in the plate,) no such danger can possibly exist. The following problem will give sufficient proof of the accuracy of this method of measuring the internal angles of any geometrical figure, whatever may be the number of its sides; *viz.* double the number of sides, and multiply them by 90°; and then, if 360° be subtracted from the product, the remainder will be the sum of all the internal angles; for if we suppose lines drawn from every angle to one common point in or near the middle of the figure, there will be as many triangles as there are sides, and the sum of all the angles at the apex, or point assumed, will be 360°, as will appear when circumscribed by a small circle: therefore, as every triangle contains 180°, the amount of all the triangles will be as many times 180° (or $90^\circ \times 2$) as there are bases, when diminished by 360°. In our example, the survey is bounded by five chain lines, with as many included angles, and therefore the amount of the angles will be $\overline{5 \times 90^\circ \times 2} - 360^\circ$; or $900^\circ - 360^\circ = 540^\circ$, agreeably to the subjoined measurements taken in the field; *viz.*

At ⊙ 2	-	-	85° 14′
⊙ 4	-	-	88 18
⊙ 6	-	-	{ 60 4 + 74 20 }
⊙ 10	-	-	{ 73 36 + 71 16 }
⊙ 1	-	-	87 12
Total sum		-	540 0

Having

"Having ſaid ſo much relative to the means of applying the theodolite moſt beneficially, I ſhall now explain an example of each of the methods I have alluded to; in doing which, I beg it may be underſtood, that although the difficulties I have enumerated may in ſome caſes exiſt, yet it is poſſible a ſurvey of moderate extent may be carried on by the needle with caution ſufficient to obviate them; though I am fully ſatisfied, from experience, that the latter method is the moſt to be relied upon: I ſhall, however, proceed to exemplify both in the order before-mentioned.

"*The Method of uſing the Theodolite in aſcertaining the Bearings by the Needle.*—It will be ſeen by the field-book, that I commence at (ſtation) 1, at the back of the manſion: here, having the theodolite firmly fixed in the ground, by means of the four adjuſting-ſcrews, I ſet it perfectly level, firſt in the direction of the magnetic north, and afterwards at right angles: being thus ſatisfied, I ſet the vernier on the upper limb correctly to 360° on the graduated circle, and looſen the ſcrew that fixes the inſtrument. I then move the graduated circle round until I aſcertain that the needle points to N. in the compaſs-box, and then tighten the ſame ſcrew, which prevents it from moving. Being now ready to take the bearing from ⊙ 1 to ⊙ 2, I direct the teleſcope to ſome object in that direction, keeping as near to the boundary-fence as can well be admitted, in order to reduce the length of the offsets; and having brought the croſs-wires in the teleſcope to bear upon the object, I then look to ſee what part of the limb is cut by the vernier, which I find to be 330° 2′, and in a north-weſt direction. This I note down as in the field-book, and afterwards examine whether it is correct. I then direct the chain-man to move forward towards that object, leaving a mark behind, to return to, and proceed by firſt taking the following offset at 00; that is, at the place of commencement, I find an offset to the right of 86 links to lady Buckinghamſhire's fence, and 40 from thence back to the building, which I note down. I then proceed, and at 212, I meaſure 5 links to the right, to a tree; and going forwards at 274, I meaſure 2 links to the left, to another tree, (which objects I am always induced to mark in the ſurvey, for the purpoſe of embelliſhing the fair map): proceeding onwards at 310, the offset to the corner of lady Buckinghamſhire's ſummer-houſe is 10; at 360, the chain touches the fence, conſequently I mark the offset 0 (nothing); at 738, there is an offset to the left of 23 links, to a tree; and at 917, one to the fence of 13: continuing the line, I ſet up a mark at 950, and write the ſame down in the field-book, thus "950 3 mark left," meaning it for a ſtation, to join to hereafter: I call it ſtation 3, being the next number following the ſtation I am meaſuring towards; and I incloſe it in a circle, to make it more prominent to refer to; and mark the 950, the number of links on the chain-line, alſo in a circle, that I may not err in plotting off the ſituation of the ſame. I then go on, and at 960 come to the outer edge of a ſmall clump of trees; at 975, an offset to the left aſcertains the width of the clump that way to be 50 links, and one to the right of 13 links to the fence; 986 paſſes the outer edge of the clump; at 1031, an offset of 31 links on the left to the canal; at 1100, paſſing cloſe to the edge of the canal, there being no offset on the left, I mark it 0 (nothing); at 1155, I croſs the gravel-walk, the width of which was previouſly noted in the field-book to be 8 links; and at 1180, I halt, and mark the offset to the fence on the right 5 links. Here I again plant my theodolite, as before, exactly over the ſtation-hole; and after ſetting it perfectly level, and having brought the vernier 360° on the circle, and aſcertained that the needle was correctly pointing to N. in the compaſs-box, I tighten the fixing ſcrew, then move the teleſcope round gently to the left, until the croſs-wires cut a conſpicuous object in the direction in which I mean to proceed, and aſcertain that the vernier cuts 235° 7′ in a ſouth-weſt direction in the box. This I note down immediately in the field-book, as there repreſented; and after examining that I had done ſo correctly, I proceeed on to meaſure the line from ⊙ 2 to ⊙ 4, taking the offsets right and left, and making the neceſſary remarks, to enable me to give a correct map and deſcription of the eſtate, and ſo on throughout the ſurvey. I have been particular in the field-book, which I truſt, by the above deſcription, will be conſidered to be a plain and facile way.

"*The Method of uſing the Theodolite in aſcertaining the Angles upon the graduated Circle, without Reference to the Needle.*—On commencing, I plant the theodolite firmly in the ground, and after adjuſting the level perfectly, and ſetting the vernier to 360° on the limb, I move the circle round, until I aſcertain that the needle in the compaſs-box points correctly to N.; then tightening the ſcrew that fixes the inſtrument, as before, I move the teleſcope gently round in the direction of the line to ⊙ 2, in doing which, I find that the vernier cuts upon 330° 2′ N.W. This is noted down, in order to ſhew the bearing of the eſtate upon the map, and which, on being deducted from 360°, leaves an angle to the left of the meridian of 29° 58′, as ſhewn in the example: then leaving a mark at ſtation ⊙ 1, and having proceeded along the line to ſtation ⊙ 2, and taken the offsets, and made the neceſſary remarks in the field-book, as in the former method, on arriving at ⊙ 2, I again plant the theodolite firmly in the ground, and adjuſting it as before, move the teleſcope round until the croſs-wires cut the lower part of the mark left at ⊙ 1: then noting in my field ſketch the number of degrees cut by the vernier upon the limb, without regarding zero, I afterwards move the teleſcope carefully round to the right, and direct it towards 4; and bringing the croſs-wires in the teleſcope to cut the object propoſed to be meaſured to, I look and ſee the number of degrees cut by the vernier on the limb, as before: deducting one from the other, I get the ∠ at ⊙ 2, *viz.* 85° 14′; and after having meaſured the line, on my arriving at ⊙ 4, I proceed exactly in a ſimilar way, by firſt looking back to the laſt ſtation, and then forward to the next, deducting the number of degrees and minutes in one direction from thoſe read in the other, which gives the angle 88° 18′. Following this courſe, I proceed on the ſurvey until all the angles and ſides are completed.

"It is neceſſary, however, before quitting each ſtation, to take particular care in reading off the angles by the vernier, and alſo in writing them down correctly: and in this way of proceeding, the trouble of adjuſting for zero of the vernier to 360° at every ſtation is avoided.

"By plotting, is underſtood the making of a draught of the eſtate from the field-book; and as the inſtruments neceſſary to be uſed by the ſurveyor, in taking the dimenſions in the field, are ſuch, that he may be enabled to aſcertain diſtances and angles correctly; it naturally occurs that correſponding requiſites are neceſſary to make a ground-plot, or draught thereof, for laying down the quantities of the ſeveral angles, and of the diſtances meaſured by the chain upon paper, which are uſually accompliſhed by means of the protractor for the former, and ſcales of equal parts for the latter.

"With reſpect to the protractor, I have hitherto uſed, and recommended the young ſurveyor to uſe, one of eight inches

inches diameter, graduated to half a degree, and numbered from 1 to 360°, to correfpond with my theodolite, with a vernier to mark off the angles to one minute of a degree, and a projecting pointer of two inches and a half beyond the outer radius of it, which in general furveying will be found, with care, to be fufficiently correct. This I had alfo from Mr. Cary of the Strand, together with the fet of ivory plotting-fcales, of about twelve inches long, decimally divided the whole length clofe by the edges, which are chamfered, to lay clofe to the paper, and give additional facility in pricking off the chain-lines, numbered 1, 2, 3, 4, &c. which are chains: thefe again are fubdivided into tenths, every one of which divifions are reckoned 10 links. The numbers are fo placed as to reckon backwards and forwards for convenience; but the method of ufing them is now fo univerfally known, and fo eafily underftood, as to preclude the neceffity of any further defcription. I fhall, therefore, proceed directly to ftate the method ufed by me of transferring the dimenfions of the eftate from the field-book, which is as follows; *viz.*

"Having provided myfelf with a fheet of drawing-paper of fufficient fize, I proceed to draw a line acrofs the fame in pencil, which line is nominally reprefentative of the magnetic meridian, or that which the needle in the compafs box points to. On a convenient fituation on this line, with a fine pointer, I make a mark thus ⊙, and calling that (ftation) ⊙ 1, I lay the protractor with its centre upon the ftation-point, and take care that 360° of the protractor cuts the line on the northern fide, and 180° the fouthern fide of the meridional line: I then turn the moveable pointer to the left, until the centre of the vernier thereof cuts 330° 2′ on the limb of the protractor, when I prefs down the pointer fufficiently hard to make a vifible mark; then taking off the protractor, I draw a fine line with a pencil from ⊙ 1 to the point fo pricked off; and afterwards, with a fcale of chains, mark off the length of the firft chain-line, *viz.* 1180 links: I alfo mark off 950 links for ⊙ 3, where a mark was left to join to. This done, I draw a line parallel to the firft magnetic meridional line through ⊙ 2; when I put the protractor upon the fame, taking care that the centre is exactly upon ⊙ 2, and that 360° and 180° exactly cut the meridional line north and fouth refpectively; which being done, I move the pointer to the left; and when I find the vernier cuts 235° 7′ on the limb, I again prefs down the pointer, and make a fufficient impreffion on the paper, to which I draw a line from ⊙ 2: then taking the fcale, I prick off the length of the chain-line from ⊙ 2 to ⊙ 4, being 1274 links, and alfo 994 links on the fame line from ⊙ 2 to a mark left there, and called in the field-book ⊙ 5. I proceed in this manner until the whole of the bearings and chain-lines are laid down, the laft of which, or the connecting-line, *viz.* from ⊙ 10 to ⊙ 1, on being laid down, and the protractor having pricked off the angle 62° 41′ N.E., I draw the pencil-line, and finding that it clofes upon ⊙ 1, both as to bearing and diftance, I am fatisfied the whole is correct.

"In laying down the angles and chain-lines of the furvey taken by the latter method, without the ufe of the needle, little need be faid; for, having firft drawn the magnetic meridian line, marked N. S., a mark is made on fome convenient part thereof for ⊙ 1; then laying the centre of the protractor thereon, and 360° and 180° thereof cutting the meridian line north and fouth refpectively, I prick off 29° 58′ on the left-hand, or north-weft fide, as being the relative bearing of ⊙ 2 from ⊙ 1; then drawing a fine line, I mark off the length of the chain-line, and lay the centre of the protractor upon ⊙ 2, and mark off the ∠ between ⊙ 1, which I firft look back to, and ⊙ 4, the angle of which, on deducting the quantity of one from that of the other, I find to be 85° 14′: this I prick off, and drawing a line thereto, I mark off the length of the chain-line 1274 links, and fo continue to proceed until the boundary is finifhed. I then proceed to mark off the offsets at their proper points in each chain-line, and connecting the points of fuch offsets, I have the boundary defined of its true fhape and dimenfions, as feen in the map. Laftly, I caft up the dimenfions of the feveral triangles and offsets, confidered as fmall trapezia, the method of doing which has been explained under the word CHAIN, and find the contents as expreffed in the fubjoined table.

Freehold in Hand.

	A.	R.	P.
A. Manfion, out-buildings, fhrubberies, lawn, canal, &c. &c.	8	1	16
B. Garden - - - -	0	3	10
C. Part of Pightle (formerly Woolley's) - - -	0	2	13
D. Adjoining fhrubbery and lawn	0	0	37
E. Freehold part of garden -	0	1	14
F. Stable - - - -	0	0	2
G. Cottage and garden - -	0	1	0
Total freehold -	10	2	11

Copyhold in Hand.

	A.	R.	P.			
H. Sheds and yard - - -	0	0	21			
I. Copyhold part of garden -	0	0	5			
K. Woolley's, three acres -	3	1	21			
L. Late Slatt's - - -	0	1	27			
				3	3	34
Total of eftate -				14	2	5

THEODORE I. pope, in *Biography*, was the fon of a bifhop of the fame name, and born at Jerufalem. He fucceeded John IV. in the papal chair in the year 642. Of this pope no material circumftance occurs, except his controverfy with the church at Conftantinople, concerning the doctrine of the Monothelites; and this controverfy is fo little interefting to our readers, that we fhall pafs it over without any farther notice. Theodore died in the year 649. Befides fome letters relating to the above-mentioned controverfy, a memorial againft Pyrrhus, the depofed patriarch of Conftantinople, and his errors, addreffed to the Eaftern bifhops, is preferved. Bower.

THEODORE II. pope, a native of Rome, fucceeded Romanus about the clofe of the year 898. During his poffeffion of the fee, which he held only for twenty days, he caufed the body of his predeceffor Stephen to be taken out of the Tyber, and interred in the Vatican, and declared all his acts to be legal and valid. Bower.

THEODORE LASCARIS I. a Greek emperor, was fon-in-law of Alexius Angelus, who imprifoned his brother Ifaac and ufurped the throne. Having valiantly but unfuccefsfully defended Conftantinople againft the French and Venetians in the year 1204, he withdrew from the fcene of conteft acrofs the Bofphorus, and put himfelf at the head of a body of troops; but when he found that the confederates were purfuing him, he fought refuge with the Turkifh fultan of Iconium. Being joined by the inhabitants of Bithynia, he took poffeffion of the country from the river Meander to the Euxine fea, and fixed his refidence at Nice, where he was crowned by the patriarch of Conftantinople. When his father-in-law heard of his fuccefs, he went over from Greece,

Greece, where he had remained concealed, to Aſia, and implored the aſſiſtance of the ſultan of Iconium in recovering that part of his dominions of which Theodore had taken poſſeſſion; and having induced him to march with 20,000 men, he laid ſiege to Antioch on the Meander. Theodore, at the head of 2000 men, marched to its relief, and routed the beſiegers. The ſultan renewed the conteſt, and ſingling out Theodore, beat him off his horſe; but the emperor recovering himſelf, unhorſed the ſultan, cut off his head, and placing it on a pole, terrified his enemies, ſo that they all fled. Alexius was carried, as a priſoner, to Nice, where he was confined. Theodore, having made peace with the Turks, formed a treaty with the Latin emperor of Conſtantinople, and ſpent the remaining eighteen years of his reign, in ſecuring his newly-founded empire, which he tranſmitted to his deſcendants; bequeathing it, at his death, to his ſon-in-law, John Ducas Vataces. The Nicæan empire terminated about fifty-ſeven years after its eſtabliſhment by the elevation of its poſſeſſor, Michael Palæologus, to the throne of Conſtantinople. Anc. Un. Hiſt. Gibbon. Gen. Biog.

Theodore, biſhop of Mopſueſtia in Cilicia, was prieſt, and probably native, of Antioch, a diſciple of Diodorus, and an intimate friend of John Chryſoſtom. He was ordained biſhop in 392 or 394, and died in 428 or 429. Sozomen ſays, that he was well ſkilled in the ſacred ſcriptures, and in the liberal ſciences of the rhetoricians and philoſophers: and Theodoret calls him the doctor of the whole church, ſaying that he was biſhop thirty-ſix years, and that he wrote againſt all hereſies, particularly thoſe of Arius, Eunomius, and Apollinarius. He wrote commentaries probably upon all the books of the Old and New Teſtament, though two or three of them are not particularly mentioned: and in theſe commentaries, as Photius ſays, he avoided all allegorical interpretations, and confined himſelf to the hiſtorical and literal ſenſe. He defended this mode in a work concerning allegory and hiſtory againſt Origen. Some have charged him with treating the book of Job, the Canticles, and the Pſalms, with diſreſpect; but theſe are the accuſations of his enemies, and perhaps founded in error, as he actually wrote comments on ſome of theſe books. The book of Job he is ſaid to have repreſented as written in a fabulous manner, though founded on truth; the Canticles he is ſaid to have conſidered as a nuptial poem, and the Pſalms as chiefly referring to the hiſtory of the times. His other works were numerous, and related to the controverſies of his times, and to various theological doctrines. Moſt of Theodore's works are now loſt, but ſome fragments of them may be found, chiefly in Latin, and perhaps not fairly repreſented, in the Acts of the ſecond general council of Conſtantinople, or the fifth general council, held in 553, and alſo in Facundus, and in the Greek Chains. Fabricius aſſures us, that his commentary upon the Twelve Prophets is ſtill extant in manuſcript in the emperor's library at Vienna; and Montfaucon ſpeaks of its being in the library of St. Mark at Venice, as well as in the library at Vienna, and in the Vatican.

Theodore was no leſs celebrated as a preacher, than as a commentator and general writer: under the former character he was admired at Antioch, at Conſtantinople, and all over the Eaſt. Diſtinguiſhed by his learning and liberality, conſidering the time in which he lived, he has been charged with adopting the ſentiments of Neſtorius and Pelagius; and ſome moderns have called him the parent both of Pelagianiſm and Neſtorianiſm; whilſt others allow, that he held the Pelagian principle, but are of opinion that the charge of Neſtorianiſm is not ſo clear. The above-mentioned council devoted a conference to the examination of Theodore's writings; and began with reading a creed attributed to him: upon which the biſhops clamoured for an anathema againſt his books and his perſon, and againſt all who did not join in that anathema. Several biſhops, however, roſe in his defence, and refuſed to concur in the anathema. Some learned moderns have charged him with adopting ſentiments concerning the perſon of Chriſt ſimilar to thoſe of the preſent Unitarians; but of this fact there is no ſatisfactory evidence. Moſheim. Lardner.

Theodore *of Tarſus*, a monk of that city, was ordained biſhop by pope Vitalian, and being ſent into England in the year 668, at the deſire of king Egbert, was appointed to govern the church of Canterbury. In this high ſtation he aſſiduouſly employed himſelf in ſettling the faith and eccleſiaſtical diſcipline of England; and after having ſpent twenty years in the performance of various important and uſeful ſervices, he died in 690, at the age of eighty-eight years. With a view to the reſtoration of the neglected diſcipline of penance, he publiſhed a book of canons, under the title of "Penitential." In this book, ſins were diſtributed into various claſſes, according to their reſpective nature and aggravation; and various kinds of penance were aſſigned to them; forms of conſolation, exhortation, and abſolution were preſcribed, and other ſuch matters reſpecting diſcipline were regulated. This Penitential paſſed from Britain to other countries, and became the model of ſimilar works. It is ſtill extant, in an imperfect ſtate; and an edition of it was publiſhed at Paris by Petit, in 1679, 4to. with notes and diſſertations. Dupin. Moſheim.

Theodore Studita, an eminent eccleſiaſtic of the ninth century, was educated under Plato, head of the monaſtery upon mount Olympus, the government of which was committed to him in the year 795. By avowing his oppoſition to the marriage of Conſtantine Copronymus to one of the maids of honour of his wife, whom he had compelled for this purpoſe to take the religious vows, and by his ſeparation from the communion of the patriarch of Conſtantinople, Theodore incurred baniſhment; but at the death of the emperor he returned, and was appointed abbot of the monaſtery of Studa, in the ſuburbs of Conſtantinople. On account of his diſapprobation of the deciſion of a ſynod which declared the ſecond marriage of Conſtantine lawful, he was baniſhed a ſecond time. After the death of the emperor Nicephorus, in 811, he returned from baniſhment, and was reconciled to the patriarch. For his zealous defence of image-worſhip in the reign of Leo, he was baniſhed a third time, and treated by the emperor with great ſeverity. In 821 the emperor Michael allowed him to return to Conſtantinople, where he indulged a freedom of ſpeech that obliged him to withdraw. He died in the year 826, in his ſixty-ſeventh year. He was a man of learning, and author of many works, which were publiſhed by Sirmond, in Greek and Latin, at the end of his own works. Dupin. Moſheim. Gen. Biog.

THEODORET, a learned prelate of the Greek church, was born at Antioch about the year 386, and placed at the age of ſeven in the monaſtery of St. Euprepius. He was educated under Theodore of Mopſueſtia and John Chryſoſtom, and from his youth addicted himſelf to all the auſterities and exerciſes of a monaſtic life. Upon the death of his parents, he diſtributed his whole property among the poor. In the year 420, or 423, he was conſecrated, againſt his own inclination, biſhop of Cyrus in Syria, in the Euphratenſian province, the inhabitants of which were ignorant and barbarous, and notorious for their ſuperſtitious practices and heretical errors. Theodoret laboured induſtriouſly and ſucceſsfully in enlightening and reforming them. In his own conduct he was an exemplary paſtor; and in every thing

thing that related to his own gratification, he was ſelf-denying and frugal, that he might poſſeſs more ample means of relieving the poor and promoting works of public utility. No biſhop of his time was more active in performing the duties that pertained to his profeſſion and ſtation, or had greater influence in every kind of public buſineſs, particularly of an eccleſiaſtical nature. He was prudent in counſel, pacific in his temper, and always diſpoſed to compromiſe differences that occurred, and to recommend mutual forbearance and union among contending parties. But like other pacificators, he could not eſcape obloquy and harſh treatment. Between him and Cyril, however, an irreconcileable antipathy ſubſiſted, as was generally the caſe between the Eaſtern and Egyptian biſhops; and this antipathy was manifeſted, even after Cyril's death, by his ſucceſſor Dioſcorus, who cauſed Theodoret to be anathematized, and to be depoſed in a general ſynod at Epheſus. In the reign of the emperor Marcian, a general council was aſſembled at Chalcedon; and this council decreed, that Theodoret was worthy to hold his ſee, and he was accordingly reſtored to the church of Cyrus. He died, without any further moleſtation, in the beginning of the reign of the emperor Leo, A.D. 457 or 458.

Theodoret bears a high rank among the ancients as a commentator on the ſcriptures for the purity of his Attic ſtyle, and the clearneſs and good ſenſe of his explanations. He wrote commentaries upon moſt parts of the ſacred ſcriptures. His canon of the Old Teſtament was very little, if at all, different from that of the Jews. With regard to the New Teſtament, it appears that he received only four goſpels, the book of Acts, which he aſcribed to St. Luke, and fourteen epiſtles of the apoſtle Paul, upon which he wrote commentaries; digeſting them according to the order of time in which they were written, and noticing the places from which they were ſent. He has ſeldom quoted the Catholic epiſtles, though they are not wholly overlooked. He ſeems to have received the epiſtle of James, the firſt of Peter, and the firſt of John; but there is no certain proof that he received the book of the Revelation, or the other four Catholic epiſtles: ſo that we may conclude, that his canon of the New Teſtament was the ſame with that of the Syrian Chriſtians. His "Eccleſiaſtical Hiſtory," compriſed in five books, may be conſidered as a ſupplement to thoſe of Socrates and Sozomen; beginning where that of Euſebius ends, at the riſe of Arianiſm in 322 or 323, and terminating in 428. Its ſtyle, according to Photius, is clear and ſublime, but too much abounding in metaphors. It is deficient in chronological preciſion, but contains many valuable documents, and ſome remarkable circumſtances, which other eccleſiaſtical hiſtorians have omitted. His "Philotheus," or treatiſe on the monaſtic life, the genuineneſs of which ſome have queſtioned without ſufficient reaſon, relates the actions and extols the piety of the Eaſtern monks, and abounds with inſtances of the credulity and ſuperſtition of the times. In his work entitled "Of Heretical Fables," in five books, he diſtributes the different hereſies into claſſes, and concludes with a ſtatement of the faith of the Catholic church. "The Cure of the falſe Opinions of the Heathens," in twelve diſcourſes, is a learned and valuable apology for Chriſtianity. Lardner has given copious extracts from this performance, which merit high commendation. His other works conſiſt of letters and tracts on different theological ſubjects. They are all compriſed in the beſt edition of his writings, which is that of Father Sirmond, in four vols. fol. Gr. and Lat. printed at Paris in 1642. To theſe the Jeſuit Garnier added a fifth in 1684. Beauſobre gives the following candid account of Theodoret. "Theodoret is, in my opinion, one of the moſt valuable of the Fathers. He is learned; he reaſons well, eſpecially in his dialogues againſt the Greek hereſies of his times: he is a good literal interpreter of the ſcriptures. I cannot but admire his prudence and moderation, when I conſider that he ended his eccleſiaſtical hiſtory at the time when the Neſtorian diſputes, in which he was ſo deeply intereſted, begun. But, I fear, his zeal againſt heretics impoſed upon him almoſt as much, as his admiration of the heroes of the Aſcetic life, with whom he was charmed. Monaſteries have undoubtedly ſent forth great men into the world; but the diſciples of the monks contracted in their youth a ſuperſtitious diſpoſition which is ſcarcely ever ſhaken off; and the weak ſide of this able man ſeems to have been an exceſſive credulity." Dupin. Moſheim. Lardner. Beauſobre.

THEODORIC I., king of the Viſigoths, was the ſon of Alaric, and in 419 ſucceeded Wallia in the kingdom eſtabliſhed in the ſouth of France. After raiſing the ſiege of Arles, he made peace with the Romans, and was ſubſidized by them in the Spaniſh war; but being deſirous of renewing his attempts in Gaul, he took an opportunity, in 435, of reſuming his hoſtilities againſt them, and laid ſiege to Narbonne; but being compelled to raiſe the ſiege, he was under a neceſſity of directing his attention to the ſafety of Toulouſe, his own capital, which was inveſted by a body of Huns, under the command of count Litorius. In a very ſanguinary engagement with the aſſailants, he totally routed them, and took Litorius priſoner; who was firſt expoſed to the inſults of the populace at Toulouſe, and then thrown into a dungeon, where he died. After this event, Theodoric made peace with the Romans. His rank among the ſovereigns of that period was reſpectable; and both his ſons and daughters were well educated. The latter formed matrimonial connections with the eldeſt ſons of the kings of the Suevi and Vandals, who reigned in Spain and in Africa. But theſe connections proved unfortunate. The huſband of the Suevian princeſs was maſſacred by his brother; and the Vandal princeſs, being ſuſpected of a deſign to poiſon her father-in-law, Genſeric, was doomed to loſe her noſe and ears, and in this mutilated condition was ſent home to her father. Theodoric eagerly ſought an opportunity for revenging this cruel inſult. With this view, the Viſigoths and Romans formed an alliance to reſiſt Attila the Hun, who, inſtigated by Genſeric, invaded Gaul in 441; and Theodoric, at the head of his army, marched to the relief of Orleans, which was beſieged by the Huns. In their way the hoſtile armies met on the plains of Chalons, and a dreadful battle enſued. Theodoric was wounded by a Goth in the ſervice of Attila, and being diſmounted, was trampled to death under the feet of his own cavalry. When his body was found, his funeral rites were performed in the face of the retiring enemy.

THEODORIC, king of the Oſtrogoths, ſurnamed the *Great*, was a deſcendant of the Gothic race of the Amali, and born near Vienna, A.D. 455. At the age of eight years, he was ſent to Conſtantinople as a hoſtage for the fulfilment of the ſubſidiary treaty formed by the emperor Leo with the Goths. Here he had an opportunity of acquiring that character which he ſuſtained among the princes of that age: but his means of inſtruction muſt have been very limited, when it is conſidered that, though he excelled in all military exerciſes, he was ſo badly taught, as not to be able to write his own name. After ten years' reſidence at the court of Leo, he returned to his father, Theodomir, who was then the ſole ruler of the Oſtrogoths, in whoſe ſervice he diſtinguiſhed himſelf by his martial ſpirit. Upon the death of his father, in 475, the crown devolved on Theodoric. The emperor

peror Zeno, wiſhing to ſecure the attachment of the young prince, invited him to his court, and conferred upon him the rank of patrician. After having rendered ſubſtantial ſervice to the emperor, he was reduced to the neceſſity of deſerting the Roman cauſe, and forming an alliance with Theodoric, the ſon of Triarius. Having been altogether neglected by Zeno, he marched in an hoſtile manner into the fertile provinces of Thrace, which he laid waſte with wanton cruelty. In the war that enſued between the empire and the Goths, a variety of events occurred; but, upon the whole, Theodoric became more and more formidable, and by the death of the ſon of Triarius, he was placed at the head of his nation. Such was the power he acquired, that the emperor found it neceſſary to cede to him part of Lower Mœſia and Lower Dacia, and to honour him with the conſulate, which office he diſcharged at Conſtantinople. But conceiving that he was an object of jealouſy, and that his life was in danger, he withdrew into Thrace, and afterwards avowed himſelf an undiſguiſed enemy to the empire. Declining to lay ſiege to Conſtantinople, he determined, as it is ſaid, at the ſuggeſtion of Zeno, to turn his forces againſt Odoacer, who having depoſed Auguſtulus, the laſt Weſtern emperor, had aſſumed the title of king of Italy.

In the year 488, Theodoric, having collected together all the ſwarms of Goths that had ſucceſſively arrived on the frontiers of the empire, ſet out on his Italian expedition; and after encountering many difficulties in his progreſs, deſcended from the Italian alps, and reached the banks of the Sontius near Aquileia. Here, in Auguſt 489, he attacked Odoacer's numerous hoſt, and forced him to retreat as far as the plains of Verona. The reſult of a ſecond engagement was a complete victory on the part of the Goths, which compelled Odoacer and his fugitives to take refuge within the walls of Ravenna, while the conqueror obtained poſſeſſion of the cities of Pavia and Milan. But, as the fortune of war is uncertain, one of Odoacer's commanders, having deſerted to Theodoric, proved treacherous, and induced ſeveral of the officers of the Gothic king to join his former maſter. Odoacer, having alſo gained an acceſſion of other fugitives from the Gothic ſervice, recovered Milan, and obliged Theodoric to immure himſelf in Pavia. Theodoric, however, in this criſis of danger, obtained a powerful reinforcement from Alaric II. king of the Viſigoths, ſettled in Gaul, and attacking Odoacer on the Addna, totally defeated him. Upon this diſaſter, Odoacer fled to Ravenna; where, in the autumn of 492, he was beſieged by Theodoric, who had made himſelf maſter of all Italy, except this city. In the following ſpring, Odoacer was reduced to the neceſſity of propoſing terms of accommodation, with which Theodoric complied; and the conſequence was the ſurrender of Ravenna to the Gothic army. It was ſtipulated between theſe two ſovereigns, that they ſhould govern Italy with equal authority. Such a ſtipulation was not likely to produce any permanent effect; and it was very ſoon violated on the part of Theodoric, by an act which entails on his memory eternal diſhonour. Having invited Odoacer to a banquet, he ſtabbed him, as it is ſaid, with his own hand, under a pretext that his dead rival had formed a ſimilar deſign with regard to himſelf. After this event, Theodoric aſſumed the enſigns of royalty, and cauſed himſelf to be proclaimed by his army "king of Italy." This aſſumption was reluctantly confirmed by Anaſtaſius, the ſucceſſor of Zeno. The manner in which he exerciſed the royal authority, however unwarrantable the means by which he acquired it, placed him far above all the ſovereigns of that age. Sicily having been united to Italy by a voluntary ceſſion, Theodoric ſheathed the ſword of war, and cultivated alliances with neighbouring powers for the ſecurity of his kingdom. He eſtabliſhed peace with the imperial court at Conſtantinople, married a daughter of the king of the Franks, and beſtowed his own two daughters by a concubine, one on the king of the Viſigoths, and the other on the ſon of the king of the Burgondians, and his ſiſter on the king of the Vandals. He ſecured the attachment of his ſoldiers by aſſigning to them a third part of the lands of Italy; and he reſtricted the military profeſſion to his countrymen the Goths, whilſt he encouraged induſtry and the arts of peace among his Italian ſubjects. The Goths held their lands and benefices as a military ſtipend, in conſideration of which they were engaged to march on a ſummons under their provincial officers: and the whole extent of Italy was diſtributed into the quarters of a well-regulated camp. The civil offices were committed to the native Italians; and the form of government, and diſtribution of magiſtracies and of provinces, which had prevailed under the emperors, were continued; ſo that the transfer of power from the Romans to the Goths was ſcarcely perceived. The taxes remained the ſame, and on occaſion of any public calamity, were remitted. He fixed his ordinary reſidence at Ravenna; and when he removed his court, it was to Verona. In the year 500 he viſited Rome, and was treated with reſpect. He iſſued edicts for preventing the demolition of ancient monuments, and appropriated revenues to the repair of public edifices. He decorated other cities of Italy; and it has been ſaid, that, after the flouriſhing times of Rome, this country was never ſo proſperous and happy. He provided a fleet for guarding the country againſt maritime attacks: and thoſe wars by land in which he engaged, were terminated without diſturbing the peace and hazarding the ſecurity of Italy. By his prudent conduct, and military achievements, he maintained the balance of power in the Weſt, till it was overthrown by the ambition of Clovis, who defeated and put to death Alaric, the Viſigoth king: neverthleſs he ſaved the remainder of his family and people, and checked the career of the Franks.

Theodoric, with regard to his religious ſentiments and profeſſion, was an Arian; but he manifeſted no ardent zeal for making proſelytes to his own opinions, nor did he moleſt others in their profeſſion. Such was the government of Theodoric, that it reflected a ſhort-lived luſtre on the Gothic name, and eſtabliſhed an era of public happineſs which it is pleaſing to contemplate. His ſecretary Caſſiodorus, who was himſelf a man of erudition, and who cauſed his untaught maſter to patronize literature, has recorded in his twelve books of Epiſtles, the events at which we have here glanced. It muſt not be diſguiſed, however, that the reign of Theodoric was not exempt from the evils inſeparable from a deſpotiſm upheld by military power. The yoke of a foreigner was galling; and more eſpecially that of a foreigner who was conſidered as a barbarian and a heretic. The tolerant principles of Theodoric did not accord with the orthodox zeal of his ſubjects; and his puniſhment of ſome outrages committed againſt the Jews, who were ſettled in the cities of Italy, was repreſented as a perſecution of the church. An intolerant edict againſt the Arians, iſſued by the Byzantine court, provoked the king to retaliate on the Catholics under his juriſdiction; and ſhortly before his death an order was prepared to forbid the exerciſe of the Catholic worſhip in Italy after a certain day. In the mean time, jealouſies of the ſenatorial party in Rome, and of their connection with the imperial court, took poſſeſſion of the mind of Theodoric, who was made ſuſpicious by age; and an inſtance of tyranny inflicted upon two exemplary characters, ſays one of his biographers, is unhappily the laſt act recorded of a ſovereign diſtinguiſhed for the mildneſs and equity of his adminiſtration. For an account

count of the circumftances to which we here refer, fee the article BOETHIUS. Theodoric, at the clofe of life, reflected without doubt with remorfe and felf-reproach on his conduct towards Boethius and Symmachus. It is faid that, whilft he was fitting at table, he perceived the gaping head of a large fifh, which was ferved up before him, and at the fight exclaimed, that he beheld the angry and menacing countenance of Symmachus. Then probably did that fever commence, which being attended with a dyfentery, terminated his life within three days, Auguft, A.D. 526, in the 72d year of his age, and the 34th of his reign, dating its commencement with the death of Odoacer. His dominions were divided by his teftament between his two grandfons, Amalaric and Athamaric, affigning the Rhone as their boundary; and the guardianfhip of the latter, who was king of Italy, was entrufted with his daughter Amalafuntha. He erected to his memory a fplendid monument in a confpicuous fituation above the city of Ravenna. Anc. Un. Hift. Gibbon's Rom. Hift. Gen. Biog.

THEODORIC, or THIERRY *of Niem*, an ecclefiaftiral writer, was born at Paderborn, and ferved Gregory XI. Urban VII. and feveral fucceeding popes, as under-fecretary. The time in which he lived may be inferred from his "Hiftory of the Schifm of the Popes," written between the years 1400 and 1410; in which work he fays that he had lived near thirty years at the court of Rome, and that being then worn down with age, it was his intention to withdraw from public bufinefs. This work, compofed in Latin, comprifed, in three books, the interval from the death of Gregory XI. to the election of Alexander V. Another work relating to the fame fubject was entitled "Nemus Unionis." In 1412 he publifhed a "Treatife on the Rights and Privileges of the Emperors in the Inveftiture of Bifhops and Abbots." He alfo wrote a journal of the proceedings of the council of Conftance, ending in June 1416, in which year he died. From bis own obfervation, he exhibits a fhocking picture of the court of Rome, and the clergy of that period. Dupin. Moreri.

THEODOROPOLIS, in *Ancient Geography*, a town of Mœfia, founded by the emperor Juftinian, who called it after the name of his wife.

THEODORUS, in *Biography*, a Cyrenaic philofopher, was a difciple of Anicerris, and for fpeaking freely concerning the gods, he was ftigmatifed with the appellation of Atheift, and banifhed from Cyrene. At Athens, where he fought refuge, he was protected by Demetrius Phalereus, and gained accefs to the court of Ptolemy Lagis. Afterwards, upon his return to Athens, he is faid to have fuffered death by hemlock; but it has been difputed whether atheifm, or contempt of the Grecian fuperftitions, was the caufe of his death. He is joined by Sextus Empiricus with Eumerus, and others, who maintained, that thofe who were efteemed gods, were men who had poffeffed great power on earth; and Clemens Alexandrinus expreffes his furprife, that Eumerus, Nicanor, Diagoras, Theodorus, and others, who had lived virtuoufly, fhould be pronounced atheifts from their oppofition to gentile polytheifm. Brucker by Enfield, vol. i.

THEODORUS, an Athenian flute-maker, the father of Ifocrates the orator. How great the demand was at this time for flutes at Athens, may be conceived from a circumftance mentioned by Plutarch in his life of the orator. His father, fays he, acquired wealth fufficient by his bufinefs, not only to educate his children in a liberal manner, but alfo to bear one of the heavieft public burdens to which an Athenian citizen was liable; that of furnifhing a choir or chorus for his tribe, or ward, at feftivals and religious ceremonies. See ISMENIAS.

THEODOSIA, in *Ancient Geography*, a town fituated on the S.E. coaft of the Tauric Cherfonefus. See CAFFA.—Alfo, a town of Afia, in the Greater Armenia.

THEODOSIOPOLIS, a town of Afia, in the Greater Armenia, on the frontiers of Perfarmenia.—Alfo, a town of Afia, in Mefopotamia, upon the river Chaborras.

THEODOSIUS I. furnamed the *Great*, in *Biography*, a Roman emperor, was the fon of an eminent general of the fame name, who was executed for treafon at Carthage in the year 376. He was born about the year 346, as fome fay, at Caucha, in Gallicia, or according to others, at Italica, near Seville. His education was liberal, and he learned the art of war by ferving under his father, both in Britain and in Africa. The death of his father put a temporary ftop to his military career, and he retired to Spain for the improvement of his mind and the culture of his paternal eftate. He was in this fituation when the emperor Valens was killed in battle, and the empire was left in great danger. Thus circumftanced, the other emperor, Gratian, fent for Theodofius, and in January, A.D. 379, declared him his partner in the empire. To him was committed the care of Thrace and the eaftern provinces, threatened at this time by numerous bands of barbarians. The refult of his campaign was, that fome of the Goths fubmitted to his authority, and the reft evacuated Thrace. Having been baptized in the fecond year of his reign, in confequence of a dangerous difeafe, he became a zealous advocate for the orthodoxy of the church, and was much applauded by the Catholics. He iffued an edict, enjoining the fubjects of his government to adhere ftedfaftly to the religion taught by St. Peter, which afferts the fole deity of the Father, the Son, and the Holy Ghoft, under an equal majefty and a pious Trinity; and to affume the title of Catholic Chriftians, all other perfons who did not embrace this doctrine being branded as infamous heretics, and their churches being declared conventicles. It alfo announces, that befides the condemnation of divine juftice, thefe perfons muft expect the fevere penalties which his authority, guided by heavenly wifdom, fhall think proper to inflict upon them. This declaration, fo incompatible with the genuine fpirit of the religion and the profeffion in which he had been initiated, was followed by correfpondent deeds. When he entered Conftantinople, after the campaign of 380, his firft act was to remove the patriarch Demophilus, and to offer him the alternative of fubfcribing the Nicene creed, or refigning all his dignities to the orthodox party. The patriarch nobly chofe the latter alternative, and withdrew into exile. Soon after he iffued a decree for expelling from their churches all the clergy who refufed to accept the Nicene creed, and he appointed a military force for the execution of it. By thefe meafures the emperor fucceeded, without tumult or bloodfhed, in eftablifhing, through the provinces of the Eaft, the Catholic faith upon the ruins of Arianifm. So affiduous was the emperor in this exercife of his zeal, that he is faid to have promulgated, in fifteen years, at leaft fifteen penal edicts againft heretics, fome of which denounced capital punifhment: and it is moreover afferted, that the office of inquifitors of the faith was firft inftituted in his reign. It has been affirmed, however, that he chiefly meant intimidation, and that the threatened penalties were feldom carried into effect.

The military ardour of this emperor feems to have been exercifed with greater prudence than his religious zeal. In order to liberate the provinces from the barbarians, he contrived to weaken their ftrength by fomenting divifions among their chiefs, and he conciliated others by his generofity: fo that about four years after the death of Valens, he figned a capitulation with the whole nation of the Goths;

 and

and as their own country was occupied by the Huns, he permitted them to fettle in Thrace and Mœfia, with exemptions from tribute and taxes. With Maximus, who had revolted againft the emperor Gratian, Theodofius entered into a treaty, by which it was ftipulated that the ufurper fhould retain the countries beyond the Alps, and that Valentinian, the brother of Gratian, fhould be fecured in the poffeffion of the remaining part of the Weftern empire. Maximus was acknowledged by Theodofius as his colleague in the Roman empire, and Arcadius, the fon of Theodofius, though only eight years of age, was admitted to a fhare in the purple. At this time Theodofius iffued fome fevere edicts againft heathen idolatry: and he paffed a law againft the marriage of coufins-german, which condemned both parties to be burnt alive, and which declared their children illegitimate. In 386, the Gruthungi, or Oftrogoths, in their attempt to pafs the Danube, were defeated with great flaughter. In 387, Maximus invaded Italy; and Valentinian, deferted by his fubjects, took refuge in the dominions of Theodofius, who married Galla, the fifter of that emperor. In this year the people of Antioch, having without effect remonftrated againft the proceedings of Theodofius, both as to religious matters and the impofition of an extraordinary tax, broke out into an infurrection; threatened the life of the governor; and, difappointed in this effort of their rage, demolifhed the ftatues of the emperor and his family. Theodofius, in the firft tranfports of refentment, upon receiving intelligence of their conduct, ordered the city to be laid in afhes, and all the inhabitants, without difcrimination of age or fex, to be put to the fword. Upon cooler reflection he revoked this fanguinary order, and contented himfelf with degrading Antioch from the rank of a city, and depriving the inhabitants of their cuftomary largefs of bread. Thofe who upon inquiry were found guilty, were condemned to death. But by the interceffion of the bifhop of Antioch, and other holy men, the culprits were pardoned, and the city reftored to all its privileges.

Theodofius, on a vifit to Valentinian at Theffalonica, prevailed on him to renounce Arianifm, and to adopt the Nicene faith; and determined to take up arms in his caufe againft Maximus. After feveral fuccefsful encounters with the ufurper, he was defpoiled of all his imperial ornaments, and dragged like a malefactor into the prefence of Theodofius, who caufed him to be beheaded. His fon Victor was alfo put to death; and the civil war terminated A.D. 388. In confequence of thefe events, Theodofius became the fole head of the Roman world; and he invefted the fon of Valentinian, now a minor, with the fovereignty of the provinces wrefted from him by Maximus, and alfo with the poffeffion of Gaul, Spain, and Britain, of which Gratian had been deprived by this ufurper. Theodofius remained three years in Italy, giving vigour to the law, correcting abufes, and adopting a variety of meafures for totally eradicating paganifm.

In 390, a fedition took place at Theffalonica, which was followed by many difaftrous confequences, and by the exercife of a degree of cruelty, which the emperor was obliged to expiate by a public penance. About this time he took advantage of a religious tumult at Alexandria for demolifhing the famous temple of Serapis, and of all the heathen temples throughout Egypt. He alfo iffued a final edict againft the ancient worfhip.

In 392, the emperor Valentinian was murdered by his general Arbogaftes, and Eugenius was placed on the throne. When this meafure was announced to Theodofius, he prepared for war; and having obtained a favourable anfwer from a holy hermit in Thebais, whom he confulted, iffued new edicts againft herefy, and abrogated the ancient penalties of treafon againft thofe who uttered feditious words againft the prince; he openly took up arms, A.D. 394, and forcing the paffage of the Alps, defcended into Italy. He met Eugenius and Arbogaftes with a great force, and after feveral conflicts, Eugenius was totally defeated, and put to death by the foldiers. His children, however, and thofe of Arbogaftes, who put an end to his own life after the battle, were treated humanely, and removed to their paternal poffeffions.

After this fuccefs, Theodofius fent for his fon Honorius to Milan, and declared him emperor of the Weft; Arcadius having been already put in poffeffion of the Eaftern empire. In January 395, Theodofius terminated his life by a dropfical diforder at Milan, at the age of fifty years, and at the clofe of the fixteenth year of his reign.

The name of Theodofius has been celebrated, but his character has been very differently appreciated. Politically confidered, whilft it exhibits many virtues and excellencies, it is chargeable with many errors and obliquities. Connected with the ecclefiaftical interefts of the period in which he lived, his conduct on various occafions was altogether indefenfible; and we may add, that how much foever he has been extolled by partial hiftorians, his bigotry and intolerance were very reprehenfible. Anc. Un. Hift. Gibbon's Rom. Hift. Gen. Biog.

Theodosius II., fon of the emperor Arcadius, and grandfon of the preceding Theodofius, was born in the year 401; and being of feeble faculties, was educated merely to fuftain the pageantry of a throne; or, as Mr. Gibbon expreffes it, "to reprefent with grace and dignity the external figure of a Roman emperor." His only active purfuit was hunting; and his more private exercifes were painting and carving, making elegant tranfcripts of religious books, and finging pfalms. He alfo fafted, gave credit to miracles and doctrines prefented to his faith, and paid due homage to all the dead and living faints of the Catholic church. His difpofition was gentle and kind; in his conduct he was free from vices, and yet, as his biographer fays, "he did not rife to virtues." Upon his father's death, A.D. 408, he fucceeded him in the Eaftern empire. To the influence of his fifter Pulcheria, fuperior in talents to himfelf, he implicitly fubmitted; and in 414 he raifed her to the rank of Augufta, and entrufted with her the reins of government. By her felection and recommendation he married, A.D. 421, the celebrated Athanais, aftewards named Eudocia. The war which broke out in 422, in confequence of a perfecution excited by the Magi againft the Chriftians, terminated in a truce of a hundred years, and a divifion of the kingdom of Armenia between the contending powers. On the death of the emperor Honorius, in 423, the throne of the Weft was ufurped by John; but Theodofius reftored it to its proper heir, Valentinian III., who afterwards married his daughter. When Attila made an irruption into the Roman empire, he was oppofed by Theodofius, whofe armies were repeatedly defeated: and Theodofius himfelf was compelled in 446 to make a humiliating treaty with the king of the Huns. By one of his favourites, the eunuch Chryfaphius, he was induced to free himfelf from Attila by affaffination, but the treachery was defeated, and he received a juft and fevere reprimand from the barbarian. Soon after this mortification, he died in confequence of a fall from his horfe, A.D. 450, in the fiftieth year of his age. What his grandfather had done towards the fubverfion of the Pagan religion in the Eaft, Theodofius completed. He always approved himfelf a dutiful fon of the church, but he is faid to have favoured the Eutychian herefy. His principal merit was the publication, A.D. 438, of the "Theodofian

"Theodosian Code." Anc. Un. Hist. Gibbon. Gen. Biog.

Theodosius, an eminent mathematician, was born at Tripoli, and flourished about the second or third century. On the doctrine of the Sphere he wrote three books, containing a considerable number of propositions, demonstrated in the pure geometrical manner of the ancients, and establishing the geometrical principles of astronomy. Ptolemy and succeeding writers availed themselves of these books, which were translated by the Arabians from the original Greek into their own language. They were afterwards translated from the Arabic into Latin, and printed at Venice; but the defects of the Arabic version were supplied in a more complete edition, published in Greek and Latin at Paris in 1556, 4to. by John Pena, regius professor of astronomy. On this work there have been many comments; but the edition of Theodosius's Spherics now generally used is that of Dr. Barrow, published in 1675, illustrated and demonstrated in a new and concise method. Theodosius was also the author of two other treatises, one "De Habitationibus," and the other "De Diebus et Noctibus." Greek copies of these were preserved in the king's library at Paris, and a Latin edition was published by Peter Dasypodius in 1572. Montucla Hist. des Mathem.

THEODULF, a learned prelate of a Gothic family, was a native of Cisalpine Gaul; and being invited to France by Charlemagne, he was promoted to the bishopric of Orleans, A.D. 794, and the abbacy of the monastery of Fleury. He continued in favour at court till the death of Charlemagne, and for some time under the emperor Lewis. But being implicated in the conspiracy of Bernard, king of Italy, against Lewis, he was committed to prison at Angers, where he remained in confinement for three years. After his liberation, and before his return to his diocese, he died at Angers, about the year 821. Theodulf was the friend of Alcuin, and deserves honourable mention as one of the votaries and promoters of literature in a dark age. He was the author of several works, published by Father Sirmond, in 1646, 8vo. One of his hymns, beginning

"Gloria, laus et honor tibi sit, Rex Christe Redemptor,"

has been adopted by the Catholic church for the service on Palm-Sunday. Dupin. Gen. Biog.

THEOGAMIA, Θεογαμια, in *Antiquity*, a Sicilian festival, in honour of Proserpine, which seems to have been instituted in memory of her marriage with Pluto.

THEOGNIS, in *Biography*, a Greek poet, was a native of Megara, in Attica, and flourished about the year B.C. 546. He has been denominated "Gnomologus," or the writer of sentences: and we have extant a work written by him, without order, consisting of moral maxims or precepts, simply expressed and destitute of poetical ornaments, versified probably for assisting the memory. Athenæus reckons him among the advocates for licentious pleasures; and Suidas refers to a work of his composition, entitled "Exhortations" or "Admontions," which contained various impurities. In the verses that now remain, nothing of this kind appears; so that if the charge be true, they must have undergone castigation. "The Sentences of Theognis" have been often printed by themselves, and with the works of other minor Greek poets. Among the best editions are those of Camerarius and Sylburgius. Vossii Poet. Græc. Gen. Biog.

THEOGONY, formed from Θεος, *God*, and γονη, *geniture*, *seed*, *offspring*, that branch of the heathen theology which taught the genealogy of their gods.

Hesiod gives us the ancient theogony, in a poem under that title. This poem treats of the origin and descent of the gods; or rather, under the allegorical dress of theogony, represents the formation of the world, and the history of eminent men. The plan of this work is intricate and confused. (See Hesiod.) The writer seems to have made use of several different theogonies, and to have blended them together with little regard to consistency. He also frequently adds, for the sake of poetical ornament, fictions of his own, which have no relation to the history and origin of the world. Aristophanes, in his comedy of "The Birds," has introduced a description of the formation of the world, which was borrowed, without doubt, from the ancient theogonies; but it deserves little attention. All the theogonies make an eternal chaos the origin of all things. Thus Ovid. Met. l. 1. v. 5.

"Ante mare, et terras, et quod tegit omnia cœlum,
Unus erat toto naturæ vultus in orbe,
Quem dixere Chaos, rudis indigestaque moles,
Nec quicquam nisi pondus iners, congestaque eodem
Non bene juncturam discordia semina rerum."

"Ere sea and earth, and heav'ns high canopy
Were form'd, great Nature's face was one;
A lifeless, rude, and undigested mass
Of jarring seeds in one wild chaos lay." See Chaos.

Whether, besides this chaotic mass, the ancient theogonies suppose an infinite, active, intelligent principle, who from the first matter formed the universe, is a question that has occasioned much debate. It is evident, upon the most cursory review of the ancient theogonies, that God, the great Creator of all things, is not expressly introduced; but it is doubted, whether the writers meant to exclude him from their system, or indirectly to suppose his existence, and the exertion of his power in giving motion to matter. In the solution of this question, it ought to be considered, whether the theogonists supposed God to have existed before chaos, and to have created it from nothing; or thought him to have sprung from a pre-existing chaos; or conceived God and matter to have been two co-existing and independent principles: whether they imagined God to have been the soul of nature, informing the eternal mass of matter; or were of opinion, that God sent forth matter as an emanation from himself; if the latter, whether this emanation was the effect of necessity, or of a free act of volition; whether it was from all eternity, or began at some limited period of duration. It must also be inquired, whether, according to the doctrine of the theogonies, a divine mind interposed in the formation of the world, or the effect was produced by the necessary laws of motion acting upon homogeneous and heterogeneous portions of matter. If the latter of these was their doctrine, it is to be farther considered, whether it necessarily follows, that they denied the existence of God, or whether it may not be supposed, that, neglecting all consideration of deity, they only endeavoured to explain the physical formation of the world, by laws originally impressed upon matter by the author of nature.

The theogonies certainly do not suppose God to have been prior in the order of time to matter: they speak of chaos as eternal, and seem to have been wholly unacquainted with the doctrine of creation from nothing. But, on the other hand, they never suppose the Deity to be derived from chaos: for Jupiter is not to be confounded with the Supreme Being, but merely to be considered as the chief of those inferior divinities, who, according to the Grecian theology, were either portions of the divinity, inhabiting and animating parts of nature, or departed spirits of heroes and illus-

illustrious men, exalted to divine honours. There is no sufficient proof, that Orpheus, Hesiod, or any other Grecian cosmogonist, supposed two independent principles in nature: for, though they ascribe the origin of evil to Chaos, they might, nevertheless, be of opinion, as we shall find to have been the case with many later philosophers, that matter is derived from God.

There were, perhaps, different opinions among the ancient cosmogonists, concerning the first cause of nature. Some might, possibly, ascribe the origin of all things to a generating force, destitute of thought, which they conceived to be inherent in matter, without looking to any higher principle. But it is probable, that the general opinion among them was that which had prevailed among the Egyptians and in the East, and was communicated by tradition to the Greeks, that matter, or chaos, existed eternally with God, and that by the divine energy of emanation, material forms were sent forth from him, and the visible world arose into existence. This principle being admitted, the whole system of the ancient theogonies appears consistent, and a satisfactory explanation may be given of most of the Grecian fables. Upon this supposition, the sum of the doctrine of the theogonies, divested of allegory and poetry, will be as follows:

The first matter, containing the seeds of all future being, existed from eternity with God. At length, the divine energy upon matter produced a motion among its parts, by which those of the same kind were brought together, and those of a different kind were separated, and by which, according to certain wise laws, the various forms of the material world were produced. The same energy of emanation gave existence to animals and men, and to gods who inhabit the heavenly bodies, and various other parts of nature. Among men, those who possess a larger portion of the divine nature than others, are hereby impelled to great and beneficent actions, and afford illustrious proofs of their divine original, on account of which, they are after death raised to a place among the gods, and become objects of religious worship.

Upon the basis of these notions, it is easy to conceive, that the whole mythological system, and all the religious rites and mysteries of the Greeks, might be founded. Brucker's Hist. Phil. by Enf. vol. i.

Among the most ancient writers, Dr. Burnet observes, that theogony and cosmogony signified the same thing. (See Cosmogony.) In effect, the generation of the gods of the ancient Persians, fire, water, and earth, is apparently no other than that of the primary elements.

THEOLOGICAL Criticism. See Criticism.

Theological *Prebend*. See Prebend.

THEOLOGIUM, formed from Θεος, and λογος *speech*, or *discourse*, in the ancient theatre, was a place, or little stage, above that on which the ordinary actors appeared. See Theater.

The theologium was the place where their gods appeared. It also included the machines on which they descended, and from which they spoke.

There was a theologium required for the representation of the Ajax of Sophocles, the Hippolitus of Euripides, &c. Scal. Poet. lib. i. cap. 1.

THEOLOGY, compounded of Θεος, *God*, and λογος, *discourse*, *divinity*; a science, which instructs us in the knowledge of God, and divine things; or which has God, and the things he has revealed, for its object.

Theology is a science which shews us what we are to believe of God, and the manner in which he would be served. It is divided into two branches, the *natural*, and the *revealed* or *supernatural*.

Theology, *Natural*, is the knowledge we have of God from his works, by the light of nature, and reason.

Theology, *Supernatural*, is that which we learn from revelation. See Religion.

Theology, *Positive*, is the knowledge of the holy Scriptures, and of the signification of them, conformably to the opinions of the fathers and councils; without the assistance of any argumentation. But some will have it, that this ought to be called *expositive*, rather than *positive*.

Theology, *Moral*, is that which teaches us the divine laws relating to our manners and actions; in contradistinction to

Theology, *Speculative*, which explains and establishes the doctrines of religion, as objects of faith.

Theology, *Scholastic*, or *School*, is that which proceeds by reasoning; or that derives the knowledge of several divine things from certain established principles of faith. See Scholastic *Divinity*.

The ancients, according to Varro, Scævola, and Plutarch, had a three-fold theology; the first μυθικη, *mythic*, *fabulous*, which flourished among the poets; and was chiefly employed in the theogony, or genealogy, and history of the gods: to whom all things were attributed, which men, and even the vilest of men, could be guilty of. Nevertheless, the popular religion and worship were in a great measure founded upon that mythology, which run through the whole of their religion, and was of great authority with the people. Many unexceptionable proofs of this are produced by Dr. Leland, in his "Advantage and Necessity of the Christian Revelation," vol. i. part i. chap. 6.

The second, πολιτικη, *political*, or *civil*, was that established by the Roman laws, and chiefly embraced by the politicians, priests, and people, as most suitable and expedient to the safety, quiet, and prosperity of the state. This, though not the true, was the vulgar theology, and constituted the public and authorized religion. It was that which the philosophers themselves, whatever private opinions or speculations they might entertain, or dispute of in their schools, universally conformed to in their own practice, and also exhorted others to do so. Varro informs us, that this theology particularly determined what gods they were publicly to worship, what sacred rites they were to observe, and what sacrifices to offer.

Although even the vulgar among the Pagans seem, in general, to have had some notion of one supreme God, yet their theology was properly polytheism; and the providence they acknowledged, was the providence, not of one God, but of many gods. The learned Dr. Cudworth, who seems inclined to put the most favourable construction upon the Pagan theology, acknowledges, that the civil theology, as well as the poetical, had not only many fantastic gods in it, but an appearance of a plurality of independent deities; several being made supreme in their respective territories or functions. Aristotle (Oper. tom. i. p. 1246. edit. Paris, 1629) intimates, that according to the laws of cities and countries, that is, in the civil or political theology, there seems to be no one absolutely powerful or all-perfect being, but a plurality of gods, one of whom is supposed to be more powerful in one respect, and another in another respect. Besides, the public religion was made up partly of the physical, and partly of the poetical theology. Those poetical fables, which Varro censures as unworthy of the gods, and as ascribing to them actions which none but the vilest of men

men would be guilty of, were not only permitted to be acted on the public theatres, and heard with pleafure by the people, but they were regarded as things pleafing to the gods themfelves, by which they were propitiated and rendered favourable; and accordingly they were taken into the public religion. Games were celebrated, and plays were founded upon them; and the public games and plays were on certain occafions confidered as acts of religion, encouraged by their deities, and celebrated in honour of them. It is alfo juftly obferved, that the images, forms, habits, and ornaments of their gods, their different fexes and ages, and the facred feftivals inftituted to their honour, had all of them a reference to the fables of the poets and mythologifts, and were founded upon them; fo that the civil and the fabulous theology might each of them be called civil, and each fabulous. Hence proceeded many abfurd and ridiculous, and many immoral and inhuman rites, which were made ufe of in the worfhip of their gods, and which were either prefcribed by the laws, or were eftablifhed cuftoms, countenanced by the magiftrates, and which had obtained the force of laws, and may, therefore, be regarded as belonging to the public religion of the Pagans. See Leland's Chriftian Revelation, ubi fupra, cap. 7.

The third, φυσικη, *natural*, was chiefly cultivated by the philofophers, as moft agreeable to nature and reafon. The phyfical or natural theology acknowledged one only fupreme God; to which it added dæmons or fpirits, as mediators between him and man.

Dr. Leland has urged a variety of confiderations to prove that, notwithftanding the high encomiums which have been beftowed upon the philofophical theology of the Pagans, it was of little ufe in leading the people into a right knowledge of God and religion, and for reclaiming them from their idolatry and polytheifm. To this purpofe he obferves, that, if the philofophers had been right in their own notions of religion, they could have but little influence on the people, for want of a proper authority to enforce their inftructions. The affected obfcurity of the Pagan philofophers was another caufe which rendered them unfit to inftruct the people in religion: to which it may be added, that fome of them ufed their utmoft efforts to deftroy all certainty and evidence, and to unfettle men's minds as to the belief of the fundamental principles of all religion; and even the beft and greateft of them acknowledged the darknefs and uncertainty they were under, efpecially in divine matters. The philofophers themfelves were alfo, for the moft part, very wrong in their own notions of the Divinity; they very much corrupted the ancient tradition relating to the one true God and the creation of the world, and endeavoured to account for the formation of all things without the interpofition of a Deity. And the opinions of thofe philofophers who were of a nobler kind, were chargeable with great defects: they generally expreffed themfelves in the polytheiftic ftrain, and inftead of leading the people to the one true God, they fpoke of a plurality of gods, even in their moft ferious difcourfes; afcribing thofe works to the gods, and directing thofe duties to be rendered to them, which properly belong to the fupreme. The philofophers likewife referred the people for inftruction in divine matters to the oracles, which were managed by the priefts: this was particularly the cafe with Socrates, Plato, and the Stoics.

It was an univerfal maxim among them, that it was the duty of every wife and good man to conform to the religion of his country; and they not only worfhipped the gods of their refpective countries according to the eftablifhed rites, and exhorted others to do fo; but when they took upon themfelves the character of legiflators, and drew up plans of laws, and of the beft forms of government, polytheifm, and not the worfhip of the one true God, was the religion they propofed to eftablifh. Moreover, they employed their learning and abilities to defend and juftify the popular idolatry and polytheifm. The worfhip of inferior deities was recommended by them, under pretence that it tended to the honour of the fupreme. Some of the moft eminent of them endeavoured to colour over the moft abfurd part of the Pagan poetical theology, by allegorizing the moft indecent fables. They apologized for the Egyptian animal worfhip, which the generality of the vulgar Pagans in other nations ridiculed. They vindicated idolatry and image-worfhip, as neceffary to keep the people from falling into irreligion and atheifm; and befides, fome of the more refined philofophers were againft any external worfhip of the fupreme God.

Many of the philofophers, and of the learned and polite Pagans, denied a providence. Of thofe who profeffed to acknowledge it, fome confined it to heaven and heavenly things; others fuppofed it to extend to the earth and to mankind, yet fo as only to exercife a general care and fuperintendency, but not to extend to individuals; others, again, fuppofed all things, the leaft as well as the greateft, to be under the care of providence; but they afcribed this not to the fupreme God, who, they thought, was above concerning himfelf with fuch things as thefe, and committed the care of them wholly to inferior deities. See the illuftration and proof of thefe feveral allegations by Dr. Leland, ubi fupra, cap. 10—17.

THEOLOGY, *Bachelor in*. See BACHELOR.

THEOLOGY, *Myftic*. See MYSTIC.

THEOLOGY, *Polemical*. See POLEMICAL.

THEOMANTIA, Θεομαντεια, in *Antiquity*, divination by the fuppofed infpiration of fome deity. For a particular account of which, fee Potter, Archæol. Græc. lib. ii. cap. 12. tom. i. p. 298.

THEON, in *Biography*, a mathematician of the Platonic fchool, was a native of Smyrna, and flourifhed under the emperors Trajan and Adrian. His mathematical treatifes are faid to have been written for the purpofe of elucidating the philofophy of Plato; and his difcourfes, treating of geometry, arithmetic, mufic, aftronomy, and the harmony of the univerfe, may ferve to throw fome light upon the Pythagorean fyftem. Part only of his work, "De iis quæ in Mathematicis ad Platonis lectionem utilia funt," or that which relates to arithmetic and mufic, has been publifhed. The remainder, which pertained to aftronomy and geometry, is faid to have been preferved in the Ambrofian library at Milan. Ptolemy refers to his aftronomical obfervations. Brucker by Enfield. Montucla Hift. des Math.

Another mathematician of the fame name belonged to the Alexandrian fchool, and flourifhed about A.D. 365. He was the father of the learned but unfortunate Hypatia. His works are various: among thefe we may mention his "Recenfio Elementorum Euclidis," publifhed by Commandeni; his "Fafti Græci priores, et Fragmenti Commentarii in Ptolomæi Canonem expeditum, five Recenfio fuccincta Chronologica regem a Nabonaffaro ad Antoninum Pium:" "Scholia in Aratum," faid to be interpolated; and "Commentarius in Magnum Ptolomæi Syntaxin," which is incomplete. Montucla.

THEOPASCHITES, THEOPASCHITÆ, in *Ecclefiaftical Hiftory*, a fect of heretics in the fifth century, the followers of Petrus Fullenfis, or Peter the Fuller, who ufurped the fee of Antioch; and after having been feveral times

times depofed, and condemned, on account of his oppofition to the council of Chalcedon, was at laft fixed in it, A.D. 482, by the authority of the emperor Zeno, and the favour of Acacius, bifhop of Conftantinople; whence they are alfo fometimes denominated *Fulloniani.*

Their diftinguifhing doctrine was, that the whole Trinity fuffered in the paffion of Jefus Chrift.

This herefy was embraced by the Eutychian monks of Scythia, or, according to La Croze, of Egypt; who ufing their utmoft efforts to make it obtain, raifed great diforders towards the beginning of the following century.

It was condemned, at its firft rife, in the councils of Rome and Conftantinople, held in 483. It was again revived in the ninth century, and again condemned in a council at Rome, held in 862, under pope Nicolas I.

F. le Quien, in his notes on Damafcenus, fays, that the fame error had been taught before Fullenfis, by Apollinarius, whofe difciples were the firft that were called *Theopatitæ*, or *Theopafchitæ*.

THEOPHANES, in *Biography*, a Greek hiftorian and poet, was of noble extraction, and born at Mitylene, in the ifland of Lefbos. About the commencement of the Mithridatic war, he is fuppofed to have come to Rome in his youth; and when Pompey was appointed to the chief command againft Mithridates, he took Theophanes with him to record his exploits, procuring for him the citizenfhip of Rome, and adding to his name thofe of "Cornelius Balbus." It is alfo fuppofed that it was principally on his account, that on his return he vifited Lefbos, and reftored to the Mitylenians the privileges of which they had been deprived by the Roman fenate. At Rome he connected himfelf with the moft diftinguifhed citizens, and he was deputed to Alexandria for the confirmation of treaties of alliance with Ptolemy Auletes. After the defeat of Pompey at Pharfalia, he accompanied him in his flight; and by his advice this commander declined to take refuge with Juba, king of Mauritania, and failed to Egypt, where he met his fate. Theophanes afterwards joined the party of Cæfar. The moft important of his writings was a "Hiftory of the Wars of the Romans, in different Countries under the Command of Pompey." Of this work there remain only five fragments, quoted by Strabo, Plutarch, and Stobæus; but Plutarch is fuppofed to have made great ufe of his authority in his life of Pompey, though he does not fpeak favourably of his character. He fays, "Theophanes afferts, that in the private papers of Mithridates taken at Cænon, there was found a memorial, compofed by Rutilius (Rufus), exhorting Mithridates to maffacre all the Romans in Afia. But it is generally believed, that this was a malicious fiction of Theophanes to blacken Rutilius, whom probably he hated, becaufe he was a perfect contraft to himfelf; or it might be invented by Pompey, whofe father was reprefented by Rutilius in his hiftory, as one of the worft of men." Rutilius was a man of fuch excellent character, as to be incapable of the crime with which he is charged; and without doubt fuch a falfification of hiftory, for bafe and private purpofes, is fufficient to deftroy all efteem for the writer.

Of the poetry of Theophanes, which was celebrated in his time, there remain only two epigrams, inferted in the Anthologia. Voffius. Moreri. Gen. Biog.

Theophanes, George, a Conftantinopolitan Greek, of a rich and noble family, married young, but from fuperftitious motives lived in a ftate of celibacy. He afterwards became a monk. At the general council held in 787, he was prefent, and was treated with refpect. When Nicephorus, patriarch of Conftantinople, was exiled by the emperor Leo the Armenian, Theophanes paid him extraordinary honours, and was himfelf banifhed to the ifle of Samothrace, where he died in 818. His chronicle, commencing where that of Syncellus terminated, was extended to the commencement of the reign of Michael Curopalata. This was printed at Paris, with the Latin verfion and notes of F. Goar, under the care of Combefis, in 1665, fol. It is valuable for its facts, but difplays the credulity and weak judgment of a fuperftitious mind. Voffius. Gen. Biog.

Theophanes Prokopovitch (the fon of Procopius), archbifhop of Novogorod, a learned Ruffian hiftorian, and mifcellaneous writer, was born at Kiof in the year 1681, and having ftudied under his uncle Theophanes at the Bratfkoi convent in Kiof, travelled into Italy in his eighteenth year. In three years he completed his courfe of preparatory ftudy, and then returned to his native town, where he read lectures on the Latin and Slavonian art of poetry, at the feminary where he had received his education. Having affumed the monaftic habit, with the name of Theophanes, he was appointed, at the age of twenty-five, prefect of the feminary, and profeffor of philofophy. By a Latin oration and a fermon, delivered before czar Peter the Great, he attracted his notice, and was chofen his companion in his war againft the Turks. In 1711 he was made abbot of the monaftery of Bratfkoi, rector of its feminary, and profeffor of divinity. By cenfuring the ignorance of the clergy, and endeavouring to excite a tafte for literature, he recommended himfelf to the czar as a proper coadjutor in his plans for reforming the church. He was accordingly placed at the head of the fynod, in the new ecclefiaftical eftablifhment, the plan of which he had prepared, and in 1718 he was promoted to the bifhopric of Plefkof. In 1720 he was created archbifhop of the fame diocefe, and foon after the acceffion of Catharine I. he was advanced to the rank of archbifhop of Novogorod, and metropolitan of all Ruffia; and in this ftation he died in 1730. This prelate was in a high degree the patron of literature, and engaged in a variety of ways, by his perfonal munificence and labour, in promoting it. His works were fermons and theological tracts, a treatife on rhetoric, and rules for compofing Latin and Slavonian poetry, Latin verfes, and more efpecially the Life of Peter the Great, terminating with his battle of Pultawa. Le Clerc afferts that he endeavoured to perfuade Peter to introduce the Proteftant religion into Ruffia, and that this event would have taken place, if it had not been prevented by Peter's death. The prelate's education at Rome, and the high rank he fuftained in his own church, render this anecdote improbable. Coxe's Travels in Ruffia.

THEOPHANIA, Θεοφανια, formed of Θεος, *God*, and φαινω, *I appear*, in *Antiquity*, a feftival obferved by the Delphians upon the day on which Apollo firft manifefted himfelf to them.

THEOPHANY, in *Church Hiftory*, is fometimes ufed in the fame fenfe with *Epiphany*.

THEOPHILA, in *Ancient Geography*, a town of India, on this fide of the Ganges.

THEOPHILE, named *Viaud*, in *Biography*, a French poet, was born at Clerac, in the Agenois, about the year 1590. By education he was a Calvinift, but in his conduct and writings he was licentious. In 1619 he withdrew to England, and unfuccefsfully attempted to introduce himfelf to king James. After his return he abjured Calvinifm, but his manners remained the fame. On account of a work entitled "Le Parnaffe Satirique," publifhed in 1622, and attributed to him, in which were feveral pieces offenfive to decency

decency and religion, he was profecuted. Being arrefted in Picardy, he was brought to Paris, and thrown into the dungeon that had been occupied by Ravaillac, where he remained for two years. He was at length releafed by the parliament, and fentenced to banifhment. The duke of Montmorency took him under his protection, and at his hotel he died in 1626. His writings are partly profe and partly verfe. His verfes are negligent and irregular, but they difplay genius and imagination. His works confift of odes, elegies, fonnets, &c.; tragedies; a dramatic dialogue on the immortality of the foul, entitled "Socrate Mourant;" apologies for himfelf, and letters. A collection of his poems and apologies was printed at Rouen in 1627, 8vo.; and his friend Mairet printed his French and Latin letters at Paris, in 1642, with his portrait prefixed. Nouv. Dict. Hift. Gen. Biog.

THEOPHILUS, emperor of Conftantinople, was the fon of Michael the Stammerer, and fucceeded his father in 829. He began his reign with the exercife of juftice in its utmoft rigour, heedlefs not only of the claims of gratitude, but of the feelings of humanity. His father had been indebted for his life and crown to the murderers of his predeceffor Leo IV. Theophilus, under a pretence of paying the debts of his father to thofe who had contributed to his elevation, fummoned them, among other confiderable perfons in the empire, to his prefence; and defiring the former to withdraw into an adjoining apartment, that their claims might be examined, he ordered them, on their own confeffion, to be capitally punifhed. In another cafe, a poor woman threw herfelf at his feet, complaining of the injury which fhe had fuftained from a powerful neighbour (the emprefs's brother), who had raifed the wall of his palace fo high, that her humble dwelling was deprived of light and air. Theophilus gave her the palace, with the ground upon which it ftood, and caufed the offender to be ftripped and fcourged in the public fquare of the city. The effect of his fingular rigour, though altogether indefenfible, was, that a fcrutiny of feventeen days coud not difcover a fingle crime or abufe in the court or city.

During this emperor's whole reign he was engaged in wars with the Saracens, the detail of which we fhall omit. Theophilus died in 842, after a reign of more than twelve years. His zeal againft the worfhip of images has caufed his character to be treated with great feverity, and his faults to be exaggerated. Although he was inexcufably rigorous in his adminiftration, he was a reformer of manners. Of his fuperiority to avarice, and high ideas of the dignity of the regal character, the following anecdote furnifhes an inftance. Seeing one day a merchant-fhip, which was deeply laden, entering the harbour of Conftantinople, he afked the mariners to whom it belonged: they replied, "to the emprefs." "God has made me (he exclaimed) a prince, and is my wife a merchant? If princes trade, their fubjects muft ftarve:" he then ordered the veffel to be fet on fire with all her cargo. Anc. Un. Hift. Gibbon's Rom. Hift.

THEOPHILUS, bifhop of Antioch, was ordained to this fee in 168 or 170, and governed it for twelve or thirteen years. In his zeal againft herefy, he wrote againft Marcion and againft Hermogenes, and he compofed other tracts, fome of which are preferved. We have alfo extant three books againft Autolycus, a learned heathen, in which he difplays great learning, and from which it appears that he had once been a heathen. Thefe works afford, as it is faid, the earlieft example of the ufe of the term "Trinity," applied by the author to the three perfons of the Godhead. Some have fuppofed that he approaches to Arianifm, when he afferts that the Word may exift in *place*, and that he was begotten in *time*. Theophilus's books to Autolycus were publifhed in Latin by Conrad Gefner at Zurich, in 1546, and were inferted in the "Orthodoxographia," Bafil, 1555. They were annexed in Gr. and Lat. to the Supplement of the "Bibliotheca Patrum," 1624; and were printed at the end of St. Juftin's Works by Morellus. Lardner.

THEOPHILUS, bifhop or patriarch of Alexandria, of violent and turbulent difpofition, was ordained to that fee in 385. He gained reputation and influence by his zeal in deftroying the temple of Serapis, and other pagan temples of Egypt in 389. (See THEODOSIUS.) He was, under the guife of a friend, a fecret enemy to John Chryfoftom, after he had been ordained to the fee of Conftantinople in 397. Without much real regard for religion, he was the zealous champion of orthodoxy; and having called a council at Alexandria in 399, he prevailed with the affembly to condemn all the followers of Origen, and with the affiftance of a band of foldiers, compelled them to abandon their refidence on mount Nitria. The poor monks, failing to find a fecure refuge, repaired to Conftantinople, to lay their complaints before the emperor. The humanity of John Chryfoftom irritated Theophilus, who was employed by the emprefs Eudoxia, for profecuting her revenge againft Chryfoftom. Accordingly, he arrived at Conftantinople at the head of a body of Egyptian failors and dependent bifhops, avowing that he was going to depofe John. His purpofe was executed at the fynod of Chalcedon in 403. (See CHRYSOSTOM.) His malignity purfued this venerable prelate in his exile, by a libel filled with abufive expreffions, which was tranflated at his requeft by Jerom, from Greek into Latin. Theophilus died at Alexandria in 412. The moft confiderable of his works was a large treatife againft Origen. Some of his epiftles are found among thofe of Jerom, and fome of his canonical epiftles are contained in the collections of Zonaras and Balfamon. Of this prelate Dupin has given the following character: "There is nothing in the writings of Theophilus that can turn to his commendation; they are obfcure, unintelligible, and full of falfe and impertinent reafonings and reflections. He was a good politician, but a bad author. He knew better how to manage a court intrigue, than to refolve a queftion in divinity The only rule for his opinions was his intereft or his ambition. He was ready to embrace any opinion or party that fuited his purpofe, without examining whether it was juft or reafonable." Dupin. Lardner. Gibbon.

THEOPHRASTA, in *Botany*, fo called in memory of the father of all natural hiftorians, Theophraftus, native of Erefos in the ifle of Lefbos; whence Plumier named this genus ERESIA. (See that article.) Linnæus on fuch occafions always preferred the appellation by which the perfon intended to be celebrated was beft known.—Linn. Gen. 84. Schreb. 110. Willd. Sp. Pl. v. 1. 824. Mart. Mill. Dict. v. 4. Swartz Obf. 58. Juff. 150. Lamarck Illuftr. t. 119. (Erefia; Plum. Gen. 8. t. 25.)—Clafs and order, *Pentandria Monogynia*. Nat. Ord. *Apocineis affine*, Juff.

Gen. Ch. *Cal.* Perianth inferior, fmall, of one leaf, in five deep, obtufe, permanent fegments. *Cor.* of one petal, bell-fhaped, fpreading, cut more than half way down into five rounded equal fegments. "Nectary five fmall, ovate, obtufe glands, thickeft at the point, lying upon the fegments of the corolla." *Jacq.*—*Stam.* Filaments five, thread-fhaped, united below to an internal membrane, fo as to form a fhort, thick, furrowed column, crowned with a five-rayed horizontal difk; anthers five, of two feparate oblong lobes,

lobes, attached to the fides of each fegment of the difk, underneath. *Pift.* Germen fuperior, ovate; ftyle cylindrical, the length of the ftamens, erect; ftigma in five obtufe lobes. *Peric.* Berry globofe, coated, of one cell. *Seeds* feveral, roundifh, fomewhat compreffed.

Eff. Ch. Corolla bell-fhaped, in five obtufe fpreading fegments, with a nectary of five incumbent glands. Berry coated, of one cell, with feveral feeds.

1. Th. *americana.* Large-fruited Theophrafta. Linn. Sp. Pl. 212. Willd. n. 1. Swartz Obf. 59. (Erefia foliis aquifolii longiffimis; Plum. Ic. 119. t. 126.)—Leaves obtufe. Clufters terminal, erect.—Native of barren dry bufhy fhady places in Hifpaniola. *Swartz.* *Stem* fhrubby, one or two feet high, erect, fimple, leafy in its upper half, round, thorny, clothed with rufty down. *Leaves* oppofite or whorled, on very fhort ftalks, erect, oblong-lanceolate, obtufe, tapering at the bafe, very rigid, ferrated; their ferratures alternately inflexed and reflexed, each tipped with a fmall, prominent, rigid, black-pointed fpine. *Footftalks* thick, rufous, clofely preffed to the ftem. *Clufters* fhort, terminal, from the midft of the terminal leaves, many-flowered, partial *flower-ftalks* numerous, fhort, curved, fingle-flowered. *Fruit* two inches in diameter, yellow, brittle, often for the moft part hollow or empty, its *receptacle* juicy at the bottom. *Seeds* black, hard, attached by their bafe. *Swartz.* We prefume the *clufters*, from Plumier's figure, to be erect, and the *feeds* numerous.

2. Th. *longifolia.* Small-fruited Theophrafta. Jacq. Coll. v. 4. 136. Hort. Schoenbr. v. 1. 62. t. 116. Willd. n. 2.—Leaves acute. Clufters lateral, drooping.—Native of the Caraccas. It flowered in the ftove at Schoenbrun from Auguft till November. The *ftem* is faid to be twenty feet high, but always unbranched. *Leaves* imperfectly whorled, near two feet long, reclining, with fpinous ferratures, fmooth, of a dark fhining green, with numerous tranfverfe veins from the mid-rib. *Clufters* numerous, fcattered between the whorls of leaves, ftalked, drooping, a fpan long, of numerous little orange-coloured or fcarlet *flowers.* *Fruit* in its native country about an inch in diameter, with about four *feeds;* but in the garden it did not attain more than half that fize, and perfected only one. If there be no miftake in Dr. Swartz's defcription of the firft fpecies, there is a prodigious difference between the ftature of the two. Yet we have a fufpicion, that they may poffibly not be more than varieties of each other. As to the generic character, Plumier's reprefentation of the parts of the *flower* is too imperfect for us to fuppofe him more right than the faithful Jacquin. Swartz's defcription may eafily be reconciled with the *Hortus Schoenbrunenfis.*

THEOPHRASTICS, a name given to the followers of Paracelfus, from his name Theophraftus.

THEOPHRASTUS, in *Biography*, a diftinguifhed Greek philofopher, the favourite pupil of Ariftotle, and nominated by him as his fucceffor in the fchool of the Lyceum, was born at Erefium, a maritime town of Lefbos, in the fecond year of the 102d Olympiad, B.C. 371. His firft rudiments of education were received under Alcippus in his own country, and being fent by his father to Athens, he became firft a difciple of Plato and afterwards of Ariftotle. Such were his natural talents, that, under fuch tuition, he made great progrefs both in philofophy and eloquence: fo that his original name, Tyrtamus, was changed, either by his mafter or his followers, into Theophraftus. After he undertook the Peripatetic fchool in the year B.C. 323, his reputation was fo diftinguifhed, that the number of his fcholars was about 2000. His erudition and engaging manners recommended him to the notice of Caffander and Ptolemy: by the former he was invited to Macedon, and by the latter to Egypt; and among the Athenians he was fo great a favourite, that, when he was accufed by one of his enemies of teaching impious doctrines, the accufer could not without difficulty efcape the punifhment which he endeavoured to bring upon Theophraftus. Theophraftus is no lefs highly celebrated for his generofity and public fpirit, than for his induftry, learning, and eloquence. He is faid to have twice faved his country from the oppreffion of tyrants; and he contributed liberally towards defraying the expence of public meetings held by philofophers for learned and ingenious converfation. In the public fchools he appeared, after the manner of Ariftotle, in an elegant drefs, and was very attentive to the graces of elocution: and hence it is faid he obtained the appellation of Theophraftus, the divine fpeaker. Towards the clofe of life, which was prolonged to the age of 85 years, he became very infirm, and was conveyed to the fchool in a carriage. In contemplating the fhortnefs of life, he expreffed great regret; complaining that long life was granted to ftags and crows, to whom it was of little value, but was denied to man, who, if it were of longer duration, might attain the fummit of fcience: whereas now, as foon as he arrives within fight of it, he is taken away. His laft advice to his difciples was, that fince it is the lot of man to die as foon as he begins to live, they fhould take greater pains to enjoy life as it paffes, than to acquire pofthumous fame. A large body of Athenians attended his funeral.

The works of Theophraftus comprehended a variety of fubjects, and were numerous. His doctrine differed in fome refpects from that of his mafter Ariftotle. He taught that the predicaments, or categories, were as numerous as the motions and changes to which beings are liable; and that among motions, or changes, are to be reckoned defires, appetites, judgments and thoughts. He maintained, that all things are not produced from contraries; but fome from contraries, fome from fimilar caufes, and fome from fimple energy; that motion is not to be diftinguifhed from action; and that there is one divine principle of all things, by which all things fubfift. By this divine principle, it is thought that Theophraftus meant the Firft Mover, without whom other things could not be moved, and therefore could not fubfift. Of his moral maxims, the following are the moft worthy of notice. "Refpect yourfelf, and you will never have reafon to be afhamed before others. Love is the paffion of an indolent mind. Blufhing is the complexion of virtue. Time is the moft precious expenditure."

Few of his works, of which Diogenes Laertius enumerates more than 200, have reached our time: of thefe, the moft famous is entitled "Characters," defcribing different moral claffes of men, fuch as the flatterer, the impudent, the difcontented, the garrulous, the fuperftitious, &c.; fo diftinguifhed and defcribed, as to fhew great knowledge of mankind. Of his other works on natural hiftory, the principal are his "Hiftory of Plants," in nine books, which Haller has particularly recommended to the notice of botanical ftudents; "On the Caufes of Plants," relating chiefly to the natural and artificial means of bringing them to maturity; to agriculture and horticulture; to the taftes and odours of vegetables; "On Stones;" "On Winds;" "On Fire;" "On Honey;" "On the Signs of Fair Weather, and of Tempefts and Rain;" "On Animals which change their Colour;" "On Animals which are born fuddenly;" "On Fifh which live out of Water." Theophraftus ranks amongft the moft diftinguifhed of the ancients for comprehenfive genius and diligent enquiry into nature. The laft edition of the whole extant works of Theophraftus is that of of Dan. Heinſius, Greek and Latin, fol. Lugd. Bat. 1613. Of his hiſtory of plants, the moſt complete is that of Budæus, Greek and Latin, fol. Amſt. 1644. Among the moſt eſteemed editions of his "Characters," which are numerous, we may reckon thoſe of Iſ. Caſaubon, of Needham, with the notes of Duport, Cantab. 1712, and of I. Fr. Fiſcher, Coburg. 1763. Diog. Laert. Brucker by Enfield. Haller Bib. Bot.

THEOPHYLACT, named *Simocatta*, a Greek hiſtorian, a native of Greece, but of Egyptian origin, flouriſhed about A.D. 612. His hiſtory of the reign of the emperor Maurice is comprehended in eight books, and terminates with the maſſacre of this prince and his children by Phocas. Caſaubon reckons Simocatta one of the beſt of the later Greek hiſtorians. The work juſt mentioned was printed at the Louvre, in 1647, fol. and forms a part of the Byzantine hiſtorians. An edition of his "Epiſtles, Moral, Rural, and Amatory," was given by Aldus. His "Phyſical Problems" were publiſhed firſt by Vulcanius at Leyden, and afterwards by Andrew Schottus. His "Hiſtory of the Habitable World" is cited by Euſtathius, in his Commentary on the Periegeſis of Dionyſius. Gen. Biog.

THEOPHYLACT, archbiſhop of Acris, the capital of Bulgaria, was a native of Conſtantinople, and flouriſhed under the emperors Michael Ducas, Nicephorus Botoniates, and Alexis Comnenus. After his elevation to the archbiſhopric of Acris, by the perſuaſion of the wife of Ducas, he diligently laboured in propagating the Chriſtian faith, and compoſed ſeveral works, which give him rank among the principal eccleſiaſtical writers of his age. The time of his death is not known; but he was living in 1071. His "Commentaries on the Four Goſpels, the Acts of the Apoſtles, and the Epiſtles of St. Paul," which are his chief work, are for the moſt part abridged from Chryſoſtom and others. He alſo wrote "Commentaries on the Minor Prophets." Several editions of his Commentaries have been publiſhed in Greek and Latin, and alſo in Latin only. "Seventy-five Epiſtles" of this author were publiſhed by Meurſius, in Greek, in 1617, and a Latin tranſlation in 1622. Some other tracts have been attributed to this author. Dupin ſays, that the Commentaries of Theophylact are very uſeful for the literal explanation of the Scriptures: and Lardner obſerves, that he quotes no forged writings or apocryphal books of the New Teſtament, many of which he excludes by his obſervation on John, i. 31—34. that Chriſt wrought no miracle in his infancy, or before the time of his public miniſtry. Dupin. Lardner.

THEOPNEUSTÆ, Θεοπνευσται, formed of Θεος, *God*, and πνεω, *I breathe*, an epithet given to enthuſiaſtical diviners.

THEOPOLIS, in *Ancient Geography*, a town of Gallia Narbonnenſis, belonging to the Aventici, N.E. of Forum Novum.

THEOPROPRIA, Θεοπροπια, formed of Θεος, *God*, and πρεπω, *I excel*, a deſignation given to oracles. See ORACLE.

THEOPSIA, Θεοπτια, formed of Θεος, *God*, and οπτομαι, *I ſee*, in *Mythology*, denoted the appearance of gods. Cicero, Plutarch, Arnobius, and Chryſoſtom, mention appearances of this kind.

THEORBO, THIORBA, or TIORBA, a muſical inſtrument, made in form of a large lute; except that it has two necks, or juga, the ſecond and longer of which ſuſtains the four laſt rows of chords, which are to give the deepeſt ſounds. See LUTE.

The word is formed from the French *teorbe*, or *theorbe*, and that from the Italian *tiorbe*, which ſignifies the ſame, and which ſome will have to be the name of the inventor.

The theorbo is an inſtrument which for many years ſucceeded to the lute, in the playing of thorough baſſes; it is ſaid by ſome to have been invented in France, by the ſieur Hotteman, and thence introduced into Italy, &c.

The only difference between the theorbo and the lute is, that the former has eight baſs or thick ſtrings twice as long as thoſe of the lute; which exceſs of length renders their ſound ſo exceedingly ſoft, and keeps it up ſo long a time, that it is no wonder many prefer it to the harpſichord itſelf. At leaſt it has this advantage over it, that it is eaſily removed from place to place, &c.

All its ſtrings are uſually ſingle; though there are ſome who double the baſs-ſtrings with a little octave, or the ſmall ſtrings with an uniſon; in which caſe, bearing more reſemblance to the lute than the common theorbo, the Italians call it the *arcileuto*, or arch-lute.

THEOREM, in the *Mathematical Method*, a propoſition which terminates in theory, and which conſiders the properties of things already made or done.

Or, a theorem is a ſpeculative propoſition, deduced from ſeveral definitions compared together. Thus, if a triangle be compared with a parallelogram ſtanding on the ſame baſe, and of the ſame altitude, and partly from their immediate definitions, and partly from other of their properties already determined, it is inferred, that the parallelogram is double the triangle: that propoſition is the theorem.

Theorem ſtands contradiſtinguiſhed from *problem*.

There are two things to be chiefly regarded in every theorem, *viz.* the propoſition and the demonſtration: in the firſt is expreſſed what agrees to ſome certain thing under certain conditions, and what does not.

In the latter, the reaſons are laid down, by which the underſtanding comes to conceive, that it does or does not agree to them.

Theorems are of various kinds: as,

THEOREM, *Univerſal*, is that which extends to any quantity without reſtriction, univerſally. As this, that the rectangle of the ſum and difference of any two quantities is equal to the difference of their ſquares.

THEOREM, *Particular*, is that which extends only to a particular quantity. As this: in an equilateral right-lined triangle, each of the angles is ſixty degrees.

THEOREM, *Negative*, is that which expreſſes the impoſſibility of any aſſertion. As, that the ſum of two biquadrate numbers cannot make a ſquare number.

THEOREM, *Local*, is that which relates to a ſurface. As, that triangles of the ſame baſe and altitude are equal.

THEOREM, *Plane*, is that which either relates to a rectilinear ſurface, or to one terminated by the circumference of a circle. As, that all angles in the ſame ſegment of a circle are equal.

THEOREM, *Solid*, is that which conſiders a ſpace terminated by a ſolid; that is, by any of the three conic ſections. *E. gr.* this: that if a right line cut two aſymptotic parabolas, its two parts terminated by them ſhall be equal. See SOLID.

THEOREM, *Reciprocal*, is one whoſe converſe is true. As, that if a triangle have two equal ſides, it muſt have two equal angles: the converſe of which is likewiſe true, that if it have two equal angles, it muſt have two equal ſides.

THEOREM, in *Algebra* and *Analyſis*, is ſometimes uſed to denote a rule, particularly when that rule is expreſſed in ſymbols or formulæ, of which there is of courſe a great number; but of theſe, ſome few, either from their importance,

portance, curiosity, or other considerations, have retained particular denominations, under which they are frequently referred to by modern authors: it is therefore necessary to have them so classed, that a reader may be able to ascertain the principles on which they are founded, the purposes they are intended to answer, and the cases to which they will best apply. The theorems to which we here allude, are Bernoulli's theorem, the Binomial theorem, Cotes's, Taylor's, Maclaurin's, &c.

Bernoulli's Theorem, is a general formula for the developement of any fluent or integral, of any proposed fluxion or differential; which may be stated as follows: *viz.* X being any function of x,

$$\int X\, d\, x = X\,\frac{x}{1} - \frac{d\,X}{d\,x}\cdot\frac{x^2}{1\,.\,2} + \frac{d^2\,X}{d\,x^2}\cdot\frac{x^3}{1\,.\,2\,.\,3} - \frac{d^3\,X}{d\,x^3}\cdot\frac{x^4}{1\,.\,2\,.\,3\,.\,4}, \ \&c.$$

Let us denote by Y, the value of this integral when $x = 0$, X, $\frac{d\,X}{d\,x}$, $\frac{d^2\,X}{d\,x^2}$, &c. being also denoted by Y′, Y″, Y‴, &c. and we shall have generally,

$$\int X\, d\, x = Y + Y'\,\frac{x}{1} + Y''\,\frac{x^2}{1\,.\,2} + Y'''\,\frac{x^3}{1\,.\,2\,.\,3} + \&c.$$

Now, in order to pass from the general value of $\int X\, d\, x$, which we shall represent by y, to that which answers to the case of $x = 0$, it is evident that we must in Taylor's formula make $h = -x$, which gives

$$Y = y - \frac{d\,y}{d\,x}\cdot\frac{x}{1} + \frac{d^2\,y}{d\,x^2}\cdot\frac{x^2}{1\,.\,2} - \frac{d^3\,y}{d\,x^3}\cdot\frac{x^3}{1\,.\,2\,.\,3} + \&c.$$

substituting in this equation, in the place of y, $\frac{d\,y}{d\,x}$, $\frac{d^2\,y}{d\,x^2}$, &c. their respective values, and taking that of $\int X\, d\, x$, we shall have

$$\int X\,d\,x = Y + X\,.\,\frac{x}{1} - \frac{d\,X}{d\,x}\,.\,\frac{x^2}{1\,.\,2} + \frac{d^2\,X}{d\,x^2}\,.\,\frac{x^3}{1\,.\,2\,.\,3} - \&c.$$

the quantity Y being still a constant arbitrary. By integrating, we arrive also at this developement: thus, if we decompose the differential X d x into its two factors X and d x, and integrate the second, we shall have

$$\int X\, d\, x = X\, x - \int x\, d\, X.$$

But

$$\int x\, d\, X = \int \frac{d\,X}{d\,x}\,.\,x\, d\, x = \tfrac{1}{2}\, x^2\, \frac{d\,X}{d\,x} - \tfrac{1}{2}\int x^2\,\frac{d^2\,X}{d\,x}$$

$$\int x^2\,\frac{d^2\,X}{d\,x} = \int \frac{d^2\,X}{d\,x^2}\,.\,x^2\, d\, x = \tfrac{1}{3}\, x^3\, \frac{d^2\,X}{d\,x^2} - \tfrac{1}{3}\int x^3\,\frac{d^3\,X}{d\,x^2}$$

$$\int x^3\,\frac{d^3\,X}{d\,x^2} = \int \frac{d^3\,X}{d\,x^3}\,.\,x^3\, d\, x = \tfrac{1}{4}\, x^4\, \frac{d^3\,X}{d\,x^3} - \tfrac{1}{4}\int x^4\,\frac{d^4\,X}{d\,x^3}$$

&c. &c. &c.

And putting successively for $\int x\, d\, X$, $\int x^2\,\frac{d^2\,X}{d\,x}$, &c. their respective values, there results,

$$\int X\, d\, x = X\,\frac{x}{1} - \frac{d\,X}{d\,x}\,.\,\frac{x^2}{1\,.\,2} + \frac{d^2\,X}{d\,x^2}\,.\,\frac{x^3}{1\,.\,2\,.\,3} - \&c.$$

which is the theorem of John Bernoulli, and is the same with regard to the integral calculus, as that of Taylor to the differential.

Binomial Theorem, or Newtonian theorem, is a general formula for the developement of any binomial of the form $(a + x)^{\frac{m}{n}}$; *viz.*

$$(a + x)^{\frac{m}{n}} =$$

$$a^{\frac{m}{n}} \times \left\{1 + \frac{m}{n}\left(\frac{x}{a}\right) + \frac{m}{n}\,.\,\frac{m-n}{2\,n}\left(\frac{x}{a}\right)^2 + \frac{m}{n}\,.\,\frac{m-n}{2\,n}\,.\,\frac{m-2\,n}{3\,n}\left(\frac{x}{a}\right)^3 + \&c.\right\}$$

See Binomial *Theorem*.

Briggs's Theorem.—There are more than one formula that have received this designation, but we believe that the following is generally understood to be implied; *viz.*

"The nth differences of any consecutive nth powers, or of any nth powers whose roots are in arithmetical progression, are expressed by the formula

$$n\,(n-1)\,(n-2)\,(n-3)\,(n-4)\,\ldots\,1\,.\,d^n$$

d being the common difference of the roots."

The demonstration of this theorem is commonly made to depend upon principles drawn from the fluxional analysis; but we prefer giving a sketch of that which appeared in vol. xi. of the Irish Transactions by Mr. Burk, being deduced from the most elementary considerations.

We know that the expansion of $(p + x)^n$, is of the form

$$p^n + n\,x\,p^{n-1} + C\,x^2 p^{n-2} + D\,x^3 p^{n-3} + \&c.$$

Let o, p, q, r, s, &c. be the terms of any decreasing arithmetical progression, of which the difference is d; then since $o = p + d$, $p = q + d$, &c. we have

$$o^n = (p + d)^n = p^n + n\,d\,p^{n-1} + C\,d^2 p^{n-2} + \&c.$$
$$p^n = (q + d)^n = q^n + n\,d\,q^{n-1} + C\,d^2 q^{n-2} + \&c.$$
$$q^n = (r + d)^n = r^n + n\,d\,r^{n-1} + C\,d^2 r^{n-2} + \&c.$$

Taking the first, second, third, &c. differences, we have

First Differences

$$n\,d\,p^{n-1} + C\,d^2 p^{n-2} + \&c.$$
$$n\,d\,q^{n-1} + C\,d^2 q^{n-2} + \&c.$$
$$n\,d\,r^{n-1} + C\,d^2 r^{n-2} + \&c.$$

And since $p^{n-1} = (q + d)^{n-1} = q^{n-1} + (n-1)\,d\,q^{n-2}$ &c. we have for the

Second Differences

$$n\,d\,(n-1)\,d\,q^{n-2} + \&c.$$
$$n\,d\,(n-1)\,d\,r^{n-2} + \&c.$$
$$n\,d\,(n-1)\,d\,s^{n-2} + \&c.$$

Third Differences

$$n\,d\,(n-1)\,d\,(n-2)\,d\,r^{n-3} + \&c.$$
$$n\,d\,(n-1)\,d\,(n-2)\,d\,s^{n-3} + \&c.$$

Fourth Differences

$$n\,d\,(n-1)\,d\,(n-2)\,d\,s^{n-3}\,(n-3)\,d\,r^{n-4} + \&c.$$

Whence, by an infallible and obvious deduction,

nth *Differences*

$$n\,d\,(n-1)\,d\,(n-2)\,\ldots\ldots\,(n - \overline{n-1})\,d\,w^{n-n}$$

$(n+1)$*th Differences*

$$n\,d\,(n-1)\,d\,(n-2)\,\ldots\ldots\,(n-n)\,d\,v^{-1}.$$

But

But since $n - n = 0$, the $(n + 1)$th differences $= 0$; and since $w^{n-n} = w^0 = 1$, the nth differences become

$$n(n-1)(n-2)(n-3) \ldots\ldots 3 \cdot 2 \cdot 1 \, d.^n$$

It may not be amiss to observe, that we have only employed the first term of the several orders of differences, which however is sufficient for our purpose, since it is obvious that the nth difference can have but one term; for the developement of $(p + d)^n$ gives $n + 1$ terms; and since one term vanishes with every difference, the first difference will have n terms, the second $n - 1$, the third $n - 2$, &c.; and consequently the nth difference will have $n - (n - 1) = 1$ term only. See Irish Transactions, vol. xi. or Monthly Review, vol. lxxiv.

Cotes's Theorem, or *Cotesian Theorem*.—The geometrical properties of this very interesting theorem are explained under the article COTESIAN *Theorem;* it will only be necessary therefore in this place to state the same analytically. In this case, the general enunciation is:

"All the imaginary roots of the binomial equation $x^n - 1 = 0$, are contained in the general formula $x^2 - 2 \operatorname{cos.} \frac{2k\pi}{n} x + 1 = 0$; and those of $x^n + 1 = 0$, in the formula $x^2 - 2 \operatorname{cos.} \frac{(2k+1)\pi}{n} x + 1 = 0$, k being any integer not divisible by n, and π representing the semi-circumference." See RECIPROCAL *Equations*.

Euler's Theorem is used to denote the theorem or formula first given by this author, for ascertaining the direct integrability of differential equations, which is as follows. The equation being reduced to the form

$$M\,dx + N\,dy = 0,$$

where M and N are functions of x and y; if $\frac{M}{dy} = \frac{N}{dx}$, then the integration may be obtained by a direct process; but if this equality have not place, the integration can then only be effected by indirect means, which frequently involve considerable difficulty.

Fermat's Theorem.—There are several theorems in the theory of numbers which are due to this ingenious analyst; but that which is more particularly designed by Fermat's theorem is this; *viz.* "Neither the sum nor difference of any two integral powers, above the square, can be equal to a rational power of the same dimension:" or, which is the same, the equation

$$x^n \pm y^n = z^n$$

is always impossible in rational numbers, if n be greater than 2.

The cases of $n = 3$ and $n = 4$ have been demonstrated; but notwithstanding the numerous attempts of the most celebrated analysts of the last and of the present age, the case of $n = 5$, and all the succeeding values of n, remain without demonstration; and as this is now the only theorem of this author which has not submitted to the power of the modern analysis, the National Institute of France has made it the subject of the prize of 3000 francs, to be decided by 1818.

Under the article NUMBERS, amongst the miscellaneous propositions, we have mentioned another theorem of Fermat's, which had not then been demonstrated, but which has since been effected by M. Cauchy, corresponding member of the Institute. The reader will also find some farther remarks relative to the equation $x^n \pm y^n = z^n$, under our article POWER.

Gauss's Theorem is used to denote a theorem invented by this distinguished mathematician, for the solution of certain binomial equations. We have seen, in the article RECIPROCAL *Equations*, in what manner the roots of binomial equations may be obtained by means of a table of sines and cosines; but Gauss's theorem is the converse of this, and shews in what manner the sines and cosines of certain angles may be obtained, by the numerical solution of such equations. See POLYGON.

Guldin's Theorem is the same as the CENTROBARYC *Method;* which see.

Lagrange's Theorem is commonly used to denote the general formula assumed by Lagrange as the foundation of his theory of functions; which may be thus enunciated.

"If ϕx be any function whatever of a variable quantity x, and if x changes its value, and becomes $x + i$, then the $\phi(x + i)$ may be represented or resolved into a series of the form

$$\phi(x+i) = \phi x + P i + Q i^2 + R i^3 + \&c.$$

in which the co-efficients of the powers of i are new functions of x, derived from the primitive function x, independent of i; and, moreover, that every co-efficient is derived from the preceding one, in the same manner as the first is derived from the original function." See FUNCTIONS.

Leibnitz's Theorem is a theorem proposed by this author for differencing under the sign $\int$, and it may be exhibited under the form $\frac{d \int M\,dx}{dy} = \int \frac{dM}{dy} dx$, where $M = \frac{du}{dx}$, u being any function of x and y.

Since $\frac{du}{dx\,dy} = \frac{du}{dy\,dx}$ by the known principles of the differential calculus; if we make $u = \int M\,dx$, we shall have $\frac{du}{dx} = M$, $\frac{d^2u}{dx\,dy} = \frac{dM}{dy}$; and integrating with regard to x, we shall find

$$\int \frac{d^2u}{dx\,dy} dx = \int \frac{d^2u}{dy\,dx} dx = \frac{du}{dy} = \int \frac{dM}{dy} dx.$$

This is called by Leibnitz *differentiatio de curva in curvam*, because in the question which he proposed to resolve, he passed from one curve to another of the same species, by making one of the constant quantities variable. See La Croix "Calcul Integral."

Maclaurin's Theorem is a formula which we owe to this author for expressing any function y, of a variable quantity x; *viz.* adopting the differential notation,

$$y = (y) + \left(\frac{dy}{dx}\right) x + \tfrac{1}{2}\left(\frac{d^2y}{dx^2}\right) x^2 + \frac{1}{2 \cdot 3}\left(\frac{d^3y}{dx^3}\right) x^3 + \&c.$$

where (y), $\left(\frac{dy}{dx}\right)$, $\left(\frac{d^2y}{dx^2}\right)$, &c. represent what these several quantities become when $x = 0$.

Let $\quad y = A + Bx + Cx^2 + Dx^3 + \&c.$

differencing, and dividing by dx, we have

$$\frac{dy}{dx} = B + 2Cx + 3Dx^2 + \&c.$$

$$\frac{d^2y}{dx^2} = 2C + 2 \cdot 3Dx + \&c.$$

$$\frac{d^3y}{dx^3} = + 2 \cdot 3D + \&c.$$

conseconfequently, when x in each of thefe $= 0$, we have

$$(y) = \mathrm{A}, \left(\frac{d\,y}{d\,x}\right) = \mathrm{B}\,; \left(\frac{d^2 y}{2\,.\,d\,x^2}\right) = \mathrm{C}\,; \frac{1\,d^3 y}{2\,.\,3\,d\,x^3} = \mathrm{D}\,;$$

therefore,

$$y = (y) + \left(\frac{d\,y}{d\,x}\right) x + \tfrac{1}{2}\left(\frac{d^2 y}{d\,x^2}\right) x^2 + \frac{1}{2\,.\,3}\left(\frac{d^3 y}{d\,x^3}\right) x^3 + \&c.$$

See Maclaurin's "Fluxions," and Boucharlat's "Calcul Differentiel, &c."

Moivre's Theorem. See the next article.

Multinomial Theorem, fometimes called Moivre's theorem, having been firft difcovered by that author, is a general expreffion or formula for determining any power or root of a given quantity confifting of any number of terms. This theorem was firft publifhed by its author in N° 230. of the Phil. Tranf. 1697; but it was afterwards fimplified by Euler in his "Calcul Differentiel," and the fame has alfo been done by Arhogaft in his "Calcul des Derivations."

The general form of this theorem, as given in Bonnycaftle's Algebra, is as follows:

$$(\mathrm{A}_0 + \mathrm{A}_1 x + \mathrm{A}_2 x^2 + \mathrm{A}_3 x^3 + \;.\;.\;.\;.\; \mathrm{A}_n x^n)^m = \mathrm{A}^m +$$

$$m\,\mathrm{A}_1 \mathrm{B}_0 \,.\, \frac{x}{\mathrm{A}} + \left.\begin{matrix} 2m\,\mathrm{A}_2 \mathrm{B}_0 \\ + (m-1)\,\mathrm{A}_1 \mathrm{B}_1 \end{matrix}\right\} . \frac{x^2}{2\,\mathrm{A}_0} + \left.\begin{matrix} 3m\,\mathrm{A}_3 \mathrm{B}_0 \\ + (2m-1)\,\mathrm{A}_2 \mathrm{B}_1 \\ + (m-2)\,\mathrm{A}_1 \mathrm{B}_2 \end{matrix}\right\} \frac{x^3}{3\,\mathrm{A}_0} + \left.\begin{matrix} 4m\,\mathrm{A}_4 \mathrm{B}_0 \\ + (3m-1)\,\mathrm{A}_3 \mathrm{B}_1 \\ + (2m-2)\,\mathrm{A}_2 \mathrm{B}_2 \\ + (m-3)\,\mathrm{A}_1 \mathrm{B}_3 \end{matrix}\right\} \frac{x^4}{4\,\mathrm{A}_0} + \&c.$$

Where $\mathrm{B}_0 = \mathrm{A}_0^m$, and B_1, B_2, B_3, &c. are the co-efficients of the terms immediately preceding thofe in which they firft appear; and the manner of applying this theorem to any particular cafe, is by fubftituting the numbers or letters in the given example for A_0, A_1, A_2, &c. and the numerical value of m for m. It would lead us too far to attempt the demonftration of this theorem in this place, we muft, therefore, refer the reader for fuch information to the works above-mentioned.

Newtonian Theorem. See Binomial *Theorem.*

Taylor's Theorem, an elegant and highly valuable formula, which was firft publifhed by Dr. Brook Taylor in his "Methodus Incrementorum," which is as follows; *viz.*

"If Y reprefent any function whatever of the variable quantity x, and if x be increafed by any difference $\Delta\,x$, the value of Y, *viz.* $\mathrm{Y} + \Delta\,\mathrm{Y}$, becomes (employing the differential notation)

$$\mathrm{Y} + \Delta\,\mathrm{Y} = \mathrm{Y} + \frac{\Delta\,x\,d\,\mathrm{Y}}{1\,.\,d\,x} + \frac{\Delta\,x^2\,d^2\,\mathrm{Y}}{1\,.\,2\,.\,d\,x^2} + \frac{\Delta\,x^3\,d^3\,\mathrm{Y}}{1\,.\,2\,.\,3\,d\,x^3} + \&c.$$

$$\text{or } \Delta\,\mathrm{Y} = \frac{\Delta\,x\,d\,\mathrm{Y}}{1\,.\,d\,x} + \frac{\Delta\,x^2\,d^2\,\mathrm{Y}}{1\,.\,2\,.\,d\,x^2} + \frac{\Delta\,x^3\,d^3\,\mathrm{Y}}{1\,.\,2\,.\,3\,d\,x^3} + \&c.$$

The demonftration of this celebrated theorem is given very concifely by La Croix, on the following principles.

Let Y be any function of x, and let Y′ denote what this function becomes, when x becomes $x + h$, we may write

$$\mathrm{Y}' = \mathrm{A} + \mathrm{B}\,h + \mathrm{C}\,h^2 + \mathrm{D}\,h^3 + \&c.$$

in which developement, it is obvious that A, B, C, &c. are functions of x.

If now we difference this equation with h variable and x conftant, we obtain, dividing by $d\,h$,

$$\frac{\mathrm{Y}'}{d\,h} = \mathrm{B} + 2\,\mathrm{C}\,h + 3\,\mathrm{D}\,h^2 + \&c.$$

Again, differencing with x variable and h conftant, we have

$$\frac{\mathrm{Y}'}{d\,x} = \frac{d\,\mathrm{A}}{d\,x} + \frac{d\,\mathrm{B}}{d\,x}\,h + \frac{d\,\mathrm{C}}{d\,x}\,h^2 + \frac{d\,\mathrm{D}}{d\,x}\,h^3 + \&c.$$

But as x and h enter exactly in the fame manner, it follows that $\frac{\mathrm{Y}'}{d\,x} = \frac{\mathrm{Y}'}{d\,h}$, whence the firft of thefe feries is equal to the fecond; equating, therefore, the co-efficients of the like powers of h, we have

$$\mathrm{B} = \frac{d\,\mathrm{A}}{d\,x},\quad \mathrm{C} = \frac{d\,\mathrm{B}}{2\,d\,x},\quad \mathrm{D} = \frac{d\,\mathrm{C}}{3\,d\,x},\ \&c.$$

Now

$$\mathrm{A} = \mathrm{Y},\ \mathrm{B} = \frac{d\,\mathrm{Y}}{d\,x},\ \mathrm{C} = \frac{d^2\,\mathrm{Y}}{1\,.\,2\,.\,d\,x^2},\ \mathrm{D} = \frac{d^3\,\mathrm{Y}}{1\,.\,2\,.\,3\,d\,x^3};$$

whence

$$\mathrm{Y}' = \mathrm{Y} + \frac{d\,\mathrm{Y}}{1\,.\,d\,x}\,h + \frac{d^2\,\mathrm{Y}}{1\,.\,2\,.\,d\,x^2}\,h^2 + \frac{d^3\,\mathrm{Y}}{1\,.\,2\,.\,3\,d\,x^3}\,h^3 + \&c.$$

Or writing

$$\mathrm{Y}' = \mathrm{Y} + \Delta\,\mathrm{Y}, \text{ and } x + h = x + \Delta\,x,$$

we have

$$\Delta\,\mathrm{Y} = \frac{\Delta\,x\,d\,\mathrm{Y}}{1\,.\,d\,x} + \frac{\Delta\,x^2\,d^2\,\mathrm{Y}}{1\,.\,2\,.\,d\,x^2} + \frac{\Delta\,x^3\,d^3\,\mathrm{Y}}{1\,.\,2\,.\,3\,d\,x^3} + \&c.$$

See La Croix "Calcul Differentiel," p. 21.

Trinomial Theorem is only a particular cafe of the *Multinomial Theorem*, which fee.

Wilfon's Theorem is a curious formula relative to prime numbers, publifhed firft by Waring in his "Meditationes Algebraicæ," which is as follows.

"If n be any prime number, then will

$$1\,.\,2\,.\,3\,.\,4,\ \&c.\ (n-1) + 1$$

be divifible by n."

This curious theorem was not demonftrated by fir John Wilfon, who firft difcovered it, nor by Waring, by whom it was firft made public; it has, however, fince received different demonftrations from Lagrange, Gaufs, &c. the latter of which is very fimple, and has been adopted by Barlow in his "Theory of Numbers," to which work we beg to refer our readers, as it would require more room than we can allow ourfelves to give it at full length in this place.

The above include, we believe, all thofe theorems which are known by any particular defignation; there are, doubtlefs, many others equally important, and which are equally entitled to bear the names of their refpective authors, but cuftom has not fanctioned the adoption; and we have, therefore, not introduced them.

THEORETIC, Theoretical, or *Theoric*, formed from θεωρεω, *I ſee or contemplate*, ſomething relating to theory, or that terminates in ſpeculation. In which ſenſe it ſtands oppoſed to *practical*.

The ſciences are ordinarily divided into *theoretical*, as theology, philoſophy, &c.; and *practical*, as medicine, law, &c. See Science.

Theoretic, *Theoreticus*, is an appellation peculiarly given to an ancient ſect of phyſicians, contradiſtinguiſhed by it from the empirics. See Empiric.

Theoretic phyſicians were ſuch as applied themſelves to a careful ſtudy and conſideration of what relates to health and diſeaſes; the principles of the human body, and its ſtructure and parts, with their actions and uſes; whatever befals it, either naturally or preternaturally; the differences of diſeaſes, their nature, cauſes, ſigns, indications, &c.; the textures, properties, &c. of plants, and other medicines, &c. In a word, the theoretic phyſicians were ſuch as proceeded in their judgment and practice on the foot of reaſon, in oppoſition to the empirical phyſicians, who proceeded wholly on experience. See Medicine.

Theoretical *Arithmetic* and *Philoſophy*. See the ſubſtantives.

THEORI, θεωροι, in *Antiquity*, an appellation given to thoſe Athenians who performed the ſolemnity called *theoria*.

THEORIA, θεωρια, a ſolemn annual voyage to Apollo's temple, in the iſland of Delos, performed by the Athenians always in the ſame ſhip in which Theſeus went. For the particularities of this naval proceſſion, ſee Potter Archæol. Græc. lib. ii. cap. 9. tom. i. p. 284, ſeq.

THEORIC Money, in *Ancient Authors*, was what was raiſed, by way of tax on the people, to defray the expences of theatrical repreſentations, and other ſpectacles.

There were particular queſtors and treaſurers of the theoric money. By a law of Eubulus, it was made a capital crime to pervert the theoric money to any other uſe; even to employ it in the occaſions of war.

THEORICAL Astronomy, is that part of aſtronomy which conſiders the true ſtructure and diſpoſition of the heavens, and heavenly bodies; and accounts for their various phenomena therefrom. See Astronomy.

It is thus called, in oppoſition to that part which conſiders their apparent ſtructure, or their diſpoſition as viewed by the eye, which is called *ſpherical* aſtronomy.

The ſeveral parts of theorical aſtonomy, ſee under System, Sun, Star, Planet, Earth, Moon, Satellite, and Comet.

THEORY, a doctrine which terminates in the ſole ſpeculation, or conſideration, of its object, without any view to the practice or application of it.

To be learned in an art, &c. the theory ſuffices; to be a maſter of it, both the theory and practice are required. Machines, many times, promiſe very well in the theory, yet fail in the practice.

We ſay, theory of the moon, theory of the rainbow, of the microſcope, the camera obſcura, the motion of the heart, the operation of purgatives, &c.

Theories *of the Planets*, &c. are ſyſtems or hypotheſes, according to which the aſtronomers explain the reaſons of the phenomena or appearances of them. See System.

Theory, in *Muſic*, in the hands of a mere mathematician is confined only to ratios and the philoſophy of ſound. (See Harmonics.) But among *practical* muſicians, the theory of harmony or compoſition is connected with the combination of agreeable ſounds, and the practice and performance of real muſic.

Theory, *Atomic*, in *Chemiſtry*, the means of explaining the compoſition and decompoſition of chemical bodies, by conſidering their ultimate atoms or particles as peculiar and diſtinct elementary ſolids, never changing in their figure, weight, or volume, under any circumſtances.

It would be difficult to conceive the exiſtence of any compound, without ſuppoſing it to have originated by union, in ſome way or other, of particles of its elementary conſtituents: but the prevalence of a doctrine, which has been generally advanced by mathematicians, *viz.* the infinite diviſibility of matter, has never allowed philoſophers to conclude that the circumſtance of compounds being made up of particles, muſt neceſſarily limit the proportions in which the elements combine. If the elementary bodies be conceived infinitely diviſible, the molecules, or compound particles, may be conceived infinitely ſmall, and the number of mean compounds exiſting between any two given extremes may be alſo conſidered infinite.

If ſuch were the nature of elementary matter, and no other cauſes interfered, there could be no limitation to the proportions in which ſimple matter would combine. This, however, is contrary to fact; as it is a fact known from the earlieſt dawnings of chemical knowledge, that bodies are limited in the proportions of their elements; the moſt ſtriking of theſe facts being the mutual ſaturation which takes place between an acid and an alkali, and the uniform proportions afforded in the analyſis of many native compounds.

Philoſophers were always ſatisfied to conſider this fact of the limitation of the proportions of bodies as one of the hidden ſecrets of nature, as difficult to conceive as the nature of the attraction by which their elements were held together. Berthollet appears to have been the firſt to attempt this arduous taſk, in his ingenious work, entitled "Chemical Statics." He ſuppoſes that the particles of bodies, when brought within the ſphere of attraction, combine without controul till the compound aſſumes ſome definite form, by which it is withdrawn from the ſituation in which it was formed. He ſuppoſes the chemical affinity of bodies to be diſtinct from that power on which their coheſion depends, and alſo that power by which they tend to an elaſtic ſtate.

Hence he concludes, that every ſolid compound is determined by the coheſion which takes place at ſome limit in the proportion of its elements: ſuch he ſuppoſes to be the caſe with ſalts and other cryſtallizable compounds. On the other hand, he ſuppoſes the limitations of the proportions of the elements of gaſeous compounds to ariſe from the elaſtic form which they aſſume in certain ſtages of combination. This hypotheſis was ſupported by ſo many ſtriking facts, that it was thought by ſome to explain in general the cauſe of limited proportions. All agreed, that whatever might be the true theory, the cauſes pointed out by Berthollet had conſiderable influence in the compoſition and decompoſition of bodies, but they ſaw at the ſame time numerous caſes in which this hypotheſis failed to explain the facts.

Chemiſts have, from the earlieſt times, been acquainted with thoſe points of limitation which we call mutual ſaturation, and have been long familiar with thoſe limited augmentations of their proportions, called by ſome doſes and by others particles. Among the oxyds of metals, which had been little examined before the time of Lavoiſier, it was found, that inſtead of having an infinite number of means between the loweſt and higheſt ſtages of oxydation, only a certain number of oxyds of each metal could be formed, in which the ratio of the metal to the oxygen is uniform. Many of the ſalts in the ſame way are formed by limited doſes of acid. Some of the facts in the latter have been explained on Berthollet's hypotheſis, while its application to to the former facts is totally insufficient. Long previous to the true cause of these limited doses, the facts were so conspicuous, that a decided nomenclature was adopted for the purpose of expressing these different stages of combination. The oxyds have been distinguished by the Greek numerals *prot*, *deut*, *trit*, &c. The salts containing two doses of acid have been called *super-salts;* and those containing an extra dose of base, have been called *sub-salts*.

Although chemists have frequently used a language which appeared to shew their acquaintance with the real cause of the definite proportions, such as one compound being forced by one proportion, dose, or particle of one of its elements, and another with two proportions, doses, or particles: on the other hand, we find expressions which would favour the idea of indefinite proportions; such as bodies losing a small portion of their oxygen, or absorbing a little oxygen from the atmosphere. Salts are sometimes said to contain a slight excess of acid, or a small excess of base.

The most decided language used in any chemical work before the discoveries of Mr. John Dalton, giving any idea that the doses are limited by distinct atoms, will be found in a work by Mr. Higgins, entitled "A Comparative View of the Phlogistic and Antiphlogistic Theories." We beg leave to correct a mistake in a former article, in which we have entitled this work a Treatise on Phlogiston.

This work was written for the express purpose of combatting the phlogistic theory, and principally in answer to Mr. Kirwan's treatise of phlogiston. In order to shew the contradictions and absurdities of the phlogistic doctrine, which, under the name of phlogiston, confounded a number of bodies which were very different, he exhibited by diagrams a number of chemical operations, in which he supposed the elementary bodies concerned to be ultimate particles, and their immediate compounds molecules. He in the same diagrams also used numbers, which he supposed to be estimates of the strength of affinity of the combining particles. By this means he very successfully shewed many of the inconsistencies which must be admitted to explain the phenomena on the phlogistic theory. In this mode of proceeding, however, the numbers expressing the relative attractions, served his purpose much more than the consideration of the proportions being caused by distinct atoms; and the language which would induce the belief that he had such a conception of the nature of elementary matter, occurs only in a very few parts of his work.

After concluding that it is unnecessary to admit the existence of the imaginary substance phlogiston in sulphur, he concludes, in page 36, that sulphurous acid is compounded of one ultimate particle of sulphur with one of oxygen, and that sulphuric acid consists of one of sulphur and two of oxygen.

In the same page he also observes, that water is formed by one ultimate particle of water united to one of oxygen.

In page 81, he supposes sulphuretted hydrogen to consist of nine ultimate particles of sulphur with five of hydrogen. Previous, however, to this conclusion, he believes that the sulphur and hydrogen are not chemically combined, but that the sulphur is dissolved in hydrogen, as a salt dissolves in water.

After using arguments to shew, in answer to Mr. Kirwan, that the nitric acid does not contain what was thought to be phlogiston, he concludes, in page 132, with giving what he conceives to be its constituents, *viz.* that the nitrous oxyd consists of one ultimate particle of azote and one of oxygen; nitrous gas, of one of azote and two of oxygen; red nitrous vapour, one of azote and three of oxygen; straw-coloured nitrous acid, one of azote to four of oxygen; and lastly, that the nitric acid is constituted by one of azote and five of oxygen. These facts are certainly very remarkable, as they agree with the conclusions in the present time, and give a strong proof of Mr. Higgins's genius at the time he wrote.

He does not, however, lay any stress upon these remarks, and was not probably aware that they would be confirmed by future research. We are induced to think so, from the manner in which he expresses himself in other parts of his work, in which he frequently speaks of the absorption of small portions of oxygen, and of bodies having a small portion of oxygen more than they can retain. This vague manner of speaking, and others which we do not immediately recollect, is sufficient to shew that Mr. Higgins had no fixed notions of the cause of definite proportions, and that the language in which he has used the words ultimate particles and molecules, was employed rather with a view to illustrate his examples, than to broach any new theory to explain indefinite proportions. Indeed it would have been inconsistent to have treated two subjects, so very different in their objects, in the same pages.

As a proof that there was nothing striking in the remarks in which the words ultimate atoms and molecules are mentioned, we only need refer to the article which Mr. Higgins himself quotes from the Analytical Review, written soon after the appearance of the work in question. The reviewer gives him the highest praise for the able manner in which he has refuted the doctrine of phlogiston, but does not even hint at his diagrams or the ultimate particles. Indeed we can venture to assert, that if no more had been said on the subject of definite proportions than is to be found in this work, we might yet have been as much in the dark as we were twenty years after the publication of Mr. Higgins's "Comparative View."

It was not enough to know that compound bodies were formed of particles, to enable us to explain the cause of definite proportions; and we want no greater proof of this, than the fact of the true cause not being known till twenty-eight years after Mr. Higgins had told us that one particle of sulphur and one of oxygen formed sulphurous acid, and that one to two formed sulphuric acid. These loose expressions were but a small step indeed towards the discovery of the atomic theory in its present form, which has placed chemistry on the same ground with that on which the discovery of the laws of gravity placed the science of astronomy.

We are inclined to believe that the first step towards this important discovery was given by Richter. He found, in the double decomposition of salts, that the acid of one salt was always just sufficient to saturate the base of the other, and *vice versâ*. He also ascertained, that when one metal was precipitated by another, the oxygen of the precipitated metal was just what was required by the precipitating metal.

The inference to be drawn from these facts was, that if A combine with x to saturation, and B with y to the same; then, if A should be found to saturate y, B would also saturate x. This inference may be still further extended; for if A be a body capable of combining with B, they will mutually saturate each other.

It is the means of drawing these inferences arising from the mutual fitness of those parts of bodies which combine, that constitutes the importance of the atomic theory, and it is for the establishment of this new principle that we are indebted to Mr. John Dalton. When Mr. Higgins can shew, from the data given in his work, that similar inferences

ences could be drawn, he then will be entitled to ſhare in the merit of the diſcovery of the atomic theory. We lay ſhare with him, for we are firmly convinced that Mr. Dalton had never read Mr. Higgins's book previous to the publication of his own work.

We perfectly recollect the time, not more than four or five years ago, even when Mr. Dalton's book was before the public, very few chemiſts underſtood the true ſpirit of the atomic theory; and thoſe who conceived they did underſtand it, in general diſcarded it. All knew that he conſidered compounds to be formed of atoms united 1 to 1, 1 to 2, 1 to 3, &c.: but it was not till the reciprocal fitneſs of theſe atoms with each other was found to agree with analyſis, that it was generally received. When they ſaw that the numbers, which Dalton called the weights of the atoms, expreſſed the ſimple proportions in which bodies combine, they knew it could not be the effect of chance, and have willingly joined in the reſearch. It is for this part of the diſcovery that Mr. Dalton juſtly merits the fame he has acquired.

We have given all the facts on which Mr. Higgins could poſſibly found his claim to the diſcovery; and we muſt leave it to our readers to judge, whether they contain the ſmalleſt data on which to eſtabliſh what in the preſent time we call the atomic theory.

In all the chemical articles ſince the article Iron, we have had the greateſt confidence in the atomic theory; and we have never failed to compare the analyſes of different authorities with the reſults given by theory. We have in general found, that theſe reſults have been nearer to the beſt of theſe authorities, than they have been to each other.

We have already given an outline of the atomic theory, with a table of the weights of the ſimple atoms, and another of ſome of the moſt conſpicuous compounds, in our articles *Definite* Proportions, and Simple *Bodies*.

The French chemiſts have adopted the atomic theory under another form, which will be found to agree with the language given by Berzelius, who uſes the word *volume* for atom, as we have already explained in the article above alluded to.

Gay Luſſac ſeveral years ago publiſhed a new law reſpecting the combination of gaſeous bodies. He held that gaſes which combine chemically, either unite in equal volumes, or 1 to 2, or ſome multiple of 1, by a whole number. Although a number of facts ſeemed to agree with this law, the truth of it was doubted by ſome chemiſts, and principally becauſe no apparent reaſon appeared for ſuch a law.

In ſtating (under the article Proportions) the notion of Berzelius reſpecting volumes, we have pointed out a curious coincidence between the ſpecific gravity and the weight of atoms of the gaſes, which has ſince been confirmed by Dr. Prout in Dr. Thomſon's Annals. In order that the weights of the atoms may be equal to their ſpecific gravities, we have there ſtated, that the number of particles in equal volumes of all gaſes muſt be equal, and the diſtance between the centres of the particles of all gaſes the ſame, ſo that the weights of equal volumes of different gaſes, would be as the weights of the atoms.

This would alſo require, that the attraction between the particles ſhould either be the ſame in all, or that it ſhould be nothing; and the diſtance of the particles be at points where the repulſion of the calorific atmoſphere is balanced by the incumbent preſſure.

The ſtate here ſuppoſed, however, is not the caſe, ſince we find that the weights of the atoms of the gaſes generally are not equal to the ſpecific gravity, when reduced to the ſame ſtandard, although it is ſtrictly the caſe with a great proportion of them. And in thoſe caſes where they are not equal, the one is ſaid to be ſome multiple of the other, by a whole number.

This circumſtance favours the hope that ſome general law exiſts, by which the weights of the atoms of bodies are intimately connected with their ſpecific gravities in the elaſtic form. When the ſpecific gravity is double the weight of the atom, as is the caſe with oxygen, we have to ſuppoſe, that the particles are nearer each other in the proportion of 2 to 1, or that two particles come together, and are ſurrounded by the caloric, which belongs to one of them in their ſingle ſtate.

It would appear that the oxygen puts on this ſingle ſtate of exiſtence in the formation of carbonic oxyd, becauſe that gaſeous body contains only one atom of oxygen; hence its ſpecific gravity is the ſame as if it were formed from a gaſeous oxygen of half the real ſpecific gravity united to an atom of carbon without any change of volume, the ſame as takes place when ſulphur or carbon is burned in oxygen gas. Hence we may explain the great tendency that oxygen has to combine in double doſes with bodies, as is the caſe with carbon, ſulphur, phoſphorus, iron, and many other bodies.

We have alſo an inſtance of a compound gaſeous body becoming of double the ſpecific gravity which would be expected in olefacient gas, which is compoſed of an atom of carbon and an atom of hydrogen. The ſpecific gravity (hydrogen being 1) ought to be $1 + 5.4 = 6.4$; but in fact it is about the double of this. Hence we ſhould conclude, that the repulſion between the particles is halved, or that the compound atoms have united in pairs, by which the denſity is doubled.

Theory *of the Manufacture and Production of Bread*, in *Rural Economy*, the explanation of the principles and practices on which it depends in different caſes. The means which are employed in ſuch caſes are moſtly well underſtood; but the principles upon which they depend are far from being ſo well known. The writer of a late work on the "Elements of Agricultural Chemiſtry," has, however, thrown ſome light on this hitherto intricate ſubject. He has noticed, that a number of the changes taking place in the vegetable principles, depend upon the ſeparation of oxygen and hydrogen as water from the compound; but that there is one of very great importance, in which a new combination of the elements of water is the principal operation: this is in the manufacture of bread. When any kind of flour, which conſiſts principally of ſtarch, is made into a paſte with water, and immediately and gradually heated to about 440°, it increaſes, it is ſaid, in weight, and is found entirely altered in its properties; it has loſt its ſolubility in water, and its power of being converted into ſugar. In this ſtate it is unleavened bread.

And when the flour of corn, or the ſtarch of potatoes, mixed with boiled roots of the ſame kind, is made into a paſte with water, kept warm, and ſuffered to remain thirty or forty hours, it ferments, carbonic acid gas is diſengaged from it, and it becomes filled with globules of elaſtic fluid. In this ſtate it is raiſed dough, and affords by baking leavened bread; but this bread, it is ſaid, is ſour and diſagreeable to the taſte; and that leavened bread for uſe is made by mixing a little dough that has fermented, with new dough, and kneading them together, or by kneading the materials for the bread with a ſmall quantity of yeaſt.

It is ſtated, that in the formation of wheaten bread, more than one-fourth of the elements of water combine with the flour;

flour; that more water in proportion is consolidated in the formation of bread from barley, and still a larger quantity in that from oats; but that the gluten in wheat, being in much larger quantity than in other grain, seems to form a combination with the starch and water, which renders wheaten bread more digestible than other species or kinds of bread.

On this principle too it is probable, that this sort of bread may be more suitable and proper for the less laborious classes of society, though the other kinds may be equally or more nourishing and lasting for those who are engaged in hard work.

THEOSOPHISTS, the denomination of a class of philosophers, who profess to derive their knowledge of nature from divine revelation. Not contented with the natural light of human reason, nor with the simple doctrines of scripture understood in their literal sense, these persons have recourse to an internal supernatural light, superior to all other illuminations, from which they pretend to derive a mysterious and divine philosophy, manifested only to the chosen favourites of heaven. They boast, that, by means of this celestial light, they are not only admitted to the intimate knowledge of God, and of all divine truth, but have access to the most sublime secrets of nature. They ascribe it to the singular manifestation of divine benevolence, that they are able to make such an use of the element of fire, in the chemical art, as enables them to discover the essential principle of bodies, and to disclose stupendous mysteries in the physical world. (See Fire *Philosophers*.) They even pretend to an acquaintance with those celestial beings, which form the medium of intercourse between God and man, and to a power of obtaining from them, by the aid of magic, astrology, and other similar arts, various kinds of information and assistance. This they affirm to have been the ancient secret wisdom, first revealed to the Jews under the name of Cabbala, and transmitted by tradition to posterity. Philosophers of this class have no common system; but every one follows the impulse of his own imagination, and constructs an edifice of fanaticism for himself. They only agree in abandoning human reason, and pretending to divine illumination. Many traces of the spirit of Theosophism are to be found in the whole history of philosophy, in which fanatical and hypocritical pretensions to divine illumination frequently occur. Among moderns, the first name that is mentioned with any distinction in this class of philosophers is Paracelsus. (See his biographical article.) He was succeeded by Robert Fludd, who compounded into a new mass of absurdity all the mysterious and incomprehensible dreams of the Cabbalists and Paracelsians. He supposed two universal principles, the northern or condensing power, and the southern or rarefying power; and over these he placed innumerable intelligences and geniuses, and called together whole troops of spirits from the four winds, to which he committed the charge of diseases. (See his article.) Another dazzling luminary in the constellation of Theosophists was Jacob Bœhmen. See Behmen.

A more scientific Theosophist than Bœhmen was Van Helmont. (See Helmont.) The most elegant and philosophical of all the Theosophists was Peter Poiret, who was born at Metz in the year 1646, and educated in the academy of Basil. In 1668 he became a student in the university of Heidelberg, with a view of qualifying himself for the clerical profession, and in 1672 he assumed the character of an ecclesiastic in the principality of Deux-Ponts. After a severe fit of illness, he wrote his "Cogitationes Rationales de Deo, Anima, et Malo," in which he mostly followed the principles of Des Cartes, having in his youth studied the Cartesian philosophy; a work which he defended against the censures of Bayle. Being obliged by the public tumults to withdraw from his clerical cure, he removed to Holland, and afterwards to Hamburgh, where he became acquainted with the celebrated mystic Mad. Bourignon, and enlisted himself in the number of her disciples. Abandoning Cartesianism, and fascinated with Bourignonian mysticism, he rejected the light of reason as useless and dangerous, and inveighed against every kind of philosophy that was not the effect of divine illumination. Towards the close of his life he settled at Rheinsburg, in Holland, and employed himself in writing mystical books; such were his treatises "De Œconomia Divina," "De Eruditione Triplici," and the last edition of his "Cogitationes Rationales." He died in the year 1719. Some of his mystical notions may be collected from the preliminary dissertation prefixed to his works: they are such as these: "It hath pleased God, in order that he may enjoy a vivid and delightful contemplation of himself, beyond that solitude which belongs to the divine essence, to create external beings in whom he may produce an image of himself. The essence of the human mind is 'thought,' capable and desirous of light, and joyful complacence; the properties in which it bears a resemblance of the divine essence. Nothing is more intimate or essential to the mind than this desire; by which it is borne always towards the true and infinite good. In order to satisfy this desire, the illumination of faith is necessary; by means of which the mind, conscious of its weakness and impotence, disclaims all the fictions of human reason, and directs itself towards God with an intense and ineffable ardour, till, by the silent contemplation of him, it is filled with tranquillizing light and joyful complacence; although, whilst oppressed with the load of mortality, it cannot behold his unveiled face. From this divine illumination proceeds the most pacific serenity of mind, the most ardent love of God, and the most intimate union with him."

To the class of Theosophists it has been usual to refer the entire society of *Rosycrucians*; which see.

It will be sufficient to observe, at the close of this article, that the whole system of Theosophism is founded in delusion, and that it is injurious both to philosophy and religion. These supposed illuminations are to be ascribed either to fanaticism or to imposture. The fastidious contempt, with which these pretenders to divine wisdom have treated those who are contented to follow the plain dictates of common sense, and the simple doctrine of scriptures, has unquestionably imposed upon the credulous vulgar, and produced an indifference to rational enquiry, which has obstructed the progress of knowledge. And their example has encouraged others to traduce philosophy and theology in general, by representing them as resting upon no better foundation than enthusiasm and absurdity. It is to be charitably presumed, that these deluded visionaries have not been themselves aware of the injury which they have been doing to the interests of science and religion. Nevertheless, it must be regretted, both on their own account, and on account of the multitudes they have misled, that whilst they have thought themselves following a bright and steady luminary, they have been led astray by wandering meteors. Brucker by Enfield.

THEOTOCUS, Deipara. See Mother *of God*.

THEOXENIA, Θεοξενια, in *Antiquity*, a festival in honour of all the gods, and celebrated in many cities of Greece, but especially Athens.

THEOXINI Malagma, the name of a sort of cataplasm, good against pains of the feet.

THERA, in *Ancient Geography*, one of the islands called *Sporades*,

Sporades, in the Ægean ſea, between the iſland of Crete and the Cyclades. It is ſaid to have taken its name from Theras, a prince of the race of Cadmus, who removed from Lacedæmon into this iſland, which was occupied by the deſcendants of the Membliarii, who had poſſeſſion of it 1550 years before our era; whereas Pliny ſays that it firſt appeared in the fourth year of the 135th olympiad. This iſland is now called *Santorin;* which ſee.—Alſo, a town of the iſland of the ſame name.—Alſo, a town of Aſia Minor, in Caria, between Idymus and Pyſtus.—Alſo, a town of Aſia, in Sogdiana.

THERAMBUS, a town of Macedonia, in the peninſula of Pallené.

THERAMNÆ, a town of Aſia Minor, in Lycia; conſecrated to Apollo.

THERAPEUTÆ, θεραπευται, a Greek term ſignifying ſervants, more eſpecially thoſe employed in the ſervice of God. The Greeks gave the appellation *therapeutæ* to ſuch as applied themſelves to a contemplative life, whether it were from the great concern they had for their ſouls, or from the particular mode and manner of their religion; the word θεραπευειν, whence *therapeutæ*, ſignifying the care a phyſician takes of his patient, or the ſervice any one renders another.

Philo, in his firſt book of the Contemplative Life, relates, that there were a people ſpread throughout moſt of the known world, but particularly throughout Egypt, and about Alexandria, who renounced their friends, their goods, &c. and who, after diſcharging themſelves of all temporal concerns, retired into ſolitary places, where they had each their ſeparate manſion, called *ſemneium*, or *monaſtery*, and placed their whole felicity in the contemplation of the divine nature.

The principal ſociety of this kind was formed near Alexandria, where they lived, not far from each other, in ſeparate cottages, each of which had its own ſacred apartment, to which the inhabitant retired for the purpoſes of devotion. After their morning prayers, they ſpent the day in ſtudying the law and the prophets, endeavouring, by the commentaries of their anceſtors, to diſcover ſome allegorical meaning in every part. They alſo amuſed themſelves with compoſing ſacred hymns in various kinds of metre. Six days of the week were thus paſſed in ſolitude. On the ſeventh day they met, decently clothed, in a public aſſembly, where, ſeated according to their age, they held the right hand between the breaſt and the chin, and the left at the ſide. Then one of the elders, ſtepping to the middle of the aſſembly, diſcourſed, gravely and calmly, on the doctrines of the ſect; the audience remaining ſilent and occaſionally expreſſing their approbation by a nod. The chapel in which they aſſembled was ſeparated into two apartments, one for the men, the other for the women. At the cloſe, the ſpeaker ſung a hymn of praiſe to God, in the laſt verſe of which the whole aſſembly joined. On great feſtivals, ſacred muſic was performed, accompanied with ſolemn dancing; and theſe vigils were continued till morning, when the aſſembly, after a morning prayer, in which their faces were directed towards the riſing ſun, was broken up. Such was their abſtemiouſneſs, that they commonly ate nothing before the ſetting ſun, and often faſted two or three days. They wholly abſtained from wine, and their ordinary food was bread and herbs.

There are two points relating to theſe therapeutæ exceedingly controverted among critics, *viz.* 1. Whether they were Jews or Chriſtians; and, 2. If they were the latter, whether they were monks or ſeculars?

Moſheim affirms, that the therapeutæ were neither Chriſtians nor Egyptians, as ſome have erroneouſly imagined; they were undoubtedly Jews; nay, they gloried in that title, and ſtyled themſelves, with particular affectation, the true diſciples of Moſes, though their manner of life was equally repugnant to the inſtitutions of that great lawgiver, and to the dictates of right reaſon, and ſhewed them to be a tribe of melancholy and wrong-headed enthuſiaſts.

Calmet alſo, in his Dictionary of the Bible, alleges a variety of reaſons to prove, that the therapeutæ were Jews and not Chriſtians; and that they were not monks in the ſenſe which eccleſiaſtical writers affix to this term. Some have imagined that they were judaizing Gentiles; but Philo, by claſſing them with the Eſſenes, evidently ſuppoſes them to be Jews. Others have maintained, that they were an Alexandrian ſect of Jewiſh converts to the Chriſtian faith, who devoted themſelves to a monaſtic life. But this is impoſſible; for Philo, who wrote before Chriſtianity appeared in Egypt, ſpeaks of this as an eſtabliſhed ſect. From a compariſon of Philo's account of this ſect with the ſtate of philoſophy in the country where it flouriſhed, we may reaſonably conclude, that the therapeutæ were a body of Jewiſh fanatics, who ſuffered themſelves to be drawn aſide from the ſimplicity of their ancient religion by the example of the Egyptians and Pythagoreans. It is uncertain how long this ſect continued; but it is thought not improbable, that, after the appearance of Chriſtianity in Egypt, it ſoon became extinct. See Essenes.

THERAPEUTICE, Therapeutics, θεραπευτικη, formed from θεραπευειν, *to attend, to nurſe, cure,* &c. that part of medicine which is employed in ſeeking out remedies againſt diſeaſes, and in preſcribing and applying them to effect a cure.

Therapeutice teaches the uſe of diet, pharmacy, ſurgery, and the *methodus medendi.*

Therapeutice is alſo uſed figuratively, in ſpeaking of the mind, and of diſcourſes made to correct the errors and defects of it.

Such is the Therapeutice or Therapeutics of Theodoret; being a treatiſe againſt the errors of unwholeſome opinions of the Greeks, *i. e.* the heathens.

THERAPHIM, or Teraphim, an Hebrew term, which has given great exerciſe to the critics. We meet with it thirteen or fourteen times in Scripture, where it is commonly interpreted *idols:* but the rabbins are not contented to have them ſimply ſignify idols, but will have it denote a peculiar ſort of idols or images intended for the knowledge of futurity, *i. e.* oracles.

R. David de Pomis obſerves, that they were called theraphim, from רפה, *raphah, to leave,* becauſe people quitted every thing to conſult them.

Others hold, that the theraphim were brazen inſtruments which pointed out the hours and minutes of future events, as directed by the ſtars.

R. Eliezer tells us the reaſon why the rabbins will have the theraphim to ſpeak, and render oracles: it is, ſays he, becauſe it is written in the prophet Zechariah, x. 2. "The theraphim have ſpoken vain things."

The ſame rabbin adds, that to make the theraphim, they killed a firſt-born child, clove his head, and ſeaſoned it with ſalt and oil: that they wrote on a plate of gold the name of ſome impure ſpirit, laid it under the tongue of the dead, placed the head againſt the wall, lighted lamps before it, and prayed to it, and that it then talked with them.

Vorſtius alſo obſerves, that, beſide the paſſage of Zechariah, juſt quoted, it appears likewiſe from Ezekiel, xxi. 21. that the theraphim were conſulted as oracles.

F. Kircher directs us to ſeek the origin of the theraphim in in Egypt; adding, that the word is Egyptian. Spencer, in his diſſertation on the *urim* and *thummim*, maintains the word to be Chaldee, and to ſignify the ſame with ſeraphim: the Chaldeans being frequently known to change the ש into ת, that is *ſ* into *t*. He adds, that thoſe images were borrowed from the Amorites, Chaldeans, or Syrians; and that the *Serapis* of the Egyptians is the ſame thing with the theraphim of the Chaldeans. See Selden de Diis Syris, ſynt. i. cap. 2.

Calmet obſerves, that the figure of a winged ſerpent, called *ſeraph*, whence the name ſeraphim, has given riſe to the appellation theraphim, becauſe in the abraxas and other taliſmans of the ancients, which are real theraphims, we find the figures of ſerpents both with and without wings; whence he infers, that the theraphims of Laban, which were ſtolen by Rachael, were real taliſmans. Jurieu conjectures, that theſe theraphims were the penates, or houſhold gods of Laban, which, he ſays, were the ſouls of the heroes of families, deified and worſhipped; and he adds, that the theraphims of Laban were the images of Noah, the reſtorer of the human race, and of Shem, the chief of the family of Laban. But Calmet, in reply to this conjecture, obſerves, that it is by no means credible, that the worſhip of the penates and lares was known in the time of Laban; and that it is not likely, that Laban ſhould have ranked among the gods Noah and Shem, who had died ſo near his own time: for Noah died A.M. 2006, and Shem A.M. 2158, about eighty-ſeven years before Jacob came to Meſopotamia after Laban.

THERAPIDION, in *Botany*, a name given by ſome authors to the common oyſter-green, or ſea-laver, a ſubſtance of the tremella kind.

THERASIA, in *Geography*, a ſmall rocky iſland in the Grecian Archipelago, ſeparated from the N.W. coaſt of Santorin (the ancient Thera) by a narrow channel, which forms a ſecure harbour for boats; 3 miles N. of St. Nicolo. Theraſia is ſaid by Tournefort and Sonnini to be the preſent *Aſpronisi* (which ſee); but Olivier mentions them as diſtinct iſlands. Theraſia, ſays this laſt-mentioned traveller, on which Ptolemy places a town, and which Pliny conjectures, with reaſon, to have been detached from Thera, cannot be taken for Aſpronisi, nor the latter for the former, as Tournefort imagines. Aſpronisi is not large enough to have had upon it the ſmalleſt village, or the ſmalleſt habitation; whereas Theraſia has ſufficient extent, and its territory is ſufficiently good, to have been always the ſcite of a town, as one is ſtill to be ſeen there at the preſent day.

THERESA, a river of Africa, which runs into the Atlantic, S. lat. 13°.

THERESA, *Order of Maria*, a military order inſtituted by the empreſs-queen in Germany, on the 18th of June, 1757, and compoſed of two claſſes, *viz.* grand croſſes and knights. To theſe the emperor Joſeph II., in the year 1765, added an intermediate claſs, under the appellation of commanders. The number of knights is not fixed, and the emperor is grand-maſter. The badge of the order is, "a croſs of gold, enamelled white, edged with gold;" on the centre are the arms of Auſtria, *viz.* "gules, a feſſe-argent, encircled with the word *Fortitudini*;" on the reverſe is "a cipher of the letters M. L. F. in gold, on an enamelled green ground." The badge is worn pendant to a ſtriped crimſon and white ribbon.

THERGUBIS, in *Ancient Geography*, a town of Aſia, in the interior of Meſopotamia, ſituated on the bank and towards the ſource of the river Chaborras.

THERIACA, ϑηριακα, *Treacle*, in *Medicine*, a name given by the ancients to various compoſitions eſteemed good againſt poiſons; but afterwards chiefly reſtrained to what, by way of diſtinction, has been called *theriaca Andromachi*, or *Venice treacle*: but now altogether out of uſe.

This is a compound of no leſs than ſixty-four drugs, prepared, pulverized, and reduced, by means of honey, into an electuary. The baſis or foundation of the compoſition is viper's fleſh. M. Charas has written a particular hiſtory of the animals, plants, and minerals, which enter the compoſition of this famed remedy.

It is ſaid to be ſovereign againſt the bites of venomous beaſts, and in the wind-colic; and was alſo uſed in intermitting fevers, and in caſes requiring perſpiratives and diaphoretics; alſo in continual fevers, eſpecially ſuch as are malignant, and where the pulſe is low and ticking; and in the ſmall-pox and meaſles: and, as moſt of the ingredients of it are very hot, in all diſeaſes where the natural heat is weak and languid.

Andromachus, Nero's phyſician, paſſes for the inventor of the theriaca; at leaſt, it was he who gave the firſt deſcription of it in elegiac verſes; his ſon did the ſame in proſe, and Damocrates in iambics.

Anciently, the treacle made at Venice had all the vogue: and many ſtill retain the ancient prejudice; but it has been ſince prepared at Montpellier, at Paris, and at London, with as much advantage as at Venice.

There is another vulgar kind of theriaca, called *diateſſaron*, becauſe it only conſiſts of four ingredients.

Treacle-water and treacle-vinegar are found good preſervatives againſt putrid air, whether by only being ſmelt at, or by rubbing the wriſts, temples, and noſe with them.

THERIACA *Ruſticorum*, a name given to garlic, from its uſe as an antidote againſt the contagion of peſtilential and other putrid diſorders.

THERIOMA, from θηριοω, *to rage*, in *Surgery*, a malignant ulcer.

THERMA, in *Ancient Geography*, a town of Cappadocia, on the route from Tavia to Cæſarea, between Tavia and Soanda. Anton. Itin.—Alſo, a town ſituated on the confines of Macedonia, or rather of Theſſaly, towards Thermopylæ. This town was ſituated on the gulf called Thermæus, whence its name.

THERMA *Pythia*, baths of Aſia Minor, in Bithynia. Procopius mentions this place, and ſays that Juſtinian conſtructed here a bath for public uſe, and a canal to conduct into it freſh water, and that he alſo provided others, which indicated a magnificence truly royal.

THERMÆ, θερμαι, in *Architecture*, ancient buildings, furniſhed with baths, eſpecially of the hot kind.

Among the nobleſt monuments of ancient Rome, are reckoned the thermæ, or baths of Diocleſian. See BATHS.

Thermæ, or hot ſprings, it is commonly argued, owe heat to a colluctation, or efferveſcence, of the minerals in them. Though Dr. Woodward aſcribes it to the ſubterraneous heat, or fire, which communicates with them by ſome ſpiracle, or canal, whereby a greater quantity of heat is derived thither, than to ordinary ſprings. See BATH.

THERMÆ, in *Ancient Geography*, a place on the ſouthern coaſt of Sicily. Pliny denominates this place a Roman colony; and Antonine calls the ſources of the hot water which gave the name of Thermæ to this place "Aquæ Larodæ." There were alſo baths at Selinonti in Sicily, called Thermæ Selinuntiæ. The name *thermæ* was alſo given to thoſe highly ſaline warm waters that were found in the neighbourhood of Corinth.

THERMÆUS SINUS, a gulf of the Ægean ſea, on the coaſt of Macedonia.

THERMASMA, a word uſed by ſome of the ancients

 to

to exprefs any thing that warms the body, and by others particularly for a warm fomentation, prefcribed by Hippocrates for removing pains in the fide, and giving eafe in pleurifies.

THERMES, in *Ancient Geography*, a town of Hifpania Citerior, S. of Numantia.

THERMI, in *Geography*, a town of Afiatic Turkey, in the province of Natolia; 24 miles N. of Burfa.

THERMIA, an ifland in the Grecian Archipelago, fo called from its abounding with hot fprings. It is not fo mountainous as fome of the other iflands, and the foil, when well cultivated, produces very large quantities of barley, wine, and figs. The ifland alfo affords plenty of honey, wax, partridges, a great quantity of fine filk, and as much cotton as the inhabitants require for their own ufe. The Greek Chriftians in this ifland are computed at 16,000. Thermia is the fee of a bifhop, and contains fifteen or fixteen churches, and feveral convents. On the ifland are ftill vifible the ruins of two cities; one of which, on the fouth coaft, muft have been of extraordinary fplendour. N. lat. 37° 20′. E. long. 24° 32′.

THERMIA, a town and capital of the ifland of Thermia. N. lat. 37° 24′. E. long. 24° 26′.

THERMOMETER, THERMOMETRUM, derived from θερμος, *heat*, and μετρον, *to meafure*, an inftrument fhewing, or rather meafuring, the increafe and decreafe of the heat and cold of the air.

The degree of heat, as afcertained by a thermometer, is only to be confidered in relation to the furrounding bodies, by virtue of which a body fupports the equilibrium of temperature, when it is in the neighbourhood of bodies equally heated: thus, if a thermometer ftands at 60°, both in a veffel of water and in another of mercury, we may infer that the water and the mercury may be mixed without any change of their temperature; but the abfolute quantity of heat contained in equal weights, or in equal bulks, of any two bodies at the fame temperature, is by no means the fame. See HEAT.

The general principles upon which the conftruction and ufe of thermometers, or meafurers of heat depend, are ftated and explained under the articles CALORIC, COLD, CONGELATION, FREEZING, HEAT, &c.

It will be fufficient to obferve in this place, that the well-known and moft general effect of heat, whether it be obtained by compreffing a certain fubftance into a narrower fpace, fo that a quantity of heat may come out of it and be communicated to certain bodies, or by expanding a certain fubftance into a larger fpace, fo that it may abforb a quantity of heat from furrounding bodies, and thus cool thefe bodies, or in whatever other way it be procured, is a dilatation of bodies, or an augmentation of their bulks. The contrary effect is produced by cold, *i. e.* by a diminution of the free caloric. It muft, however, be obferved, that bodies of equal bulks, but of different kinds, are not expanded alike by being heated to the fame degree; nor are the increments of bulk in the fame body always proportional to the quantities of heat which are communicated to it. *E. gr.* if a given quantity of water, by being heated to a certain degree, be increafed in bulk one cubic inch, the addition of double or treble that quantity of heat will not increafe its bulk two or three cubic inches refpectively; therefore the expanfions of water are not proportional to the increments of heat.

The only practicable method of meafuring the expanfions of fluids, is by inclofing them in certain veffels, and by meafuring that part of the cavity of each veffel which is occupied by the particular fluid which fills it in different temperatures. It is evident, that the fubftance of the veffel is alfo expanded by the heat, and of courfe its cavity is enlarged. Therefore, when we find that the bulk of the fluid is increafed, that apparent increment is only the difference between the enlarged capacity of the veffel and the increafed bulk of the fluid. For this reafon thofe veffels muft be made of fuch fubftances as are leaft expanfible by heat. Indeed glafs is the fubftance which is univerfally ufed for fuch purpofes, both on account of its little expanfibility, and of its tranfparency, befides its having other remarkably ufeful properties.

A glafs veffel filled to a certain degree with a liquid, for the purpofe of fhewing the expanfion of that liquid in different temperatures, or for the purpofe of fhewing the temperature by the correfponding expanfion of that liquid, is called a *thermometer*.

The thermometer and thermofcope are ordinarily accounted the fame thing: Wolfius, however, makes a difference; but fhews, at the fame time, that what we call thermometers are, in reality, no more than thermofcopes.

The invention of the thermometer is attributed to feveral perfons by different authors, *viz.* to Sanctorio, Galileo, Father Paul, and Drebbel. The invention is afcribed to Cornelius Drebbelius of Alcmaer, about the beginning of the feventeenth century, by his countrymen Boerhaave (Chem. i. p. 152. 156.) and Mufchenbroeck, Introd. ad Phil. Nat. vol. ii. p. 625.

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There are various kinds of thermometers; the conftruction, defects, theory, &c. of which, are as follow:

Conftruction of the Thermometer, depending on the Rarefaction of the Air.—This *aerial* thermometer, which was that firft invented by Drebbel, confifts of a glafs tube B E (*Plate* XVI. *Pneumatics, fig.* 1.), connected at one end with a large glafs ball A, and at the other end immerfed in an open veffel, or terminating in a ball D E, with a narrow orifice at D; which veffel, or ball, contains any coloured liquor that will not eafily freeze. Aqua fortis tinged of a fine blue colour with folution of vitriol or copper, or fpirit of wine tinged with cochineal, or Brafil wood, will anfwer this purpofe. But the ball, A, muft be firft moderately warmed, fo that a part of the air contained in it may be expelled through the orifice D; and then the liquor preffed by the weight of the atmofphere will enter the ball D E, and rife, *e. g.* to the middle of the tube at C, at a mean temperature of the weather; and in this ftate the liquor by its weight, and the air included in the ball A, &c. by its elafticity, will counterbalance the weight of the atmofphere. As the furrounding air becomes warmer, the air in the ball and upper part of the tube, expanding by heat, will drive the liquor into the lower

lower ball, and consequently its surface will descend; on the contrary, as the ambient air becomes colder, that in the ball is condensed, and the liquor pressed by the weight of the atmosphere will ascend: so that the liquor in the tube will ascend or descend more or less, according to the state of the air contiguous to the instrument. To the tube is affixed a scale of the same length, divided upwards and downwards from the middle, C, into one hundred equal parts, by means of which the ascent and descent of the liquor in the tube, and consequently the variations in the cold or heat of the atmosphere, may be observed.

It must be acknowledged, that the expansion of elastic fluids affords, in some cases, a test of heat, which is very convenient from its great delicacy, and because a very small quantity of heat is sufficient to raise their temperature very considerably.

A similar thermometer may be constructed by putting a small quantity of mercury, not exceeding the bulk of a pea, into the tube B C (*fig.* 2.) thus bent in wreaths, that taking up the less height, it may be the more manageable and less liable to harm; divide this tube into any number of equal parts to serve for a scale.

Here the approaches of the mercury towards the ball, A, will shew the increase of the degree of heat. The reason is the same as in the former.

The defect of both these instruments consists in this, that they are liable to be acted on by a double cause: for, not only a decrease of heat, but also an increase of weight of the atmosphere, will make the liquor rise in the one, and the mercury in the other; and, on the contrary, either an increase of heat, or decrease of weight of the atmosphere, will make it descend.

In winter, for example, the liquor would rise and sink too much; for a frost condensing the internal air, the liquor would ascend, but as the air is heavier in frosty weather, its pressure on the liquor in the vessel D E (*fig.* 1.) being increased, would raise the liquor still higher in the tube, and thus indicate a degree of cold greater than it really is. On the other hand, if the weather grows warm, as it does in rainy weather in winter, the air in the ball will expand, and the liquor descend in the tube; but as the weight of the atmosphere is less in foul weather, the liquor in D E will be less pressed than it was, and suffer the liquor to descend more than it should do, and shew a greater degree of warmth than that of the ambient air. The reverse of this will happen in summer: for warm weather being fair weather, and the atmosphere being then heavier than usual, the liquor will be made to stand higher in the tube than it should do, and shew the degree of heat to be less than it really is. And as in summer, the weather becomes cold with rain; but the weight of the atmosphere being diminished, the liquor will not ascend so far as it ought to ascend by the condensation of the internal air, and therefore indicate the cold to be less than it really is: and when the two causes, thus contributing to the rise and fall of the liquor, act equally in opposite directions, the liquor would appear neither to ascend nor descend, whatever might be the changes in the temperature of the atmosphere, on account of equal corresponding variations in its gravity. Besides, the air in the ball, &c. is liable to be affected more or less in its elastic quality by the vapours that detach themselves from the included liquor according to the degree in which it is heated or cooled. For these and other measures, thermometers of this kind have been long disused.

Instruments of this kind, when they are subject to the variations of the pressure of the atmosphere, as well as to those of its temperature, are properly called manometers, and require, for enabling us to employ them as thermometers, a comparison with the barometer; while, on the other hand, they may be used as barometers if the temperature be otherwise ascertained. They are, however, very useful without this comparison, in delicate experiments of short duration; besides, the changes of the barometer are seldom very rapid, and they may also be wholly freed from the effects of the pressure of the atmosphere in various ways.

Bernouilli's method consists in closing the tube of a common barometer so as to leave the column of mercury in equilibrium with the air contained in the bulb at its actual temperature, and capable of indicating, by the changes of its height and of its pressure, any subsequent changes in the temperature of the air, which must affect both its bulk and its elasticity. (See *fig.* 3.) Mr. Leslie's photometer, or *Differential* THERMOMETER (which see), has some advantages which render it better than this instrument; but it can only be employed when the changes of the temperature can be confined only to a part of the instrument. The elasticity of the air contained in the bulb is here counteracted, not by the pressure of a column of mercury, but by the elasticity of another portion of air in a second bulb, which is not to be exposed to the heat or cold that is to be examined; and the difference of the temperatures of the two bulbs is indicated by the place of a drop of a liquid, moving freely in the tube which joins them.

M. Amontons, in 1702, with a view of perfecting the *aerial* thermometer, contrived his *universal* thermometer. Finding that the changes produced by heat and cold in the bulk of the air were subject to invincible irregularities, he substituted for these the variations produced by heat in the elastic force of this fluid. This thermometer consisted of a long tube of glass (see *fig.* 4.) open at one end, and recurved at the other end, which terminated in a ball. A certain quantity of air was compressed into this ball by the weight of a column of mercury, and also by the weight of the atmosphere. The effect of heat on this included air was to make it sustain a greater or less weight; and this effect was measured by the variation of the column of mercury in the tube, corrected by that of the barometer, with respect to the changes of the weight of the external air. This instrument, though much more perfect than those in the room of which it was substituted by its inventor, is nevertheless subject to very considerable defects and inconveniences. Its length of four feet renders it unfit for a variety of experiments, and its construction is difficult and complex: it is extremely inconvenient for carriage, as a very small inclination of the tube would suffer the included air to escape: and the friction of the mercury in the tube, and the compressibility of the air, contribute to render the indications of this instrument extremely uncertain. Besides, the dilatation of the air is not so regularly proportional to its heat, nor is its dilatation by a given heat nearly so uniform as he supposed. This depends, as the abbé Nollet has suggested, much on its moisture; for dry air does not expand near so much by a given heat, as air stored with watery particles; which by being converted into steam, very much increase the seeming volume of the air. For these and other reasons enumerated by M. de Luc, (Récherches sur les Mod. de l'Atm. tom. i. p. 278, &c.) this instrument was imitated by very few, and never came to be of general use.

Construction of the Florentine Thermometer.—The academists del Cimento, about the middle of the seventeenth century, considering the inconveniences of the air-thermometers above described, attempted another, that should measure heat and cold by the rarefaction and condensation of spirit of wine; though much less than those of air, and consequently to express any thing that warms the body, and by others particularly for a warm fomentation, prescribed by Hippocrates for removing pains in the side, and giving ease in pleurisies.

THERMES, in *Ancient Geography*, a town of Hispania Citerior, S. of Numantia.

THERMI, in *Geography*, a town of Asiatic Turkey, in the province of Natolia; 24 miles N. of Bursa.

THERMIA, an island in the Grecian Archipelago, so called from its abounding with hot springs. It is not so mountainous as some of the other islands, and the soil, when well cultivated, produces very large quantities of barley, wine, and figs. The island also affords plenty of honey, wax, partridges, a great quantity of fine silk, and as much cotton as the inhabitants require for their own use. The Greek Christians in this island are computed at 16,000. Thermia is the see of a bishop, and contains fifteen or sixteen churches, and several convents. On the island are still visible the ruins of two cities; one of which, on the south coast, must have been of extraordinary splendour. N. lat. 37° 20'. E. long. 24° 32'.

THERMIA, a town and capital of the island of Thermia. N. lat. 37° 24'. E. long. 24° 26'.

THERMOMETER, THERMOMETRUM, derived from θερμος, *heat*, and μετρον, *to measure*, an instrument shewing, or rather measuring, the increase and decrease of the heat and cold of the air.

The degree of heat, as ascertained by a thermometer, is only to be considered in relation to the surrounding bodies, by virtue of which a body supports the equilibrium of temperature, when it is in the neighbourhood of bodies equally heated: thus, if a thermometer stands at 60°, both in a vessel of water and in another of mercury, we may infer that the water and the mercury may be mixed without any change of their temperature; but the absolute quantity of heat contained in equal weights, or in equal bulks, of any two bodies at the same temperature, is by no means the same. See HEAT.

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It will be sufficient to observe in this place, that the well-known and most general effect of heat, whether it be obtained by compressing a certain substance into a narrower space, so that a quantity of heat may come out of it and be communicated to certain bodies, or by expanding a certain substance into a larger space, so that it may absorb a quantity of heat from surrounding bodies, and thus cool these bodies, or in whatever other way it be procured, is a dilatation of bodies, or an augmentation of their bulks. The contrary effect is produced by cold, *i. e.* by a diminution of the free caloric. It must, however, be observed, that bodies of equal bulks, but of different kinds, are not expanded alike by being heated to the same degree; nor are the increments of bulk in the same body always proportional to the quantities of heat which are communicated to it. *E. gr.* if a given quantity of water, by being heated to a certain degree, be increased in bulk one cubic inch, the addition of double or treble that quantity of heat will not increase its bulk two or three cubic inches respectively; therefore the expansions of water are not proportional to the increments of heat.

The only practicable method of measuring the expansions of fluids, is by inclosing them in certain vessels, and by measuring that part of the cavity of each vessel which is occupied by the particular fluid which fills it in different temperatures. It is evident, that the substance of the vessel is also expanded by the heat, and of course its cavity is enlarged. Therefore, when we find that the bulk of the fluid is increased, that apparent increment is only the difference between the enlarged capacity of the vessel and the increased bulk of the fluid. For this reason those vessels must be made of such substances as are least expansible by heat. Indeed glass is the substance which is universally used for such purposes, both on account of its little expansibility, and of its transparency, besides its having other remarkably useful properties.

A glass vessel filled to a certain degree with a liquid, for the purpose of shewing the expansion of that liquid in different temperatures, or for the purpose of shewing the temperature by the corresponding expansion of that liquid, is called a *thermometer*.

The thermometer and thermoscope are ordinarily accounted the same thing: Wolfius, however, makes a difference; but shews, at the same time, that what we call thermometers are, in reality, no more than thermoscopes.

The invention of the thermometer is attributed to several persons by different authors, *viz.* to Sanctorio, Galileo, Father Paul, and Drebbel. The invention is ascribed to Cornelius Drebbelius of Alcmaer, about the beginning of the seventeenth century, by his countrymen Boerhaave (Chem. i. p. 152. 156.) and Muschenbroeck, Introd. ad Phil. Nat. vol. ii. p. 625.

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lower ball, and consequently its surface will descend; on the contrary, as the ambient air becomes colder, that in the ball is condensed, and the liquor pressed by the weight of the atmosphere will ascend: so that the liquor in the tube will ascend or descend more or less, according to the state of the air contiguous to the instrument. To the tube is affixed a scale of the same length, divided upwards and downwards from the middle, C, into one hundred equal parts, by means of which the ascent and descent of the liquor in the tube, and consequently the variations in the cold or heat of the atmosphere, may be observed.

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A similar thermometer may be constructed by putting a small quantity of mercury, not exceeding the bulk of a pea, into the tube B C (*fig.* 2.) thus bent in wreaths, that taking up the less height, it may be the more manageable and less liable to harm; divide this tube into any number of equal parts to serve for a scale.

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In winter, for example, the liquor would rise and sink too much; for a frost condensing the internal air, the liquor would ascend, but as the air is heavier in frosty weather, its pressure on the liquor in the vessel D E (*fig.* 1.) being increased, would raise the liquor still higher in the tube, and thus indicate a degree of cold greater than it really is. On the other hand, if the weather grows warm, as it does in rainy weather in winter, the air in the ball will expand, and the liquor descend in the tube; but as the weight of the atmosphere is less in foul weather, the liquor in D E will be less pressed than it was, and suffer the liquor to descend more than it should do, and shew a greater degree of warmth than that of the ambient air. The reverse of this will happen in summer: for warm weather being fair weather, and the atmosphere being then heavier than usual, the liquor will be made to stand higher in the tube than it should do, and shew the degree of heat to be less than it really is. And as in summer, the weather becomes cold with rain; but the weight of the atmosphere being diminished, the liquor will not ascend so far as it ought to ascend by the condensation of the internal air, and therefore indicate the cold to be less than it really is: and when the two causes, thus contributing to the rise and fall of the liquor, act equally in opposite directions, the liquor would appear neither to ascend nor descend, whatever might be the changes in the temperature of the atmosphere, on account of equal corresponding variations in its gravity. Besides, the air in the ball, &c. is liable to be affected more or less in its elastic quality by the vapours that detach themselves from the included liquor according to the degree in which it is heated or cooled. For these and other measures, thermometers of this kind have been long disused.

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Construction of the Florentine Thermometer.—The academists del Cimento, about the middle of the seventeenth century, considering the inconveniences of the air-thermometers above described, attempted another, that should measure heat and cold by the rarefaction and condensation of spirit of wine; though much less than those of air, and consequently fequently the alterations in the degree of heat likely to be much lefs fenfible.

The fpirit of wine was enclofed in glafs tubes, hermetically fealed; fo that thefe thermometers could be fubject to no inconvenience by the evaporation of the liquor, or the variable gravity of the incumbent atmofphere. Inftruments of this kind were firft introduced into England by Mr. Boyle, and they were foon univerfally ufed among philofophers in other countries. The *Florentine* thermometer confifts of a fmall narrow tube B C D (*fig.* 5.) connected with a glafs ball A. The tube fhould be procured as cylindric as poffible: and it may be tried, by putting into one end of it as much mercury as will fill the length of one inch, and letting this quantity of mercury pafs from one part of the tube to another, through its whole length; meafure with compaffes the length it occupies in every part of the tube; and if it every where takes up an inch, the tube is cylindric, and a fcale of equal divifions will agree with it: otherwife it will be longer where the tube is fmaller, and fhorter than an inch where the tube is larger; and in this cafe, the divifions muft be fuited to the contents of the bore. The glafs ball may then be joined to the tube, and a fmall cavity be made at the other end. Fill the ball and tube with rectified fpirit of wine to a convenient height, as to C, when the weather is of a mean temperature, which may be done by inverting the tube into a veffel of ftagnant coloured fpirit, under a receiver of the air-pump, or by many other ways. The fpirit may be coloured by pouring a quantity of it on fmall pieces of turmeric, which will hereby receive a red tincture; and the fpirit may be repeatedly filtrated through brown paper, in order to feparate from it the coarfer particles of the root. Some perfons, in filling the ball and tube, for preventing the fpirit from wholly defcending into the ball in winter, recommend putting the ball into a lump of fnow, mixed with falt; or if the inftrument be made in fummer, into fpring-water impregnated with falt-petre, that the condenfed fpirit may fhew how far it will retire in extreme cold. If it rifes to too great a height from the ball, part of it is to be taken out; and that the tube may not be made longer than neceffary, it is convenient to immerge the ball, filled with its fpirit in boiling water, and to mark the fartheft point to which it then rifes. When the thermometer is properly filled, with a lamp heat the little bubble left at the end of D red-hot, and feal it hermetically, leaving, as Dr. Defaguliers recommends, in the thermometer only the third part of the air that was in it, which will give room to the dilatation of the fpirit; and this rarefied air will prevent the air left in the fpirit, even after the air-pump has been applied, from dividing the fpirit by its expanfion. To the tube apply a fcale, divided into one hundred equal parts, from C towards D, and alfo from C towards B.

Now, fpirit of wine rarefying and condenfing very confiderably; as the heat of the ambient air increafes, the fpirit will dilate, and confequently will afcend in the tube; and as the heat decreafes, the fpirit will defcend: and the degree or quantity of afcent and defcent will be feen in the fcale. Yet as the ratio of yefterday's heat to to-day's is not hereby difcovered, this inftrument is not ftrictly a thermometer, any more than the former.

It is to be here obferved, 1. That as the natural gravity of the liquor makes it tend downwards, fo it refifts its afcent out of the ball into the tube; and that the more, as it rifes higher; for which reafon, fome have advifed to have the tube horizontal.

2. Since there muft of neceffity be fome air left in the void part of the tube, over the liquor, that air, by its elafticity, will tend downwards, and of confequence will refift the rife of the liquor, and be compreffed by it as it does rife: its elafticity therefore is thus increafed.

3. Since it is found from experience, that a lefs degree of heat is communicated more eafily to the fpirit of wine in the ball than a greater, the rarefactions of the fpirit of wine are not proportionable to their producing caufes; efpecially fince a greater degree of heat finds more liquor in the tube than a lefs does, to which, notwithftanding, the heat may be more eafily communicated than to that ftagnating in the ball.

4. Spirit of wine is incapable of bearing very great heat or very great cold. It boils fooner than any other liquor, and, therefore, the degrees of heat of boiling fluids cannot be determined by this thermometer. And though it retains its fluidity in pretty fevere cold, yet it feems not to condenfe very regularly in them: and at Torneo, near the polar circle, the winter cold was fo fevere, as Maupertuis informs us, that the fpirits were frozen in all their thermometers. So that the latitude of heat and cold, which fpirit of wine is capable of indicating, is much too limited to be of very great or univerfal ufe. On thefe accounts, the Florentine thermometer, though it has been much ufed, is far from being an accurate meafure of heat, &c. to which may be added what Dr. Halley obferves in the Philofophical Tranfactions, that he has learned from thofe who have kept fpirit of wine long, that it always lofes part of its expanfive force in courfe of time.

This objection, fuggefted by Dr. Halley, and often infifted on by others, has, according to Dr. Martine, no great weight. Well rectified fpirit of wine, if fealed up in a glafs, is in a confiderable degree unalterable. It cannot evaporate; and by many years experience its force of expanfion has continued the fame; as, befide other obfervations, we know efpecially from the Annual Regifters of M. de la Hire's fpirit thermometer, that have been kept in the Obfervatory for many years.

Another great defect of thefe, and other thermometers, is, that their degrees are not comparable with each other. They mark, indeed, the different degrees of heat and cold; but each marks only for itfelf, and after its own manner; becaufe they do not proceed from any point of heat, or cold, that is common to them all. It is with them as with two clocks, which for want of having been firft fet to the fame hour by the fun, will, indeed, mark that one, two, or more hours are paffed, but not what hour it is by the day. Nor can we be affured, that when the liquor is rifen a degree in two different thermometers, they have both fuffered the fame impreffion of an equal additional heat: fince the fpirit of wine may not be the fame in both; and, in proportion as the fpirit is more or lefs rectified, it will rife more or lefs high by the fame heat. Nor is this all; for in graduating thermometers, they often take equal lengths of the tube for equal afcents of the fpirit: whereas, fuppofing the diameters of the tube equal throughout, which very rarely happens, there are fo many irregularities withinfide, that a certain length of tube fometimes requires double the quantity of liquor to fill it, that the fame length in another tube of the fame diameter requires. All which arifes from the unequal thickneffes of the parietes of tubes in different places; and from accidental prominences and cavities, always found in the inner furfaces of tubes; and efpecially from their being always bigger at one end than the other.

Befides, the divifions of the fcale cannot accurately indicate the quantity of rarefaction, unlefs the proportion of the cavity of the tube D B to that of the ball A were known. Hence it is, that the comparifon of thermometers becomes fo precarious and defective. Yet the moft curious and interefting ufe of thermometers is, what ought to arife from fuch ſuch compariſon. It is by this we ſhould know the heat or cold of another ſeaſon, of another year, another climate, &c. and what is the greateſt degree of heat or cold in which men and other animals can ſubſiſt.

M. de Reaumur contrived a new thermometer for the purpoſe; wherein the inconveniences above recited are propoſed to be remedied. He took a large ball and tube, and knowing the content of the ball as well as that of the tube in every part, he graduated the tube, ſo that the ſpace from one diviſion to another might contain a thouſandth part of the liquor, which liquor would contain one thouſand parts when it ſtood at the freezing point: then putting the ball of his thermometer, and part of the tube, into boiling water, he obſerved whether it roſe eighty diviſions; and if it exceeded theſe, he changed his liquor, and by adding water lowered it, ſo that on the next trial from the freezing point to the point of boiling water, it ſhould only riſe eighty diviſions: but if the liquor, being too low, fell ſhort of eighty diviſions, he raiſed it by adding rectified ſpirit to it. The liquor thus prepared ſuited his purpoſe, and ſerved for making a thermometer of any ſize, whoſe ſcale would agree with his ſtandard. Such liquor, or ſpirits, being about the ſtrength of common brandy, may eaſily be had any where, or made of a proper degree of denſity by raiſing or lowering it.

The abbé Nollet made many excellent thermometers upon M. de Reaumur's principle. Dr. Martine, however, expreſſes his apprehenſions that thermometers of this kind are conſtructed on principles, that will by no means be found ſo accurate as were to be wiſhed and expected. The balls, or bulbs, being large, as three or four inches in diameter, are neither heated nor cooled ſoon enough to ſhew the variations in the heat of bodies, and in the weather. Small bulbs and ſmall tubes, he ſays, are much more convenient, and may be conſtructed with ſufficient accuracy. Though it muſt be allowed, that Reaumur, by his excellent ſcale, and by depriving the ſpirit of wine of its air, and expelling the air by means of heat from the ball and tube of his thermometer, has brought it to as great a degree of perfection as it may poſſibly admit; yet it is liable to ſome of the inconveniences of *ſpirit* thermometers, and much inferior to the *mercurial* thermometers. Thermometers of this kind, and thoſe of mercury, do not agree in indicating the ſame degrees of extreme cold; for when the mercury has ſtood at 22° below 0, the ſpirit indicated only 18°; and when the mercury ſtood at 28° or 37° below 0, the ſpirit reſted at 25° or 29°. See the deſcription of Reaumur's thermometer at large in Mem. de l'Acad. R. des Scienc. an. 1730, p. 645. Hiſt. p. 15. Ibid. an. 1731, p. 354. Hiſt. p. 7.

In 1740, M. Micheli du Creſt conſtructed a ſpirit thermometer, to which he annexes four ſcales beſides its own, *viz.* that of the old thermometer in the Obſervatory at Paris, Reaumur's, de l'Iſle's, and Fahrenheit's. See *Fixed Points of* THERMOMETERS.

THERMOMETER, *Mercurial.* It is a circumſtance of principal importance in the conſtruction of thermometers, to procure a fluid that meaſures equal variations of heat by correſponding equal variations in its own bulk or volume: and the fluid which poſſeſſes this eſſential requiſite in the moſt perfect degree is mercury: the variations in its bulk approaching nearer to a proportion with the correſponding variations of its heat than any other fluid. This general propoſition M. de Luc has very elaborately evinced, by ſhewing that the condenſations of fluids, which increaſe in bulk when they freeze, are not proportional to the diminutions of heat; and that the dilatations of fluids, which are eaſily converted into vapour by heat, are not proportional to the augmentations of heat: whereas the bulk of mercury is not enlarged when it freezes, and it reſiſts evaporation more than every other liquid that has been uſed in the conſtruction of thermometers. Beſides, it is of all liquids the moſt eaſily purged of its air. It is alſo the moſt proper for meaſuring very conſiderable variations of heat; for, if a ſcale be graduated with 0 at the point of melting ice, and 80 at that of boiling water, mercury well purged of its air will indicate ſeven times this difference of heat, or 561 degrees in ſuch a ſcale; as it will condenſe without freezing to — 261 of this ſcale, and expand without boiling to 300 of the ſame ſcale. Mercury is alſo more ſenſible than any other fluid, air excepted, and conforms more readily to the ſeveral variations of heat. Moreover, as mercury is an homogeneous fluid, it will in every thermometer exhibit the ſame dilatation or condenſation by the ſame variations of heat. The expanſion of mercury is ſcarcely leſs regular than that of ſolids, which probably approaches the neareſt to the ſteps of the natural ſcale, though not without ſome inequality; and therefore a portion of mercury incloſed in a bulb of glaſs, having a fine tube connected with it, forms a thermometer the moſt convenient and probably the moſt accurate of any, for common uſe; the degrees correſponding very nearly with thoſe of the natural ſcale, although, according to the moſt accurate experiments, they appear to indicate, towards the middle of the common ſcale of Fahrenheit, a temperature two or three degrees too low. There is an inequality of the ſame kind, but ſtill greater, in the degrees of the ſpirit thermometer; and this inſtrument has alſo the diſadvantage of being liable to burſt in a heat below that of boiling water; nevertheleſs, it is well calculated for the meaſurement of very low temperatures, ſince pure alcohol has never yet been frozen, while mercury has been reduced to a ſolid by the cold of Siberia and of Hudſon's Bay; but both mercury and linſeed oil ſupport a heat of between 500° and 600°, without ebullition.

In order to render thermometers uniform and comparable, it is deſirable that mercury, ſo excellently adapted for this purpoſe, ſhould be the only fluid uſed in the conſtruction of them, more eſpecially as a thermometer with mercury may be more eaſily conſtructed than any others. De Luc's Récherches, &c. vol. i. part ii. cap. 2. paſſim.

Dr. Halley, though appriſed only of ſome of the remarkable properties of mercury above recited, ſeems to have been the firſt who ſuggeſted the application of this fluid to the conſtruction of thermometers. Phil. Tranſ. Abr. vol. ii. p. 34.

Boerhaave (Chem. i. p. 720.) ſays, theſe mercurial thermometers were firſt contrived by Olaus Roemer; but the claims of Fahrenheit of Amſterdam, who gave an account of his invention to the Royal Society in 1724 (Phil. Tranſ. N° 381, or Abr. vol. vii. p. 49.), have been generally allowed. And though Prins and others, in England, Holland, France, and other countries, have made this inſtrument as well as Fahrenheit, moſt of the mercurial thermometers are graduated according to his ſcale, and are called *Fahrenheit's* thermometers. Theſe are made of different lengths, and with ſome variation in the form of the bulb, according to the purpoſes for which they are deſigned. Inſtead of the ball, uſed in the ſpirit thermometer, a cone or cylinder is annexed to the tube, which may be eaſily enlarged or diminiſhed, and made of ſuch a magnitude, that its capacity may have a certain and known proportion to that of the tube; and by this means ſeveral thermometers may be conſtructed to the ſame ſcale: beſides, the heat more eaſily penetrates and reaches the inmoſt parts of the cylindric bulb, and cauſes the whole content to expand uniformly, and the mercury to riſe almoſt immediately; whereas in thermometers with a ſpherical bulb it is ſeen firſt to fall, and then to riſe. This phenomenon has been long ſince noticed both in Florentine and mercurial thermometers, when they are ſuddenly plunged into a heated liquor, the ſpirit of wine or mercury firſt deſcends, and then aſcends; and when they are plunged into a cold fluid, the included liquor firſt aſcends and then deſcends: this is the more remarkable in thermometers whoſe bulb is made of thick glaſs; and the reaſon of the phenomenon is obvious. The bulb of glaſs is ſooner affected by the heat or cold applied to it than the included fluid; and as the glaſs expands by heat, the capacity of the bulb is enlarged, and the liquor deſcends in the tube, but being condenſed by cold, and its capacity diminiſhed, the liquor is preſſed upwards in the tube: and both theſe effects continue till the heat and cold equally affect the incloſed fluid. Hence it follows, that all the variations of aſcent and deſcent, to which the ſpirit or mercury is ſubject in the thermometer, are only the difference of the rarefactions and condenſations of glaſs, and of the contained fluid. Hiſt. Ac. Royal, 1705.

The cone, or cylinder, of the thermometer is made of glaſs of a moderate thickneſs, leſt, when the exhauſted tube is hermetically ſealed, its internal capacity ſhould be diminiſhed by the weight of the ambient atmoſphere. When the mercury is thoroughly purged of its air and moiſture by boiling, the thermometer is filled with a ſufficient quantity of it; and before the tube is hermetically ſealed, the air is wholly expelled by heating the mercury, ſo that it may be rarefied and aſcend to the top of the tube. To the ſide of the tube is annexed a ſcale (ſee *fig.* 4.) which Fahrenheit divided into ſix hundred parts, beginning with that of the ſevere cold which he had obſerved in Iceland in 1709, or that produced by ſurrounding the bulb of the thermometer with a mixture of ſnow or beaten ice and ſal ammoniac or ſea-ſalt. This he apprehended to be the greateſt degree of cold, and accordingly he marked this, as the beginning of his ſcale, with 0; the point at which mercury begins to boil, he conceived to ſhew the greateſt degree of heat, and this he made the limit of his ſcale. The diſtance between theſe two points, he divided into ſix hundred equal parts or degrees; of which 32 reckoned from 0, indicates the degree of cold when ſnow or ice thaws naturally, or water begins to freeze, and this is called the *freezing point:* and he marked the heat of boiling water with 212, &c. In order more particularly to explain the diviſions of this ſcale, and to ſhew how the dilatation and condenſation of the mercury are eſtimated by it, we may obſerve that the bulb is ſuppoſed to contain, according to Boerhaave and Muſchenbroek, 11124 parts of quickſilver, which ſtands at the loweſt mark, or *gr.* 0, in an intenſe cold, &c. as above determined: if the bulb be immerged in ſnow or ice thawing naturally, or in water beginning to freeze, the quickſilver is dilated, and riſes in the tube 32 of theſe 11124 parts; and therefore the ſpace of the tube from *gr.* 0 to the freezing point *gr.* 32, is divided into thirty-two equal parts. When the thermometer is placed in water brought to a ſtrong boiling at a middle ſtate of the atmoſphere in places near the level of the ſea, when the mercury in the barometer ſtands at about 30 inches or a very little under it, the quickſilver is dilated 212 of theſe parts beyond its original bulk of 11124, ſo as now to poſſeſs in the bulb and tube together a ſpace equal to 11336 ſuch parts; and the ſpace from *gr.* 32 to *gr.* 212, is divided into 180 equal parts or degrees of the thermometer; which, if the tube be long enough, may be protracted as far as is convenient. It may extend well enough to *gr.* 600, and not much farther, for with a heat but little greater than that the mercury begins to boil.

Dr. Boerhaave, in one place, makes the number of parts into which the mercury in the bulb is ſuppoſed to be divided to be 10782 inſtead of 11124, and in another place ſtates it at 11520, which Dr. Martine apprehends to be nearer the truth, or about 11790 parts; and he thinks the eaſieſt and ſureſt method is to fill the bulb and tube, without being ſolicitous about the bulk of the quickſilver, ſo that in freezing water, or melting ice, the mercury ſhall ſtand at a convenient height, which muſt be very nicely marked *gr.* 32; and then as accurately to obſerve where it ſtands when dilated by the heat of boiling water to *gr.* 212. The intermediate ſpace is then divided into 180 degrees, which ſcale may be protracted upwards or downwards as far as we ſhall judge convenient. See *Fixed Points of* THERMOMETERS.

In the above method of graduating the ſcale, the bore of the tube is ſuppoſed to be perfectly cylindric, which cannot always be obtained. But though it be tapering or ſomewhat unequal, it is eaſy to manage that matter, in the manner propoſed by the abbé Nollet (Leçons de Phyſ. Exp. tom. iv. p. 376.) by making a ſmall portion of the quickſilver, *e. g.* as much as fills up an inch or half an inch, ſlide backward and forward in the tube; and thus to find the proportions of all its inequalities, and from thence to adjuſt the diviſions to a ſcale of the moſt perfect equality. See *Obſervations on the Conſtruction of* THERMOMETERS.

Other thermometers of a ſimilar conſtruction have been accommodated to common uſe, the ſcale of which is only a part of that above deſcribed. They have been made of a ſmall ſize and portable form, and the tube with its annexed ſcale has been encloſed in another thicker glaſs hermetically ſealed, in order to preſerve it from injury. Mr. Ramſden, at the deſire and for the uſe of Mr. Hunter in his experiments on the heat of animals and vegetables, conſtructed very ſmall thermometers, ſix or ſeven inches long, and not above two twelfths of an inch thick in the ſtem; having the external diameter very little larger than that of the ſtem, on which was marked the freezing point. The ſtem was embraced by a ſmall ivory ſcale, ſo as to ſlide upon it eaſily, and retain any poſition. Upon the hollow ſurface of this ſcale were marked the degrees which were ſeen through the ſtem. Phil. Tranſ. vol. lxviii. part i. p. 8.

Several varieties of thermometers are conſtructed for philoſophical purpoſes. For comprehending the whole range of thermometrical temperature from the moſt intenſe artificial cold to the boiling point of mercury, it is neceſſary to be provided with a very long tube; but for moſt chemical purpoſes, it need only be graduated to about ten degrees above the boiling point, which will reach the temperature of moſt ſaline ſolutions when boiling. For experiments in intenſe cold, a ſpirit thermometer ſhould be graduated about 100 degrees below 0, and the lower extremity of the ſcale ſhould be at ſome diſtance from the bulb, that the temperature may be obſerved without lifting the bulb out of any deep veſſel that may contain the freezing mixture. The moſt delicate and ſenſible thermometers are made with a very ſmall bulb, ſcarcely larger than the ſtem, and a tube of an extremely narrow bore, not larger than a horſe-hair. For chemical purpoſes alſo, the ſcale ſhould either be ſcratched on the glaſs itſelf, or, as this is difficult to be ſeen in a common light, an ivory ſcale ſhould be attached without reaching ſo low as the bulb, that the latter may be ſafely immerſed in acid or corroſive liquors.

In

In 1733, M. de l'Isle of Petersburg constructed a *mercurial* thermometer (see *fig.* 4.) on the principles of Reaumur's *spirit* thermometer. In his thermometer, the whole bulk of quicksilver, when immerged in boiling water, is conceived to be divided into 10,000, or rather 100,000 parts; and from this one fixed point, the various degrees of heat, either above or below it, are marked in these parts on the tube or scale, by the various expansion or contraction of the quicksilver in all the imaginable variety of heat. Dr. Martine apprehends it would have been better if M. de l'Isle had made the integer of 100,000 parts, or fixed point at freezing water, and from thence computed the dilatations or condensations of the quicksilver in those parts. All the common observations of the weather, &c. would have been expressed by numbers increasing as the heat increased, which is the more natural way; nor would there have been any great incongruity, or inconvenience, in expressing, after the manner of Reaumur, the few observations that occur below simple freezing by numbers of contraction below *gr.* 0, or 100,000. However, in practice, it will not be very easy to determine exactly all the divisions from the alteration of the bulk of the contained fluid. And besides, as glass itself is dilated by heat, though in a less proportion than quicksilver, so that it is only the excess of the dilatation of the contained fluid above that of the glass that is observable; if different kinds of glass be differently affected by a given degree of heat, this will make a seeming difference in the dilatation of the quicksilver in the thermometers, constructed in the Newtonian method, either by M. de Reaumur's or M. de l'Isle's rules. Accordingly, it has been found, that the quicksilver in thermometers, constructed in M. de l'Isle's way, has stood at different degrees of the scale when immerged in thawing snow. In some it was at *gr.* 154, in others at 156, and in another at 158: and it appears by M. de l'Isle's own account, that his thermometers disagree considerably from one another. *Celsius's* thermometer has been chiefly used in Sweden, and hence it has been called the *Swedish* thermometer. The French chemists have lately adopted it, under the name of *centigrade* thermometer. See *Fixed Points of* THERMOMETERS, and the table at the close of this article.

THERMOMETER, *Metalline*, is a name given to a machine composed of two metals, which, whilst it indicates the variations of cold and heat, serves to correct the errors that result from hence in the construction of pendulum clocks. Instruments of this kind have been contrived by Graham, Le Roy, in 1738, Ellicot, Harrison, &c. See *Compound* PENDULUM.

We have also an account of instruments of this kind invented by Mortimer, Frotheringham, and Fitzgerald, in the Phil. Trans. vol. xliv. p. 689, vol. xlv. p. 129, and vol. li. p. 823; to which we must refer for a particular description of each, illustrated by figures.

M. de Luc has likewise described two thermometers of metal, which he uses for correcting the effects of heat upon a barometer, and an hygrometer of his construction connected with them. In one of these, a strong rod of well-hardened brass, supports upon an edge, at a convenient distance from the centre of motion, a lever, which holds the scale of the barometer suspended, and makes it rise or fall by the dilatation or condensation of the brass rod, as the quicksilver rises or falls in the barometer, by the corresponding variations of heat. This scale of the barometer, when it moves, draws or loosens a thread of silk-grass, which goes over a small pulley placed upon the same axis with a much larger one, to which the scale of the hygrometer is hung likewise by a similar thread, which thus varies, by the proportion of the diameters of the pulleys, as the heat makes the quicksilver in the hygrometer vary. This instrument is convenient for meteorological observations: because it saves one observation and two corrections for the heat; but it is necessary from time to time to correct an irregularity in it, which is easily perceived by means of an index, carried by the moveable scales of the two instruments, which, going over immoveable scales of the same sort, shews their difference of height. When this difference is no longer conformable to the indication of the thermometer, it is easily rectified by turning small pegs, on which is twisted the thread of silk-grass, which serves for the suspension of the scales. The irregularity just mentioned consists in this, that when the heat, after having varied, returns to the same point of the quicksilver thermometer, the metallic thermometer does not return to it exactly, but varies nearly in the following manner: during the summer, the latter gains constantly on the former, *i. e.* amidst its variations, it always preserves a small part of the lengthening, which is at that time its ordinary state. In winter, on the contrary, it becomes insensibly a little too short. The other metallic thermometer, which is more curious than useful, on account of its greater irregularity, consists of a rod of lead, which, communicating by a thread of silk-grass with a small pulley fixed to the same axis with a greater one, conducts, by means of another pulley, a needle through whose axis, which is bored, passes another axis that carries the needle of a pulley barometer. Thus this instrument marks the heat and weight of the air upon two concentric circles, by means of two needles turning upon the same centre, as in clocks; besides which, the needle of the thermometer points out upon a third circle the correction for the heat, to be made on the barometer. See Phil. Trans. vol. lxviii. part i. p. 437, &c.

THERMOMETERS, *Oil.* To this class belongs sir Isaac Newton's thermometer, constructed in 1701, with linseed oil instead of spirit of wine. This liquor has the advantage of being sufficiently homogeneous, and capable of a considerable rarefaction, not less than fifteen times greater than that of spirit of wine. It has not been observed to freeze even in very great colds, and it is able to bear a great heat, about four times that of water, without boiling. With these advantages it was made use of by sir Isaac Newton, who discovered by it the comparative degree of heat for boiling water, melting wax, boiling spirit of wine, and melting tin; beyond which it does not appear that this thermometer was applied. The method he used for adjusting the scale of this oil-thermometer was as follows: supposing the bulb, when immerged in thawing snow, to contain 10,000 parts, he found the oil expanded by the heat of the human body so as to take up one thirty-ninth more space, or 10256 such parts; and by the heat of water boiling strongly, 10725; and by the heat of melting tin, 11516. So that, reckoning the freezing point as a common limit between heat and cold, he began his scale there, marking it *gr.* 0, and the heat of the human body he made *gr.* 12; and, consequently, the degrees of heat being proportional to the degrees of rarefaction, or 10256 : 10725, *i. e.* 256 : 725 :: 12 : 34, the heat of boiling water was expressed by *gr.* $34 = \frac{725 \times 12}{256}$; and that of the melting tin by *gr.* 72. Phil. Trans. No. 270, or Abr. vol. iv. part ii. p. 3.

Although in this graduation sir Isaac Newton does not specify any degree of cold below that of freezing water, yet it would be easy to protract his scale downward below *gr.* 0, or the freezing point, and thus to adapt it for estimating greater degrees of cold, like other thermometers. But there is another insuperable inconvenience that attends all ther-

thermometers made with oil, or any other viſcid liquor, *viz.* that ſuch a liquor adheres too much to the ſides of the tube. In a ſudden cold or fall of the oil, much of it ſticks by the way, and only ſinks gradually afterwards, ſo that at firſt the ſurface appears really lower than the preſent temperature requires. And beſides, as at all times ſome of the oil muſt continue to ſtick and moiſten the inſide of the tube, in different degrees of heat and cold, the oil, becoming alternately more or leſs viſcid, will adhere ſometimes more and ſometimes leſs; and will, therefore, inevitably diſturb the regularity and uniformity of the thermometer. Martine's Eſſays, Eſſ. iii.

Thermometers, *Fixed Points of.* Various methods have been propoſed by various authors, for finding a fixed point, or degree, of heat and cold, from which to reckon the other degrees, and adjuſt the ſcale; ſo that obſervations made at the ſame or different times, in different places, might be compared together. For want of this, notwithſtanding all the numerous regiſters of the weather, &c. that have been kept and publiſhed by different authors, we are much at a loſs to determine the comparative differences of heat and cold in different countries and climates, and the reſult of many other obſervations. If all the weather-glaſſes in the world had been made according to one determined ſcale, theſe inconveniences and uncertainties would have been prevented; which, indeed, are now unavoidable, and muſt ſtill continue ſo, till all agree to graduate their thermometers in the ſame manner, or at leaſt determine ſome fixed or unalterable points of heat, to which all the different ſcales of thoſe inſtruments may be reduced. The honourable Mr. Boyle was very ſenſible of this inconvenience, and much laments it; and he propoſed the freezing of the eſſential oil of aniſeeds, as a term of heat and cold that might be of uſe in making and judging of thermometers, and ſo to graduate them from this point according to the proportional dilatations or contractions of the included ſpirits. He mentioned alſo the coldneſs requiſite to begin the congelation of diſtilled water as another fixed term that might be adopted; for he was perſuaded, that among the ordinary waters, ſome were apt to freeze more eaſily than others. But he was deterred from proſecuting this ſcheme of fixing a ſtandard for making and graduating all thermometers in the ſame way. Experiments, &c. on cold, in his works abridged by Shaw, vol. i. p. 579.

Dr. Halley (Phil. Tranſ. Abr. vol. ii. p. 36.) ſeems to have been fully apprized of the bad effects of the indefinite method of conſtructing thermometers, and wiſhed to have them adjuſted to ſome determined points. What he ſeems to prefer for this purpoſe is the degree of temperature which is found in ſubterranean places, where the heat in ſummer and cold in winter appears to have no influence. But this degree of temperature is ſhewn by Dr. Martine to be a term for the univerſal conſtruction of thermometers, both inconvenient, as it cannot be eaſily aſcertained; and a precarious one, as the difference of ſoils and depths may occaſion a conſiderable variation. Another term of heat which he thought might be of uſe in a general graduation of thermometers, is that of boiling ſpirit of wine that has been highly rectified: but a much more convenient term of heat, though leſs inſiſted on by Dr. Halley, is that of boiling water. The firſt trace that occurs of the method of actually applying fixed points or terms to the thermometer, and of graduating it, ſo that the unequal diviſions of it might correſpond to equal degrees of heat, is the project of Renaldinus, profeſſor, of Padua, in 1694: it is thus deſcribed in the Acta Erud. Lipſ. "Take a ſlender tube, about four palms long, with a ball faſtened to the ſame; pour into it ſpirit of wine, enough juſt to fill the ball, when ſurrounded with ice, and not a drop over: in this ſtate, ſeal the orifice of the tube hermetically, and provide twelve veſſels, each capable of containing a pound of water, and ſomewhat more; and into the firſt pour eleven ounces of cold water, into the ſecond ten ounces, into the third nine, &c.: this done, immerge the thermometer in the firſt veſſel, and pour into it one ounce of hot water, obſerving how high the ſpirit riſes in the tube, and noting the point with unity: then remove the thermometer into the ſecond veſſel, into which are to be poured two ounces of hot water, and note the place the ſpirit riſes to with 2. By thus proceeding till the whole pound of water is ſpent, the inſtrument will be found divided into twelve parts denoting ſo many terms or degrees of heat; ſo that at 2 the heat is double to that at 1, at 3, triple, &c."

But this method, though plauſible, Wolfius ſhews, is deceitful, and is built on falſe ſuppoſitions; for it takes for granted, that we have one degree of heat, by adding one ounce of hot to eleven of cold water; two degrees, by adding two ounces to ten, &c.: it ſuppoſes, alſo, that a ſingle degree of heat acts on the ſpirit of wine in the ball with a ſingle force; a double with a double force, &c. laſtly, it ſuppoſes, that if the effect be produced in the thermometer by the heat of the ambient air, which is here produced by the hot water, the air has the ſame degree of heat with the water.

Soon after this project of Renaldinus, *viz.* in 1701, ſir Iſaac Newton conſtructed his *oil* thermometer, and fixed the baſe or loweſt fixed point of his ſcale at the temperature of thawing ſnow, and twelve at that of the human body, &c. in the manner explained under the article *Oil* Thermometer.

M. de Luc obſerves, that the ſecond term of his ſcale ſhould have been at a greater diſtance from the firſt, and that the heat of boiling water would have anſwered this purpoſe better than that of the human body.

In 1702, M. Amontons contrived his *univerſal* thermometer, the ſcale of which was graduated in the following manner. He choſe for the firſt term the weight that counterbalanced the air included in his thermometer, when it was heated by boiling water: and in this ſtate he ſo adjuſted the quantity of mercury contained in it, till the ſum of its height in the tube, and of its height in the barometer at the moment of obſervation, was equal to ſeventy-three inches. Fixing this number at the point to which the mercury in the tube roſe by plunging it into boiling water, it is evident, that, if the barometer at this time was twenty-eight inches, the height of the column of mercury in the thermometer above the level of that in the ball was forty-five inches; but if the height of the barometer was leſs by a certain quantity, the column of the thermometer ought to be greater by the ſame quantity, and reciprocally. He formed his ſcale on the ſuppoſition that the weight of the atmoſphere was always equal to that of a column of mercury of twenty-eight inches, and divided it into inches from the point 73 downwards, marking the diviſions with 72, 71, 70, &c. and he ſubdivided the inches into lines.

But as the weight of the atmoſphere is variable, the barometer muſt be obſerved at the ſame time with the thermometer, that the number indicated by this laſt inſtrument may be properly corrected, by adding or ſubtracting the quantity of which the mercury is below or above twenty-eight inches in the barometer. In this ſcale, then, the freezing point is at $51\frac{1}{2}$ inches, correſponding to *gr.* 32 of Fahrenheit, and the heat of boiling water at 73 inches,

inches, anfwering to *gr.* 212 of Fahrenheit's: and thus they may be eafily compared together.

The fixed points of Fahrenheit's thermometer, which is generally ufed in Great Britain, (as we have already obferved under *Mercurial* THERMOMETER,) are the congelation produced by fal ammoniac and the heat of boiling water. The interval between thefe points is divided into 212 equal parts; the firft of thefe points is marked 0, 32 degrees below the freezing point, and the other 212; the diftance of courfe between the freezing and boiling points being 180. The reafon why Fahrenheit fixed his fcale fo far below the water-freezing point was founded on an erroneous hypothefis relative to the real *zero* or point of abfolute privation of heat; neverthelefs it has this advantage, that the diftinction between the pofitive and negative terms, or thofe which exprefs degrees above or below the *zero*, much lefs frequently occurs in any experiments, and fcarcely ever in the regifter of natural cold in temperate climates, by which many accidental errors are avoided. Reaumur, in his thermometer, the conftruction of which he publifhed in 1730, and which is generally ufed in France and other parts of the continent, begins his fcale at an artificial congelation of water in warm weather, which, as he ufes large bulbs for his glaffes, gives the freezing point much higher than it fhould be, and at boiling water he marks *gr.* 80, (the diftance between both points being 80,) which point Dr. Martine apprehends to be more vague and uncertain than his freezing point. The fpirit in the thermometer, he obferves, is abfolutely incapable of fuch a great heat as Reaumur afcribed to it, and that not by a fmall or trifling difference. He finds, that highly rectified fpirit of wine cannot be heated beyond *gr.* 175 in Fahrenheit's thermometer, while boiling water raifes the quickfilver 37 degrees higher; and common brandy was able to conceive a heat no greater than about *gr.* 190. So far, he concludes, was Reaumur in the wrong, when he thought that all fpirits, weak and ftrong, immerged in boiling water, received a given degree of heat, and that equal to the heat of the furrounding water. He fuppofes his ftandard heat could take a heat only of about *gr.* 180; lefs by 32 degrees than what he reckoned. In order to determine the correfpondence of his fcale with that of Fahrenheit, it is to be confidered that his boiling-water heat is really only the boiling heat of weakened fpirit of wine, coinciding nearly, as Dr. Martine apprehends, with Fahrenheit's *gr.* 180. And as his *gr.* $10\frac{1}{4}$ is the conftant heat of the cave of the obfervatory at Paris, or Fahrenheit's *gr.* 53, he thence finds his freezing point, inftead of anfwering juft to *gr.* 32, to be fomething above *gr.* 34.

The thermometer of M. de l'Ifle, of which he prefented an account to the Academy of Sciences at Peterfburg in 1733, has only one fixed point, which is the heat of boiling water, and, contrary to the common order, the feveral degrees are marked downwards from this point or *zero*, according to the condenfations of the contained quickfilver, and confequently by numbers increafing as the heat decreafes to 150, the freezing point. In order to determine the extent of the degrees of this fcale, M. de l'Ifle firft weighed the empty tube, and then weighed it full of mercury; and the difference of thefe two weights gave him that of the mercury. He then expofed the thermometer to the heat of boiling water, and took care to preferve the mercury, which this increafe of heat forced out of it; this he accurately weighed, and deducting its weight from the total weight of the mercury, he made the remainder, or that which was left in the thermometer, equal to 10000: he then found by calculation how many 10000 parts of this refidue that forced out of the tube contained, and thefe parts formed the divifions of the fcale from the point, determined by the condenfation of the mercury to the fame point at which it ftood before it was plunged in boiling water, to the upper end of the tube; and thefe divifions formed the extent of the degrees of M. de l'Ifle's fcale. According to his ftandards, the freezing point, fays Dr. Martine, is near to his *gr.* 150, correfponding to Fahrenheit's *gr.* 32, by which means they may be compared; but M. Ducreft fays, that this point ought to be marked at leaft at *gr.* 154.

M. Ducreft, in his fpirit thermometer, conftructed in 1740, made ufe of two fixed points; the firft, or 0, indicated the temperature of the earth, and was marked on his fcale in the cave of the Royal Obfervatory at Paris; and the other was the heat of boiling water, which the fpirit in his thermometer was made to endure, by leaving the upper part of the tube full of air. He divided the interval between thefe points into 100 equal parts; calling the divifions upwards degrees of heat, and thofe below 0 degrees of cold.

He afterwards regulated his thermometer by the degree of cold indicated by melting ice, which he found to be $10\frac{2}{5}$. In Celfius's, or the centigrade thermometer, the freezing point, like that of Reaumur's, was 0, the boiling point at 100, and the diftance between both 100. See the table at the clofe of the article.

The Florentine thermometers made and ufed by the members of the famous academy *del' Cimento*, being fome of the firft inftruments of the fort, were vaguely graduated, fome of them having many more degrees than others; but thofe of their moft common graduation were of two forts; in one fort the freezing point, determined by the degree at which the fpirit ftood in the ordinary cold of ice or fnow (probably in a thawing ftate), and coinciding with *gr.* 32 of Fahrenheit, fell at *gr.* 20; and in the other fort at *gr.* $13\frac{1}{2}$: and the natural heat of the vifcera of cows and deer, &c. raifed the fpirit in the latter, or lefs fort, to about *gr.* 40, coinciding with their fummer heat, and nearly with *gr.* 102 in Fahrenheit's, and in their other long thermometer, the fpirit, when expofed to the great midfummer heat in their country, rofe to the point at which they marked *gr.* 80. The freezing point of one was 20, the boiling point 174, and the diftance between both was 154: in the other the freezing point was $13\frac{1}{2}$, the boiling point $81\frac{2}{3}$, and the diftance $68\frac{1}{2}$.

In the Parifian thermometer, or the ancient thermometer of the Academy of Sciences, the freezing point was at 25, the boiling point at 239, and the diftance between both 214.

In the thermometer of the obfervatory at Paris, made of fpirit of wine by M. de la Hire, the fpirit always ftands at *gr.* 48, in the cave of the obfervatory, correfponding to *gr.* 53 in Fahrenheit's; and his *gr.* 28 correfponded with 51 inches fix lines in Amontons's thermometer, and confequently with the freezing point, or *gr.* 32 of Fahrenheit's. This thermometer of De la Hire, which ftood in the obfervatory of Paris above 60 years, feems to have been graduated thus; the freezing point 28, the boiling point $199\frac{1}{5}$, and the diftance between both $171\frac{1}{3}$. In Amontons's thermometer the freezing point was $51\frac{1}{2}$, the boiling point 73, and the diftance between them $21\frac{1}{2}$.

In the thermometer of Poleni, made after the manner of Amontons's, but with lefs mercury, 47 inches correfponded, according to Dr. Marfine, with 51 in that of Amontons's, and 53 with $59\frac{1}{2}$. It was graduated thus; the freezing point at $47\frac{3}{10}$, the boiling point at $62\frac{9}{10}$, and the

the diſtance between them $15\frac{1}{10}$. In Crucquius's, the freezing point was 1070, the boiling point 1510, and the diſtance 440.

In the ancient ſtandard thermometer of the Royal Society, after which thermometers were for a long time conſtructed in England, Dr. Martine found that *gr*. $34\frac{1}{2}$, anſwered to *gr*. 64 in Fahrenheit's, and *gr*. 0 to 89 or 88. From that point the numeration aſcended and deſcended thus; the freezing point was $73\frac{1}{4}$, the boiling point $141\frac{1}{4}$, and the diſtance between them $215\frac{1}{2}$. In ſir Iſaac Newton's, the freezing point was 0, the boiling point 34, and the diſtance 34.

In the thermometers graduated for adjuſting the degrees of heat proper for exotic plants, &c. in ſtoves and green houſes, the middle temperature of the air is marked at *gr*. 0, and the degrees of heat and cold are numbered both above and below. Many of theſe are made on no regular and fixed principles. But in that formerly much uſed, called Fowler's regulator, the ſpirit fell, in melting ſnow, to about *gr*. 34 under 0; and Dr. Martine found, that his *gr*. 16 above 0, coincided with nearly *gr*. 64 of Fahrenheit. His 0 ſeems to have coincided with about the 53d or 54th degree of Fahrenheit's, and from that point the numeration aſcended and deſcended thus; the freezing point 34, the boiling point $250\frac{1}{3}$, and the diſtance between them $284\frac{1}{3}$.

Dr. Hales (Statical Eſſays, vol. i. p. 58.) in his thermometer made with ſpirit of wine, and uſed in experiments on vegetation, began his ſcale with the loweſt degree of freezing, or *gr*. 32 of Fahrenheit, and carried it up to *gr*. 100, which he marked where the ſpirit ſtood when the ball was heated in hot water, on which wax ſwimming firſt began to coagulate, and this point Dr. Martine found to correſpond with *gr*. 142 of Fahrenheit. But by experience Hales's *gr*. 100 falls conſiderably above our *gr*. 142. According to others, his freezing point was 0, his boiling point was 163, and the diſtance of courſe 163.

In the Edinburgh thermometer, made with ſpirit of wine, and uſed in the meteorological obſervations publiſhed in the Medical Eſſays, the ſcale is divided into inches and tenths. In melting ſnow the ſpirit ſtood at $8\frac{1}{5}$, and the heat of the human ſkin raiſed to $22\frac{2}{5}$. Dr. Martine found, that the heat of the perſon who graduated it was *gr*. 97 of Fahrenheit. It ſeems to have been graduated thus; the freezing point $8\frac{1}{3}$, the boiling point 47, and the diſtance between them $38\frac{2}{3}$.

As it is often of uſe to compare different thermometers, in order to judge of the reſult of former obſervations, we have annexed from Dr. Martine's Eſſays, the table by which he compared fifteen different thermometers. See *Plate* XVI. *Pneumatics*, *fig*. 4. See alſo the table at the cloſe of this article.

There is a thermometer which was formerly much uſed in London, called the thermometer of Lyons, becauſe M. Criſtin brought it there into uſe, which is made of mercury: the freezing point is marked *gr*. 0, and the interval from that point to the heat of boiling water is divided into 100 equal degrees.

From the above abſtract of the hiſtory of the conſtruction of thermometers, it appears that freezing and boiling water have furniſhed the diſtinguiſhing points that have been marked upon almoſt all thermometers. The inferior fixed point is that of freezing, which ſome have determined by the freezing of water, and others by the melting of ice; and though the difference between theſe two temperatures is not commonly very conſiderable, yet it is not invariable.

It is now well known, that all, or almoſt all bodies, by changing from a fluid to a ſolid ſtate, or from the ſtate of an elaſtic to that of an unelaſtic fluid, generate heat; and that cold is produced by the contrary proceſs.

In order to obtain this fixed point or limit, melting ice, or ice powdered and mixed with water, will produce the ſame temperature. And though there may be ſome trifling difference between the temperature of ice diſpoſed to melt, and that of melted ice or the water produced by it; this difference, however, has no ſenſible effect on the thermometer; conſequently, the temperature of water ſucceſſively produced by ice, and accumulated in its interſtices, or from powdered ice mixed with the water which is produced by it in melting, affords, as De Luc obſerves, a fixed point, which is eaſily obtained, and which ſhould be adopted in the conſtruction of all thermometers.

The ſuperior fixed point of almoſt all thermometers, is the heat of boiling water; but this point cannot be conſidered as fixed, unleſs the heat be produced by the ſame degree of boiling, and under the ſame weight of the atmoſphere. With regard to the firſt circumſtance, it is obſerved, that water, when it begins to boil, has not attained to its greateſt degree of heat, which is known by its bubbling or foaming from the bottom of the veſſel, and over the whole ſurface of the water, with the greateſt violence which it is capable of acquiring; and in this ſtate the water diſcovers an augmentation of heat more than one degree above the heat it had when it began to boil. The temperature of water which boils with vehemence ſhould, therefore, be the ſtandard of the fixed point of thermometers: nevertheleſs it is to be conſidered farther, that this degree of heat with which water violently boils, is invariably the ſame, only under a given preſſure of the atmoſphere; but if the preſſure be diminiſhed or increaſed, the boiling heat is diminiſhed or increaſed. It is well known that water, placed under the exhauſted receiver of an air-pump, will be converted into ſteam with a degree of heat far inferior to that which is neceſſary to its boiling in the open air; and under the preſſure of its own vapour, confined in Papin's digeſter, it is ſaid to ſuſtain a degree of heat, without boiling, far exceeding that which, in the open air, would convert it into ſteam. Hence it follows that, in climates where the preſſure of the atmoſphere is liable to conſiderable change, the heat of boiling water, in open air, will be different at different times. Conſequently thermometers, made in different ſtates of the barometer, will diſagree; unleſs allowance has been made for the effect of the variation of the barometer upon accurate principles. That the heat of boiling was variable, according to the preſſure of the atmoſphere, ſeems to have been known to Fahrenheit as early as the year 1724. See Phil. Tranſ. N° 385.

Some time after this period, Meſſrs. le Monnier and Caſſini (Mem. de l'Acad. des Sc. for 1740) made ſome deciſive obſervations, in order to ſhew that this quantity was very conſiderable.

M. de Luc, in 1762, made a much more complete ſeries of experiments, which he has deſcribed and reduced into a ſyſtem in his Recherches ſur les Mod. de l'Atmoſphere, vol. i. p. 382, &c. vol. ii. p. 338, &c. and theſe have been ſince verified by ſir George Shuckburgh, in 1775 and 1778. See Phil. Tranſ. vol. lxix. part ii. p. 362, &c.

M. de Luc fixes the boiling point of his thermometer when the barometer is at 27 Paris, or 28.75 Engliſh inches, that being its mean height at Geneva. He divides the fundamental interval, *i. e.* the whole extent of the ſcale, between melting ice and boiling water, after the French manner, into eighty equal parts; and by a great number of experiments

periments on the heat of boiling water, at different heights above the level of the ſea, he hath found, that the height of his thermometer, plunged in boiling water, may be expreſſed, in all ſtates of the barometer, by the following formula, *viz.* $\frac{99}{200000}\log. y - a = \mathrm{T}$: in which y denotes the height of the barometer in ſixteenths of a Pariſian line, T the height of a thermometer, plunged in boiling water, above melting ice, in hundredths of a degree of his ſcale; and a the conſtant number 10387.

By logarithms he always means the tabular or Briggian logarithms, and conſiders the ſeven figures given by the tables, beſides the index, as integral figures, *i. e.* he conſiders the eighth figure of the logarithm as ſtanding in the place of units. But as it is more uſual with mathematicians, and, in general, more convenient, to conſider all the figures after the index as decimals, the number which M. de Luc expreſſes by $\frac{99}{200000}\log. y$, would in that caſe be $\frac{99 \times 100}{2}\log. y$; or $\overline{99 \times 50}\log. y$. However, in the ſequel, M. de Luc's notation is retained.

Now if care were taken by the above formula, or in any other way, to adjuſt the boiling point to the main height of the barometer in every country, the inſtruments of the ſame country would always be conſiſtent; but thoſe of different countries would ſtill diſagree; that is, they would expreſs the ſame temperature differently, though their ſimilar intervals ſhould be ſimilarly divided; for in every ſcale, the number of degrees above or below melting ice, by which any given temperature is expreſſed, will be as the value of each degree inverſely; that is, if each be a given part of the fundamental interval, as the value of the fundamental interval inverſely; but if the degrees of different ſcales be different parts of the fundamental intervals, as the value of the fundamental interval inverſely, and the number of degrees contained in it directly.

In order, therefore, to compare the thermometers of different countries, the proportions of their fundamental intervals to each other muſt be aſcertained, or we muſt have ſome means of finding, upon one ſcale, the place of the boiling point of another. For this purpoſe, a general ſolution is requiſite of the following problem, *viz.* the fundamental interval being given for a given height of the barometer, to find the fundamental interval for any other given height of the barometer. The ſolution is furniſhed by M. de Luc's reſearches; and his formula, above given, is reduced to Engliſh meaſures, and adapted to Engliſh inſtruments, by Dr. Horſley. As the ſubject is curious and important, we ſhall ſubjoin the proceſs he has purſued for this purpoſe. It is but ſeldom that the barometer in this country ſtands ſo low as 27 Paris inches. Its main height upon the plain country about London is near 30 Engliſh inches. It may, therefore, be proper for the London workmen to fix their boiling point when the barometer is at 30 inches. Fahrenheit's diviſion of the ſcale, which makes 180 degrees between melting ice and boiling water, and places the point 0 at the 32d degree below melting ice, may be retained: and the thermometer thus conſtructed is called by Dr. Horſley, Bird's Fahrenheit, becauſe Mr. Bird, he apprehends, is the firſt workman who took the pains to attend to the ſtate of the barometer in making thermometers, and has always fixed the boiling point when his barometer has ſtood at 30 inches.

T, then, being put for the height of a thermometer plunged in boiling water, above melting ice, in 100dths of a degree of De Luc's ſcale, in any given ſtate of the barometer; let Θ denote the ſame height in 100dths of a degree of Bird's Fahrenheit; put y for the height of the barometer, in 16ths of a Paris line; v, for its height in Paris lines; x, in 10ths of a Paris inch; z, in 10ths of an Engliſh inch; and for 10387 put a; for 16, b; for 10, c; for 12, d; and let E and F repreſent numbers expreſſing the proportion of the Engliſh foot to the French foot.

M. de Luc hath found that, whatever be the value of y, $\frac{99}{200000}\log. y - a = \mathrm{T}$. But $\log. y = \log. v + \log. b$; and $\log. v = \log. x + \log. d - \log. c$; and $\log. x = \log. z + \log. \mathrm{E} - \log. \mathrm{F}$; therefore $\log. y = \log. z + \log. \mathrm{E} + \log. d + \log. b - \log. \mathrm{F} - \log. c$; and $\frac{99}{200000}\log. z + \frac{99}{200000}\overline{\log. \mathrm{E} + \log. d + \log. b - \log. \mathrm{F} - \log. c} - a = \mathrm{T}$. But $\frac{99}{200000}\overline{\log. \mathrm{E} + \log. d + \log. b - \log. \mathrm{F} - \log. c} - a = -4171.55$; the French foot being to the Engliſh as 2.1315 to 2. Therefore $\frac{99}{200000}\log. z - 4171.55 = \mathrm{T}$; and $\frac{99}{20000000}\log. z - 41.7155 = \frac{\mathrm{T}}{100}$ = the height of the thermometer, plunged in boiling water, above melting ice, in degrees of De Luc's ſcale, when the height of the barometer in tenths of an Engliſh inch, is z. For z write 300: then $\frac{\mathrm{T}}{100} = 80.902$; which is therefore the height of the thermometer, in boiling water, above melting ice, in degrees of De Luc's ſcale, when the barometer is at 30 inches Engliſh. And in the ſame ſtate of the barometer, the height of the thermometer plunged in boiling water, above melting ice, in degrees of Bird's Fahrenheit, or $\frac{\Theta}{100}$, is 180. Hence the numbers T and Θ are in the conſtant proportion of 809 and 1800, whatever be the value of z. For the change produced in the heat of boiling water, by any change of z, being always the ſame for both thermometers, the temperature expreſſed by T in parts of one ſcale is always the ſame, as Θ expreſſes in parts of the other; and therefore putting $\frac{1}{\mathrm{L}}$ and $\frac{1}{\mathrm{B}}$ for the values of the 100dth part of a degree of the ſcales of De Luc and Bird reſpectively, the fractions $\frac{\mathrm{T}}{\mathrm{L}}$, $\frac{\Theta}{\mathrm{B}}$ are always equal, and T, Θ are in the conſtant proportion of the invariable numbers L, B: conſequently, when the proportion of T and Θ is determined for any particular value of z, it is found generally for all: conſequently $\mathrm{T} : \Theta :: 809 : 1800$. And $\mathrm{T} = \frac{809}{1800}\Theta = \frac{899}{2000}\Theta$ very nearly in all values of z: and ſubſtituting this value for T in the equation

equation exhibiting the relation between z and T, we have, for the relation between z and Θ, $\frac{99}{20000000}$ log. z − 41.7155 = $\frac{899}{2000 \times 100}\,\Theta$: or, $\frac{99}{10000 \times 899}$ log. z − 92.804 = $\frac{\Theta}{100}$ = the height of the thermometer in boiling water, above melting ice, in degrees of Bird's Fahrenheit, when the height of the barometer in tenths of an Englifh inch, is z. And thus M. de Luc's formula, for the variation of the boiling point, is adapted to Englifh inftruments, and reduced to Englifh meafures of length.

For z write 287.7525, the length of 27 French inches in tenths of an Englifh inch, and $\frac{\Theta}{100}$, the height of De Luc's boiling point above melting ice, in degrees of Bird's Fahrenheit, comes out 177.989. Hence M. de Luc's boiling point falls upon 209.989 of Bird's fcale, *i. e.* upon 210 very nearly, or infenfibly more than two degrees below Bird's point of boiling. But as 899 is a troublefome divifor, the computation will be more eafy and expeditious, by writing for $\frac{11}{1000000}$ log. z, s. Then $s + \frac{1}{900}s - 92.804 = \frac{\Theta}{100}$ very nearly. Upon thefe principles Dr. Horfley has computed the table following, for finding the heights to which a good Bird's Fahrenheit will rife, when plunged in boiling water, in all ftates of the barometer, from 27 to 31 Englifh inches; which will ferve, among other ufes, to direct inftrument-makers in making a true allowance for the effect of the variation of the barometer, if they are obliged to finifh a thermometer, when the barometer is above or below 30 inches; though it is beft to fix the boiling point when the barometer is at the height prefcribed.

Equation of the Boiling Point.

Barometer.	Equation.	Difference.
31.0	+ 1.57	0.78
30.5	+ 0.79	0.79
30.0	0.00	0.80
29.5	− 0.80	0.82
29.0	− 1.62	0.83
28.5	− 2.45	0.85
28.0	− 3.31	0.86
27.5	− 4.16	0.88
27.0	− 5.04	

The numbers in the firft column of this table exprefs heights of the quickfilver in the barometer in Englifh inches and decimal parts: the fecond column fhews the equation to be applied, according to the fign prefixed, to 212° of Bird's Fahrenheit to find the true boiling point for every fuch ftate of the barometer. The boiling point for all intermediate ftates of the barometer may be had with fufficient accuracy by taking proportional parts, by means of the third column of differences of the equations. (See Phil. Tranf. vol. lxiv. part i. art. 30. See alfo an excellent paper on this fubject by Dr. Mafkelyne, in the Phil. Tranf. vol. lxiv. part i. art. 20.) In the following table we have the refult of fifteen different obfervations made by fir George Shuckburgh (ubi fupra) compared with the refult of M. de Luc's rules.

Height of the Barometer reduced to the fame Temperature of 50°.	Mean Boiling Point by Obfervation.	Boiling Point by De Luc's Rules.
Inch.	Deg.	Deg.
26.498	207.07	208.54
27.241	208.64	208.84
27.954	209.87	210.03
28.377	210.50	210.81
28.699	211.27	211.34
28.898	211.50	211.67
28.999	211.60	211.85
29.447	212.55	212.74
29.805	212.95	213.15
30.008	213.22	213.47
30.207	213.58	213.79
30.489	214.15	214.23
30.763	214.37	214.66
30.847	214.83	214.79
30.957	214.96	214.96

Sir George Shuckburgh has alfo fubjoined the following general table for the ufe of artifts in conftructing the thermometer, both according to his own obfervations, and thofe of M. de Luc.

Height of the Barom.	Correct. of the Boiling Point.	Difference.	Correct. accord. to M. de Luc.	Difference.
Inch.	Deg.		Deg.	
26.0	− 7.09	.91	− 6.83	.90
26.5	− 6.18	.91	− 5.93	.89
27.0	− 5.27	.90	− 5.04	.88
27.5	− 4.37	.89	− 4.16	.87
28.0	− 3.48	.89	− 3.31	.86
28.5	− 2.59	.87	− 2.45	.83
29.0	− 1.72	.87	− 1.62	.82
29.5	− 0.85	.85	− 0.80	.80
30.0	0.00	.85	0.00	.79
30.5	+ 0.85	.84	+ 0.79	.78
31.0	+ 1.69		+ 1.57	

The Royal Society, fully apprized of the importance of adjufting the fixed points of thermometers, appointed a committee of feven gentlemen to confider of the beft method for this purpofe; and their report is publifhed in the Phil. Tranf. vol. lxvii. part ii. art. 37. From a variety of experiments and obfervations, relating to this fubject, the committee have deduced the following practical rules, which they recommend in adjufting the fixed points of thermometers. The moft accurate way of adjufting the *boiling point* is, not to dip the thermometer into the water, but to expofe it only to the fteam, in a veffel clofed up in the manner reprefented in *Plate* XVI. *Pneumatics*, *fig.* 6. where A B *b a* is the veffel containing the boiling water, D *d* the cover, E a chimney made in the cover intended to carry off the fteam, and M *m* the thermometer paffed through a hole in the cover. In the purfuit of this method the following particulars muft be regarded: the boiling point muft be adjufted when the barometer is at 29.8 inches; unlefs the operator corrects the obferved point in the manner

manner directed in the ſequel of this article. The ball of the thermometer muſt be placed at ſuch a depth within the pot, that the boiling point may riſe very little above the cover; and the ſurface of the water in the pot ſhould be at leaſt one or two inches below the bottom of the ball. Care muſt be taken to ſtop up the hole in the cover through which the tube is inſerted, and to make the cover fit pretty cloſe, ſo that no air ſhall enter into the pot that way, and that not much ſteam may eſcape. A piece of thin flat tin-plate muſt alſo be laid on the mouth of the chimney, ſo as to leave no more paſſage than what is ſufficient to carry off the ſteam.

If the artiſt pleaſes, he may tie each corner of this plate by a ſtring to prongs fixed to the chimney, and ſtanding on a level with the plate, as it will be thus always kept in its place.

Fig. 7. is a perſpective view of the chimney and tin-plate; A B C D is the plate, E the chimney, F *f*, G *g*, M *m*, and N *n*, the prongs faſtened to the chimney, to which the four corners of the plate are to be tied by the ſtrings A F, B G, C M, and D N; the ends F, G, M, and N, of the prongs muſt be on a level with the plate, and the ſtrings ſhould not be ſtretched tight. The chimney ought not to be leſs than half a ſquare inch in area, and not leſs than two or three inches in length. The cover ſhould be made to take on and off eaſily, and a ring of woollen cloth may be placed under it, ſo as to lie between it and the top of the pot. The hole in the cover may be ſtopped up by a cork, with a hole bored through it, big enough to receive the tube, and then cut into two, parallel to the length of the hole. Another method, more convenient in uſe, but not ſo eaſily made, is repreſented in *fig.* 8. which exhibits a perſpective view of the apparatus: A *a* is the cover, H the hole through which the thermometer is paſſed, B *b* a flat piece of braſs fixed upon the cover, and D *d* E *e* a ſliding piece of braſs, made ſo as either to cover the hole H, or to leave it uncovered, as in the figure, and to be tightened in either poſition by the ſcrew *s* ſliding in the ſlit M *m*; alſo in the edge D *d*, to encloſe the tube of the thermometer: pieces of woollen cloth ſhould alſo be faſtened to the edges B *b* and D *d*, and alſo to the bottom of the ſliding-piece D *d* E *e*, unleſs that piece and the cover are made ſufficiently flat to prevent the eſcape of the ſteam. In order to keep the thermometer ſuſpended at the proper height, a clip may be uſed like that repreſented in *fig.* 9. which, by the ſcrew *s*, muſt be made to embrace the tube tightly, and may reſt on the cover.

Another method, which is rather more convenient, when the top of the tube of the thermometer is bent into a right angle, in the manner often practiſed at preſent for the ſake of more conveniently fixing it to the ſcale, is repreſented in *fig.* 10.: G *g* F *f* is a plate of braſs ſtanding perpendicularly on the cover, and L *l* N *n* a piece of braſs bent at the bottom into the form of a loop, with a notch in it, ſo as to receive the tube of the thermometer, and to ſuffer the bent part to reſt on the bottom of the loop; this piece muſt ſlide in a ſlit K *k*, in the plate L *l* N *n*, and be tightened at any height by the ſcrew T.

Moreover, it is beſt to make the water boil pretty briſkly, as otherwiſe the thermometer is apt to be a great while before it acquires its full heat, eſpecially if the veſſel is very deep; and the obſerver ſhould wait at leaſt one or two minutes after the thermometer appears to be ſtationary, before he concludes that it has acquired its full height.

Another way of adjuſting the boiling point is to try it in a veſſel of the ſame kind as the former, only with the water riſing a little way, *viz.* from one to three or four inches above the ball, taking care that the boiling point ſhall riſe very little above the cover. In this method there is no need to cover the chimney with the tin-plate, and there is leſs need to make the cover fit cloſe, unleſs to prevent the operator from being incommoded with the ſteam. The height of the barometer in this method is $29\frac{1}{2}$ inches.

It will be convenient to have two or three pots of different depths for adjuſting thermometers of different lengths. A third way of adjuſting the boiling point is to wrap ſeveral folds of linen rags or flannel round the tube of the thermometer, and to try it in an open veſſel, taking care to pour boiling water on the rags, in order to keep the quickſilver in the tube as nearly of the heat of boiling water as poſſible. In this method the barometer ſhould be at 29.8 inches; the water ſhould boil faſt, and the thermometer ſhould be held upright, with its ball two or three inches under water, and in that part of the veſſel where the current of water aſcends.

Whichever of theſe methods of adjuſting the boiling point is uſed, it is not neceſſary to wait till the barometer is at the proper height, provided the operator will take care to correct the obſerved height according to the following table.

Height of the Barometer when the Boiling Point is adjuſted according to the		Correction in 1000dths of the Interval between 32° and 212°	Height of the Barometer when the Boiling Point is adjuſted according to the		Correction in 1000dths of the Interval between 32° and 212°.
1ſt or 3d Method.	2d Method.		1ſt or 3d Method.	2d Method.	
	30.60	10	29.69	29.39	1
	53	9	58	28	2
30.71	41	8	47	17	3
59	29	7	36	06	4
48	18	6	25	28.95	5
37	07	5 Lower.	14	84	6 Higher.
25	95	4	03	73	7
14	84	3	28.92	62	8
03	73	2	81	51	9
29.91	61	1	70		10
80	50	0	59		11

In uſing this table, ſeek the height of the barometer in the column anſwering to the method of adjuſting the boiling point, the correſponding number in the third column ſhews how much the point of 212° muſt be placed above or below the obſerved point: *e. gr.* ſuppoſe the boiling point to be adjuſted in them when the barometer is at 29 inches, and that the interval between the boiling and freezing points is 11 inches; the neareſt number to 29 in the left-hand column is 29.03, and the correſponding number in the table is 7 higher, and therefore the mark of 212° muſt be placed higher than the obſerved point by $\frac{7}{1000}$ths of the interval between boiling and freezing, *i. e.* by $\frac{11 \times 7}{1000}$, or .077 of an inch. This method of correcting the boiling point is not ſtrictly juſt, unleſs the tube is of an equal bore in all its parts; but the tube is ſeldom ſo unequal as to cauſe any ſenſible error, where the whole correction is ſo ſmall. The trouble of making the correction will be abridged by a diagonal ſcale, ſuch as is repreſented in *fig.* 10.

Although it is of no great conſequence what kind of water is uſed in adjuſting the boiling point, ſo that it is not ſalt, ſ.lt, or, if it be hard, that it ſhould be kept boiling at leaſt ten minutes before it is uſed; yet the committee recommend, for the adjuſtment of thermometers intended for nice experiments, to employ rain or diſtilled water, and to perform the operation in ſteam.

It is obſerved, that though the boiling point be placed ſo much higher on ſome of the thermometers now made than on others, yet this does not produce any conſiderable error in the obſervations of the weather, at leaſt in this climate: for an error of $1\frac{1}{2}°$ in the poſition of the boiling point. will make an error only of half a degree in the poſition of 92°, and of not more than a quarter of a degree in the point of 62°.

It is only in nice experiments, or in trying the heat of hot liquors, that this error in the boiling point can be of much ſignification.

In adjuſting the freezing, as well as the boiling point, the quickſilver in the tube ought to be kept of the ſame heat as that in the ball. When the freezing point is placed at a conſiderable diſtance from the ball, the pounded ice ſhould be piled to ſuch a height above the ball, that the error which can ariſe from the quickſilver in the remaining part of the tube, not being heated equally with that in the ball, ſhall be very ſmall, or the obſerved point muſt be corrected on that account, according to the following table.

Heat of the Air.	Correction.
42°	.00087
52	.00174
62	.00261
72	.00348
82	.00435

The correction in this table is expreſſed in 1000th parts of the diſtance between the freezing point and the ſurface of the ice: *e. g.* if the freezing point ſtands ſeven inches above the ſurface of the ice, and the heat of the room is 62°, the point of 32° ſhould be placed 7 × .00261, or .018 of an inch lower than the obſerved point. A diagonal ſcale will facilitate this correction.

The committee obſerve, that in trying the heat of liquors, care ſhould be taken that the quickſilver in the tube of the thermometer be heated to the ſame degree as that in the ball; or if this cannot be done conveniently, the obſerved heat ſhould be corrected on that account; for the manner of doing which, and a table calculated for this purpoſe, we muſt refer to their excellent report in the Phil. Tranſ. vol. lxvii. part ii. art. 37.

Several experiments made by governor Hutchins, at Albany Fort, in Hudſon's Bay, in 1782, in purſuance of a method ſuggeſted by Dr. Black and Mr. Cavendiſh, and for which he obtained ſir Godfrey Copley's medal from the Royal Society in 1783, have not only confirmed the obſervations before made, relative to the ſolid ſtate into which quickſilver can be brought by cold, its metalline ſplendour and poliſh when ſmooth, its roughneſs and cryſtallization where the ſurface was unconfined, its malleability, ſoftneſs, and dull ſound when ſtruck; but have alſo clearly demonſtrated, that its point of congelation is no lower than — 40°, or rather — 39°, of Fahrenheit's ſcale; that it will bear, however, to be cooled a few degrees below that point, to which it jumps up again on beginning to congeal; and that its rapid deſcent in a thermometer, through many hundred of degrees, when it has once paſſed the above-mentioned limit, proceeds merely from its great contraction in the act of freezing. See Phil. Tranſ. vol. lxxiii. part ii. art. *20, 20, 21.

THERMOMETERS, *Obſervations on the Conſtruction of.* It is abſolutely neceſſary that thoſe who would derive any advantage from theſe inſtruments, ſhould agree in uſing the ſame liquor, and in determining, according to the ſame method, the two fundamental points. If they agree in theſe fixed points, it is of no great importance whether they divide the interval between them into a greater or leſs number of equal parts. The ſcale of Fahrenheit, in which the fundamental interval between 212°, the point of boiling water, and 32°, that of melting ice, is divided into 180 parts, ſhould be retained in the northern countries, where Fahrenheit's thermometer is uſed: and the ſcale, in which the fundamental interval is divided into 80 parts, will ſerve for thoſe countries where the thermometer of M. de Reaumur is adopted. But no inconvenience is to be apprehended from varying the ſcale for particular uſes, provided care be taken to ſignify into what number of parts the fundamental interval is divided, and the point where 0 is placed.

With regard to the choice of tubes, it is moſt deſirable to have them exactly cylindric through their whole length. See *Mercurial* THERMOMETER.

The capillary tubes are preferable to others, becauſe they require leſs bulbs, and they are alſo leſs brittle, and more ſenſible. Thoſe of the moſt convenient ſize for common experiments are ſuch as have their internal diameter about the fourth of a line: and thoſe made of thin glaſs are better than others, as the riſe and fall of the mercury may be more diſtinctly perceived. The length of nine inches will ſerve for all common occaſions; but for particular purpoſes, the length both of the tubes and of the diviſions ſhould be adapted to the uſes for which they are deſigned.

In determining the beſt ſize of the balls or bulbs, it has been uſual to compare new tubes with ſuch thermometers as are well proportioned. But M. Durand has propoſed a formula for finding the proportion which the balls ought to bear to their reſpective tubes. With this view he expreſſes the length of the tube, meaſured in diameters of itſelf, by a; the whole capacity of the ball and tube by c; the capacity of the fundamental interval, expreſſed in the ſame parts with the whole capacity, by d; the number of degrees of the fundamental interval by m; the number of other degrees which the ſcale is to contain, beſides thoſe of the fundamental interval both above and below it, by n; and the diameter of the ball meaſured in diameters of the tube by b: and $b = \sqrt[3]{\frac{2}{3} a \times \frac{c\,m}{d \times \overline{m+n}}} - 1$. For two cylinders having equal baſes being as their heights, $m : n :: d : \frac{d\,n}{m}$, which is the capacity of that part of the tube which exceeds the fundamental interval, to which adding d, that interval, we have the total capacity of the tube $= \frac{d\,n}{m} + d$, or $\frac{d\,n + d\,m}{m}$. Subtracting this from c, we ſhall have the capacity of the ball $= c - \overline{\frac{d\,n + d\,m}{m}} = \frac{c\,m - d\,m - d\,n}{m}$. If this quantity be divided by the capacity of the tube, the quotient will ſhew how often the capacity of the ball contains that of the tube; and this quotient is =

$c\,m$

$\frac{cm - dm - dn}{dm + dn}$. Conſequently the ball is equal to as many cylinders having *a* diameters of the tube, for their reſpective height, and 1 diameter for the baſe, as are contained in this laſt quotient; and, therefore, its cylindric ſolidity expreſſed in the cylindric ſolidities of the tube will be $= a \times \frac{cm - dm - dn}{dm + dn}$. But the diameter of this ball is equal to the baſe of the cylinder in which it may be inſcribed, and the ſolidity of this cylinder is equal to $\frac{2}{3}$ds the ſolidity of the circumſcribing ſphere. Conſequently the ſolidity of this cylinder will be $= \frac{3}{2} a \times \frac{cm - dm - dn}{dm + dn}$; and the diameter of its baſe equal to the diameter of the ball, will be $= \sqrt[3]{\frac{3}{2} a \times \frac{cm - dm - dn}{dm + dn}}$ or $\sqrt[3]{\frac{3}{2} a \times \frac{cm}{d \times \overline{m + n}} - 1}$.

It is evident that, *cæteris paribus*, the larger the bulb is, in proportion to the diameter of the cavity of the tube, or the narrower the latter is in proportion to the former, the greater will the motion of the ſurface of the fluid be in the tube. But it muſt be obſerved, that when the bulb is very large, the thermometer will not eaſily arrive at the preciſe temperature of any place, wherein it may be ſituated. Some perſons, in order to give the bulb a greater ſurface, and of courſe to render it more capable of readily attaining a given temperature, have made it not globular, but cylindrical (which ſhape was adopted by Fahrenheit), or flat, or bell-like, &c.; but thoſe ſhapes are improper, becauſe they are liable to be altered by the varying gravity of the atmoſphere, conſequently thoſe thermometers cannot be accurate. The bulb ſhould be clean and colourleſs; ſince coloured ſurfaces are apt to be partially heated by a ſtrong light. If you take two equal thermometers, and paint the bulb of one of them black, or of any dark colour, and expoſe them both to the ſun; the mercury in that whoſe bulb is painted will riſe ſeveral degrees higher than in the other: even a ſtrong day-light, independently of the direct rays of the ſun, will affect them differently. The ball of the thermometer ſhould not be in contact with the ſubſtance of the ſcale, leſt it ſhould be influenced by the temperature of that ſubſtance.

When a proper tube and ball are procured, and their proportion aſcertained, the next object which requires peculiar attention is that of filling the thermometer. For this purpoſe the tubes ſhould be clean and dry, and the mercury very pure. (See Mercury and Barometer.) The mercury may be introduced into the tube by means of a kind of reſervoir fixed at the top of it, and proportioned in ſize to the bulk of the ball, or by rolling upon the tube a ſlip of fine paper, about two or three inches broad. In order to clear the tube of its air and moiſture, it ſhould be held over a gentle fire, ſo diſpoſed, as that it may heat at once the whole extent of the tube, till its heat becomes too great for the operator's hand to bear, who therefore uſes a glove or nippers for this purpoſe; care being taken that the ball is not heated at the ſame time. After the incloſed air is thus rarefied, and the particles that might obſtruct the free motion of the mercury are made to float in vapours within the bore of the tube, the tube is to be held upright, and the ball ſuddenly heated, by which means the air contained in it will be dilated, and carry off the impurities of the tube, ſo that it will be rendered clean and free from air. When the ball is heated to a conſiderable degree, the mercury may be poured into the reſervoir fixed at the top of the tube, through a ſmall corner of the paper. When the reſervoir is almoſt full, the ball ſhould be withdrawn from the fire, and the air will then be condenſed, and the ſpace left by it will be ſoon occupied by the mercury. By alternately heating and cooling the ball, it may thus be filled with mercury; but when it is nearly full, the mercury contained in it muſt be made to boil, by placing it over burning coals, in order to purge it of its air. However, as a ſmall quantity of air will be left in the ball after this operation, it will be expedient to remove the mercury, which remains in the reſervoir, immediately after the thermometer is withdrawn from the fire; and thus the whole column, unſupplied with mercury from the reſervoir, will deſcend into the ball by the condenſation of that which is contained in it, and the tube being empty, the ſmall bubble of air will eſcape. Let the tube be again heated ſucceſſively through its whole length, commencing from the bottom, and preſerving the heat of the ball, that the mercury may occupy it entirely, and no air be allowed to enter. During this operation, when the mercury of the thermometer begins to appear in the reſervoir, let the mercury contained in a paper funnel be poured into it in ſuch a quantity as will more than fill the thermometer, which is then to be removed from the fire. The mercury of the tube, and that diſcharged from the funnel, will unite, and paſs together into the thermometer, and thus it will be wholly filled. In this ſtate it may be left for any time at pleaſure, without any apprehenſion of its imbibing either air or moiſture. Nothing now remains but to get rid of the ſuperfluous quickſilver, and to ſeal the tube. For this purpoſe the thermometer is held in the hand and heated, till a drop of mercury falls out of it, and is then left to recover the temperature of the air; by which means there will remain at the top of the tube a ſmall empty ſpace. Then with a blow-pipe and the flame of a candle, let the end of the tube be formed into a fine point, of ſuch a length as will admit of its being properly ſealed. When this preparatory proceſs is completed, let the thermometer be gradually plunged into boiling water, ſo that the ſuperfluous mercury may iſſue from it ſlowly; and when it ceaſes to be diſcharged, withdraw the thermometer from the boiling water; wipe it dry, and as ſoon as poſſible, put the ball of it over a ſmall fire, covered with aſhes, and previouſly prepared for the purpoſe. In this part of the operation, it is neceſſary to be quick, that the mercury may not have time to condenſe, and the air enter into the tube. In this ſtate the thermometer may be left to heat, till it parts with more or fewer drops of the mercury, according to the proportion which the length of the tube bears to that of the ſcale applied to it. The thermometer is then ſealed, by melting only the end of the point above mentioned, and at the ſame inſtant withdrawing it from the fire.

The method of filling the thermometer with a paper tube, or funnel, is as follows. Let the ball be heated, ſo that the mercury may riſe to the top of the tube; whilſt it approaches it, apply the tube of paper to the end of the tube, ſo that it may ſerve for a reſervoir. The thermometer being placed near the fire, ſo that it may always preſerve the ſame degree of dilatation, take ſome well purified mercury in a paper cornet, and communicate a little more heat to the ball. When the mercury riſes, and forms a ſmall drop at the end, pour the mercury of the cornet into the reſervoir of paper, and withdraw the ball from the fire. Having removed the paper reſervoir, place the ball again over the fire, and ſeal the point of the tube at the moment when the mercury riſes to it, and withdraw the thermometer from the fire. This operation will be acquired by uſe.

Thermometers that are defired for meafuring great degrees of heat, require to be filled with particular precautions, which M. de Luc has minutely defcribed.

When the thermometer is filled and fealed, nothing more is neceffary than to mark the two fixed points, graduate the fcale, and attach it to a proper frame. See de Luc's Récherches, &c. vol. i. p. 393, &c.

The frame may be made of any fubftance, or kind of wood, at pleafure: and the degrees may be marked on metal or wood, or paper, or ivory, &c.; but fuch fubftances fhould be preferred for the fcales of thermometers as are not apt to be bent or fhortened, or otherwife altered by the weather, efpecially if the inftruments are not defended by a glafs cafe, or by a box with a glafs face. Thermometers for indicating the temperature of the atmofphere need not have fcales that are much extended; if they go as high as 120° it is fufficient. The lower degrees may be carried down as low as may be neceffary for the cold of any particular climate. The mercurial thermometer need not be graduated lower than 40° below 0, becaufe at about that degree mercury ceafes to be fluid. The fpirit thermometer may be graduated lower, if neceffary.

Thermometers ufed for obfervation, muft be fituated in the open air out of the houfe, and at the diftance of a foot (at leaft) from the wall, and where the light of the fun may not fall directly upon them. For chemical purpofes, the bulbs and part of the tubes of the thermometers fhould project fome way below the fcales, that they may be dipped in liquids, mixtures, &c. For other purpofes, as for botanical obfervations, hot-houfes, brewing manufactories, baths, &c. the thermometers muft be made longer or fhorter, or narrower; and particular directions may be given with regard to the fcales and other appendages.

Great inconvenience has attended the ufe of various kinds of thermometers with different graduations. Kirwan propofed to lay all thefe afide, and to conftruct a general one, beginning at the congelation of mercury, and terminating at the boiling of water, and divided into 250°. Mr. Murray of Edinburgh has fince fuggefted, that it would be convenient to form a fcale whofe extreme points fhould be the temperatures of freezing and boiling mercury, both which are now capable of being accurately afcertained, and to divide this fcale into 1000°.

Thermometers, *Experiments with.* We fhall here infert a table of fome obfervations made with the thermometers of Fahrenheit, Reaumur, fir Ifaac Newton, and Dr. Hales.

Obfervations by Fahrenheit's Thermometer.

	Deg.		
At	600	Mercury boils	According to Mufchenbroeck, the barometer being at 29 Rhinland inches.
	546	Oil of vitriol boils	
	242	Spirit of nitre boils	
	240	Lixivium tartari boils	
	213	Cow's milk boils	
	212	Water boils.	
	206	Frefh human urine boils.	
	190	Brandy boils.	
	174	Alcohol boils.	
	176	————— according to Mufchenbroeck.	
	156	Serum of blood and white of eggs hardens.	
	146	Killing heat for animals, in a few minutes.	
	108	A hen hatching eggs, but feldom fo hot.	
From 107 to 103		Heat of fkin in ducks, geefe, hens, pigeons, partridges and fwallows.	
At	106	Heat of fkin in a common ague and fever.	
From 103 to 100		Heat of fkin in dogs, cats, fheep, oxen, fwine, and other quadrupeds.	
From 99 to 92		Heat of the human fkin in health.	
At	97	Heat of a fwarm of bees.	
	96	A perch died in three minutes, in water fo heated.	
	80	Heat of the air in the fhade, in very hot weather.	
	74	Butter begins to melt.	
	64	Heat of the air in the fhade, in warm weather.	
	48	Temperate air, in England and Holland.	
	43	Oil of olive begins to ftiffen and grow opaque.	
	32	Water juft freezing, or fnow and ice juft thawing.	
	30	Milk freezes.	
	28	Urine and common vinegar freezes.	
	25	Blood out of the body freezes.	
	20	Good Burgundy, ftrong claret, and Madeira freezes.	
	7	One part of fpirit of wine mixed with three parts water freezes.	
	5	Greateft cold in Pennfylvania in 1731–2, 40° lat.	
	4	Greateft cold at Utrecht, in 1728–9.	
	0	A mixture of fnow and falt, which is able to freeze oil of tartar *per deliquium*, but not brandy.	
	— 39	Mercury freezes.	

Martine's Effays, p. 284, &c.

We muft here obferve, that the heat of a hen hatching chickens is placed, by this table, at 108° of Fahrenheit's thermometer: but it appears from M. Reaumur's experiments, that eggs will hatch in a heat no greater than that of the human fkin. See Hatching.

2. *Obfervations by Reaumur's Thermometer.*

	$97\frac{1}{2}$	Anfwers to the heat of boiling water.
	80	Spirit of wine in Reaumur's thermometer boils.
At	$29\frac{2}{3}$	Greateft height of the air in the fhade, obferved at Paris in 1706, 1707, 1724.
	$10\frac{1}{5}$	Conftant heat of the caves of the obfervatory at Paris.
	0	Artificial congelation of water.
	$14\frac{1}{4}$	Lower than (0) greateft cold at Paris, in 1709.

3. *Obfervations by fir Ifaac Newton's Thermometer.*

34	Water boils vehemently.
$28\frac{6}{11}$	Heat between water boiling and wax melting.
24	Heat of water on which floating wax melts.
$20\frac{2}{11}$	Heat of water on which floating melted wax begins, by cooling, to lofe its fluidity and tranfparency.
17	Heat of a bath fupportable to the hand at reft.
$14\frac{3}{11}$	Heat of a bath fupportable to the hand in motion. The heat of blood juft let out is almoft the fame.
12	Heat of thermometer in contact with a human body. The heat of a bird hatching her eggs much the fame.

Deg.	
6 5 4	Heats of the air in ſummer.
4 3 2	Heats of the air in ſpring and autumn.
2 1 0	Heat of the air in the winter.
0	Water begins to freeze.

Phil. Tranſ. Abr. vol. iv. part ii. p. 1.

4. *Obſervations by Dr. Hales's Thermometer.*

$146\frac{1}{3}$	Anſwers to the heat of boiling water.
100	Heat of water on which floating wax begins to melt.
88	Hotteſt ſunſhine in 1727.
85	Scorching heat of a hot-bed of horſe-dung, and alſo the heat of blood in high fevers.
64	Heat of the blood of animals; whence the heat of the blood to that of boiling water is as 14.27 to 33.
58	Heat of urine.
56	Due healthy heat of a hot-bed of horſe-dung in February, that of the open air being 17°, and nearly the boſom heat, and heat for hatching of eggs.
55	Heat of milk from the cow.
54	External heat of the body.
50	Common noon heat in the ſun in July.
38	Mean heat of the air in the ſhade in July.
From 30 to 17	May and June heat; and the moſt genial heat for moſt plants, in which they flouriſh and grow moſt.
From 20 to 10	Autumnal and vernal heat.
From freezing point to 10	Winter heat.
18	Temperate point.
31	The moſt kindly heat for melon-thiſtle.
29	——— ananas or pine-apple.
26	——— pimento.
24	——— euphorbium.
$21\frac{1}{2}$	——— cereus.
19	——— aloe.
$16\frac{1}{2}$	——— Indian fig.
14	——— ficoides.
12	——— oranges.
9	——— myrtle.
0	Freſh water juſt freezing.

Hales's Statical Eſſ. vol. i. p. 58, &c.

For other ſimilar obſervations, ſee Freezing *Mixture*, and Heat.

See on the general ſubject of thermometers, Martine's Eſſays, Medical and Philoſophical, printed at London in 1740, 8vo. Deſaguliers's Exp. Phil. vol. ii. p. 289, &c. Muſchenbroeck's Int. ad Phil. Nat. vol. ii. p. 625, &c. ed. 1762. De Luc's Récherches ſur les Modifications de l'Atmoſphere, tom. i. part ii. c. 2. Nollet's Leçons de Phyſique, tom. iv. p. 375, &c.

Thermometers *for particular Uſes*. In 1757, the right hon. the earl of Cavendiſh preſented to the Royal Society an account of a curious conſtruction of thermometers, of two different forms; one contrived to ſhew the greateſt degree of heat, and the other the greateſt cold, that may happen at any time in a perſon's abſence. The firſt conſiſts of a cylinder of glaſs joined to a tube, and differs from the common ſort only in having the top of the ſtem drawn out into a capillary tube, which enters into a glaſs ball C (*Plate* XVI. *Pneumatics*, *fig.* 11.) joined on to the ſtem at the place where it begins to be contracted. The cylinder, and part of the tube, are filled with mercury, the top of which ſhews the common degrees of heat as uſual. The upper part of the tube above the mercury is filled with ſpirit of wine, and ſome of the ſame liquor is left in the ball C, ſo as to fill it almoſt to the top of the capillary tube.

When the thermometer riſes, the ſpirit of wine will be driven out of the tube, and will fall into the ball C. When the thermometer ſinks again, as the ſpirit cannot be returned back from the ball, the top of the tube will remain empty, and the length of the empty part will be proportional to the fall of the thermometer. Conſequently, by means of a proper ſcale, the top of the ſpirit of wine will ſhew how many degrees it has been higher than when obſerved, which being added to the preſent height, will give the greateſt degree of heat it has been at. To fit this thermometer for a new obſervation, it is neceſſary to fill the upper part of the tube with ſpirits, by inclining the inſtrument till the ſpirits in the ball C cover the end of the capillary tube; for if the cylinder is then heated, by applying the hand to it, or by the flame of a lamp held at ſome diſtance, till the ſpirits riſe to the top of the tube, and run over into the ball C, and is then ſuffered to cool in the ſame poſition, the tube will remain full of ſpirits, and the thermometer will be fitted for a new experiment.

The ſcale of degrees at top, which ſhews the deſcent of the thermometer from the higheſt point it has arrived at, ought not, in ſtrictneſs, to be the ſame at all times of the year; for theſe degrees exceed the common degrees of heat pointed out by the top of the mercury, as much as the column of ſpirit of wine expands, and therefore are greateſt when that column is ſo; *i. e.* when the greateſt heat to which the inſtrument has been expoſed is leaſt. A difference of 30 degrees of Fahrenheit's ſcale, in the greateſt riſe of the thermometer, would require the ſcale to be altered one ſixtieth part; and the error ariſing from making uſe of the ſame ſcale, will be about one-ſixth of a degree, if the thermometer is obſerved when it has fallen ten degrees.

In the thermometer here deſcribed, the bore of the tube is about 0.027 inches; and one inch of it contains two grains of mercury, and anſwers to about ten degrees, the cylinder containing about 2280 grains. When the ſcale of degrees is large, the cylinder muſt be of conſiderable ſize. The quickſilver in the ball C ſerves to ſupply the tube, in caſe any of it ſhould be driven into the ball by the thermometer's being expoſed to too great a heat.

If the weight of the mercury be thought inconvenient, it may be avoided by the conſtruction in *fig.* 12. where the bottom of the tube is bent ſo as to point upwards, and is joined to a ball A, which communicates with a cylinder placed above it. It is in all other reſpects the ſame as the former inſtrument. It is filled with ſpirits of wine and mercury; the quantity of the latter being ſufficient to fill the whole tube and the ball A.

The thermometer for ſhewing the greateſt degree of cold that happens in any place during the time the inſtrument is left in it, is repreſented in *fig.* 13. The tube is bent into the ſhape of a ſiphon, of unequal legs, ſtanding parallel to one another; the top of the ſhorter leg is bent to a right angle, and opens into a ball A, which, by means of a ſhort bent tube on the oppoſite ſide, communicates with a cylinder

der ſtanding parallel to the legs of the ſiphon, and pointing downwards. This cylinder contains the greateſt part of the fluid, and is added only to make the thermometer more ſenſible than it would be, if the ball A was made of a ſufficient ſize to contain the proper quantity of fluid. This inſtrument is filled with ſpirit of wine, with the addition of as much mercury as is ſufficient to fill both legs of the ſiphon, and about a fourth or fifth part of the ball A. The common degrees of heat are ſhewn by the top of the mercury in the longeſt leg, or by the top of the ſpirit, in caſe any of it is left above the mercury. When the mercury in the longeſt leg ſinks by cold, that in the ſhorter leg will riſe, and will run over into the ball A; from whence it cannot return back when the thermometer riſes again, as the ſurface of the mercury in the ball is below the orifice of the tube *n*. Therefore the upper part of the ſhorter leg will be filled with a column of ſpirits of a length proportional to the increaſe of heat; the bottom of which, by means of a proper ſcale, will ſhew how much the thermometer has been lower than it is; which being ſubtracted from the preſent height, will give the loweſt point that it has been at. In order to prevent the mercury from falling into the ball A in large drops, which would affect the accuracy of the inſtrument, the top of the ſhorter leg, cloſe to the ball, is contracted, by being held in the flame of a lamp, and the paſſage farther ſtraightened by a ſolid thread of glaſs placed within the tube, and extending from the bottom of the ſhorter leg to the part near the ball A, where it is moſt contracted. By this means, as ſoon as any ſmall portion of mercury is got beyond the thread of glaſs, it breaks off, and falls into the ball in very ſmall drops.

In order to fill the ſhorter leg with mercury, for a new experiment, it muſt be inclined till the mercury in the ball covers the orifice of the tube *n*. The cylinder being then heated, the mercury will be forced into the ſhorter leg, and will run down the thread of glaſs in drops, which will ſoon unite. Thus ſuch a quantity of mercury muſt be got into the ſhorter leg, as, upon the cooling of the inſtrument, will be ſufficient to drive all the ſpirit of wine into the ball, with a leſs degree of cold than what the thermometer is likely to be expoſed to. The ball A muſt always have ſome mercury in it, but never enough to fill it up to the orifice of the tube *n*. It will be beſt to leave a little of the ſpirit above the mercury in the longeſt leg; in which caſe the top of the ſpirit will ſhew the common degrees of heat. The ſcale of degrees on the ſhorter leg will, in different ſeaſons, be liable to an error ſimilar to that which was explained in the firſt mentioned thermometer; but it will be leſs conſiderable, as the ſpace between the two ſcales is filled with mercury, whoſe expanſion is about ſix times leſs than that of the ſpirit of wine. In the thermometer now deſcribed, the bore of the tube is about 0.054 inches; and one inch of it contains eight grains of mercury, and anſwers to ſeven degrees of Fahrenheit's ſcale. The drops of mercury which fall into the ball A, anſwer to about one-eighth of a degree.

Inſtruments of this kind, with ſome alteration in their conſtruction, would ſerve for finding the temperature of the ſea at great depths, and alſo for finding that of the air at conſiderable heights. Lord Charles Cavendiſh has ſhewn how to adapt them for ſuch purpoſes. See Phil. Tranſ. vol. l. art. 38. p. 300, &c.

Since the publication of Mr. Canton's diſcovery of the compreſſibility (ſee Compression) of ſpirits of wine and other fluids, there are two corrections neceſſary to be made in the reſult given by lord Charles Cavendiſh's thermometer. For in eſtimating, *e. g.* the temperature of the ſea at any depth, the thermometer will appear to have been colder than it really was: and beſides, the expanſion of ſpirits of wine by any given number of degrees of Fahrenheit's thermometer is greater in the higher degrees than in the lower. For the method of making theſe two corrections by Mr. Cavendiſh, ſee Phipps's Voyage to the North Pole, p. 145.

Inſtruments of this kind, for determining the degree of heat or cold in the abſence of the obſerver, have been invented and deſcribed by others. Van Swinden (Diſſ. ſur la Compariſon du Therm. p. 253—255.) deſcribes one, which, he ſays, was the firſt of the kind made on a plan communicated by M. Bernouilli to M. Leibnitz. M. Kraft, he alſo tells us, made one nearly like it. Mr. Six, in 1782, propoſed another conſtruction of a thermometer of the ſame kind, which has been well received.

This is properly a ſpirit thermometer, though mercury is employed in it for the purpoſe of ſupporting a certain index: *a b* (*fig.* 14.) is a tube of thin glaſs, about ſixteen inches long, and $\frac{8}{10}$ths of an inch in diameter; *c d e f g h* is a ſmaller tube, with the inner diameter about $\frac{1}{20}$th, joined to a larger at the upper end *b*, and bent down firſt on the left ſide, and then, after deſcending two inches below *a b*, upwards again on the right, in the ſeveral directions *c d e*, *f g h*, parallel to, and one inch diſtant from it. At the end of the ſame tube at *h*, the inner diameter is enlarged to half an inch from *h* to *i*, which is two inches in length. This glaſs is filled with highly rectified ſpirit of wine to within half an inch of the end *i*, excepting that part of the ſmall tube from *d* to *g*, which is filled with mercury. From a view of the inſtrument it will be readily conceived, that when the ſpirit in the large tube is expanded by heat, the mercury in the ſmall tube on the left ſide will be preſſed down, and cauſe that on the right ſide to riſe: on the contrary, when the ſpirit is condenſed by cold, the reverſe will happen. Fahrenheit's ſcale, which begins with 0 at the top of the left ſide, has the degrees numbered downwards, while that at the right ſide, beginning with 0 at the bottom, aſcends. The diviſions are aſcertained by placing the thermometer with a good ſtandard mercurial one in water, gradually heating or cooling, and marking the diviſions of the new ſcale at every five degrees. The diviſions below the freezing point are taken by means of a mixture of ſea-ſalt and ice, as deſcribed by Nollet, De Luc, and others. In order to ſhew how high the mercury has riſen in the obſerver's abſence, there is placed within the ſmall tube of the thermometer, above the ſurface of the mercury on either ſide, immerſed in the ſpirit of wine, a ſmall index, ſo fitted as to paſs up and down as occaſion may require. One of theſe indices is repreſented in *fig.* 15; *a* is a ſmall glaſs tube, three-quarters of an inch long, hermetically ſealed at each end, incloſing a piece of ſteel wire nearly of the ſame length; at each end *c*, *d*, is fixed a ſhort piece of a tube of black glaſs, of ſuch a diameter as to paſs freely up and down within the ſmall tube of the thermometer. The lower end, floating on the ſurface of the mercury, is carried up with it when it riſes, while the piece at the upper end, being of the ſame diameter, keeps the body of the index parallel to the ſides of the thermometrical tube. From the upper end of the body of the index at *c* is drawn a ſpring of glaſs to the fineneſs of a hair, about five-fourths of an inch in length, which being ſet a little oblique, preſſes lightly againſt the ſurface of the tube, and prevents the index from following the mercury when it deſcends, or being moved by the ſpirit paſſing up and down, or by any ſudden motion given to the inſtrument; but at the ſame time the preſſure is ſo adjuſted as to permit this index to be readily carried up by the ſurface of the riſing mercury, and downwards, whenever the inſtrument is rectified for obſervation. This index, by not returning

turning with the mercury when it defcends, fhews diftinctly and accurately how high the mercury has rifen, and confequently what degree of cold or heat has happened. To prevent the fpirit from evaporating, the tube at the end *i* is clofely fealed. The daily rectification of this inftrument is performed, by applying a fmall magnet to that part of the tube againft which the index refts; by the action of which the included piece of fteel wire, and confequently the index, is eafily brought down to the furface of the mercury. When this has been done, the inftrument is rectified for the next day's obfervation, without heating, cooling, feparating, or at all difturbing the mercury, or moving the inftrument. With a thermometer of this fort, Mr. Six obferved the greateft heat and cold that happened every day and night throughout the year 1781. But for the more particular defcription of this inftrument, the illuftration of it by figures, and an account of its advantages, the limits of this work require our referring to Phil. Tranf. vol. lxxii. part i. p. 72, &c.

A fimilar effect to that produced by Six's thermometer is obtained in Rutherford's arrangement of a pair of thermometers, one with mercury, the other with fpirit of wine, placed in a horizontal pofition; one index being without the furface of the mercury, the other within that of the fpirit: the thermometers being in contrary directions, both indices may be brought back to their places, by merely raifing the end of the inftrument. (See *fig.* 16.) Self-regiftering thermometers have alfo fometimes been conftructed for keeping a ftill more accurate account of all the variations of temperature that have occurred, by defcribing a line on a revolving barrel, which fhews the height for every inftant during the whole time of their operation.

M. de Luc has defcribed the beft method of conftructing a thermometer, fit for determining the temperature of the air, in the menfuration of heights by the barometer. He has alfo fhewn how to divide the fcale of a thermometer, fo as to adapt it for aftronomical purpofes in the obfervation of refraction. See Récherches, &c. tom. ii. p. 35, &c. p. 265, &c.

Mr. Cavallo, in 1781, propofed the conftruction of a thermometrical barometer, which, by means of boiling water, might indicate the various gravity of the atmofphere, or the height of the barometer. This thermometer, he fays, with its apparatus, might be packed up into a fmall portable box, and ferve for determining the heights of mountains, &c. with greater facility than with the common portable barometer. The inftrument, in its prefent ftate, confifts of a cylindrical tin veffel, about two inches in diameter, and five inches high, in which veffel the water is contained, which may be made to boil by the flame of a large wax-candle. The thermometer is faftened to the tin veffel in fuch a manner, as that its bulb may be about one inch above the bottom. The fcale of this thermometer, which is of brafs, exhibits on one fide of the glafs tube a few degrees of Fahrenheit's fcale, *viz.* from 200° to 216°. On the other fide of the tube are marked the various barometrical heights, at which the boiling water fhews thofe particular degrees of heat which are fet down in fir G. Shuckburgh's table. With this inftrument the barometrical height is fhewn within one-tenth of an inch. The degrees of this thermometer are fomewhat longer than one-ninth of an inch, and therefore may be divided into many parts, efpecially by a Nonius. But the greateft imperfection of the inftrument arifes from the fmallnefs of the tin veffel, which does not admit a fufficient quantity of water; but when the quantity of water is fufficiently large, *e. g.* 10 or 12 ounces, and is kept boiling in a proper veffel, its degree of heat under the fame preffure of the atmofphere is very fettled; whereas when a thermometer is kept in a fmall quantity of boiling water, the quickfilver in its ftem does not ftand very fteady, fometimes rifing or falling even half a degree. Mr. Cavallo propofes a farther improvement of this inftrument in the Phil. Tranf. vol. lxxi. part ii. p. 524.

The ingenious Mr. Wedgwood, fo well known for his various improvements in the different forts of pottery-ware, has contrived to make a thermometer for meafuring the higher degrees of heat, by means of a diftinguifhing property of argillaceous bodies, *viz.* the diminution of their bulk by fire. This diminution commences in a low red heat, and proceeds regularly, as the heat increafes, till the clay becomes vitrified. The total contraction of fome good clays which he has examined in the ftrongeft of his own fires, is confiderably more than one-fourth part in every dimenfion. If, therefore, we can procure at all times a clay fufficiently apyrous or unvitrefcible, and always of the fame quality in regard to contraction by heat; and if we can find means of meafuring this contraction with eafe and accuracy, we fhall be furnifhed with a meafure of fire fufficient for every purpofe of experiment or bufinefs. Some of the pureft Cornifh porcelain clays (which, by the analyfis of Mr. Wedgwood, appear to contain no calcareous earth nor gypfeous matter, but to confift of pure argillaceous or alum earth, and another indiffoluble earth, which he apprehends to be of the filiceous kind, in the proportion of three parts of the former to two parts of the latter) feem the beft adapted, both for fupporting the intenfity, and meafuring the degrees of fire. This material is prepared for ufe by wafhing it over, and whilft in a diluted ftate paffing it through a fine lawn: it is then dried and put up in boxes. The dry clay is to be foftened for ufe with about two-fifths its weight of water; and formed into fmall pieces, in little moulds of metal, $\frac{6}{10}$ths of an inch broad, with the fides exactly parallel; about $\frac{4}{10}$ths of an inch deep, and an inch long. The moulds are to be oiled and warmed. Thefe pieces, when perfectly dry, are put into another iron mould or gage, confifting only of a bottom, with two fides, $\frac{5}{10}$ths of an inch deep, to the dimenfions of which fides the breadth of the pieces is to be pared down. For meafuring the diminution which they are to fuffer from the action of fire, another gage is made of two pieces of brafs, twenty-four inches long, with the fides exactly ftraight, divided into inches and tenths, fixed five-tenths of an inch afunder at one end, and three-tenths at the other, upon a brafs plate; fo that one of the thermometric pieces, when pared down in the iron gage, will juft fit to the wider end. If this piece be fuppofed to have diminifhed in the fire one-fifth of its bulk, it will then pafs on to half the length of the gage; if diminifhed two-fifths, it will go on to the narroweft end: and in any intermediate degree of contraction, if the piece be flid along till it refts againft the converging fides, the degree at which it ftops will be the meafure of its contraction, and confequently of the degree of heat it has undergone. The thermometric pieces may be formed much more expeditioufly than in the fingle mould by means of an inftrument, confifting of a cylindrical iron veffel, with holes in the bottom, of the form and dimenfions required.—The foft clay, put in the veffel, is forced by a prefs down through thefe apertures, in long rods, which may be cut while moift, or broken when dry, into pieces of convenient lengths. After which, recourfe fhould be had to the paring gage for afcertaining and adjufting their breadth when perfectly dry.

Each divifion of the fcale, though fo large as a tenth of an an inch, anſwers to $\frac{1}{600}$th part of the breadth of the little piece of clay. When one gage is accurately adjuſted to the proportional meaſures above ſtated, two pieces of braſs ſhould be made, one fitting exactly into one end, and the other into the other; which will ſerve as ſtandards for the ready adjuſtment of other gages to the dimenſions of the original, and thus we may be aſſured, that thermometers on this principle, though made by different perſons, and in different countries, will all be equally affected by equal degrees of heat, and all ſpeak the ſame language. The ſcale commences at a red heat fully viſible in day light; and the greateſt heat which Mr. Wedgwood has hitherto obtained in his experiments, is 160°. Swediſh copper has been found to melt at 27°, ſilver at 28°, and gold at 32°, of this thermometer. Braſs is in fuſion at 21°: the welding heat of iron is from 90° to 95°, and the greateſt heat that could be produced in a common ſmith's forge, 125°. Caſt iron melted at 130°; and the heat by which iron is run down among the fuel for caſting is 150°. A Heſſian crucible melted into a ſlag-like ſubſtance at about 150°. The fonding heat of glaſs furnaces, or that by which the perfect vitrifications of the materials is produced, was at one of them 114° for flint-glaſs, and 124° for plate-glaſs. Delft-ware is fired by a heat of 40° or 41°; Queen's-ware by 86°; and ſtone-ware by 102°, which degree of heat changes it to a true porcelain texture. The thermometer pieces begin to acquire a porcelain texture at about 110°. A piece of an Etruſcan vaſe melted completely at 33°; pieces of other vaſe and Roman ware about 36°; Worceſter china vitrified at 94°; Mr. Sprimont's Chelſea china at 105°; the Derby at 112°; the Bow at 121°; but Briſtol china ſhewed no appearance of vitrification at 135°. The common ſort of Chineſe porcelain does not perfectly vitrify by any fire which Mr. Wedgwood could produce: but began to ſoften about 120°, and at 156° became ſo ſoft as to ſink down and apply itſelf cloſe upon an irregular ſurface underneath. The true ſtone Nankeen does not ſoften in the leaſt, by this ſtrong heat; nor even acquire a porcelain texture. The Dreſden porcelain is more refractory than the common Chineſe, but not equally ſo with the ſtone Nankeen. The cream-coloured or Queen's-ware bears the ſame heat as the Dreſden. Mr. Pott ſays, that to melt a mixture of chalk and clay in certain proportions, which appear from his tables to be equal parts, is "among the maſter-pieces of art." This mixture melts into a perfect glaſs at 123° of this thermometer. For other curious particulars, ſee Phil. Tranſ. vol. lxxii. part ii. p. 305, &c.

This thermometer, ſays Dr. Young, (Lect. on Nat. Philoſ. vol. i. 648.) may be extremely uſeful for identifying the degree of heat which is required for a particular purpoſe; but for the compariſon of temperatures by an extenſion of the numerical ſcale, we have not ſufficient evidence of its accuracy to allow us to depend on its indications; and it is ſcarcely credible, that the operation of furnaces of any kind, can produce a heat of ſo many thouſand degrees of a natural ſcale, as Mr. Wedgwood's experiments have led him to ſuppoſe; nor is the ſuppoſition conſiſtent with the obſervations of other philoſophers.

Thermometer, *Differential*, a curious ſort of thermometer invented by profeſſor Leſlie, which expreſſes not the abſolute degree of heat, but the difference, when any exiſts, between the temperatures of the two ſpots where its two bulbs are placed. The method of conſtructing it is as follows. (See *Plate* XVI. *Pneumatics*, *fig.* 17.) Select two thermometer tubes with bores rather wider than uſual, and one a little wider than the other. Let the balls be blown as equal as the eye can judge, and from .4 to .7 of an inch in diameter, and let the open end of the tube alſo be widened in a ſlight degree. The tubes muſt be of unequal length, the longeſt being nearly twice the length of the other. Then introduce into the longer tube a little ſulphuric acid tinged with carmine, ſufficient to fill about an inch of its cavity; join the two tubes together by the blow-pipe, and when joined, bend them in the form of the letter U, with the bulbs about three or four inches aſunder, making one flexure juſt below the juncture of the two tubes, where the ſmall cavity (which is repreſented in the plate) facilitates the adjuſtment of the inſtrument, which by a little dexterity is performed by forcing a few globules of air by the heat of the hand from one bulb to the other. Attach a graduated ſcale to the ſhorter tube, making the zero about the middle of it, and adjuſt to it the quantity of air in each bulb, ſo that when the bulbs are at the ſame temperature, the upper ſurface of the coloured liquor may juſt correſpond with the zero. Sulphuric acid is choſen as the liquor interpoſed between the bulb, on account of its bearing any heat or cold that would be uſed without being evaporated or congealed.

In this inſtrument the air incloſed in the bulbs is the ſubſtance, which, by its expanſion or contraction, cauſes the motion of the coloured liquor up or down the ſcale, and as gaſes are much more expanſible than liquids, the inſtrument is ſooner affected by minute changes of heat. But as the two bulbs are of equal ſize, and both filled with air, and ſeparated from each other by the intervening liquor, it is obvious that when the temperature is the ſame in each bulb, be it high or low, the preſſure on each ſide of the liquor is alſo equal, and it muſt remain ſtationary: ſo that it can only move when one bulb is warmer than the other. Hence the particular and ſole uſe of this inſtrument as a differential thermometer. The lower part of the inſtrument (or the ſpace included between the two bends) is cemented to an upright ſtem, by which it is ſupported.

This inſtrument has been employed by the inventor in a variety of curious experiments on caloric, or the matter of heat. The peculiar advantage which this inſtrument poſſeſſes is, that, beſides its extreme ſenſibility, in uſing it the common temperature of the ſurrounding air may, in general, be diſregarded; this being always the *zero* of the ſcale, whatever be the actual variation of heat in the ſurrounding atmoſphere; and hence a much greater degree of ſimplicity is introduced into the delicate reſearches on this ſubject. For the reflection of heat mirrors were employed, generally of block-tin, highly poliſhed, and hammered to fit a wooden gage, the ſegment of a parabolic curve, by which much of the diſperſion produced by a ſimple concave form was avoided; ſo that when expoſed to the direct rays of the ſun, they collected them into a pretty diſtinct focus, of about half an inch in diameter. The ſubſtance employed to generate the radiant heat was a hollow cubic tin caniſter, placed directly in front of the mirror of its focal point, and when uſed, filled with boiling water, and fitted with a common thermometer, paſſing through a hole in the cover, and immerſed in the water. The cubical form of the caniſter allowed of four ſides, of perfectly equal dimenſions, each of which, when turned to the mirror, afforded a heated ſurface for the tranſmiſſion of radiant caloric, and they were occaſionally coated with various ſubſtances to aſcertain the effect of colour, poliſh, and the like, in retarding or promoting the radiation of the heat within. With this apparatus, and his differential thermometer, Mr. Leſlie performed a variety of intereſting experiments, for

for the general reſults of which we refer to the article Heat; and for a more minute detail to Leſlie's "Inquiry into the Nature of Heat;" and for an extenſive abſtract, to an elaborate article on *Caloric* in Aikin's Dictionary. See alſo our articles Caloric, Radiant *Rays*, &c. &c.

Thermometer, *Balance*, an inſtrument invented by Mr. James Kewley, of the Iſle of Man, and for which he obtained a patent for Scotland, dated Nov. 4, 1816; for England, dated Nov. 21, 1816; and for Ireland, dated Jan. 4, 1817. This inſtrument (beſides anſwering the purpoſe of aſcertaining the temperature) is uſed as a firſt moving power for putting machinery into motion, for the purpoſe of regulating the temperature, by opening or cloſing the flues, windows, or doors of the apartment in which it is placed. This invention muſt therefore be of great importance to the horticulturiſt; as by it the artificial climate of hot-houſes, conſervatories, hot-beds, &c. can be accurately regulated, without the leaſt attention from the gardener, farther than occaſionally to wind up the machine to which it is attached.

In *Plate* XVI. *Pneumatics*, *fig.* 18. is a perſpective repreſentation of Kewley's balance thermometer. A is a glaſs tube, with its bulbs *c* and *d* hermetically ſealed at *e*, and having a very fine aperture at *f*, for the admiſſion of the preſſure of the atmoſphere upon the ſurface of the quickſilver contained in the bulb *d*: *g* is a milled-headed nut, let into a mortiſe in the frame *h*, having a female ſcrew in its centre, through which the ſcrew *i* is made to paſs. This nut ſerves to elevate or depreſs the tube with the two clamping-pieces (between which it is ſcrewed faſt) in the frame *h*, for the purpoſe of adjuſting the inſtrument to its proper centre of gravity: *k* is a milled nut, having a pinion on its arbor, and ſerves the purpoſe of moving the ſcale *i* to the right or left, as may be required: *m* and *n* are the knife-edged centres, on which the inſtrument ſwings in any ornamental frame that the poſſeſſor may chooſe. When the inſtrument is at the mean temperature of its range, the bulbs *c* and *d* ought to be each about half full, and the ſmall tube communicating with the bulbs quite full of quickſilver; and the large tube, and half of the bulb *c*, full of alcohol. Now it is evident, that when the alcohol in the large tube expands by an increaſe of temperature, it muſt preſs upon the ſurface of the quickſilver in the bulb *c*, and force a quantity of quickſilver, equal to its expanſion, into the bulb *d*: the centre of gravity of the inſtrument will thereby be altered, and it will turn upon its centres, like the beam of a pair of ſcales; therefore, when the temperature is deſired to be known, the ſcale is to be moved by turning the nut *k*, in order to bring the inſtrument to a balance; when that is done, the degree is read off at *o*. When this inſtrument is uſed as a firſt moving power, to regulate the temperature of hot-houſes, &c. it has a lever or wheel attached to one of its centres, which communicating with machinery, puts it in motion when the temperature is either higher or lower than the degree deſired, which motion opens or cloſes the windows, flues, &c. as may be neceſſary, until the degree of temperature to which the inſtrument is at be produced.

Comparisons of different Thermometers.

Table for Reaumur's Thermometer.

Reau.	Cent.	Fahr.	Reau.	Cent.	Fahr.	Reau.	Cent.	Fahr.	Reau.	Cent.	Fahr.
80	100.	212.	51	63.75	146.75	23	28.75	83.75	5	6.25	20.75
79	98.75	209.75	50	62.5	144.5	22	27.5	81.5	6	7.5	18.5
78	97.5	207.5	49	61.25	142.25	21	26.25	79.25	7	8.75	16.25
77	96.25	205.25	48	60.	140.	20	25.	77.	8	10.	14.
76	95.	203.	47	58.75	137.75	19	23.75	74.75	9	11.25	11.75
75	93.75	200.75	46	57.5	135.5	18	22.5	72.5	10	12.5	9.5
74	92.5	198.5	45	56.25	133.25	17	21.25	70.25	11	13.75	7.25
73	91.25	196.25	44	55.	131.	16	20.	68.	12	15.	5.
72	90.	194.	43	53.75	128.75	15	18.75	65.75	13	16.25	2.75
71	88.75	191.75	42	52.5	126.5	14	17.5	63.5	14	17.5	0.5
70	87.5	189.5	41	51.25	124.25	13	16.25	61.25	15	18.75	−1.75
69	86.25	187.25	40	50.	122.	12	15.	59.	16	20.	4.
68	85.	185.	39	48.75	119.75	11	13.75	56.75	17	21.25	6.25
67	83.75	182.75	38	47.5	117.5	10	12.5	54.5	18	22.5	8.5
66	82.5	180.5	37	46.25	115.25	9	11.25	52.25	19	23.75	10.75
65	81.25	178.25	36	45.	113.	8	10.	50.	20	25.	13.
64	80.	176.	35	43.75	110.75	7	8.75	47.75	21	26.25	15.25
63	78.75	173.75	34	42.5	108.5	6	7.5	45.5	22	27.5	17.5
62	77.5	171.5	33	41.25	106.25	5	6.25	43.25	23	28.75	19.75
61	76.25	169.25	32	40.	104.	4	5.	41.	24	30.	22.
60	75.	167.	31	38.75	101.75	3	3.75	38.75	25	31.25	24.25
59	73.75	164.75	30	37.5	99.5	2	2.5	36.5	26	32.5	26.5
58	72.5	162.5	29	36.25	97.25	1	1.25	34.25	27	33.75	28.75
57	71.25	160.25	28	35.	95.	0	0.	32.	28	35.	31.
56	70.	158.	27	33.75	92.75	−1	−1.25	29.75	29	36.25	33.25
55	68.75	155.75	26	32.5	90.5	2	2.5	27.5	30	37.5	35.5
54	67.5	153.5	25	31.25	88.25	3	3.75	25.25	31	38.75	37.75
53	66.25	151.25	24	30.	86.	4	5.	23.	32	40.	40.
52	65.	149.									

TABLE for Fahrenheit's Thermometer.

Fahr.	Reau.	Cent.	Fahr.	Reau.	Cent.	Fahr.	Reau.	Cent.	Fahr.	Reau.	Cent.
212	80.00	100.00	148	51.55	64.44	85	23.55	29.44	22	4.44	5.55
211	79.55	99.44	147	51.11	63.88	84	23.11	28.88	21	4.88	6.11
210	79.11	98.88	146	50.66	63.33	83	22.66	28.33	20	5.33	6.66
209	78.66	98.33	145	50.22	62.77	82	22.22	27.77	19	5.77	7.22
208	78.22	97.77	144	49.77	62.22	81	21.77	27.22	18	6.22	7.77
207	77.77	97.22	143	49.33	61.66	80	21.33	26.66	17	6.66	8.33
206	77.33	96.66	142	48.88	61.11	79	20.88	26.11	16	7.11	8.88
205	76.88	96.11	141	48.44	60.55	78	20.44	25.55	15	7.55	9.44
204	76.44	95.55	140	48.00	60.00	77	20.00	25.00	14	8.00	10.00
203	76.00	95.00	139	47.55	59.44	76	19.55	24.44	13	8.44	10.55
202	75.55	94.44	138	47.11	58.88	75	19.11	23.88	12	8.88	11.11
201	75.11	93.88	137	46.66	58.33	74	18.66	23.33	11	9.33	11.66
200	74.66	93.33	136	46.22	57.77	73	18.22	22.77	10	9.77	12.22
199	74.22	92.77	135	45.77	57.22	72	17.77	22.22	9	10.22	12.77
198	73.77	92.22	134	45.33	56.66	71	17.33	21.66	8	10.66	13.33
197	73.33	91.66	133	44.88	56.11	70	16.88	21.11	7	11.11	13.88
196	72.88	91.11	132	44.55	55.55	69	16.44	20.55	6	11.55	14.44
195	72.44	90.55	131	44.00	55.00	68	16.00	20.00	5	12.00	15.00
194	72.00	90.00	130	43.55	54.44	67	15.55	19.44	4	12.44	15.55
193	71.55	89.44	129	43.11	53.88	66	15.11	18.88	3	12.88	16.11
192	71.11	88.88	128	42.66	53.33	65	14.66	18.33	2	13.33	16.66
191	70.66	88.33	127	42.22	52.77	64	14.22	17.77	1	13.77	17.22
190	70.22	87.77	126	41.77	52.22	63	13.77	17.22	0	14.22	−17.77
189	69.77	87.22	125	41.33	51.66	62	13.33	16.66	−1	14.66	18.33
188	69.33	86.66	124	40.88	51.11	61	12.88	16.11	2	15.11	18.88
187	68.88	86.11	123	40.44	50.55	60	12.44	15.55	3	15.55	19.44
186	68.44	85.55	122	40.00	50.00	59	12.00	15.00	4	16.00	20.00
185	68.00	85.00	121	39.55	49.44	58	11.55	14.44	5	16.44	20.55
184	67.55	84.44	120	39.11	48.88	57	11.11	13.88	6	16.88	21.11
183	67.11	83.88	119	38.66	48.33	56	10.66	13.33	7	17.33	21.66
182	66.66	83.33	118	38.22	48.77	55	10.22	12.77	8	17.77	22.22
181	66.22	82.77	117	37.77	47.22	54	9.77	12.22	9	18.22	22.77
180	65.77	82.22	116	37.33	46.66	53	9.33	11.66	10	18.66	23.33
179	65.33	81.66	115	36.88	46.11	52	8.88	11.11	11	19.11	23.88
178	64.88	81.11	114	36.44	45.55	51	8.44	10.55	12	19.55	24.44
177	64.44	80.55	113	36.00	45.00	50	8.00	10.00	13	20.00	25.00
176	64.00	80.00	112	35.55	44.44	49	7.55	9.44	14	20.44	25.55
175	63.55	79.44	111	35.11	43.88	48	7.11	8.88	15	20.88	26.11
174	63.11	78.88	110	34.66	43.33	47	6.66	8.33	16	21.33	26.66
173	62.66	78.33	109	34.22	42.77	46	6.22	7.77	17	21.77	27.22
172	62.22	77.77	108	33.77	42.22	45	5.77	7.22	18	22.22	27.77
171	61.77	77.22	107	33.33	41.66	44	5.33	6.66	19	22.66	28.33
170	61.33	76.66	106	32.88	41.11	43	4.88	6.11	20	23.11	28.88
169	60.88	76.11	105	32.44	40.55	42	4.44	5.55	21	23.55	29.44
168	60.44	75.55	104	32.00	40.00	41	4.00	5.00	22	24.00	30.00
167	60.00	75.00	103	31.55	39.44	40	3.55	4.44	23	24.44	30.55
166	59.55	74.44	102	31.11	38.88	39	3.11	3.88	24	24.88	31.11
165	59.11	73.88	101	30.66	38.33	38	2.66	3.33	25	25.33	31.66
164	58.66	73.33	100	30.22	37.77	37	2.22	2.77	26	25.77	32.22
163	58.22	72.77	99	29.77	37.22	36	1.77	2.22	27	26.22	32.77
162	58.77	72.22	98	29.33	36.66	35	1.33	1.66	28	26.66	33.33
161	57.33	71.66	97	28.88	36.11	34	0.88	1.11	29	27.11	33.88
160	56.88	71.11	96	28.44	35.55	33	0.44	0.55	30	27.55	34.44
159	56.44	70.55	95	28.00	35.00	32	0.	0.	31	28.00	35.00
158	56.00	70.00	94	27.55	34.44	31	−0.44	−0.55	32	28.44	35.55
157	55.55	69.44	93	27.11	33.88	30	0.88	1.11	33	28.88	36.11
156	55.11	68.88	92	26.66	33.33	29	1.33	1.66	34	29.33	36.66
155	54.66	68.33	91	26.22	32.77	28	1.77	2.22	35	29.77	37.22
154	54.22	67.77	90	25.77	32.22	27	2.22	2.77	36	30.22	37.77
153	53.77	67.22	89	25.33	31.66	26	2.66	3.33	37	30.66	38.33
152	53.33	66.66	88	24.88	31.11	25	3.11	3.88	38	31.11	38.88
151	52.88	66.11	87	24.44	30.55	24	3.55	4.44	39	31.55	39.44
150	52.44	65.55	86	24.00	30.00	23	4.00	5.00	40	32.00	40.00
149	52.00	65.00									

Table for the Centigrade Thermometer.

Cent.	Reau.	Fahr.	Cent.	Reau.	Fahr.	Cent.	Reau.	Fahr.	Cent.	Reau.	Fahr.
100	80.	212.	64	51.2	147.2	29	23.2	84.2	6	4.8	21.2
99	79.2	210.2	63	50.4	145.4	28	22.4	82.4	7	5.6	19.4
98	78.4	208.4	62	49.6	143.6	27	21.6	80.6	8	6.4	17.6
97	77.6	206.6	61	48.8	141.8	26	20.8	78.8	9	7.2	15.8
96	76.8	204.8	60	48.	140.	25	20.	77.	10	8.	14.
95	76.	203.	59	47.2	138.2	24	19.2	75.2	11	8.8	12.2
94	75.2	201.2	58	46.4	136.4	23	18.4	73.4	12	9.6	10.4
93	74.4	199.4	57	45.6	134.6	22	17.6	71.6	13	10.4	8.6
92	73.6	197.6	56	44.8	132.8	21	16.8	69.8	14	11.2	6.8
91	72.8	195.8	55	44.	131.	20	16.	68.	15	12.	5.
90	72.	194.	54	43.2	129.2	19	15.2	66.2	16	12.8	3.2
89	[illegible]1.2	192.2	53	42.4	127.4	18	14.4	64.4	17	13.6	1.4
88	70.4	190.4	52	41.6	125.6	17	13.6	62.6	18	14.4	— 0.4
87	69.6	188.6	51	40.8	123.8	16	12.8	60.8	19	15.2	2.8
86	68.8	186.8	50	40.	122.	15	12.	59.	20	16.	4.
85	68.	185.	49	39.2	120.2	14	11.2	57.2	21	16.8	5.8
84	67.2	183.2	48	38.4	118.4	13	10.4	55.4	22	17.6	7.6
83	66.4	181.4	47	37.6	116.6	12	9.6	53.6	23	18.4	9.4
82	65.6	179.6	46	36.8	114.8	11	8.8	51.8	24	19.2	11.2
81	64.8	177.8	45	36.	113.	10	8.	50.	25	20.	13.
80	64.	176.	44	35.2	111.2	9	7.2	48.2	26	20.8	14.8
79	63.2	174.2	43	34.4	109.4	8	6.4	46.4	27	21.6	16.6
78	62.4	172.4	42	33.6	107.6	7	5.6	44.6	28	22.4	18.4
77	61.6	170.6	41	32.8	105.8	6	4.8	42.8	29	23.2	20.2
76	60.8	168.8	40	32.	104.	5	4.	41.	30	24.	22.
75	60.	167.	39	31.2	102.2	4	3.2	39.2	31	24.8	23.8
74	[illegible]	165.2	38	30.4	100.4	3	2.4	37.4	32	25.6	25.6
73	[illegible]	163.4	37	29.6	98.6	2	1.6	35.6	33	26.4	27.4
72	5[illegible].6	161.6	36	28.8	96.8	1	0.8	33.8	34	27.2	29.2
71	56.8	159.8	35	28.	95.	0	0.	32.	35	28.	31.
70	56.	158.	34	27.2	93.2	1	0.8	30.2	36	28.8	32.8
69	[illegible]5.2	156.2	33	26.4	91.4	2	1.6	28.4	37	29.6	34.6
68	54.4	154.4	32	25.6	89.6	3	2.4	26.6	38	30.4	36.4
67	53.6	152.6	31	24.8	87.8	4	3.2	24.8	39	31.2	38.2
66	52.8	150.8	30	24.	86.	5	4.	23.	40	32.	40.
65	52.	149.									

THERMOPOLIUM, formed of θερμος, *hot*, and πωλεω, *I sell*, a name for a sort of public houses among the ancients, in which hot liquors were sold, in the manner of our coffee-houses.

THERMOPSIS, in *Botany*, from θερμος, *a Lupine*, and οψις, *appearance* or *aspect*, indicating a general resemblance to that genus of plants.—Brown in Ait. Hort. Kew. v. 3. 3. lass and order, *Decandria Monogynia*. Nat. Ord. *Papiliona*. Linn. *Leguminosæ*, Juss.

Ch. Calyx oblong, five-cleft half way down, two-li ; convex behind ; tapering at the base. Corolla papilionaceous ; petals nearly of equal length ; standard reflexed at the sides, keel obtuse. Stamens permanent. Legume compressed, linear, with many seeds. *Br.*

1. Th. *lanceolata.* Sharp-leaved Thermopsis. Ait. n. 1. (Podalyria lupinoides ; Willd. Sp. Pl. v. 2. 504. Sophora lupinoides ; Linn. Sp. Pl. 534. "Pallas Astrag. 119. t. 89.")—Leaflets oblong-lanceolate. Stipulas lanceolate, twice as long as the footstalks Flowers whorled.—Native of Siberia ; from whence the late duke of Northumberland is said to have received it in 1776. This is a hardy perennial herbaceous plant, flowering in June and July. The *stems* are spreading or decumbent, about a foot long, branched in an alternate manner, round, hairy, leafy. *Leaves* ternate, light green, hairy, on short stalks ; their *leaflets* about an inch long. *Stipulas* half as large, or more. *Flowers* stalked, about three in each whorl, yellow, much resembling those of a Lupine. *Calyx* hairy.

By Mr. Brown's specific character, we presume there are more species of this genus, though not in our gardens, of which he will one day give an account. For the soundness of the generic distinctions, we rely on him. The compressed *legume* seems the most important difference between *Thermopsis* and the *Baptisia* of Ventenat and Brown ; see Ait. Hort. Kew. v. 3. 5 ; also our articles Sophora and Podalyria.

THERMOPYLÆ, in *Ancient Geography*, a strait or pass, rendered famous by the valour of Leonidas and his companions, who defended it against the army of Xerxes in the year 480 B.C ; and which, long after that celebrated event, was defended against the Gauls. This pass is the only road by which an army can penetrate from Thessaly into Locris, Phocis, Bœotia, Attica, and the adjacent countries. The following succinct description is given of this strait by the abbé Barthelemy, in his "Anacharsis." On quitting Phocis to go into Thessaly, having passed the little country of the Locrians, we arrive, says the abbé, at the town of Alpenus, situated by the sea. As it stands at the entrance of the strait, it has been fortified. The road at first is only wide enough for the passage of a waggon ; but it it afterwards enlarges itſelf between moraſſes formed by the waters of the ſea and almoſt inacceſſible rocks, which terminate the chain of mountains known by the name of Oeta. After leaving Alpenus, a ſtone is diſcovered on the left, conſecrated to Hercules Melanpygus, and a path preſents itſelf that leads to the ſummit of the mountain. Farther on, the traveller croſſes a current of hot water, which gives this place its name of Thermopylæ. Next to this ſtream is the town of Anthela; and in the plain which ſurrounds it are a ſmall eminence and a temple of Ceres, in which the Amphictyons annually held one of their aſſemblies. On coming out of the plain there is a road, or rather cauſeway, only about ſeven or eight feet wide. Here the Phocians had formerly built a wall, to protect their country from the inroads of the Theſſalians. After paſſing the Phœnix, which at laſt falls into the Aſopus, a river that riſes in an adjacent valley, we come to the laſt defile, half a plethrum (15 or 16 yards) in breadth. The road then widens as far as Trachinia, which takes its name from the city of Trachis, that was inhabited by the Malians. This country preſents to the view of the traveller extenſive plains watered by the Sperchius and other rivers. To the E. of Trachis ſtood the city of Heraclea, which did not exiſt in the time of Xerxes. The whole ſtrait, from the defile before we arrive at Alpenus to that which is beyond the Phœnix, may be about 48 ſtadia (about 2 leagues) in length. Its breadth varies almoſt at every ſtep; but through its whole extent it is ſhut in on one ſide by ſteep mountains, and on the other by the ſea, or impenetrable moraſſes. The road is often deſtroyed by the torrents, or by ſtagnant waters. Leonidas poſted his little army near Anthela, rebuilt the wall of the Phocians, and diſpatched a few advanced troops to defend the approaches. But it was not ſufficient to guard the paſſage at the foot of the mountain; on the mountain itſelf there was a path, which, beginning at the plain of Trachis, terminated, after various windings, near the town of Alpenus. Leonidas entruſted the defence of this path to the thouſand Phocians he had with him, and who took poſt on the heights of mount Oeta. As ſoon as theſe arrangements were completed, the army of Xerxes was diſcovered, ſpreading itſelf over Trachinia, and covering the plain with its innumerable tents. The Greeks deliberated on the meaſures proper to be adopted; moſt of the generals were for retiring to the iſthmus; but Leonidas rejected this counſel. A Perſian horſeman was deputed to reconnoitre the advanced poſt of the Greeks, which was compoſed of Spartans; and as the reſt of the army was concealed from him by the wall, he only gave an account to Xerxes of the 300 men he had ſeen at the entrance of the defile. After various meſſages from Xerxes to Leonidas, and the firm and calm replies of the latter, the Perſian king was enraged, and gave orders for an attack. The Medes ruſhed on with fury, and one rank fell after another, while the Greeks, preſſing cloſe againſt each other, and covered with large bucklers, preſented an impenetrable front of long pikes, and a phalanx which freſh troops ſucceſſively in vain attempted to break. At length the Medes were ſeized with a panic, and fled; but they were ſpeedily relieved by the choſen body of the 10,000 immortals, commanded by Hydarnes. The action now became more bloody; but the Greeks had the advantage of ſituation, and ſuperiority of arms. The Perſians loſt many men; and Xerxes, witneſſing their flight, leaped, as it is ſaid, more than once from his chariot, and trembled for their fate. Next day the attack was renewed, but with ſo little ſucceſs, that Xerxes deſpaired of forcing the paſſage. At length Epialtes, an inhabitant of thoſe diſtricts, diſcovered to him the fatal path by which he might turn the Grecians; and ſerved as a guide to Hydarnes and his corps of immortals, under whoſe conduct they arrived near the ſpot where Leonidas had poſted a detachment of his army; and prepared to attack it. When this dreadful news reached the Greeks, their leaders aſſembled. Some were for retreating, and others for remaining; but Leonidas declared for himſelf and his companions, that they were not permitted to quit a poſt which Sparta had confided to their care. In the middle of the night, the Greeks, with Leonidas at their head, iſſued out of the defile, advanced through the plain, overthrew the advanced poſts, and penetrated to the tent of Xerxes, who had already taken flight. They ſpread over the camp, and glutted themſelves with carnage. The Perſians were terrified and confuſed, and many of them periſhed by the hands of one another. At length, with the dawn of day they diſcovered the inconſiderable number of their victors, and rallying, attacked the Greeks on all ſides. Leonidas fell beneath a ſhower of darts; and a conteſt for the honour of carrying off his body, occaſioned a terrible conflict between his companions and the moſt expert and hardy warriors of the Perſian army. The Greeks, however, prevailed, and carried off their general; and having regained the defile, poſted themſelves on an eminence, and for ſome time continued to defend themſelves. When Xerxes offered to Leonidas the empire of Greece, if he ſubmitted to his power, he replied, "I rather chooſe to die free than to enſlave my country." When the king commanded him to ſurrender his arms, he wrote the laconic anſwer, "come and take them." "The Perſians are near us," ſaid one of his ſoldiers to Leonidas: "rather ſay," he coolly replied, "that we are near the Perſians." See Leonidas.

It has been a ſubject of diſpute what was the number of Grecian troops under the command of Leonidas at Thermopylæ. Herodotus ſtates them at 5100, Pauſanias at 11,200, and Diodorus at 7400. The abbé Barthelemy attempts to reconcile theſe different ſtatements, and concludes, upon the whole, that Leonidas had with him about 7000 men. If we may credit Diodorus, he had no more than 500 ſoldiers when he determined to attack the Perſian camp.

On the eminence to which the companions of Leonidas retired after the death of their commander, there were ſeveral monuments erected by order of the Amphyctionic council, in honour of the 300 Spartans, and the other Grecian troops engaged in the combat. On one of theſe cippi is inſcribed, "Here four thouſand Greeks of Peloponneſus fought againſt three millions of Perſians."

THERMOSCOPE, an inſtrument ſhewing the changes happening in the air with reſpect to heat and cold.

The word thermoſcope is generally uſed indifferently with that of thermometer. There is ſome difference, however, in the literal import of the two; the firſt ſignifying an inſtrument that ſhews or exhibits the changes of heat, &c. to the eye; formed from θερμη, *heat*, and σκοπειν, *video, I ſee*; and the latter an inſtrument that meaſures thoſe changes, from θερμη, *heat*, and μετρειν, *to meaſure*, on which foundation the thermometer ſhould be a more accurate thermoſcope, &c. This difference the excellent Wolfius taking hold of, deſcribes all the thermometers in uſe as thermoſcopes; ſhewing that none of them properly meaſure the changes of heat, &c. none of them do more than indicate the ſame. Though their different heights yeſterday and to-day ſhew a difference of heat; yet, ſince they do not diſcover the ratio of yeſterday's heat to to-day's, they are not ſtrictly thermometers.

THERONDELS, in *Geography*, a town of France, in the department of the Aveiron; 3 miles N.E. of Mur.

THEROUANNE, a town of France, in the department of the Straits of Calais, on the Lys. It was anciently the

the capital of the Morini, and afterwards an epifcopal fee, with feveral churches and convents; but being taken in the year 1553 by the emperor Charles V., he demolifhed it. The diftrict belonging to it, however, was ceded by Spain to France, at the treaties of the years 1559 and 1659; 6 miles S. of St. Omer.

THERSA, or Thapsa, in *Ancient Geography*, a royal town of Judea, in the half-tribe of Manaffeh, on this fide of Jordan. Therfa was the feat, capital, and burying-place of the firft kings of Ifrael.

Thersa, or *Thirza*, a town of Paleftine, in the tribe of Ephraim.

THERSARA, a town of Afia, in the interior of Affyria. Ptolemy.

THERSITÆ, a people of Spain, in Iberia; they were of the number of thofe whom Annibal caufed to pafs into Africa.

THERUINGI, a people who inhabited a part of Dacia, on the other fide of the Danube.

THESBON, a town of Paleftine, on the other fide of Jordan, in the tribe of Gad.

THESEA, or Thesæa, Θησεια, in *Antiquity*, feafts celebrated by the Athenians in honour of Thefeus.

In fpite of the important fervices that hero had done his country, in delivering it from a fhameful tribute of fo many youths, of either fex, fent yearly to be devoured by the Minotaur in Crete (as the fable has it), or fent as flaves to Minos, king of Crete, as the hiftories have it, from which he freed them, by overturning Taurus, Minos's general; he was banifhed for fome time, and retired to Scyros, under the protection of Lycomedes, king of that ifland, where he finally loft his life either by accident, or in confequence of the jealoufy of the king.

The gods, it is faid, revenged this treatment Thefeus received from the Athenians, by afflicting them with a famine, which the oracle affured them fhould not ceafe till they had avenged his death. Upon this they flew Lycomedes, brought Thefeus's bones to Athens, placed them in a temple erected to him, and appointed Thefea to be held every eighth day of each month, in which largeffes were diftributed to the people, and the day was fpent, by the rich, in feafting and rejoicing, and with peculiar folemnity on the eighth day of the month Pyanepfion.

Plutarch, however, gives a different account of the origin of this feaft; he fays that the Athenians, imagining they faw Thefeus at the battle of Marathon under the form of a tutelary deity, confulted the oracle on this prodigy: and being ordered to collect his bones in the ifland of Scyros, removed them with great pomp to Athens; and depofited them under a magnificent monument erected in the middle of the city, which became afterwards an afylum for flaves, in commemoration of the fuccour afforded by this prince to the unfortunate during his life. They alfo erected a temple where they offered facrifices, &c. At Rome, Thefeus was held in very different eftimation, for Virgil (Æn. lib. vi.) places him in Tartarus, among thofe who were tormented for their crimes.

THESEUS, in *Biography*, a hero celebrated in the fabulous ages of Greece, and referred by chronologers to the thirteenth century B.C. was the illegitimate fon of Ægeus, king of Athens, by Æthra, daughter of Pittheus, king of Trœzern; and as he advanced towards maturity difcovered a vigorous fpirit in an athletic frame. In his journey to Athens by land he met with many adventures and conflicts, and on his arrival found the city agitated by diffenfions. The fons of Pallas, the brother of Ægeus, fufpecting that the aged and childlefs fovereign would adopt this newly arrived ftranger for his heir, fomented his jealoufies, fo that Ægeus prepared poifon for difpatching him; but before his plan could be accomplifhed, he difcovered by certain tokens that he was his fon. The confequence of this difcovery was a revolt of the Pallantides, which Thefeus fuppreffed.

For an account of the further exploits of Thefeus for the relief of the Athenians, we refer to our article *Hiftory of* Athens. Thefeus having, in the manner there related, eftablifhed a conftitution for the Athenians, yielded to the impulfe of ambition; and quitting his throne, and fometimes in the company of Hercules and fometimes of Pirithous, fon of Ixion, king of Theffaly, whofe friendfhip he had fecured, undertook a variety of enterprizes, the account of which is fo intermixed with the fabulous, that it is impoffible fatisfactorily to develope it. He is faid, however, to have conquered certain Amazons on the banks of the Thermodon, in Afia, taking a queen from among them for his wife; to have affifted Pirithous in overcoming the Centaurs in Theffaly; and to have ftolen away from Sparta the celebrated Helen; and afterwards to have joined the fame friend in a fimilar attempt upon Proferpina, the daughter of Aidoneus, king of the Moloffians, in which Pirithous loft his life, and Thefeus underwent an imprifonment, from which Hercules procured his efcape. Upon his return from this romantic expedition, he found his kingdom and family in confufion. Caftor and Pollux, the brothers of Helen, ravaged Attica by way of revenge for the infult offered to their fifter. His queen Phædra, falling in love with Hippolytus, his fon by the Amazon, and being rejected, calumniated him to his father, and occafioned his death, as his tragedy has recorded. From a variety of circumftances that occurred, Thefeus finding that he had loft the attachment of the Athenians, abandoned the city, and intended to repair to Demetrius, fon of Minos, now reigning in Crete. In his paffage thither he was driven by a ftorm to the ifle of Scyros, where he was kindly received by the king, Lycomedes; but foon afterwards he loft his life by a fall from a rock. (See Thesea.) The refentment of the Athenians afterwards fubfided, and they regarded him only as a hero and benefactor; and Cimon, fon of Miltiades, having conveyed his bones, as they were fuppofed to be, to Athens, in confequence of the injunctions of an oracle, a magnificent temple was erected over them, which was made an afylum for the unfortunate. Its remains ftill fubfift as one of the nobleft relics of ancient art in that famous capital. Plut. in Vit. Thefei. Anc. Univ. Hift. Travels of Anacharfis, vol. i.

THESIN.—*Per Arfin* and *Thefin*. See Per *Arfin*.

THESIS, Θεσις, *pofition*, formed from τιθημι, *I put* or *lay down*, in the *Schools*, a general propofition, which a perfon advances, and offers to maintain.

In the college it is frequent to have placards, containing a number of thefe thefes in theology, in medicine, in philofophy, in law, &c. The maintaining a thefis, is a great part of the exercife a ftudent is to undergo for a degree.

Thesis, in *Logic*, &c.—Every propofition may be divided into thefis and hypothefis; thefis contains the thing affirmed or denied, and hypothefis the conditions of the affirmation or negation.

Thus, in Euclid, if a triangle and parallelogram have equal bafes and altitudes (is the hypothefis), the firft is half of the fecond (the thefis).

Arfis and Thefis. See Arsis.

Thesis, θεσις, *depofitio* or *remiffio*, the beating down the hand or foot at the beginning of a bar in mufic. See Arsis, *tollo*, which is the lifting up the hand or foot in the middle or latter part of a bar.

THESIUM, in *Botany*, an ancient name, adopted from the Greeks, enumerated by Linnæus, Phil. Bot. 174, among

 thofe

thoſe whoſe derivation is extremely difficult, and, after all, doubtful. Pliny has the *Theſium* in two places; book 21. chap. 17, and book 22. chap. 22. In the former, it is mentioned amongſt bulbous plants, as having a harſh taſte: in the latter, it ſtands next to *Picris*, as very bitter, and purgative. This laſt account is copied from Theophraſtus, who, in his book 7. chap. 11, ſpeaks of θησιον in the ſame terms, along with a number of plants of the Sowthiſtle and Dandelion tribe, or *Cichoraceæ*. To theſe indeed ſome of the *Arum* family are ſubjoined, and *Theſium* is placed at the end. All we can hence gather is, that the plant in queſtion may poſſibly be ſome plant of the *Syngeneſia Polygamia-æqualis*, of the ſection *ſemifloſculoſæ*, whoſe root is tuberous. Of this deſcription there are ſeveral natives of Greece; ſee Scorzonera, n. 12 and 13. Ambroſini derives the word from θης, *a ſervant*, or rather *a poor tradeſman*, becauſe, as he thinks, of its being ſerviceable in many reſpects, both for food and medicine. Poſſibly Linnæus, who frequently conſulted this author, may hence have been led to apply the name of *Theſium* to the preſent genus, totally different indeed from all that is recorded of the Greek θησιον, but remarkable for its mean habit and hardy texture.—Linn. Gen. 114. Schreb. 160. Willd. Sp. Pl. v. 1. 1211. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 269. Prodr. Fl. Græc. Sibth. v. 1. 164. Ait. Hort. Kew. v. 2. 63. Purſh 177. Brown Prodr. Nov. Holl. v. 1. 352. Juſſ. 75. Lamarck Illuſtr. t. 142. Gærtn. t. 86.—Claſs and order, *Pentandria Monogynia*. Nat. Ord. *Vepreculæ*, Linn. *Elæagni*, Juſſ. *Santalaceæ*, Brown.

Gen. Ch. *Cal.* Perianth ſuperior, of one leaf, tubular, in four or five erect ſegments, internally coloured and hairy, permanent. *Cor.* none. *Stam.* Filaments equal in number to the ſegments of the calyx, but not ſo long, inſerted into their baſe, awl-ſhaped; anthers roundiſh, of two lobes. *Piſt.* Germen inferior, roundiſh, confluent with the baſe of the calyx; ſtyle thread-ſhaped, the length of the ſtamens; ſtigma tumid, cloven. *Peric.* none. *Seed.* Nut oval, angular, coated, crowned with the permanent involute calyx, of one cell, with a ſolitary kernel.

Eſſ. Ch. Calyx ſuperior, of one leaf, bearing the ſtamens. Corolla none. Nut ſolitary, coated, crowned with the calyx.

Obſ. Our learned friend Mr. Brown propoſes to ſeparate the Cape ſpecies of this genus from the reſt, perhaps even into two diſtinct genera; but as we cannot find ſufficient grounds for this meaſure, we ſhall admit the whole here, at leaſt till we can obtain fuller information. *Th. Colpoon*, Linn. Suppl. 161. Willd. n. 18, is of courſe excluded, having a *Drupa*, and a very different habit. This is deſcribed, by ſome one of our coadjutors, under the article Fusanus. See alſo Leptomeria.—We are enabled to add a few in its ſtead to Willdenow's liſt, but cannot adopt ſuch as are merely named by Mr. Brown, unleſs where we happen to have ſpecimens.

The whole genus is of a rigid broom-like habit; ſometimes roughiſh, though ſcarcely pubeſcent; with ſimple, uſually very narrow, ſcattered *leaves;* and inconſpicuous green, whitiſh, or yellowiſh *flowers*, either cluſtered, ſpiked, or ſomewhat capitate.

1. Th. *linophyllum*. Baſtard Toad-flax Theſium. Linn. Sp. Pl. 301. Willd. n. 1. Fl. Brit. n. 1. Prodr. Fl. Græc. n. 1. Engl. Bot. t. 247. Pollich Palat. v. 1. 238. Roth. in Sims and Konig's Ann. of Bot. v. 2. 18. (Th. pratenſe; Ehrh. Herb. n. 12. Th. montanum; ibid. n. 2. Th. intermedium; Schrad. Spicil. 27. Anonymos lini folio; Cluſ. Hiſt. v. 1. 323. Linaria adulterina; Ger. Em. 555.)—Stem erect, ſomewhat branched. Cluſter moſtly compound. Bracteas ternate. Leaves linear-lanceolate. Tube of the calyx cup-ſhaped, very ſhort.—Native of dry chalky hills throughout moſt parts of Europe, though reckoned amongſt our rarer Engliſh plants, flowering in July. The *root* is woody, perennial, branched, crooked, whitiſh, ſending up ſeveral erect or reclining, ſmooth, leafy, more or leſs angular, rigid, branched *ſtems*, from four to twelve inches high. *Leaves* numerous, alternate, linear, entire, in ſome degree ſucculent and glaucous, minutely rough at the edges, as are ſometimes the angles of the ſtem. *Cluſters*, rather than ſpikes, more or leſs branched, or even panicled, each branch bearing one or more *flowers*, either ſolitary at the extremity, accompanied by three lanceolate, leafy, unequal *bracteas*, or without *bracteas*, in the fork of the ſtalk, whoſe diviſions bear other *flowers*, with one or more *bracteas*. The latter is the more luxuriant ſtate of this plant, in which it has been called *intermedium* by Schrader, and *montanum* by Ehrhart; we cannot ſee, by original ſpecimens, that theſe two ſuppoſed ſpecies differ at all, not even ſo as to merit Willdenow's diſtinction of them as varieties. Our Engliſh plant is leſs luxuriant, anſwering to Pollich's excellent deſcription. The *calyx* is turbinate, having hardly any tube: its limb five-cleft, whitiſh, ſpreading, acutely five-cleft, ſometimes with intermediate teeth; cloſely involute after flowering. *Anthers* yellow. *Stigma* white, of two knobs. *Fruit* hard, ſtriated, with five angles. The herb is ſcarcely bitter, a little ſaltiſh. It uſually grows among graſs, which it ſo much reſembles at a little diſtance, as not to be readily diſcernible. The pure air of the open hills about Bury, and ſimilar ſituations, ſeems to ſuit this plant, though the ſoil does not much promote its luxuriance of growth.

2. Th. *ramoſum*. Branched German Theſium. "Hayne in Schrad. Journ. v. 1. 30. t. 7." Roth in Sims and Kon. Ann. of Bot. v. 2. 18. Marſch. von Bieberſt. Caucaſ. v. 1. 175. (T. alpinum; Pollich Palat. v. 1. 239.)—Stem erect, branched. Cluſter elongated. Bracteas ternate. Leaves linear-lanceolate. Flowers three or four-cleft, with a very ſhort, cup-ſhaped tube.—Native of heaths, and ſandy paſtures or woods, in the Palatinate, flowering at the ſame time as the preceding. Not having been able to aſcertain this ſpecies amongſt our ſpecimens, we ſhall copy Pollich's deſcription, having endeavoured to improve our ſpecific character by the aſſiſtance of that faithful and inſtructive writer. "The *root*," ſays he, "is white, fibrous. *Stem* erect, from three inches to a foot high, round, ſtriated, ſmooth, branched from the very baſe; the *branches* alternate, very ſhort. *Leaves* alternate or ſcattered, linear-lanceolate, ſharpiſh, entire, rather fleſhy; convex on one ſide, flat on the other; ſeſſile, above an inch long, three-quarters of a line wide. *Flowers* ſolitary and ſeſſile at the ends of the very ſhort branches, between three leaves, of which the two lateral ones are ſmaller than the third. There is a white roundiſh baſis, or *receptacle*, on which each *flower* ſtands. The *calyx* is two lines in diameter, green without, white within, having but three or four ſegments, which ſpread croſswiſe. *Anthers* pale yellow. *Stigma* white, capitate. Evidently different from the foregoing." *Pollich*. He miſtakes however in his reference to Linnæus, Gerard, and Haller. As to Jacquin's *Enumeratio*, 40 and 213, we have no poſitive means of determining, the tube of the *calyx* not being there deſcribed. Marſchall von Bieberſtein conſiders our Engliſh plant, above deſcribed, as belonging to this ſpecies, and not to *linophyllum*.

3. Th. *alpinum*. Alpine Tubular Theſium. Linn. Sp. Pl. 301. Willd. n. 2. Roth in Sims and Kon. Ann. of Bot. v. 2. 18. (Th. floribus ſubſeſſilibus, pedunculis folioſis, foliis linearibus; Gerard Gallopr. 442. t. 17. f. 1. Th. n. 1574;

n. 1574; Hall. Hift. v. 2. 265.)—Stems procumbent, unbranched. Clufters fimple. Bracteas ternate; the odd one very long. Leaves linear. Flowers three or four-cleft; their tube prifmatic, as long as the limb.—Native of the mountains of Germany, Siberia, Switzerland, and Italy. We received it from Switzerland, and have gathered the fame on mount Cenis. Haller doubted whether his plant were really diftinct from *Th. linophyllum*, not adverting to the oblong angular tube of the *calyx*, which indeed we have not found noticed by any author, except Vahl, nor is it fufficiently indicated in Gerard's plate. That character however clearly diftinguifhes the *alpinum*, which may alfo be recognized by its numerous, fhort, fimple, moftly procumbent, *ftems*; narrower *leaves*; very unequal *bracteas*, the middle one being from three to five times the length of the others, and greatly exceeding the *flower* with its ftalk. The *fruit* is exactly oval, copioufly marked with branching ribs, but not furnifhed with angles. The *flowers*, ufually four-cleft, are faid by Haller to have fometimes but three fegments.

4. Th. *ebracteatum*. Naked-flowered Thefium. "Hayne in Schrad. Journ. v. 1. 33. t. 7. Termin. Bot. n. 6. t. 26. f. 4." Roth in Sims and Kon. Ann. of Bot. v. 2. 18.)—Stem erect, unbranched. Clufter fimple. Flowers without lateral bracteas; their tube cup-fhaped, very fhort.—Found near Berlin, by Mr. Hayne, author of an elegant German and Latin work on botanical terminology. We have an authentic fpecimen from profeffor Schrader, though we accidentally are deficient in that fafciculus of his Journal, which contains the defcription of the prefent fpecies. No difpute can arife as to its difference from all the foregoing. The wide fhallow form of the *calyx* is like the two firft, but the narrow *foliage*, and the long narrow terminal *bracteas*, agree with *Th. alpinum*. The total abfence of the pair of fmaller lateral *bracteas*, effentially diftinguifhes it from all three.

5. Th. *humile*. Dwarf Thefium. Vahl Symb. v. 3. 43. Willd. n. 3. (Alchimilla linariæ folio, floribus et vafculis in foliorum alis feffilibus; Shaw Afric. n. 14.)—Stem erect, branched. Flowers axillary, feffile, five-cleft; their tube very fhort. Gathered in cultivated ground near Tunis, by Vahl, who refers hither the fynonym of Shaw, applied by Linnæus, not without fcruple, to his *alpinum*; from which therefore it muft of courfe be erafed. The prefent is faid to be annual, with an herbaceous *ftem* hardly three inches high, branched from the bafe; *branches* fmooth, angular, fomewhat divided, as tall as the main ftem. *Leaves* linear, thick, numerous, acute, an inch and half long. Tube of the *calyx* fcarcely any; not elongated as in *Th. alpinum*. *Fruit* globofe, rugofe, the fize of Coriander-feed. *Vahl.*

6. Th. *auftrale*. Auftralian Thefium. Br. n. 1.—"Clufter fimple, elongated, fomewhat fpiked. Partial-ftalks fhorter than the flower. Calyx four or five-cleft; its fegments bordered longitudinally, rather longer than the tube."—Gathered by Mr. Brown, at Port Jackfon, as well as in Van Diemen's ifland, and on the fouth coaft of New Holland. We have feen no fpecimens.

7. Th. *lineatum*. Lineated Thefium. Linn. Suppl. 162. Thunb. Prodr. 45. Willd. n. 4.—"Leaves linear. Stem round, fomewhat angular; leaflefs in the lower part: branches ftraight, divaricated. Flowers axillary, ftalked." *Linn.*—Gathered at the Cape of Good Hope, by Thunberg, who, in his *Prodromus*, defines it, "leaves lanceolate, remote; branches ftriated, erect." We have not feen the plant, nor does Mr. Brown mention its name.

8. Th. *fquarrofum*. Recurve-leaved Thefium. Linn. Suppl. 162. Thunb. Prodr. 46. Willd. n. 5.—Leaves linear-awlfhaped, recurved. Stem round. Flowers axillary, feffile.—From the fame country. Thunberg fays the *flowers* are ftalked. The younger Linnæus remarks that the recurved, or reflexed, *foliage* gives this plant a very fquarrofe afpect. It does not appear that he poffeffed any fpecimen.

9. Th. *Frifea*. Little Trailing Thefium. Linn. Mant. 213. Willd. n. 6. Thunb. Prodr. 46.—Stem decumbent. Leaves awl-fhaped. Flowers fpiked; denfely woolly within. Fruit globofe, wrinkled.—Found at the Cape of Good Hope by Koenig, who fent fpecimens to his preceptor Linnæus, under the new generic name of *Frifea*, by which, we prefume, he meant to commemorate his own countryman Chriftian Friis Rottböll; but Linnæus reduced the plant to *Thefium*. It is one of thofe fpecies whofe *calyx* is denfely lined with reflexed pubefcence, and of which Mr. Brown has, juftifiably perhaps, made a diftinct genus, on that account. Yet it has all the habit of an European *Thefium*. The little woody knobbed *root* fends forth numerous decumbent, fimple, leafy, roundifh, fmooth *ftems*, two or three inches in length. *Leaves* not an inch long, linear, acutely pointed; channelled above. *Flowers* feffile, each accompanied by two fmall acute *bracteas*. *Calyx* in five deep, lanceolate, acute fegments, with fcarcely any tube; their denfe internal white woollinefs did not efcape Linnæus. *Fruit* nearly globofe, much wrinkled, not fo large as Coriander-feed.

10. Th. *funale*. Stringy Thefium. Linn. Sp. Pl. 302. Willd. n. 7. Thunb. Prodr. 45.—Stem with numerous long, nearly naked, branches. Leaves, and lateral bracteas, awl-fhaped, very fhort. Flowers fpiked; their fegments lanceolate, denfely woolly within.—Native of the Cape. The fhrubby round fmooth *ftem*, with its numerous crowded upright *branches*, has a very rufhy afpect. The little *leaves* are diftantly fcattered. The *fpikes* are terminal, folitary, fcarcely an inch long, compofed of feveral fmall, crowded, not quite feffile, *flowers*, in ftructure like the laft; each accompanied by one ovate, pointed, keeled *bractea*, and a pair of minute, lateral, awl-fhaped ones.

11. Th. *fpicatum*. Large-fpiked Thefium. Linn. Mant. 214. Willd. n. 8.—Stem erect, repeatedly branched. Leaves awl-fhaped, minute, fcattered. Flowers fpiked; their fegments linear, denfely woolly within. Lateral bracteas lanceolate.—From the fame country, growing on hills. Allied to the laft, but thrice as large in almoft every part, with a ftout, round, ftraight, determinately branched *ftem*. The *leaves* however are even more minute than in that fpecies. The *fpikes* are thick, of numerous, very denfely crowded, *flowers*, which Linnæus defines *læves*, fmooth, apparently in contradiftinction to thofe of *Th. funale*; but however fmooth, or even, like that, externally, their fegments, which are linear, narrow, and parallel, are full as hairy or woolly within. The outer *bracteas* are much dilated and rounded in their lower half; the lateral ones alfo are broadly lanceolate, very different from thofe of *funale*.

12. Th. *capitatum*. Capitate Thefium. Linn. Sp. Pl. 302. Willd. n. 9. Thunb. Prodr. 46.—Flowers capitate, feffile, terminal. Leaves three-edged, pointed, fmooth. Bracteas ovate. Segments of the calyx ftrongly pointed; denfely woolly within.—Native of the fame country. The *ftem* is hard and fhrubby, with alternate diftant *branches*; the upper ones gradually longer. *Leaves* alternate, fmall, awl-fhaped, pointed. Heads of *flowers* terminal, a frefh branch fhooting out from beneath each. Segments of the *calyx* very much pointed, and internally villous throughout their whole length. *Linnæus*. In his herbarium are fpecimens which anfwer to this defcription, though left by him with-

out

out any specific name, he having originally described the present species in Van Royen's *Prodromus*. The younger Linnæus took these specimens for *scabrum*, with which they agree only so far as to confirm their being the *capitatum*, contrasted therewith in Sp. Pl. Their *leaves* however can hardly be termed small, measuring near an inch in length. The *bracteas* have dilated membranous edges; fringed, as Thunberg describes them. *Calyx* with an oblong, five-angled tube. We cannot so blindly follow Willdenow, as to insert any species between this and *scabrum*.

13. Th. *scabrum*. Rough Thesium. Linn. Sp. Pl. 302. Willd. n. 13. Thunb. Prodr. 45.—Heads of flowers stalked. Leaves three-edged, pointed; their edges very rough with cartilaginous teeth.—Native likewise of the Cape. Nearly allied to the last, though undoubtedly a very distinct species. The *leaves* are but half as large, and remarkable for the cartilaginous teeth of their three edges. *Flower-stalks* sometimes two or three inches long, naked. *Calyx* with hardly any tube; its segments, according to Linnæus, internally villous at the tips only, but of this we are not perfectly convinced.

14. Th. *strictum*. Wand-like Thesium. Berg. Cap. 73. Linn. Mant. 214. Willd. n. 10. Thunb. Prodr. 45.—Leaves lanceolate, with a decurrent keel. Cymes terminal. Calyx obtuse, smooth, except at the back of each stamen.—Found at the Cape, and first described by Bergius. Linnæus originally referred the description of this author to his own *Th. capitatum*, from which scarcely any species can be more distinct. In general dimensions, and shrubby habit, indeed they are not unlike; but the *leaves* of the present plant are much fewer, and more distant, and the *inflorescence* totally different, being a sort of compound irregular *umbel*, or *cyme*. The *calyx* being smooth both within and without, except a slender tuft of hairs at the back of each *stamen*, as observed by Mr. Brown, reduces this species to a different section, according to that author, along with *squarrosum*, n. 8, *fragile*, n. 16, and some others. A note at the back of one of the Linnæan specimens of *Th. strictum*, gathered by Sparrmann, says "the fruit is a *drupa*, like that of *Prunus Padus*." If so, this species should seem referrible to some other genus, as *Fusanus*; yet their habits are too dissimilar.

15. Th. *umbellatum*. Umbel'd Thesium. Linn. Sp. Pl. 302. Willd. n. 11. Ait. n. 2. Pursh n. 1. (Centaurium luteum ascyroides virginianum; Pluk. Mant. 43. Phyt. t. 342. f. 1.)—Flowers umbellate. Leaves elliptic-oblong.—On dry hills and fields, from New York to Carolina. Perennial, flowering in June and July.—*Flowers* white. *Pursh*. Mr. Aiton records its having first been introduced into the British gardens in 1782, by the late Dr. Hope, professor of botany at Edinburgh. This is an herbaceous species, about a foot high, erect, scarcely branched, except at the top, and having more of the aspect of some annual *Euphorbiæ*, than of the genus of which we are treating. The *leaves* are scattered, on short stalks, erect, smooth, nearly oval, about an inch long. *Flowers* three or four together in small *umbels*, on slender, solitary *stalks*, either axillary or terminal. *Bracteas* three or four under each umbel, pale, lanceolate, deflexed. Mr. Brown says the character of the *flower* of this, the only American species, is between *Fusanus* and *Santalum*. Of the *fruit* nothing is known.

16. Th. *fragile*. Brittle Thesium. Linn. Suppl. 162. Willd. n. 12. Thunb. Prodr. 45. — Leaves three-edged, somewhat ovate, keeled, decurrent. Stem angular. Flowers axillary, sessile.—Discovered by Thunberg at the Cape of Good Hope. We have seen no specimen of this species. It is said to have the habit of a *Salsola*, and to be extremely brittle. The *leaves* are so very short, that at first sight they seem to be altogether wanting.

17. Th. *paniculatum*. Panicled Thesium. Linn. Mant. 51. Willd. n. 14. Thunb. Prodr. 45. — Stem much branched; branches diffuse, panicled, angular, many-flowered. Flowers solitary, stalked. Leaves awl-shaped.—From the Cape of Good Hope.—The *stem* is round, shrubby, with several round primary *branches*, subdivided throughout into many lateral and terminal, slender, angular ones, repeatedly and irregularly cloven and forked, bearing innumerable, small, terminal, stalked, solitary *flowers*, each of which is subtended by four or five sharp awl-shaped *bracteas*, which Linnæus describes as an inferior, but not a proper, *calyx*. The real *calyx* is obtuse and five-cleft. *Fruit* like Coriander-seed. Many of the *flowers* are abortive. The *leaves* are scattered, and for the most part very minute. Mr. Brown does not mention this species, perhaps from not having been able to examine the inside of the *flowers*.

18. Th. *ericoides*. Heath-like Thesium. Herb. Banks. Brown Prodr. Nov. Holl. v. 1. 353.—Stem much branched, panicled; branches erect, many-flowered. Flowers capitate. Leaves lanceolate, channelled, decurrent, acute.—Native of the Cape of Good Hope. This has a round shrubby *stem*, with the panicled habit, and innumerable small *flowers*, of many *Ericæ*. The younger Linnæus confounded it very negligently with the last, and it seems to have passed undescribed, being only mentioned in Mr. Brown's work, by the apt name it bears in the Banksian herbarium. The *leaves* are pretty numerous, minute, spreading, concave, broad at the base; decurrent at the margins and keel. *Flowers* sessile, two, three, or four, in each little terminal head, accompanied by several imbricated, ovate, keeled, sheathing *bracteas*, partly jagged or fringed at the edges. These *bracteas* evince the true nature of what Linnæus terms, in the foregoing, an inferior *calyx*.

19. Th. *amplexicaule*. Heart-leaved Thesium. Linn. Mant 213. Willd. n. 15. Ait. n. 3.—"Clusters terminal. Leaves heart-shaped, sessile."—Native of lofty hills at the Cape of Good Hope.—*Stem* rather woody, erect, somewhat angular, four feet high, smooth. *Leaves* alternate, sessile, clasping the stem, heart-shaped, entire, rather acute, smooth, thickish, an inch long. *Clusters* terminal, consisting of minute *flowers*, intermixed with large ovate *bracteas*. *Linnæus*. Neither Mr. Brown nor professor Thunberg mention this species. There is no authentic specimen of it in the Linnæan collection, and we are almost convinced of its being the same plant as the following. Willdenow has made a singular mistake in copying the specific character of *Th. Frisea*, see n. 9, over again, for the *amplexicaule*, which stands above it in the *Mantissa*.

20. Th. *euphorbioides*. Spurge-like Thesium. Berg. Cap. 74. Linn. Mant. 214. Willd. n. 17. Thunb. Prodr. 46. (Planta africana frutescens, portulacæ foliis, Morgsani Syrorum, ex brevi pediculo binis, similis; Pluk. Amalth. 173.) — Stalks three-flowered, terminal. Leaves roundish-ovate, acute, fleshy. Stem shrubby, with alternate corymbose branches.—Native of the Cape of Good Hope. This was adopted from Bergius by Linnæus, without seeing a specimen, at least from that author. One is preserved in his own herbarium, on which he had written *Thesium capense*, which his son altered to *euphorbioides*, considering it as the same with the plant of Bergius. A similar specimen lies in the Banksian collection for *Th. amplexicaule*. Both names are excellent, but perhaps *euphorbioides*, as the original

original one, ought to be preferred. The plant is of a ftout fhrubby habit, turning black in drying. *Leaves* about the fize of the finger-nail, alternate, feffile, ovate or rather heart-fhaped, clafping the ftem, acute, entire, flefhy, fmooth, without rib or veins. *Flowers* about the tops of the alternate corymbofe upper branches, enveloped in *bracteas*, like the leaves, but fmaller. Tube of the *calyx* very fhort, and ftrongly angular; limb fmooth within, except perhaps a few minute hairs behind the *ftamens*, indicated by Mr. Brown. *Fruit* globofe, chiefly angular at the top.

21. Th. *triflorum*. Three-flowered Thefium. Linn. Suppl. 162. Willd. n. 16. Thunb. Prodr. 46.—"Leaves lanceolate. Stem angular. Flower-ftalks axillary, three-forked, compound."—Gathered by Thunberg at the Cape. The *flower-ftalks* are three-flowered, fometimes divided, or three-cleft, greatly divaricated. *Linn.* We have met with no fpecimen anfwering to this fpecies, nor does Mr. Brown advert to it.

22. Th. *fpinofum*. Spinous Thefium. Linn. Suppl. 161. Willd. n. 19. Thunb. Prodr. 45. — Leaves awl-fhaped, fpinous-pointed, fpreading, flefhy, decurrent. Flowers axillary, ftalked, folitary. — Gathered by Thunberg at the Cape. A very fingular fpecies, whofe woody decumbent *ftem* is befet with numerous, afcending, fimple *branches*, two or three inches long, clothed with alternate, horizontally projecting, pungent *leaves*, one-third of an inch in length, giving the plant the afpect of an *Ulex*. *Flower-ftalks* about as long as the leaves. — Mr. Brown places this in his fection of fuch Cape fpecies as have the *calyx* internally naked, except a flender tuft of hairs behind each *ftamen*. With it ranges *fquarrofum*, *fragile*, *ftrictum*, *fpinofum*, *ericoides*, *euphorbioides*, and one unknown to us, called *fparteum*. The fection whofe *calyx* is lined with a denfe deflexed beard, confifts of *Frifca*, *funale*, *fpicatum*, *capitatum*, and *fcabrum*, befides five fpecies unknown to us, called *craffifolium*, *teretifolium*, *debile*, *ciliatum*, and *divaricatum*.

THESMOPHORIA, Θεσμοφορια, in *Antiquity*, a feftival in honour of Ceres, which was celebrated by many cities of Greece; but efpecially the Athenians obferved it with great devotion and pomp. For the ceremonies of this folemnity, fee Potter, Archæol. Græc. tom. i. p. 403, feq. See CEREALIA and ELEUSINIA.

THESMOTHETÆ, Θεσμοθεται, an appellation given to fix of the nine Athenian archons; the firft and chief of the nine was called, by way of eminence, *archon;* the fecond in dignity was called *bafileus;* the third, *polemarchus;* and the other fix, *thefmothetæ:* for an account of whofe power and jurifdiction, fee Potter, Archæol. Græc. tom. i. p. 77.

THESPANIS, in *Ancient Geography*, a river of Afiatic Sarmatia; the mouth of which, according to Ptolemy, lay between that of Rhembitus and the town of Azara.

THESPHATA, Θεσφατα, in *Antiquity*, an appellation given to oracles. See ORACLE.

THESPIA, or THESPIÆ, in *Ancient Geography*, a town of Bœotia, fituated at the foot of mount Helicon, about 50 ftadia from the city of Thebes. The Thebans, who deftroyed this city, fpared nothing but the facred monuments, among which were the temple of Hercules, which was ferved by a prieftefs reftricted to celibacy during her whole life, and the ftatue of that Cupid (or Cupidon), fometimes confounded with the god of love, which was only a fhapelefs ftone as it was dug in the quarry, for thus the objects of public worfhip were reprefented in ancient times. Praxiteles is faid to have formed a ftatue of Cupidon of Penthelic marble; and Lyfippus made one of bronze. The Thefpians reported, that the ftatue of Praxiteles was taken away by Caius, the Roman emperor; but others fay, that it was returned by Claudius, and that Nero removed it to Rome, where it was confumed by fire. This ftatue was fo beautiful, that, according to Cicero, Thefpia was vifited merely for the fake of feeing it. The Cupidon that exifted in the time of Paufanias was an imitation of that of Praxiteles by Menodorus, the Athenian; but here were a Venus and Phryné in marble, executed by Praxiteles himfelf. In one quarter of the city was a temple confecrated to Venus Melenis. The theatre was a beautiful ftructure, ornamented with a ftatue of Hefiod in bronze. Near it was a Victory in bronze, and a chapel confecrated to the Mufes, each of which had a fmall ftatue in marble. At Thefpia there was a ftatute of Venus in marble, made by Praxiteles.

THESPIADES, in *Mythology*, an appellation given to the Mufes from the city of Thefpia, where they were honoured.

THESPIÆ, in *Ancient Geography*, a town of Theffaly, in Magnefia.

THESPIANA, the name of an antidote intended for internal abfceffes.

THESPIS, in *Biography*, an ancient poet, and the fuppofed inventor of tragedy, was born in a fmall borough of Attica, named Icaria, and he, as well as Sufarion, a native of the fame place, appeared each at the head of a company of actors, one on a kind of ftage and the other in a cart. Sufarion attacked the vices and abfurdities of his time, and reprefented his firft pieces towards the year 580 B.C. Thefpis treated nobler fubjects, which he drew from hiftory: he appeared fome years after Sufarion, made his firft attempts in tragedy, and acted his Alceftis in the year 536 B.C. He was followed in this fpecies of drama by Æfchylus, Sophocles, and Euripides. Thefpis having obferved at the feftivals, in which before his time hymns only were fung, one of the fingers, mounted on a table, forming a kind of dialogue with the chorus, took the hint of introducing into his tragedies an actor, who by fimple recitals, introduced at intervals, fhould relieve the chorus, divide the action, and render it more interefting. This innovation, together with fome other liberties in which he indulged himfelf, alarmed Solon, the legiflator of Athens, who condemned a fpecies of compofition, in which the ancient traditions were difguifed by fiction. "If we applaud falfehood in our public exhibitions," faid he to Thefpis, "we fhall foon find that it will infinuate itfelf into our moft facred engagements."

The exceffive approbation and delight with which both the city and country received the pieces of Thefpis and Sufarion, at once juftified and rendered ufelefs the fufpicious forefight of Solon; the poets, who till that time had only exercifed their genius in dithyrambics and licentious fatire, ftruck with the elegant forms which thefe fpecies of compofition began to affume, dedicated their talents to tragedy and comedy. See TRAGEDY.

Thefpis, according to the defcription of Horace, extended his plan farther than the introduction of a fingle actor in the intervals between the fongs of the chorus, to the reprefentation of fome fable by actors on a kind of moveable ftage, who alternately fung and played, with their faces ftained by the lees of wine.

> "Ignotum tragicæ genus inveniffe Camœnæ
> Dicitur, et plauftris vexiffe poemata Thefpis,
> Quæ canerent agerentque peruncti fæcibus ora."
>
> Art. Poet.

Some writers have mentioned three pieces of Thefpis, *viz.*

viz. "The Conteft of Pelias or Phorbas;" "The Sacred Youths;" and "Pentheus." Socrates fays that he reprefented tragedies in the 61ft Olympiad, long after Solon's death. Travels of Anacharfis, vol. vi. 8vo.

THESPIUS, in *Ancient Geography*, a river of Greece, in Bœotia.

THESPROTI, a people of Epirus, who inhabited Thefprotia, in the vicinity of the Ambraciates; and formed one nation with the Chaonians. They derived their name from Thefprotus, the fon of Pelafgus, who was the fon of Lycaon, and who was the firft that conducted the Pelafgi into Epirus.

THESPROTIA, or THESPROTIS, a fmall country of Epirus, S. of Chaonia, having to the E. the lake Ambracius and Ambracia, and to the S. the fea. This country was watered by three rivers, which ran from W. to E, viz. Thiamis, Cocytus, and Acheron.

THESSALIA, THESSALY, a celebrated country of Greece. This country, comprifing Magnefia and other fmall diftricts which have particular denominations, is bounded to the E. by the fea, to the N. by mount Olympus, to the W. by mount Pindus, and to the S. by mount Oeta. From thefe permanent boundaries branch out other chains of mountains and hills, that wind through the country, occafionally embracing fertile plains, which, from their form, and the manner in which they are inclofed, refemble vaft amphitheatres. Opulent cities are feated on the heights that encircle thefe plains; and the whole country is watered by rivers falling in general into the Peneus, which, before it lofes itfelf in the fea, flows through the famous valley of Tempé. The Aphidanus, or Apidanus, proceeded from the S. where was Dolopia, afcended northward (fee PENEUS), traverfed the plains of Pharfalia in the Theffaliotide, and difcharged itfelf into the Alpheus, W. of Lariffa. (See APIDANO.) The Oncheftus, or Onfchones, took its rife S. of Lariffa, paffed by the Palus Bœbeis, and after having received the Naurus, difcharged itfelf into the Pelafgic gulf, between Demetrius on the left and Pagafæ on the right. The Sperchius commenced S.W. in an angle which was formed by the chains of Pindus with thofe of mount Oeta, afcended N.E., watered Sperchium, turned to the E., and having paffed Hypata, received the Achelous of Theffaly, which proceeded from mount Othrys, and being joined by the Lamina, difcharged itfelf into the Maliac or Lamiac gulf. The country was marfhy, and abounded with a variety of plants, fome of which were medicinal and fanative, and others venomous and pernicious. The knowledge of their different properties caufed the Theffalians to be regarded as a clafs of forcerers, who poffeffed the art of producing fupernatural effects. The principal people of Theffaly were the Æthices, fituated towards the N.W., whofe chief town was Oxinia, near a lake that lay between fmall chains of mountains:—the Pelagoni Tripoliti, in a kind of hollow territory, feparated from Macedonia by a chain of mountains, called Cambrunii montes; denominated Tripolitans on account of their three towns, Dolicha, Pythium, and Azorus: in the eaftern part of this territory was the Afcuris palus, or marfh Afcuri:—the Perrhæbi, lying S. of the mountains which formed this territory, and extending from W. to E., the N. of the Peneus:—S. of the Peneus, towards the W., was the Eftiæotis, watered by the rivers Ion and Thœus, and bounded W. and S. by mount Pindus: its moft confiderable towns being Gomphi, Trica, Pellinæum, and Pharcadon:—the Pelafgiotis, towards the E., having the Peneus to the N. and commencing W. from the Apidanus, which received the Enipeus, that paffed to Pharfala: the principal towns of this part of Theffaly were Lariffa, reckoned the capital of Theffaly; Pharfala, one of the largeft and moft opulent towns, now Pharfalia, Scotuffa, Cranon, &c.:—the Theffaliotis being to the S. and watered by the Enipeus in the lower part of its courfe, and having to the S. mount Othrys, and to the S.W. Dolopia; its principal town was Melitæa upon the Enipeus:—the Phthiotis, towards the S.E., terminating in a peninfula, and watered by the Sperchius and Achelous; its principal towns were Pheræ, to the N.; Thaumaci, to the W., commanding one of the fineft profpects in Greece; Alos and Lamia, towards the middle; Phalara, at the bottom of the Amaliac gulf; in the peninfula, Thebæ, Lariffa, Cremafta and Echinus: at the extremity the port of Aphetæ, and S.E. Heraclea Trachina, the road from which led to the ftraits of *Thermopylæ;* which fee. Magnefia was feparated from the fea by mount Pelion: here were the towns of Demetrias and Iolcos, and S.E., on the eaftern coaft, the town of Magnefia, and at the extremity of the peninfula to the S.W. the town of Antium. At the bottom of the Pelafgiotic gulf were the two fmall iflands of Deucalion and Pyrrha. Dolopia lay towards Ætolia, and contained no confiderable towns. The extremity of the S.E. of Magnefia was terminated by the promontory Sepias, where the fleet of Xerxes was battered by a tempeft. The town of Gonnus, at the entrance of the valley of Tempé, was the key of Theffaly on the fide of Macedonia, as the poft of Thermopylæ was on the fide of Phocis. See THESSALY.

The feveral nations which we have recounted, as properly Theffalian, were formerly governed by kings, but after various revolutions became for the moft part fubject to an oligarchy. The ftates and the towns were independent of each other. The confederacy of the Theffalians, properly fo called, was the moft powerful of all, both from the number of towns pertaining to it, and from the acceffion of the Magnefians and Perrhæbians which were brought almoft under complete fubjection. There were fome free cities, unconnected with any of the ftates. The Theffalians could bring into the field an army of 6000 horfe and 10,000 infantry, exclufively of their archers, who were excellent, and who from their infancy were accuftomed to draw the bow. The Theffalians are faid to have been the firft who managed horfes with the bit, and ufed them in battle; and hence, it is faid, originated the tradition that a race of creatures, called centaurs, half horfe and half man, formerly exifted in Theffaly. This country produced wine, oil, and fruit of different kinds. The land has been reprefented to be fo rich, that the corn grew too faft, if it were not cut, or fheep turned in to graze upon it. They carried on a confiderable commerce in corn. The Theffalians, though they boafted of their liberty, were the firft to reduce Greeks to flavery. Amongft them they had a prodigious number of flaves, known by the name of Peneftæ. Thefe people are very hofpitable to ftrangers, and treat them magnificently. In their drefs and houfes luxury is confpicuous; and at their entertainments they hire dancing girls to amufe them. They are reckoned paffionate and turbulent, and very difficult to be governed; and they are reproached with infincerity and falfehood. They have cultivated poetry from their moft early ages, and pretend that Theffaly gave birth to Thamyris, Orpheus, Linus, and many others who lived in the heroic age; but fince that period, they have produced no writer nor any celebrated artift. They were much addicted to dancing; and in fome places generals or magiftrates were called chiefs of the dance. Their mufic obferves a medium between the Doric and Ionic, and accordingly harmonizes with the character and manners of the country,

country. They have never on any occaſion killed ſtorks, and the ſame puniſhment was inflicted on a perſon who killed one of theſe birds as if he had taken away the life of a man. This law, it is ſaid, was founded on the circumſtance, that ſtorks had freed Theſſaly from the enormous ſerpents which formerly infeſted it.

THESSALICUM Sedile, the Theſſalian chair, ſo called from Theſſaly, where chairs of this figure were moſt in uſe: it is recommended by Hippocrates, Lib. de Art. in place of a machine for reducing a recent luxation of the ſhoulder-bone. The back of this chair is perpendicular to the ſeat, as Galen tells us, by which conſtruction it is diſtinguiſhed, and accommodated to the operation.

THESSALIOTIS. See Thessalia.

THESSALON, in *Geography*, a river of Canada, which runs into lake Huron, N. lat. 49° 6′. W. long. 82° 8′.

THESSALONIANS, *Epiſtles to*, in *Scripture Hiſtory*. See Epistle.

THESSALONICA, in *Ancient Geography*, a town of Macedonia, ſituated on the Thermaic gulf; and built on the declivity of a mountain in the form of an amphitheatre, the ſummit of which was defended by a caſtle of great extent. Strabo ſays that it was named "Therma," and that it was only a village; that Caſſander augmented it conſiderably, and tranſported hither the inhabitants of ſome neighbouring cities, and gave it the name of Theſſalonica, that of his wife, the ſiſter of Alexander the Great. In the year 168 B.C., Macedonia was divided into four parts, and Theſſalonica was the capital of the ſecond part. Its government was regulated by magiſtrates, called "Political." Under the Greek empire it continued to be governed by a ſenate. Cicero, during his exile, paſſed ſome time at Theſſalonica. This city had ſeveral divinities, and alſo emperors, who were objects of public worſhip. Jupiter was the principal; Apollo was alſo repreſented on its monuments; and the Cabiri had a temple in Theſſalonica. The Cabirian and Pyrrhic games were exhibited in this city in honour of the Cabiri, and the Olympic games were celebrated in honour of Jupiter. That rich and powerful city had, for its ſpectacles and the amuſement of the citizens, an amphitheatre for the combats of gladiators, and a circus for the public games. The emperors Valerian and Gallienus gave it the title of a colony. It had alſo the title of Neocorus, The modern name of Theſſalonica is *Salonica* or *Saloniki*. (which ſee.) Although there are different routes by which goods are tranſported from Macedonia into the Auſtrian dominions, the beſt, ſays Dr. Holland in his Travels into Albania, &c. is through Bulgaria, by Widin and Offovo, where it enters the Auſtrian territory, and is thence continued through the Bannat by Temeſwar, Peſt, Raab to Vienna. The goods landed at Salonica are made up in packages of 1½ hundred weight, and two of theſe are the load of a horſe. The cavalcades for this inland journey conſiſt often of 200 or 300, and ſometimes of 1000 horſes. The property ſo tranſported, at a moderate eſtimate, might be worth 30,000*l.* on its arrival in Germany. The time occupied between Salonica and Vienna was in general thirty-five days, excluſive of the quarantine at Offovo, which ſometimes took place. The cavalcades uſually travel eight hours in the twenty-four.

THESSALY, or Janna, in *Geography*, a province of European Turkey, bounded on the N. by Macedonia, on the E. by the Archipelago, on the S. by Livadia, and on the W. by Livadia and Epire, anciently called *Theſſalia*, *Pelaſgia*, and *Pyrrhæa*, (ſee Thessalia,) and now by the Turks *Janna*. It was ſometimes annexed to Macedonia, and ſometimes ſeparated from it. The celebrated mount Pindus, now Meſſova, or Meſſo Novo, ſeparated it from Epirus, or a part of the preſent Albania. Amongſt its once celebrated twenty-four mountains, the moſt remarkable are Olympus, Pelion, and Oſſa. Here are alſo ſituated the plains of Pharſalia, and the delightful valley of Tempé. The country is extremely fertile, and retains its ancient character in this reſpect. It produces oranges, citrons, lemons, pomegranates, very ſweet grapes, excellent figs and melons, almonds, olives, cotton, and cheſnuts, which take their name from Caſtanea in Magneſia. The modern Theſſalians are a well-made ſpirited people. The moſt remarkable places in the country are Lariſſa and Janna. See Thessalia.

THESTIA, in *Ancient Geography*, a town of Epirus, in Acarnania.—Alſo, a river of the Peloponneſus, in Laconia.

THESTIDION, a town of Greece, in Theſſaly.

THESTIS, a town which belonged to the Arabs.—Alſo, a town of Africa, in Libya.—Alſo, a fountain of Africa, in the Cyrenaica, near Iraſa.

THETA, Θ, among the *Ancients*, one of the Greek letters. It was uſed as a mark on the ballots of judges, by which they condemned the perſon to death, it being the firſt letter of the word Θανατος, *death*. Whence it had the epithet of *niger* and *infelix*, thus:

"O multum ante alias infelix litera theta."

THETES, Θητες, in *Antiquity*, the loweſt claſs of people at Athens. Ariſtides repealed Solon's law by which the thetes were made incapable of bearing any office in the government.

THETFORD, in *Geography*, an ancient borough and market-town, partly in the hundred of Shropham, and county of Norfolk, and partly in the hundred of Lackford, in the county of Suffolk, England, is ſituated at the diſtance of 28 miles S.W. from Norwich, and 80 miles N.N.E. from London. It was a place of conſiderable conſequence at an early period.

Thetford, called in the Saxon Chronicle *Theodford*, has an acknowledged claim of having been once the ſeat of the Eaſt Anglian kings. Being the metropolis of that portion of the heptarchy, it became ſubject to the ravages of the Danes, by whom it was repeatedly laid in aſhes. From numerous coins, it is evident that there was a mint at Thetford from the time of Athelſtan to the reign of king John. At the eaſtern extremity of the town are ſome extenſive remains of fortifications, conſiſting of a large artificial mount, or keep, with lofty banks and deep ditches. Theſe fortifications were probably firſt formed by the early kings of Eaſt Anglia, and the keep an addition, made ſubſequent to the Norman conqueſt. Eaſt of the mount is a large area, or place of arms, three hundred feet ſquare. The mount is about one hundred feet in height, and nine hundred and eighty-four feet in circumference, at the baſe. The ſlope is extremely ſteep; and yet no traces remain of any path or ſteps for the purpoſe of carrying up machines or weighty ammunition.

In the Conqueror's time, Herfaſt having removed the epiſcopal ſee from North Elmham to Thetford, the latter became the head of the Eaſt Anglian dioceſe; but in the ſucceeding reign, the ſee was transferred to Norwich. The ruins of eccleſiaſtical and other buildings ſtrongly point out the ancient ſplendour of this town. At one period it is ſaid to have had twenty churches, anſwerable to the number of pariſhes, and eight monaſteries, beſides other religious and charitable foundations. But of theſe, the names only of ſome remain; and of others, a few dilapidated walls ſerve to to mark their fcites. Of the twenty churches, three only are preferved; St. Peter's, and St. Cuthbert's, on the Norfolk fide of the river; and St. Mary the Lefs on the Suffolk fide. St. Peter's, commonly called the Black church, from its being conftructed chiefly of flint, confifts of a chancel, nave, two aifles, and a tower. The latter was rebuilt in 1789, when a great part of the church was alfo re-edified. The battlements on the fouth fide, and the buttreffes, are decorated with allufive ornaments and large letters inlaid in the flint work.

The *Nunnery* was founded by Uvius, the firft abbot of St. Edmund's Bury, in the reign of king Canute; in commemoration of the number of perfons who fell at Snarefhill, near this town, in the fanguinary conflict between king Edmund's army and the forces under the Danifh leaders Ingwar and Ubba. A few monks were placed in this monaftery, which was then confidered as a cell to Bury Abbey. In the year 1176, the monks, being reduced to two, refigned, by the requeft of the abbot of Bury, who placed in their ftead a convent of nuns, who had previoufly refided at Lynn. At the diffolution, the revenues and fcite were granted to fir Richard Fulmerfton, who made this houfe his refidence. It was afterwards let to a farmer, and fome years fince the greater part was taken down: a new farm-houfe was built of the materials, and the conventual church converted into a barn. Some of the walls, with buttreffes, windows, &c. ftill remain.

The *Priory* or *Abbey* was founded by Roger Bigod, in the year 1104, for monks of the Cluniac order. This was a peculiarly privileged houfe; for other Cluniac monafteries were fubject to have their revenues feized, on a war breaking out between England and France, becaufe being dependant on the abbey of Clugny, in Burgundy, the monks were confidered as foreigners; but the religious perfons of this monaftery were naturalized, and treated as other fubjects of the realm. At the fuppreffion the revenues were granted to the duke of Norfolk, and are now the property of lord Petre. The ancient gateway, conftructed with freeftone and black flint, with parts of the church, &c. ftill remain. This monaftery had been the burial-place of the feveral noble families who had fucceffively borne the title of earls of Norfolk.

St. Auftin's Friary was founded by John of Gaunt, duke of Lancafter, in the year 1387, for friars mendicant of the Auguftine order. The fcite, granted to fir Richard Fulmerfton, is ftill called the Friar's Clofe.

The *Monaftery of St. Sepulchre* was founded in 1109, by William, earl of Warren and Surrey, for canons of the Auguftine order, and additionally endowed by king Henry II. The fcite is ftill called Canons: part of the conventual church, yet ftanding, has long fince been ufed as a barn. The gate of the porter's lodge, and fome other parts of the buildings, remain. Of the other four religious houfes, no veftiges are now left. In the Suffolk part of the town, near St. Mary's church, is a free grammar-fchool. In the year 1566, fir Richard Fulmerfton bequeathed property for the erection of a free-fchool, with dwelling-houfes and falaries for a mafter and ufher; and alfo habitations and weekly penfions for two poor men and two poor women. The benevolent defign of the donor, however, was not carried into effect till the time of James I., when it was enacted by authority of parliament, that there fhould be for ever a free grammar-fchool and hofpital; and that the mafter, ufher, and the four poor people, fhould be a body politic, under the title of "The mafter and fellows of the fchool and hofpital at Thetford, founded by king James the Firft, according to the will of fir Richard Fulmerfton, knt."

Thetford, though a very ancient burgh, is comparatively a modern corporation. In the time of the Conqueror, the town was governed by a conful and other inferior officers. Not being a free burgh, it fuffered greatly at times by the oppreffion of the officers nominated by the crown. But in the year 1573, queen Elizabeth granted a charter, by which a mayor, ten aldermen, twenty common-councilmen, a recorder, town-clerk, fword-bearer, and two ferjeants at mace, conftitute the corporation. The mayor for the time being is clerk of the market, and in the year after his mayoralty officiates as coroner. The corporation had alfo permiffion to fend two burgeffes to parliament, "provided they were difcreet and honeft men, and were elected at the expence of the borough." This charter was furrendered to the crown in the thirty-fourth year of Charles II., and a very imperfect one obtained in its ftead. But in 1692 an order was procured from the court of chancery for cancelling the furrender, and procuring a tranfcript of the charter granted by Elizabeth, under which the town is at prefent governed. Thetford has been honoured with the prefence of many of our fovereigns, particularly Henry I. and II. Several charters, granted by the former, bear date from this town. When the manor fell with the duchy of Lancafter, of which it formed a parcel, to the crown, the ancient feat of the earls Warren became the royal palace. This was rebuilt in the time of queen Elizabeth, who occafionally refided here. King James I. made it one of his hunting feats; but being difgufted with the abrupt remonftrance of a farmer, over whofe lands he had been hunting, he gave the palace to fir Philip Wodehoufe: it has been rebuilt, and is now the property of a private gentleman; but ftill bears the appellation of the "King's Houfe." The old guildhall or council-houfe being in a dilapidated condition, fir Jofeph Williamfon, fecretary of ftate to king Charles II., erected at his own expence the prefent council-chamber, and the apartment for the juries. Thetford has been much improved within the laft twenty years. A new bridge has been built, the principal ftreet paved, and feveral handfome houfes have been erected. The navigation of the river has been attended to, and by this communication fome mercantile bufinefs is tranfacted in the corn and coal trade. Five fairs are held annually, and a market weekly on Saturdays; but, compared with its former greatnefs, it is now a very inconfiderable place. The population in the return of the year 1811, was ftated to be 2450, occupying 530 houfes.

Near to Thetford is a mineral fpring, the waters of which poffefs confiderable virtues, though their celebrity has by no means been commenfurate with their acknowledged efficacy. Thomas Paine, well known for his political and theological tracts, was a native of this town, and received his education in the grammar-fchool.—Blomefield's Effay towards a Topographical Hiftory of Norfolk, vol. ii. Beauties of England and Wales, vol. xi. by John Britton, F.S.A. Hiftory, &c. of Thetford, by Thomas Martin, 4to.

THETFORD, a town of the United States, in the county of Orange, Vermont; 10 miles N. of Hanover; containing 1735 inhabitants.

THETIS, in *Mythology*, the name of the moft beautiful of the Nereids.

THEVACOURCHY, in *Geography*, a town of Hindooftan, in the Carnatic; 20 miles W.S.W. of Tiagar.

THEUDORIA, in *Ancient Geography*, a town of Achaia, from which the Macedonians were driven by the Romans.

THEUDURUM, a town of Lower Germany, on the route

route from Colonia Trajana to Colonia Agrippina, between Mederiacum and Coriovallum. Anton. Itin.

THEVEN, in *Geography*, a town of Perfia, in the province of Lariftan; 40 miles E. of Lar.

THEVENARD, Gabriel Vincent, of Paris, in *Biography*, born in 1669, became in the operas of Lulli the firft finger and actor of his time. He had a tenor voice, which made the public forget that of Beaumavielle; it was fonorous, mellow, and extenfive in compafs. He fung a little through the throat, but by dint of art, he found the means of rendering this little defect even agreeable. His appearance on the ftage was dignified, and his performance wonderful! It was to him that the prefent manner (1780) of fpeaking recitative is due. He excelled above all in finging at table; nor has he ever been furpaffed in that talent, except by De Chaffé and Jeliote, who fo many years delighted their friends.

He fung more than forty years at the Opera, and only retired in the year 1730. He was more than fixty years old, when, feeing a beautiful female flipper in a fhoemaker's fhop, he fell violently in love, unfight, unfeen, with the perfon for whom it was made; and having difcovered the lady, married her, after obtaining the confent of an uncle on whom fhe was dependent, with the affiftance of many bottles of wine which they cracked together with the utmoft cordiality, and which Thevenard meliorated with the charms of his voice.

He died at Paris in 1741, at the age of 72. Thevenard was the caufe of the duke d'Antin quitting the management of the opera. This finger having a penfion offered him for his fervices, found it fo inconfiderable, that he refufed to accept of it, faying it was only fit for his footman. The duke, piqued at this infolence, would have fent him to prifon; but it having been reprefented to him that the public would fuffer by his abfence, he facrificed to this confideration his refentment; but determining to have nothing more to do with fuch people, he quitted the fuperintendance of the opera. Laborde.

THEVENOT, John, a traveller in the Levant, was born in Lorraine, and after repeated journies, died in Perfia in 1667. He is faid to have introduced the ufe of coffee into France. His "Voyage in Afia" was publifhed in 1664, which is a work confiderably efteemed, and has been often re-edited. The Amfterdam edition in 12mo., 1727, is comprifed in 5 vols. Nouv. Dict. Hiftor.

Thevenot, Nicholas Melchisedec, a writer of travels, was born in 1621, probably at Paris, and having finifhed his ftudies, indulged his propenfity for vifiting foreign countries, confining himfelf chiefly to various parts of Europe. Some perfons have given him the credit of being a great linguift, but this is difputed by Huet, who was perfonally acquainted with him. The refult of his obfervations and inquiries was publifhed in a "Collection of Voyages and Travels," comprifed in 4 vols. fol. from 1663 to 1672. Thevenot was a great collector of books, confifting of more than 2000 volumes, in which the royal library, of which he was keeper, was deficient. Nointel, on returning from his embaffy to Conftantinople, enriched this collection by a prefent of his marbles, infcriptions, and bas-reliefs. He died in 1692. From various MSS. in the royal library, he had compiled "The Works of Ancient Mathematicians," an edition of which was publifhed after his death. Moreri. Huet.

THEVET, Andrew, a traveller and writer, was born at Angouleme in 1502; and being defirous of vifiting foreign countries, he obtained, by the intereft of the cardinal of Lorraine, an opportunity of going to Jerufalem. His travels in the Levant occupied him from 1549 to 1554; and after his return to France, he accompanied the fieur de Villegaignon, in 1555, to found a colony in Brazil. In 1556 he took the habit of an ecclefiaftic, and was appointed almoner to queen Catharine de Medicis. He alfo obtained the titles of hiftoriographer and cofmographer royal, and died at Paris in 1590, at the advanced age of 88 years. Befides other works, he publifhed "Cofmographie du Levant," 1554, 4to.; "Les Singularités de la France Antarctique," 1588, 4to.; and "Cofmographie Univerfelle," 2 vols. fol. 1575; but unfortunately his veracity is queftionable. Moreri.

THEVESTE, Tiffeste, in *Ancient Geography*, a town of Africa, fituated on a delightful plain in the interior of the country, on the banks of a river, E. of Sigus, and E.S.E. of Cirta. In Anton. Itin. this town has the title of a Roman colony, and is placed on the route from Carthage to Cæfarea, between Ammedara Colonia and Attaba.

THEVET. See Tebet.

THEVETIA, in *Botany*, a name given by Linnæus, in his *Hortus Cliffortianus* 75, to a genus diftinguifhed by Plumier, and other authors, under the American appellation of *Ahouai*. The perfon commemorated by the above name was André Thevet, a French monk, who travelled to Brafil, of which he publifhed an account in 1554, under the title of *Les Singularitez de la France Antarctique, autrement nommée Amerique*, &c. Of this book there are feveral editions, with rude wooden cuts, and fome accounts of plants, amongft which the *Ahouai* is, for the firft time, defcribed. The author, according to De Theis, died in 1590, about the age of eighty-eight. Haller fays he has injudicioufly applied paffages in the writings of the ancients to the productions of the new world; and that he has defcribed many countries which he never vifited. Linnæus himfelf appears not to have been fatisfied with the honour he was conferring, for he fays he fhould not be difpleafed with any perfon who might change this name for another. He fubfequently retained it as a fpecific name only, when the genus in queftion was funk in his own Cerbera. See that article.

THEU-PROSOPON, in *Ancient Geography*, a promontory of Phœnicia, between Tripolis and Botrys. Mela calls it Euprofopon.

THEURGY, θεουργια, a name which the ancients gave to that facred part of magic which we fometimes call *white magic*, or the *white art*.

The word is formed from Θεος, *God*, and εργον, *work*; *q. d.* the art of doing divine things, or things which God alone can do: or the power of working extraordinary and fupernatural things, by invoking the names of God, faints, angels, &c.

Accordingly, thofe who have written of magic in the general, divide it into three parts: the firft of which is called *theurgy*, as operating by divine or celeftial means; the fecond, *natural magic*, performed by the powers of nature; and the third, *necromancy*, which proceeds by invoking dæmons.

This theurgy, or pretended art of fo purging and refining that faculty of the mind, which receives the images of things, as to render it capable of perceiving the dæmons, and of performing many marvellous things by their affiftance, was adopted by the difciples of Ammonius towards the clofe of the fecond century. Ammonius, the founder of the fect of modern Platonics (fee Platonism), with a view of reconciling the popular religions of different countries, and particularly the Chriftian, with his own fyftem, turned into mere allegory the whole hiftory of the gods, and maintained that thofe beings, whom the priefts and people dignified with this title,

title, were no more than celestial ministers, to whom a certain kind of inferior worship was due. He acknowledged Christ to be a most excellent man, the friend of God, and the admirable theurge; but denied that it was his intention entirely to abolish the worship of dæmons, and of the other ministers of divine providence; affirming, on the contrary, that he merely purified the ancient religion, and that his followers had manifestly corrupted the doctrine of their divine master. Mosh. Eccl. Hist. vol. i. 8vo.

THEUTIS, in *Ancient Geography*, a small town of Arcadia, S. of the river Lodon, and near that of Tuthoa.

THEUX, in *Geography*, a town of France, in the department of the Ourthe; 5 miles N.W. of Spa.

THEXIS, a word used by the old medical writers, sometimes for wounds made by puncture with small instruments, and sometimes for the operation of the suture, or the sewing together the lips of a wound, to make it heal with a less scar.

THEYA, in *Geography*. See TEYA.

THEYE-CHEEKE LAKE, a lake of North America. N. lat. 65°. W. long. 109°.

THEYE-NOYE-KYED LAKE, a lake of North America. N. lat. 64° 10′. W. long. 108°.

THEYHOLEKYED LAKE, a lake of North America. N. lat. 62°. W. long. 102° 5′.

THEYSSE, a river which rises in the E. part of Hungary, on the borders of Poland, and runs into the Danube; 19 miles N.W. of Belgrade.

THEZE, a town of France, in the department of the Lower Pyrenees; 12 miles N. of Pau.

THIA, or DIVINE, in *Ancient Geography*, an island which, A.D. 46, was under the empire of Claudius. It was one of the Cyclades, situated between Thera and Therasia. It either disappeared, or was reunited to that of Hiera towards the year 726, on occasion of a violent eruption which took place at that time.

THIA, a town of Cappadocian Pontus, upon the route from Trapezunte to Satala, between Zigana and Sedisscapisonti. Anton. Itin.

THIACAR, in *Geography*, a town of Thibet; 75 miles S.E. of Lassa.

THIAGOLA, in *Ancient Geography*, a name given to the most northerly mouth of the Danube, and to the marsh which it forms before it runs into the Euxine sea.

THIAN, in *Geography*, a town of the county of Tyrol; 13 miles W. of Bolzano.

THIAR, in *Ancient Geography*, a town of Spain, upon the route from Tarragona to Castula, between Illicis and Carthage. Anton. Itin.

THIAUCOURT, in *Geography*, a town of France, in the department of the Meurthe; 7 miles W. of Pont-à-Mousson.

THIAUMA, in *Ancient Geography*, a town of Albania, between the rivers Cæsius and Gerrus.

THIBAULT VI., in *Biography*, count of Champagne and king of Navarre, deserves to be recorded as one of the earliest French song-writers. In 1234 he succeeded to the crown of Navarre on the death of his maternal uncle. Upon his return from the East, whither he went as one of the crusaders, he cultivated literature, and particularly poetry. He died at Pampelona in 1253, having acquired the somewhat inconsistent titles of the Great and the Song-maker. Under the latter character he obtained permanent reputation, degraded, however, by the occasional licentiousness of his imagery. He was the first, it is said, who blended masculine with feminine rhymes:—a capital invention in French versification. Moreri. Nouv. Dict. Hist.

The songs of this prince are placed by some at the head of those that have been preserved in the French language, as those by Guillaume IX., duke of Aquitaine, are in that of Provence. There were indeed songs written in both languages before these princes had done poetry the honour to make it their favourite amusement; but the chief part of those of higher antiquity than the time of these patriarchs of Provençal and French versification are either lost, or thought of little value.

This prince was contemporary with Philip Augustus, and Lewis VIII. and IX., which last prince he accompanied to the Holy War. It has been said by several historians that he was much captivated by the charms of queen Blanche of Castile, mother of St. Lewis, to whom many of his songs were addressed; but this point of history has been disputed with great zeal by M. l'Eveque de la Ravalliere, editor of Thibault's poems, which he published in 1742, with notes, in 2 vols. 12mo. and a history of the revolutions, in the French language, from the time of Charlemagne to that of St. Lewis, together with an Essay on the Antiquity of French Songs. This learned prelate has defended the honour of queen Blanche with his pen, five hundred years after her decease, with as much prowess and true chivalry, as the most valiant champion of injured innocence could have done with his sword and lance, had he been animated by the presence of that princess, and the heroism of the times in which she lived.

"Les Grandes Chroniques de France" tell us that Thibault, at the age of thirty-five, having conceived a violent and hopeless passion for queen Blanche, was advised by wise and prudent counsellors to apply himself to music and poetry, which he did with such success, that he produced "the most beautiful songs and melodies that have ever been heard." Fauchet Des Anciens Poetes François.

Two airs by Thibault may be seen in Burney's General History of Music, from the Vatican collection of Provençal songs in Gregorian notes, without bars or base; and given afterwards in modern notation, with a base, and an English version of the words.

THIBERVILLE, in *Geography*, a town of France, in the department of the Eure; 9 miles E. of Lisieux.

THIBET, or TIBET, pronounced *Tibbet* and *Tibt* in Bengal, and called by its own inhabitants *Puë*, or *Puëkoachim*, *puë* signifying *northern*, and *koachim*, *snow*, that is, the snowy region of the North, is a country of Asia, of which our knowledge, principally obtained at a very recent period, is still very imperfect. We have no evidence that the ancients ever penetrated the snowy mountains of Tibet. It seems to have been in some measure disclosed to the Portuguese, in their commercial intercourse with the East Indies; and the name of it was known to Marco Paolo and other travellers of the 12th and 13th centuries. Accordingly, Tibet seems to have been the southern part of their Tangut. Paolo indeed describes the province of "Tebeth," as containing eight kingdoms, with many cities and villages, and as being a mountainous country, which produced some gold and spices, a large breed of dogs, and excellent falcons. But we have no geographical nor statistical account of this conntry upon which we can depend previously to the last century; and even now our knowledge of it is very partial and defective. About the year 1715, the emperor of China, as we learn from Du Halde, being desirous of obtaining a map of Tibet, sent two lamas, who had studied geometry, for this purpose. These lamas drew a map, from Sining, in the province of Shen-si, to the sources of the Ganges, which was afterwards examined by the Jesuits, and improved. This map is published in the Atlas of Du Halde, and has been followed, with few variations, by our modern geographers.

Its

Its authority is doubtful, its accuracy very fufpicious, and the information it affords concerning kingdoms, ftates, and provinces, as well as particular places, very limited and unfatisfactory. According to our moft recent maps, Tibet extends from about the 75th to the 101ft degree of longitude, which, in the latitude of 30°, may be about 1350 geographical miles. The breadth may be regarded as extending from the 27th to the 35th degree of latitude, or about 480 geographical miles. It appears, however, from the teftimonies of two intelligent travellers, Mr. Forfter and Tieffenthaler, that the northern boundary of Tibet may be fafely extended two degrees farther than it appears in our beft maps, in which there is no portion of Great Tibet to the N.E. of Cafhmir. Major Rennell moved it one degree farther to the north than D'Anville's boundary in lat. 34°, and Pinkerton thinks that he might fafely have extended it at leaft 3°. The northern boundary of Tibet, according to the Ruffians, is Mus Tag, and they place that range in 38°. By adding 2° to 35°, we obtain an addition of 120 geographical miles to the number of 480 above ftated.

Thibet, according to Mr. Bogle's account (Phil. Tranf.) begins properly from the top of the great ridge of the Caucafus, and extends from thence in breadth to the confines of Great Tartary, and perhaps to the dominions of the Ruffian empire. He fays, that having once attained the fummit of the Bootan mountains, you do not defcend in an equal proportion on the fide of Thibet; but continuing ftill on a very elevated bafe, you traverfe vallies which are wider and not fo deep as the former, and mountains that are neither fo fteep, nor apparently fo high. On the other hand, he reprefents it as the moft bare and defolate country he ever faw; and the climate as extremely fevere. According to Mr. Turner, the boundaries of Tibet and Bootan are feparated by the lofty range of mountains called Soomoonang, and are marked by a long row of little infcribed flags, fixed in rude heaps of ftones, and fluttering in the wind. Thefe, at the fame time, are fuppofed to operate as a charm over the Dewtas, or "genii loci," who are paramount here. No mountain is thought to be wholly exempt from their influence; and they range chiefly in the moft elevated regions, where, drenched with dews, and worried with tempeftuous weather, they are fuppofed to deal around them, in ill humour, their moft baneful fpells, to harafs and annoy the traveller.

Tibet is fometimes divided into three parts, *viz.* Upper, Middle, and Lower. Upper Tibet comprifes chiefly the province of Nagari, abounding with tremendous rocks and mountains, always covered with fnow. The countries of Lata or Ladak (Latac) and Breguiong or Bramafcion (perhaps Sirinagur) probably conftitute a portion of Upper Tibet, as well as Nagari. Middle Tibet contains the provinces of Shang, Ou, and Kiang; and thofe of Lower Tibet are Takbo, Congbo, and Kahang. Many of thefe provinces are again fubdivided: *e. g.* Nagari, which is confidered as a kingdom confifting of three departments, Sanghar, Pourang, and Tamo (Dam or Daum). Shang is on the W. bounded by Nipal. The province of Ou contains Lahaffa or Laffa, the capital of Tibet. Kiang lies to the N. (or N.E.) of Ou, and is inhabited by a mixture of Tibetians and Monguls in tents. Kahang is on the S.E. bordering on the Birmans, and is divided into twelve departments. To thefe we muft add the wide region of Amdoa, if it be not the fame with Kahang, the natives of which fpeak the Chinefe language. The country of Hor lies between Tartary and the provinces of Nagari and Kiang, and feems to be the Hohonor of our maps. Our *Bootan* (which fee) is called by the natives Decpo or Takbo; and the countries W. of it, *viz.* Moringa or Morung, Mocampour, Nipal, Gorca, and Kamaoon, are not confidered as parts of Tibet. On the weftern fide, high mountains, covered with perpetual fnow, and terrible avalanches, have prevented the accefs and invafions of the Perfians and the conquerors of Bucharia; while the deferts on the N.E. have proved ineffectual barriers againft the Monguls and Eluts. Travellers have alfo been prevented from exploring this quarter by the weftern mountains, fo that it is even now little known.

According to the topography, compiled from the papers of Pinnabilla, a Capuchin friar, who died in 1747, and was buried at Patan, by father Giorgi, in a work publifhed at Rome in 1762, Tibet is bounded on the E. by China and Tarcenton, a province abounding with tea, and, fince the year 1720, incorporated with the Chinefe empire; on the S. by Bengal, Lotenke, Altibary, Mon, Brukpa, Lhoba, Lhokhaptra, Sciapado, and Bha; on the W. by Cafhmir, Nekpal, and Moronga; and on the N. by Great Tartary, the Ufbeks, Cafhur, and Jonkar, as far as Jerkend and Cokonor or Kokonor. The kingdoms and provinces in this topography are enumerated by Pinkerton, *ubi infra.*

The government of Tibet has been confidered as ecclefiaftical or fpiritual; though the lamas were accuftomed to appoint a "tipa," or fecular regent, a right which has been probably transferred to the Chinefe emperor. This officer refides at Laffa the capital, and he is invefted with the government and fupreme controul over the whole country. Mr. Turner, however, is of opinion, that the temporal authority of the lamas may again recover its former dignity and fplendour. Bootan, which is generally confidered as a feudatory province of Tibet, has a raja or prince called Daab, of no very permanent or extenfive authority. The laws muft, like the religion, bear fome affinity to thofe of the Hindoos.

The lama of Tibet was the Prefter John of the middle ages, if he were not fome Neftorian khan; and the appellation was unaccountably transferred by Portuguefe ignorance to the emperor of Abyffinia. (See Prester John.) In the time of Marco Paolo, Tibet, having been ravaged by the Monguls, was almoft defolate. For fome time this country had been fubject to fecular kings, called Tfan Pa; and the lama refided at Laffa, with a power refembling that of the fpiritual prince of Japan. According to Giorgi, the fucceffion of kings and lamas commences about 1340 years B.C. but about 1100 years after Chrift the Chinefe emperor gave to a celebrated lama the regal power. Thofe Monguls, called Eluts, conquered the fecular prince, and transferred the whole power to the lama. (See Du Halde, iv. 50.) In 1792, the Nipalefe, having committed great ravages in Tibet, the Chinefe emperor fent an army to protect the lama; in confequence of which the Chinefe eftablifhed military pofts on the frontiers, fo that the intercourfe between their country and Bengal is now precluded. The revenues of the lama and of the fecular princes are trifling; nor is it likely that Tibet can ever afpire to any political importance.

Some have faid, that the religion of Tibet is a corrupted Chriftianity; and even father Difiderii, a Jefuit, who vifited the country about the beginning of the laft century, thinks he can refolve all their myfteries into ours; and he afferts that they have a good notion of the Trinity, fince, in their addrefs to the Deity, they fay as often koneiok-oik in the plural, as koneiok in the fingular, and with their rofaries pronounce thefe words, Om, Ha, Hum. Of thefe whimfical conjectures we fhall fay no more, but pafs on to obferve, that the religion of the Tibetians feems to have derived its origin, fays Turner, (*ubi infra,*) from a difciple of Budh, who firft broached the doctrine which now prevails over the wide extent of Tartary. It is reported to have received its earlieft admiffion admiſſion in that part of Tibet bordering upon India, (which from hence became the ſeat of the ſovereign lamas,) to have traverſed over Mantchew Tartary, and to have been ultimately diſſeminated over China and Japan. Though it differs from the Hindoo in many of its outward forms, yet it ſtill bears a very cloſe affinity with the religion of Brahma in many important particulars. The principal idol in the temples of Tibet is Mahamoonie, the Budha of Bengal, who is worſhipped under theſe and various other epithets throughout the great extent of Tartary, and among all the nations to the eaſtward of the Berhampooter. In the wide extended ſpace over which this faith prevails, the ſame object of veneration is acknowledged under numerous titles; among others, he is ſtyled Godama or Gowtama, in Aſſam and Ava; Samana, in Siam; Amida Buth, in Japan; Fohi, in China; Budha and Shakamuna, in Bengal and Hindooſtan; Dherma Raja and Mahamoonie, in Bootan and Tibet. Durga and Kali; Ganeiſh, the emblem of wiſdom; and Cartikeäh, with his numerous heads and arms, as well as many other deities of the Hindoo mythology, have alſo a place in their aſſemblage of gods.

The ſame places of popular eſteem or religious reſort, are equally reſpected in Tibet and in Bengal; Praag, Caſhi, Durgeedin, Saugor, and Jagarnaut, are objects of devout pilgrimage; and loads of the ſacred water taken from the Ganges, have been ſeen travelling over theſe mountains, (which, by the bye, contribute largely to its increaſe,) upon the ſhoulders of men, whom enthuſiaſts have deemed it worth their while to hire at a conſiderable expence for ſo pious a purpoſe.

As far as can be judged reſpecting their ritual or ceremonial worſhip, it differs materially from the Hindoo. The Tibetians aſſemble in chapels, and unite together in prodigious numbers, to perform their religious ſervice, which they chant in alternate recitative and chorus, accompanied by an extenſive band of loud and powerful inſtruments. So that, whenever theſe congregations were heard, they forcibly recalled to remembrance, both the ſolemnity and ſound of the Roman Catholic maſs.

The inſtruments made uſe of were all of an enormous ſize. Trumpets above ſix feet long; drums ſtretched over a copper cauldron, ſuch as are termed *nowbut* in Hindooſtan; the gong, a circular Chineſe inſtrument of thin hammered bell-metal, capable of producing a ſurpriſing ſound; cymbals, hautboys; and a double drum, ſhallow, but of great circumference, mounted upon a tall, ſlender pedeſtal, which the performer turns with great facility, ſtriking either ſide with a long curved iron, as the piece requires a higher or a lower tone: theſe, together with the human tibia, and ſea-conch, a large ſpecies of the buccinum, compoſe, for the moſt part, their religious band. Harſh as theſe inſtruments, individually taken, might ſound to a muſical ear, yet when joined together in uniſon with the voices of two or three hundred boys and men, managed with varying modulation, from the loweſt and ſofteſt cadence to the loudeſt ſwell, they produce to the ear an effect extremely grand.

Other muſical inſtruments are in the hands of the people of Tibet.

Among the Tibetians, ſays Mr. Turner, all is ſyſtem and order. The mind readily obeys the ſuperiority it has been accuſtomed to acknowledge. A ſovereign lama, immaculate, immortal, omnipreſent, and omniſcient, is placed at the ſummit of their fabric. He is eſteemed the vicegerent of the only God, the mediator between mortals and the ſupreme. They view him only in the moſt amiable light, as perpetually abſorbed in religious duty; and, when called to beſtow attention on mortal beings, as employed only in the benign office of diſtributing comfort and conſolation by his bleſſing, and in exerciſing the firſt of all attributes, forgiveneſs and mercy. He is alſo the centre of all civil government, which derives from his authority all its influence and power. At the ſame time that he is the ſoul which animates their whole ſyſtem, a regular gradation, from the moſt venerated lama, through the whole order of Gylongs to the young noviciate, is obſerved with rigid ſeverity.

The inferior gradations from the preſident of a monaſtery, who is always ſtyled lama, in addition to the name of the ſtation to which he belongs, are Gylong, Tohba, and Tuppa. See Gylong, Teshoo-Loomboo, Tohba, and Tuppa.

The nation is divided into two diſtinct and ſeparate claſſes, thoſe who carry on the buſineſs of the world, and thoſe who hold intercourſe with heaven. No interference of the laity ever interrupts the regulated duties of the clergy. The latter, by mutual compact, take charge of all their ſpiritual concerns; and the former, by their labours enrich and populate the ſtate.

In Tibet there are two ſects, diſtinguiſhed by the appellations of Gyllookpa and Shammar, but the external appearance, or dreſs of both, is ſimilar, except the diſtinction in the colour of the cap; the Gylloopka having adopted yellow, the Shammar red; a circumſtance which is ſtrictly attended to, on all occaſions of ceremony. Three lamas are placed at the head of each ſect; Dalai lama, Teſhoo lama, and Taranaut lama, preſide over the Gyllookpa, who have their reſidence at Pootalah, Teſhoo-Loomboo, and Kharka. This ſect prevails over the greateſt part of Tibet, and a diviſion of the ſame is ſaid to be eſtabliſhed in a province of the Decan, called Seurra or Serrora.

In like manner, three lamas alſo, lam' Rimbochay, lam' Sobroo Nawangnamghi, and lam'Ghaſſatoo, preſide over the Shammar; theſe have their reſidence in Bootan, in ſeparate monaſteries, but, from the limited extent of that country, at no great diſtance from each other. The principal of the Shammar ſect in Tibet is ſtyled Gongſo Rimbochay, and has his reſidence at Sakia.

The Tibetians are actuated by an ardent ſpirit of devotion; and they attribute the merit of every thing great, or ſingularly beneficial, to the agency of ſome ſupernatural being. It is the cuſtom in Tibet to preſerve entire the mortal remains of their ſovereign Lama only; every other corpſe is either conſumed by fire, or given to be the promiſcuous food of beaſts and birds of prey. As ſoon as life has left the body of the Lama, it is placed upright, ſitting in an attitude of devotion, the legs being folded before him, with the inſtep reaching upon each thigh, and the ſoles of the feet turned upwards. It is the practice here to cover the bodies of men, found dead in the fields, with clods of earth, which the rains gradually diſſolve and incorporate, forming the looſe maſs into a compact hillock. This always attracts the ſame reſpect, and paſſengers continue to add to the heap, long after all traces of the body are loſt, and its exiſtence forgotten. Thus alſo the piety of the Tibetians offers a ſimilar rite to the bodies of thoſe whom chance may have led to the ſpot, where the fragment lay at the inſtant of its fall, though the fatal effects of it may not have been certainly known.

A tribute of reſpect is paid, in this region, to the manes of the dead in various ways. The ſovereign lamas are depoſited entire, in ſhrines prepared for their remains, which ever after are looked upon as ſacred, and viſited with religious awe. The bodies of inferior lamas are uſually burnt, and their aſhes preſerved with great care in little metallic idols, which have places aſſigned them in their ſacred cabinets. Common ſubjects are treated with leſs ceremony;

mony; fome of them are carried to lofty eminences, where, after having been disjointed, and the limbs divided, they are left a prey for ravens, kites, and other carnivorous birds. Others, with lefs refpect, are committed to the ufual receptacle of the dead. The laft, but lefs frequent, mode of difpofing of the dead, is committing them to the waters of the river. Burial, that is, inhuming the corpfe entire in the earth, is altogether unpractifed.

On one fide of the monaftery of Teshoo-Loomboo is the place to which they convey their dead. It is a fpacious area, inclofed on one part by a perpendicular rock, and on the others by lofty walls, raifed probably with a view to feclude from public obfervation, the difgufting objects contained within them. At the top it was totally uncovered, fo as to be perfectly open to the birds; and at the bottom a narrow paffage was left through the walls, near their foundation, for the fole purpofe of admitting dogs, or other beafts of prey. On the rock above, a platform overhung the inclofure, which had been conftructed for the conveniency of precipitating the dead bodies with greater eafe over the walls, into the area. And here, the only rites performed, in honour of the dead, were merely fuch as tended to facilitate the deftruction of the body by dogs or birds of prey. But though this was the general receptacle, yet there were fome who declined the ufe of it, and conveyed their friends to the fummit of fome neighbouring hill, where they disjointed and mangled the dead body, that it might become a more eafy prey to carnivorous birds. Hence it was concluded that there was a ftrong prejudice in their minds of fome idea of pollution attached to "being given to the dogs," which was fufficient to create a preference of the contrary practice. In Tibet, as well as in Bengal, an annual feftival is kept in honour of the dead.

The Tibetians are much addicted to fuperftition; and accordingly they lay great ftrefs on lucky and unlucky days. They alfo pay great refpect to the profeffors of aftrology. Hence we find no prudent traveller ever attempting to undertake a journey, without previoufly appealing to this authority, and endeavouring to obtain an aufpicious prefage. The fame fignal of favour is deemed indifpenfably requifite in every important enterprife, and the fame wary circumfpection enters equally into all the more minute concerns of domeftic life. The union of the fexes, and the giving names to infants, are neither of them events to be accomplifhed without a regular appeal to the fame decifive oracle. This fcience is alfo regarded in the conftruction of their almanacs. Their year, which is lunar, confifts of 12 months, each month having 29 days; and the days are reckoned from the appearance of the new moon, in regular fucceffion, till it fhews itfelf again. The parts of the days are, evening, night, morning, and noon: and their computation of time is conformable to the general practice of the Eaft, by a cycle of 12 years. The art of printing is faid to have been very anciently practifed in Tibet; but it has hitherto been principally appropriated to facred works, and to the fervice of learning and religion. Their books are printed with blocks of wood, on narrow flips of thin paper, fabricated from the fibrous root of a fmall fhrub. The printed and written letters appropriated to works of learning and religion, are called "uchen;" and thofe of bufinefs and correfpondence are called "umin." The Gylongs, or priefts, pafs through a regular education. As for the language of Tibet, its origin is not fatisfactorily afcertained. Du Halde reports, that it is the fame with that fpoken by the people of Sifan, on the frontiers of China; but as this province is fometimes included in Tibet, this information is vague and indeterminate. Their characters, fays fir William Jones, are apparently Indian, but their language has now the difadvantage of being written with more letters than are ever pronounced; for, although it was anciently Sanfcrit and polyfyllabic, it feems at prefent, from the influence of Chinefe manners, to confift of monofyllables, to form which, with fome regard to grammatical derivation, it has become neceffary to fupprefs, in common difcourfe, many letters which we fee in their books; and thus we are enabled to trace in their writings a number of Sanfcrit words and phrafes, which, in their fpoken dialect, are quite undiftinguifhable.

A fingular cuftom prevails in this country, which may be called polyandry. One female affociates her fate and fortune with all the brethren of a family, without any reftriction of age or of numbers. The choice of a wife is the privilege of the elder brother; and it is faid, that a Tibetian wife is as jealous of her connubial rites, though thus joined to a numerous party of hufbands, as the defpot of an Indian zennana is of the favours of his imprifoned fair. The bufinefs of propagating the fpecies is abandoned to mere plebeians; and marriage feems to be confidered rather as an odium and a burden. The influence of this cuftom on the manners of the people is not found to be unfavourable. Humanity and gentlenefs of difpofition are the conftant inheritance of a Tibetian. Mr. Turner fays that he never faw thefe qualities poffeffed by any people in a more eminent degree. Without being fervilely officious, they are always obliging; the higher ranks are unaffuming; the inferior, refpectful in their behaviour; nor are they at all deficient in attention to the female fex; but, as we find them moderate in all their paffions in this refpect, alfo their conduct is equally remote from rudenefs and adulation. Comparatively with their fouthern neighbours, the women of Tibet enjoy an elevated ftation in fociety. To the privileges of unbounded liberty, the wife here adds the character of miftrefs of the family, and companion of her hufbands. The company of all, indeed, fhe is not at all times entitled to expect. Different purfuits, either agricultural employments or mercantile fpeculations, may occafionally caufe the temporary abfence of each; yet whatever be the refult, the profit of the labourer flows into the common ftore; and when he returns, whatever may have been his fortune, he is fecure of a grateful welcome to a focial home. The men are generally ftout, having in a degree the Tataric features, and the women are of a ruddy brown complexion, heightened like the fruits by the proximity of the fun, while the mountain breezes beftow health and vigour.

The ceremonies of marriage are neither tedious nor intricate in Tibet. Their courtfhips are carried on with little art, and quickly brought to a conclufion. The elder brother of a family, to whom the choice belongs, when enamoured of a damfel, makes his propofal to the parents. If his fuit is approved, and the offer accepted, the parents, with their daughter, repair to the fuitor's houfe, where the male and female acquaintance of both parties meet and caroufe for the fpace of three days, with mufic, dancing, and every kind of feftivity. At the expiration of this time the marriage is complete.

Tibet is thinly fcattered with inhabitants, on account of its mountainous furface and the feverity of its climate; nor can any accurate eftimate be made of its population. From fome circumftances it has been conjectured, that upon the whole it cannot be lefs than half a million. Giorgi, indeed, or rather Pinnabilla, from whom he deduces his ftatement, computes the number of inhabitants in 1730 at 33 millions, and the foldiers at 690,000; but both thefe numbers are moft extravagantly exaggerated; for Tibet has been

been often conquered by the Chinefe with armies not exceeding 40,000 men. The fingular cuftom of polyandry, already mentioned, feems adapted to check the progrefs of population, the fuperabundance of which, in an infertile country like Tibet, would be one of the greateft calamities, as it muft produce eternal warfare or internal want.

Bootan and Tibet exhibit a very remarkable contraft in their external appearance. Bootan prefents to the view nothing but the moft mis-fhapen irregularities; mountains covered with eternal verdure, and rich with abundant forefts of large and lofty trees. Almoft every favourable afpect of them, coated with the fmalleft quantity of foil, is cleared and adapted to cultivation, by being fhelved into horizontal beds: not a flope or narrow flip of land between the ridges lies unimproved. There is fcarcely a mountain, whofe bafe is not wafhed by fome rapid torrent, and many of the loftieft bear populous villages, amidft orchards and other plantations, on their fummits and on their fides. It combines in its extent the moft extravagant traits of rude nature and laborious art.

Tibet, on the other hand, ftrikes a traveller, at firft fight, as one of the leaft favoured countries under heaven, and appears to be in a great meafure incapable of culture. It exhibits only low rocky hills, without any vifible vegetation, or extenfive arid plains, both of the moft ftern and ftubborn afpect, promifing full as little as they produce. Its climate is cold and bleak in the extreme, from the fevere effects of which the inhabitants are obliged to feek refuge in fheltered valleys and hollows, or amidft the warmeft afpects of the rocks. Yet perhaps Providence, in its impartial diftribution of bleffings, has beftowed on each country a tolerably equal fhare. The advantages that one poffeffes in fertility, and in the richnefs of its forefts and its fruits, are amply counterbalanced in the other by its multitudinous flocks and invaluable mines. As one feems to poffefs the pabulum of vegetable, in the other we find a fuperabundance of animal, life. The variety and quantity of wild fowl, game, and beafts of prey, flocks, droves, and herds in Tibet, are aftonifhing. In Bootan, except domeftic creatures, nothing of the fort is feen. It has been afferted that Tibet was, in remote times, almoft totally inundated; and the removal of the waters that covered its furface is afcribed to the miraculous interpofition of fome object of their worfhip, whofe chief temple is reported to be at Dungeedin, Gya. In this traditionary belief we may poffibly difcover fome traces of the univerfal deluge; though the tradition be obfcured by fable and disfigured by a mixture of abfurdity. In the temperature of the feafons in Tibet, a remarkable uniformity prevails, as well as in their periodical duration and return. The fame divifion of them takes place here, as in the more fouthern region of Bengal. The fpring is marked from March to May, by a variable atmofphere; heat, thunder-ftorms, and occafionally with refrefhing fhowers. From June to September is the feafon of humidity, when heavy and continued rains fill the rivers to their brim, which run off from hence with rapidity, to affift in inundating Bengal. From October to March, a clear and uniform fky fucceeds, feldom obfcured either by fogs or clouds. For three months of this feafon, a degree of cold is felt, far greater perhaps than is known to prevail in Europe. Its extreme feverity is more particularly confined to the fouthern boundary of Tibet, near that elevated range of mountains which divides it from Affam, Bootan, and Nipal. The fummits of thefe are covered all the year with fnow, and their vicinity is remarkable, at all feafons, for the drynefs of the winds. The range is confined between the twenty-fixth and twenty-feventh degrees of northern latitude. During the winter, a practice is adopted in the neighbourhood of thefe mountains, fimilar to that in ufe in the coldeft parts of North America, but in fome refpects more complete. It is that of preparing meat and fifh for carriage, by the action of extreme cold. This practice, however, feems to be confined to the prefervation of mutton alone, which is a very fimple procefs, and requiring no ufe of falt. The Tibetians generally ufe that which is recently killed in a raw ftate, without any previous cookery.

Among the valuable and ufeful animals of Tibet, which are mufk-deer, horfes of a fmall fize, goats yielding the hair that is manufactured into fhawls, and cattle that are diminutive, to which we may refer the yak of the Tartars, their breed of fheep claims a diftinguifhed rank. Of thefe the flocks are numerous, and upon them they chiefly depend for their winter food. A peculiar fpecies, thought to be indigenous to this climate, is marked almoft invariably by black heads and legs. Their fize is fmall, their wool is foft, and their flefh, fays Mr. Turner, is the fineft mutton in the world. The wool affords material for one of their principal manufactures. (See IJHANSA-JEUNG.) Their fkins and thofe of the lambs are cured with the wool on, and conftitute a valuable article for winter garments, and for foreign traffic.

The foil and climate of Tibet are very unfavourable to any kind of exertion and activity that have for their object the cultivation of the land, but from time immemorial it has been the refort of merchants. Commerce, however, has been very languidly encouraged. The form of government, which is arbitrary, is inimical to induftry and enterprife. In Tibet, and alfo in Bootan, the firft member of the ftate is the chief merchant; and his ftation and power of controul give him great advantages over the common adventurer; and of courfe by this monopoly of the fovereign, emulation is reftrained and fuppreffed.

Although, as we have faid, the nature of the foil prohibits agriculture; yet the vales on the approach of winter being laid under water, they are ploughed and fown in fpring, and the crops are matured by frequent fhowers and a powerful fun. The autumn being clear and tranquil, the harveft is long left to dry on the ground; and when fufficiently hardened is trod out by cattle. The courfe of cultivation is wheat, peas, and barley; rice being confined to a more fouthern foil. Neverthelefs, the country abounds with commodities, which in different circumftances would give fpirit and extent to commercial tranfactions, whilft they are languifhing in floth, or exhibiting every indication of poverty. The trade with Bengal was formerly not inconfiderable; but this has been interrupted and diminifhed by the commotions which have long diftracted the kingdom of Nipal, which was the only known channel of communication. Bengal tranfmitted to Tibet, broad cloth, chiefly of inferior quality, and of yellow and fcarlet colours; fome few trinkets, fuch as fnuff-boxes, fmelling-bottles, knives, fciffars, and optic-glaffes; and fpices, particularly cloves and nutmegs; fandal wood, pearls, emeralds, fapphires, lapis lazuli, coral, jet, amber, fhells, cloths, leather, tobacco, indigo, and otter-fkins; and it received from Tibet, gold-duft, mufk, and tincal. The articles of trade next in importance, amongft the natural productions of Tibet, are goats' hair and rock-falt. Bootan, Nipal, Bengal, and Hindooftan, are fupplied with tincal from Tibet. The hair of the goats is carried to Cafhmire, where it is manufactured into fhawls. The demand for falt is in the confumption of Nipal and Bootan.

The trade from Tibet to Bootan confifts of gold-duft, tea,

tea, woollen cloths, and falt; from Bootan to Tibet, the articles are Englifh broad cloth, Rungpore leather, tobacco, coarfe cotton cloths, &c. paper, rice, fandal wood, indigo. Tibet fends to Luddauk, the mart between Cafhmire and Tefhoo-Loomboo, the fine hair of goats, and receives in return gamboge, fhawls, dried fruits, as apricots, raifins, currants, dates, almonds, and faffron. Khumbauk fends to Tibet, horfes, dromedaries, and Balgar hides. In Tibet there are feveral mines of lead; and as lead-ore contains filver, it might be feparated from it to great advantage, if the method of doing it were known. Here are alfo mines of cinnabar, which contains a great proportion of mercury, if the Tibetians knew how to extract it. The copper-mines furnifh materials for the manufacture of idols, and all the ornaments difpofed about monafteries, on which gilding is beftowed, for which there is a great demand in Tibet.

A very fmall quantity of fpecie is current in Tibet, and that is of a bafe ftandard. It is the filver coin of Nipal, here denominated *indermillee*, and worth about one-third of a ficca rupee; and it is cut into halves, third parts, and quarters. In all mercantile tranfactions, however, the equivalent is made in bullion, *i. e.* talents of gold and filver, valued in proportion to the purity and fpecific gravity of the metal.

The commerce between Tibet and China is carried on principally at a garrifon town, on the weftern frontier of China, named Sinning, or Silling: thither merchants refort from Tibet with their manufacture; *viz.* a thin cloth refembling frieze, but rather of a more open texture, gold-duft, and fome other commodities procured from Bengal; which they exchange for tea, filver bullion, brocades, and fruit. In thefe articles an extenfive trade is carried on; and Mr. Turner has been affured that, on the territory of Tefhoo-Loomboo alone, tea, to the amount of five or fix lacs of rupees, is annually confumed. From hence, too, Bootan is fupplied with tea, which is in the fame general ufe there.

Tibet exports to China, gold-duft, diamonds, pearls, coral, mufk, woollen cloths of its own manufacture, lamb-fkins and otter-fkins, called *ood*, brought from Bengal; and China returns to Tibet, gold and filver brocades, plain filks, fatins, black teas of four or five different forts, tobacco, filver bullion, quickfilver, cinnabar, china ware, trumpets, cymbals, and other mufical inftruments; furs, *viz.* fable, ermine, black fox; and dried fruits of various forts.

The regulations for carrying the commerce of the Englifh Eaft India Company through the dominions of Bootan, by means of the agency of native merchants, were fettled by the treaty entered into by Mr. Bogle, in the year 1775.

The cities and towns of Tibet are little known: the capital is *Laffa;* which fee. Among the edifices, the monafteries occupy the firft clafs. (See Teshoo-Loomboo.) The chief river of Tibet is *Berhampooter;* which fee. The Hoan-ho and Kian-ku of the Chinefe alfo derive their origin from the eaftern boundaries of Tibet. The great Japanefe river of Cambodia, or Maykaung of Laos, that of Nou Kia, fuppofed to pafs near Martaban, into the gulf of Pegu, and the Irawaddy of the eaft country, are fuppofed to have their fources from the mountains of Tibet, which may be ftyled the Alps of Afia. Another large river, called the Sardjoo or Gagra, which, after a courfe of about 600 miles, nearly parallel on the E. with that of the Ganges, joins it near Chupra, and derives its fpring from the lofty weftern mountains of Tibet. In thefe Alpine regions are many lakes, fuch as *Terkiri*, and Jamdro or *Pelté;* which fee. The ranges of Tibetian mountains in the W. and S. feem to bend in the form of a crefcent, from the fources of the Ganges to the frontiers of Afam, in a N.W. and S.E. direction. To the N. of Sampoo a parallel and higher ridge feems to extend, the northern extremities abounding with large frozen lakes. The chief elevation of mountains appears to be central, S. of the lake Terkiri, and is called Koiran, the weftern part being denominated Kantel. The fouthern range prefents many names of diftinct mountains, comprehended under the Hindoo name of Himmela. From thefe ranges many branches extend N. and S. This country poffeffes many mineral waters, the falutary ufe of which is not unknown to the natives. Among its natural curiofities we may reckon a fingular rock, N. of Taffifudon, defcribed by Mr. Saunders in the Appendix to Turner's Travels, and forming in front fix or feven angular femi-pillars of large circumference, and fome one hundred feet in height. This natural curiofity is partly detached from the mountains, and projects over a confiderable fall of water, which heightens the picturefque appearance of the whole. The rock is laminated, and might be formed into flate; and as iron-ftones are found in the vicinity, thefe pilafters probably, like thofe of bafalt, arife from the influence of that metal. Phil. Tranf. vol. lxvii. Sir W. Jones's Works, vol. iii. Turner's Travels. Pinkerton's Geography.

Thibet or Tibet, *Little*, a diftrict N.W. of Cafhmire, which is fuppofed to contain the chief fource of the Indus. The fituation of this country is doubtful; it probably lies on the N. and N.W. of Cafhmire, and is divided from Great Tibet by a high mountainous ridge, and by a higher chain, that of Belur, from Great Bucharia. It is defcribed as a very mountainous and poor country, pervaded by the Indus, and towards the N. full of forefts. The capital is Afcardu, and further to the N. is Schekar. Temir-kand, or the fortrefs of iron, feems to command the pafs between Great and Little Tibet; and the two Ganges of the Chinefe maps (fuppofed fources of the Ganges) are probably rivers which join the Indus from the Eaft. Pinkerton.

The delineation of the country of the Sacæ, by Ptolemy and Strabo, (fee Sacæ,) will be found to correfpond, fays Hugh Murray, efq. in his "Ancient Geography of Central and Eaftern Afia," in every refpect, with that given by Mr. Elphinftone of the Plain of Pamera and Little Thibet. It was bounded on the S. by Hindooftan, from which it was feparated by the ridge of Imaus. On the N. it was bounded by the next parallel chain, "Mons Afcataneas," which cannot poffibly be any other than the Mooz-Taugh, to whofe name, indeed, it bears a rude refemblance. It extended E. from the Montes Comedorun, (the Beloor or Belur,) to fomewhat beyond the head of the Ganges; precifely the dimenfions of Little Thibet. Great and Little Thibet form a table land of extraordinary elevation, bordering on Hindooftan to the S.: and two parallel chains, running from E. to W., prop this mighty bulwark of Afia. The northern barrier is formed by an immenfe chain, known under the name of Hindoo Coofh, and Himmela or Himalaya, which forms the northern limit of India. The whole extent of it is covered, to a great depth, with perpetual fnow; and every meafurement yet made, from Pefhaur to Nepaul, has made it exceed 20,000 feet above the level of the plain, being higher than the higheft peaks of the Andes. The whole is recognized by Ptolemy under the name of Imaus. The northern range, known by the uncouth appellation of Mooz-Taugh, *taugh* being merely the generic name of mountain, or Karrakorum, Mr. H. Murray apprehends to be defcribed by him under the name of Mons Afcataneas. Its abfolute elevation feems to exceed that of Himalaya, and yet from the high level of its bafe, it does not prefent fo formidable an afpect. At right angles to both, connecting them, and shutting in the western side of the table land, is another chain, called the Beloor-Taugh; forming the eastern limit of Shognaun, the ancient Sogdiana, and thus coinciding with the Montes Comedorum. According to the writer now cited, the "Scythia extra Imaum" of Ptolemy must be Great Thibet, with an extent of Tartary stretching indefinitely northwards. After Scythia, he says, comes the famous Serica; and if Great Thibet be Scythia extra Imaum, the next great country must be China, which he concludes from a variety of circumstances to be Serica. This writer thinks Pinkerton's hypothesis, mentioned under SERICA, of its being Little Bucharia, altogether inadmissible. See Murray's Ancient Geography of Central and Eastern Asia.

THICKET, a close knot or tuft of trees; a close wood, &c. in any field or inclosure of any kind.

THICKETS, in *Gardening*, a sort of close plantations of trees and shrubs, in pleasure-grounds, parks, &c. They are designed for different purposes, as sometimes to repel the force of tempestuous and cold cutting winds, either from the habitation, or some particular part of the garden; or to form places of shade and retirement in summer, having spaces for walks, recesses, &c. under the umbrage of the trees, and occasionally to conceal from view any unsightly or disagreeable object, and also sometimes to form a screen or blind arranged towards some outward boundary.

They are sometimes planted wholly of the large tree kinds, five or six to eight or ten feet asunder, some in regular lines, like a close grove, or more generally in a sort of promiscuous planting, but with some degree of order in the distances: they are also often composed of various trees and shrubs together, to effect a more full, close growth below and above, and to display a greater diversity in the plantation, by disposing the various shrubs properly between the larger trees, in some order of gradation, the lowest towards the front, and the taller growths backward, so as to form a sort of close underwood thicket below, while the trees run up and form a thicketty growth above; and sometimes they are formed wholly of shrubs of different sorts and degrees of growth, from the lowest placed forward, to the tallest behind.

They are sometimes, too, formed wholly of particular sorts of trees disposed separately in distinct plantations, as of elm, ash, beech, poplar, alder, willow, &c.

The planting of thicket plantations should be effected with young trees of from four, five, or six, to eight or ten feet growth, and the shrub kinds proportionally; in all of which the planting may be performed in the common seasons of autumn, winter, and spring.

In the culture of thicket plantations, little is required but that of keeping them clear from large overbearing weeds, while the trees and shrubs are in young small growth.

Thickets are now much less in use than was formerly the case in ornamental gardening, and pleasure-ground planting; they may, however, on some occasions, be introduced with good effect.

THICKON, in *Geography*, a river of Pennsylvania, which runs into the Delaware, N. lat. 40° 25′. W. long. 75° 8′.

THICKSTUFF, a name for sided timber exceeding four inches in thickness, but not being more than twelve inches in thickness.

THIEBLEMONT, in *Geography*, a town of France, in the department of the Marne; 8 miles E.S.E. of Vitry le François.

THIEL, or TIEL, a city or town of Holland, in the department of Guelderland, situated on the north side of the Wahal, in a small island called *Tieler-Weert*. In one of its fauxbourgs, called *Santwyck*; which is well fortified, is a strong citadel: the fortifications were destroyed in the year 1674, by the French, who had made themselves masters of the place about two years before, and have been since repaired. In the year 1528, it was besieged by the Spaniards, when Charles V. was at war with the duke of Gueldres; but they were compelled to raise the siege, through the brave resistance of the citizens. The country about it is marshy, and the air reckoned unwholesome. The fortifications are destroyed; 18 miles N.N.E. of Bois-le-Duc.

THIELLE, a town of the county of Neufchâtel, between the lake of Bienne and the lake of Neufchâtel; 5 miles N.E. of Neufchâtel.—Also, a river of Switzerland, which rises in the Vaudois, passes through the lakes of Neufchâtel and Bienne, and runs into the Aar, 3 miles below Buren.

THIELLEN, a town of Switzerland, in the canton of Uri; 2 miles N.W. of Altorff.

THIELT, a town of France, in the department of the Lys; 10 miles N. of Courtray.

THIENE, a town of Italy, in the Vicentin; 9 miles N.W. of Vicenza.

THIERS, JOHN BAPTIST, in *Biography*, a divine, was born at Chartres about the year 1636, and became a batchelor of the Sorbonne, professor in the college of Du Plessis at Paris, and curé of Chauprend, in the diocese of Chartres. Being arrested in consequence of a dispute with the clergy of Chartres, and a satire against one of them, he escaped by a stratagem, and found refuge with the bishop of Mans, who gave him the cure of Vibraie, where he died in February, 1703. His works are numerous, freely written, and on singular subjects; but we refer for an account of them to Moreri, the Nouv. Dict. Histor. and Gen. Biog.

THIERS, in *Geography*, a town of France, and principal place of a district, in the department of the Puy-de-Dôme; here are manufactures of cutlery, playing-cards, paper, thread, &c.; 21 miles S.E. of Gannat. N. lat. 45° 52′. E. long. 3° 38′.

THIERSHEIM, a town of Germany, in the principality of Culmbach; 6 miles N.E. of Wonsiedel.

THIERSTEIN, a town of Germany, in the principality of Culmbach, on the Eger; 5 miles N.E. of Wonsiedel.

THIE-WEY-ARA-YETH LAKE, a lake of North America. N. lat. 61° 20′. W. long. 106° 30′.

THIGH, FEMUR, a part of the body of men, quadrupeds, and birds, between the leg and the trunk. See EXTREMITIES.

We have an account in the Philosophical Transactions of a large piece of a young man's thigh-bone being taken out, and the place so well supplied by a callus, that he walked straight. See N° 461. sect. 2.

THIGH-*Bone*, *Fractured*. See FRACTURE.

THIGH, *Luxation of*. See LUXATION.

THIGH, in the *Manege*. The effect of the horseman's thigh is one of the aids that serves to make a horse work vigorously. See AID.

Fore-thigh, or arm of a horse, is that part of the fore-leg that runs between the shoulder and the knee: though the fore-thigh does not bend or bow, yet we commonly say, a horse goes fine, that bends well the fore-thigh, importing by it, that he bends well his leg.

Horses should always be full and well made in the thick parts of the thigh, especially in horses of the working kinds.

THIGHT, in *Agriculture*, a term provincially applied to turnip, or other crops which are thick or closely set. It also signifies impervious, when applied to roofs or vessels in some districts.

THILACHIUM, in *Botany*, so named by Loureiro, from

from θυλακιον, *a little bag*, alluding to the form of the calyx. It ought rather therefore to have been *Thylachium*.—Loureir. Cochinch. 342.—Clafs and order, *Polyandria Monogynia*. Nat. Ord. *Capparides*, Juff.

Gen. Ch. *Cal.* Perianth inferior, oblong-turbinate, ribbed, pointed, undivided, clofe, at length burfting all round. *Cor.* none. *Stam.* Filaments numerous, about feventy, awl-fhaped, long, erect, inferted into the receptacle; anthers oblong, upright. *Pift.* Germen fuperior, on a ftalk the length of the filaments, oblong, ftriated; ftyle none; ftigma roundifh. *Peric.* Berry oblong, with ten fides, of one cell. *Seeds* numerous, kidney-fhaped, imbedded in pulp.

Eff. Ch. Calyx of one leaf, oblong, burfting all round. Corolla none. Berry ftalked, with ten angles, one cell, and many feeds.

1. Th. *africanum*. African Pouch-flower.—Obferved by Loureiro on the eaftern coaft of Africa, near Mozambique, where it is called by the Portuguefe *Mangueiro*. The *tree* is fmall, with fpreading *branches*. *Leaves* alternate, ftalked, ovate, entire, fmooth. *Stalks* terminal, bearing feveral *flowers*, whofe long *ftamens* are of a faffron colour. The author obferves that this genus approaches *Capparis*, in its *ftamens* and the ftalk of its *berry*, but differs widely in the unufual form of the *calyx*, as well as the want of a *corolla*, and the figure of the *feed-veffel*. De Theis thinks it allied to MARCGRAVIA, fee that article. As far as it is related to *Capparis*, he is right; but between the *corolla* of *Marcgravia*, and the *calyx* of *Thilachium*, which he feems to have had in view, there can be no affinity; any more than between the latter and the pouch in the outer *calyx* of RUYSCHIA, which article the reader may likewife confult. We muft be content to leave the matter as we find it, there being great probability, confidering how little we know of the botany of its native country, that the plant, and even its genus, are entirely new to Europeans.

THILAY, in *Geography*, a town of France, in the department of the Ardennes; 7 miles N.N.E. of Charleville.

THILCHATEL, a town of France, in the department of the Cote d'Or; 14 miles N. of Dijon.

THILCO, or rather T'HILCO, in *Botany*. See FUSCHIA, n. 9.

THILL, in *Rural Economy*, the name of the framed fhafts of carts and waggons, between which the horfe draws and moves. The thills of thefe kinds of carriages fhould always, as much as poffible, be made of tough afh-wood, and light in proportion to the nature and ufes of them.

THILL-*Horfe*, the laft horfe in a team, or the horfe that goes between the thills or fhafts; which often fuftains much undue weight and preffure on the back, in confequence of the load which is drawn. This is capable of being relieved in various ways and by different contrivances, but the two which are noticed below would feem to be the moft fimple and eafy. It is well known to be almoft univerfally the practice to hook or attach the fecond horfes, in cart or waggon teams, on at the end of the fhafts. The confequence of which is obvioufly this: whenever the cart or carriage afcends a hill, and the fore part of the team comes to level ground, which not unfrequently happens, while the thill-horfe or horfes are ftill on the declivity, from their force being exerted in a right line to the ends of the fhafts, all the powers of the whole of the leading horfes muft, in fuch cafes, inevitably load and opprefs the thill-horfe or horfes, when fo directed, as they tend to deprefs the fhafts, in their exertion to draw at the proper point of draught; that is, in the line with the axle. The thill-horfe or horfes are often feen, in fuch inftances, nearly borne down, where the afcents are fteep, and the levels rather fuddenly regained. The back, or backs, of fuch horfes become a fort of fulcrum, on which the ftrength of all the preceding horfes acts as a kind of lever; which, if fufficiently forcible, and the thill-horfe or horfes' backs were ftrong enough to bear the preffure, muft lift the carriage off the ground, until it fhould come to a level with the line of their pull.

In order to remedy this great preffure and inconvenience, it is advifed that a looped iron, of about a foot in depth, in the whole, be faftened to the end of the fhaft; nailing and rivetting it firmly, by means of expanded flats. The looped part will then reach about eight or nine inches under or below the fhafts. Each trace is to be carried through thefe loops inftead of hooking on there, and be faftened at the bottom of the fhaft, near to where it hitches on to the frame of the carriage. This will give play to the traces, and wholly relieve the thill-horfe or horfes from the undue preffure to which they are expofed.

The principle here laid down is neceffary, whatever other method may be had recourfe to in removing the inconvenience.

At Hinton-Houfe, in Berkfhire, S. Nicolls, efq. is faid to effect this in a fomewhat different manner, the aim of which is the prevention of the draught of the trace-horfes pulling down the thill-horfe or thiller, which is always found to be the cafe, when they draw from a *drail*, as it is termed, in the fore part of the fhaft, if the thill-horfe be taller than the trace-horfes, or if the latter are going down a declivity, before the former has paffed its fummit, as feen above.

The preventive practice or mode in this cafe is by inferting a chain to the hinder part of the fhafts, which is alfo attached, and confined in fome meafure, to the fore part of the fhaft (where the drail is generally placed) by a piece of chain, which allows it to move freely to a certain diftance from the fhaft, in order that the draught may be conftantly kept in a horizontal direction.

THILYPTERIS, in *Botany*, a term ufed by Dillenius to exprefs the common female fern or brakes.

THIMA, in *Geography*. See TIMA.

THIMBLE, a cover for the finger, made of brafs, fteel, or filver, and ufed by all people who few, as taylors, milliners, &c.

THIMBLE, in *Sea Language*, an iron ring with a groove round the outfide, to receive the rope it is fpliced into. Thimbles are fpliced into the rigging and fails for blocks to be hooked to, or ropes to reeve through where blocks would appear too heavy.

THIMBLE *Iflands*, in *Geography*, fmall iflands near the coaft of Connecticut. N. lat. 41° 11'. W. long. 72° 42'.

THIMBRIC-KEUY, a village of Afiatic Turkey, in the province of Natolia, on the fcite of an ancient town called "Thymbra," built by Dardanus, king of Phrygia. Here are fome confiderable ruins, fuppofed of a temple of Apollo.

THIMDA, a town of Tunis; 8 miles S.W. of Bizerta.

THIMIO, in the *Materia Medica*, a name ufed by fome authors for a peculiar fort of lignum aloes, which is blackifh and very heavy, and extremely fweet.

THIN, a name given by the Arabian writers to earth of any kind.

Thus the bole armenic of Galen is called by Avicenna *thin Armeni*; and hence the word *muthin*, an adjective fignifying earthy, or approaching to the nature of earth; a term applied to many medicines of this kind.

THINA, in *Botany*, a name by which fome authors have called the larix, or larch-tree.

THINGAU, in *Geography*. See TINGAU.

THINGVALLA, a place of Iceland, about 26 miles distant from Reikiavik, and 24 miles from Skalholt; in which is a small, mean, and dirty church. The scenery about it is romantic; but the want of wood, and the effects of subterraneous heat, combine to give it a dreary aspect. The adjoining lake of the same name is a fine sheet of water, reckoned to be about ten miles long and from three to seven in breadth. In the lakes are two pretty large islands, called Sandey and Nesey, composed entirely of volcanic matter. The depth of the lake is said to be very great; a line of 100 fathoms having been sunk without reaching the bottom. It receives the waters of the surrounding bogs, and near it in different places vapours are seen to ascend from hot springs. It abounds with trout. At the S. end the mountains are very picturesque, and the ascending vapours contribute to the solemnity of the whole scene, as they arise from springs that have been produced by the most dreadful commotions, and the destruction of a country that may once have been beautiful and fertile. Near Thingvalla is a building, where the courts of justice were formerly held; but as Reikiavik is now the seat of government, the courts are held there. It does not appear why this place was originally selected for the seat of justice; but a town being once established, and trade carried on freely, and to a greater extent than in former times, ready recourse to the law became necessary. Although not more than fifteen years have elapsed (1817) since the judicial courts were transferred to Reikiavik, few remains are left to mark a spot so famous in the history of Iceland. The only building is a small wooden house, in which the consultations were held and sentence pronounced by the stiftantment or governor. The magistrates and people assembled on the occasion lived in tents. The culprits who were condemned to die were beheaded on a small island in the river Oxeran, which here flows into the lake. The females were drowned in a deep pool below the lava, a little farther up the valley. An ecclesiastical court used to be held at Thingvalla by the bishop of Skalholt, attended by the provosts and two ministers from each Syssel. It is suggested, that Tingwall in Shetland, and Dingwall in Rossshire, are evidently the same names as Thingvalla; and were probably, in ancient times, places where justice was administered. Towards the N. are several ranges of mountains, which, from the account received, and the appearances observed, are volcanic. Among these, the principal seems to be Skalbreidé, a lofty Jokul, of which description of mountains others were seen at a distance. Although the transference of the superior court from Thingvalla to Reikiavik has, probably, been attended with advantage, the Icelanders, as a people, have some reasons for regarding this change with regret. The annual meeting at Thingvalla was not merely that of a tribunal of justice, but an assembly of the nation; and though the importance of this assembly was diminished, and its dignity degraded, by the subjection of the island to a foreign power, yet on the spot where the greatest among his ancestors so often stood, the mind of the Icelander must ever have been awake to enthusiasm and patriotic pride. "Hic sacra, hic genus, hic majorum multa vestigia!" Mackenzie's Iceland.

THINKING, COGITATION, a general name for any act or operation of the mind.

Chauvin, with the Cartesians, will have thinking to consist in a certain native, inherent motion or agitation of the human mind, of which itself is conscious.—*Native* and *inherent*, since he conceives it no other than the very essence of the mind itself, or, at least, its principal and fundamental property: an *agitation*, since there is a new modification or change made in the mind, which we scarcely know how to conceive without motion; add, that the origin and etymology of the word *cogitation*, according to Varro and Festus, implies as much; *cogito* being used for *coagito*.

When the mind turns its view inwards, upon itself, the first idea that offers, says Mr. Locke, is thinking; in which it observes a great variety of modifications, and of them frames to itself distinct ideas: thus the perception annexed to any impression on the body, made by an external object, is called *sensation*.

When an idea recurs without the presence of the object, it is called *remembrance*.

When sought after by the mind, and brought again into view, it is called *recollection*.

When held there long under attentive consideration, it is called *contemplation*.

When ideas float in the mind without regard or reflection, it is called a *revery*; when they are taken express notice of, and, as it were, registered in the memory, it is *attention*; and when the mind fixes its view on any one idea, and considers it on all sides, it is *study* and *attention*.

These are the most obvious modes of thinking; but there are several others which we know of; and, doubtless, the mind is capable of infinite others, of which we have no notion at all.

The school-philosophers usually divide thinking, with regard to the object it is employed about, into understanding, *intellectio*; and willing, *volitio*.

And hence, those are said to be the two powers or faculties of the human mind.

Intellectual thinking is farther subdivided into divers kinds; the first, when the mind merely apprehends or takes notice of a thing, called *perception*; the second, when it affirms or denies a thing, called *judgment*; the third, when it gathers or infers a thing from others given, called *reasoning*; the fourth, when the mind disposes its own thoughts or ideas in order, called *method*.

Volitive thinking, or volition, admits of infinite different modifications, or new determinations.

Some authors extend the idea of thinking farther; and consider it in God, angels, brutes, &c. whence results a new division of thinking, into divine, angelical, human, and animal or sensitive.

But the two first we know little or nothing of: the third is that of which we have already been treating.—As to the last, *viz.* animal or sensitive thought, it is defined to be, an action of the soul attending to an external object, affected by means of the animal spirits duly agitated in the brain, to excite an idea.

The Cartesians maintain, that thinking is essential to the human soul; and, consequently, that there is no time when the soul does not think: but this doctrine has been very vigorously attacked by Mr. Locke; who labours to shew, that in sleep, without dreaming, there is an entire cessation of the modes of thinking.

I think, *cogito*, according to Des Cartes, is the first, and most certain, of all truths; from which, alone, we draw this consequence, *therefore I am*, or exist, *sum*.—One might also say, *cogito, ergo Deus est*; *I think, therefore there is a God.*—Logic is defined, the art of thinking methodically.

THINNING *of Plantations and Woods*, in *Agriculture*. The practice of thinning plantations of trees and woods, so as to let the plants of them have more room as they advance in growth, is mostly an operation of considerable importance; as upon it, perhaps, more than upon any other point of the after-management in such cases, depends the nature, quantity,

tity, and modification of the timber which is raiſed and produced.

Woods of the natural kinds, the ſeeds of which are ſown by birds or the winds on ſoils and ſurfaces of very different deſcriptions and ſorts, riſe and ſpring up at different times, and of very different degrees of thickneſs, ſtrength, and vigour in themſelves and their different parts; conſequently it is eaſy to ſuppoſe, that thoſe which are placed in favourable ſituations and circumſtances, will quickly overtop the others; and if they do not wholly deſtroy, will at leaſt weaken them in ſuch a way as not to be affected or inconvenienced by them, until the ſtrongeſt trees ultimately find ample and ſufficient room for their growth. In this way, although nature may be ſlow in her operations, ſhe effects her purpoſe in a very complete manner. Beſides theſe obſervations, Mr. Loudon has noticed that artificial thinning is only aſſiſting nature; and that hence even leaving natural woods to be thinned by time, would not be economical.

It is ſuggeſted with regard to artificial plantations, that in theſe the ſoil is equally cultivated, and the plants are put into the ground much about the ſame ſize, and at the ſame time, and that hence they of courſe ruſh up together all nearly of the ſame height, producing neither ornament nor timber; and none being produced ſo ſtrong as to take the lead and deſtroy the reſt, they grow in this manner until they are ſo crowded as to exclude air and moiſture. At which period, unleſs aſſiſtance has been previouſly given by thinning, the whole of the plantation dies together, and is deſtroyed.

Where thinning is neceſſary in old natural woods, or ſuch as have been planted, it ſhould conſtantly be performed by degrees in a regular manner, well conſidering the ſtate, qualities, and habits of the trees, as well as the nature of the ſoil on which they grow, the ſituation and expoſure in which they are placed, and other ſimilar matters. The outſides of them ſhould commonly be leſs thinned than the other parts, and the trees on the richer parts of the land be more thinned than thoſe on the other deſcriptions of it. The thinning of the ſide ſhoots and branches of the trees ſhould likewiſe, in ſome meaſure, accompany the other thinnings, and be performed in a ſuitable manner to their natures, ſtates, and purpoſes for which they are intended.

It is, however, moſtly the cuſtom to begin to thin them out at about ſeven years from the time of planting them, or that of their firſt growing up, and to repeat it every ſeven years afterwards. When the planting has been performed in the proportion of from ſix to eight hundred trees to the acre, they may be made to ſtand, in the firſt thinning, at about one tree to each rod of ground, or nine trees to eight rods. But in the ſecond thinning, a rather larger proportion of trees ſhould be taken out, as rather more than one to each rod; and in the third thinning, the proportion may be made ſtill in a larger ratio, ſo as to leave the trees about a rod ſquare each. Much muſt, however, always depend upon the nature, ſituation, and circumſtances of the particular plantations and woods.

In all theſe thinnings the worſt trees ſhould be removed, ſo as to leave the ſtraighteſt and beſt plants to ſtand for timber or other purpoſes.

It is ſuggeſted, that as in moſt plantations the fir tribe of trees has been introduced either for the purpoſe of ornament or ſhelter; where thinning is practiſed, in ſuch caſes, too large a proportion of theſe firs are moſtly left. Hence, from their comparatively quick growth, it is concluded that ſuch plantations have a diſagreeable ſameneſs throughout; and that, as moſt of them are made in the ſame manner, this appearance extends itſelf over the whole country.

The plantations in which thinnings in the way of ornament is moſt particularly required, are thoſe which are deſigned for groves. In many woods and copſes no plants require to be taken out but the nurſe ones, where any ſuch have been planted. Plantations of the fir kind, Mr. Loudon adviſes to be thinned ſomewhat gradually, beginning the work after they have been five or ſix years planted, and continuing it for ten or twelve years: after which time, thinning, he thinks, becomes pernicious. And that the trees which are to be thinned out ſhould conſtantly be grubbed up by the roots; for that when theſe are ſuffered to remain, they check the progreſs of the trees which are left. But theſe ſorts of plantations are ſometimes, and very properly, left altogether without thinning, being cut down wholly as a crop when fifteen or twenty years old, or of about that ſtanding. This is conceived to be in general the moſt profitable mode of planting and after-management on thin, bare ſoils in the vicinity of mines and pits, where wood of this ſort is greatly in demand by the proprietors for the ſupport of the upper ſtrata. Where ſome of the fir tribe have been planted as nurſes, they are recommended to be thinned out in a gradual manner, by being grubbed up as they begin to injure and inconvenience the principal trees. And groves, where the trees are of the deciduous kinds, ſhould be thinned out after the ſame manner; only, the work in theſe caſes may proceed until the trees have arrived at nearly their full growths.

Woods, where under-growth is always the object intended when they are properly planted, require, as has been ſeen above, no ſort of thinning, unleſs in caſes where nurſes have been planted, or when the timber-trees are too much crowded by the low growths; the whole ſhould be ſuffered to grow for twelve, fourteen, or more years, or until the under-growth is in a ſuitable ſtate to be cut over; when at that period the ſtrongeſt trees ſhould be fixed upon, and left as ſtandards in a properly thin ſtate. As copſe-woods uſually grow a certain length of time in proportion to their natures and kinds, and are then wholly cut over by the ſurface of the ground; they, of courſe, demand leſs thinning than others, or none at all, except when nurſes have been planted among them; and in the caſe of both woods and copſes, theſe, as they are thinned out, ſhould conſtantly be replaced by the principal trees at ſuitable diſtances.

In all caſes where ornament is in any way conſidered, the above writer thinks the trees or copſe left in thinning ſhould not be equidiſtant from each other, but in groups of irregular thickneſs; and it is ſuppoſed that the ſame may be had recourſe to even in woods where utility is the chief conſideration; as it will make no material difference in the produce of timber, and is ſo much more natural. See Plantation and Planting. See alſo Timber and Wood.

Thinning *out Crops*, the practice of thinning out ſuch plants among them as are too thickly or cloſely placed together, as in the caſe of turnips or other ſimilar crops. In the different ſorts of turnips, the thinnings may be made in ſuch a manner as that the plants may ſtand ultimately at the diſtance of from ſeven or eight to nine or ten inches every way from each other, in proportion as the land is more poor or rich in its quality. But in carrot crops, the thinning them out to the diſtance of about eight or twelve inches, according to the richneſs of the ſoil, may probably be the moſt proper practice. And the ſame will moſtly be the caſe for thoſe of the parſnip and beet kinds.

Where cabbage, borecole, or other ſimilar crops, are ſown, fown, they fhould always be thinned out to the diftance of a foot and a half, two feet or more, as the foil may be of a lefs or more rich quality. And lettuces, when put in by fowing, fhould be thinned to the diftance of from eight to twelve inches, according to the nature of the foil.

The thinning out of any other forts of field-crops of thefe kinds muft alfo be performed according to their natures and particular habits of growth.

Some of thefe forts of crops are beft thinned out in a gradual manner, as the turnip, carrot, beet, &c.; while in others it may be done all at once, as for the cabbage, and fome other kinds.

There are feveral different methods practifed in accomplifhing this bufinefs, as by means of the hand fimply, the ufe of the hand-hoe of different fuitable fizes, according to the ftates and circumftances of the crops, and lately in the row kinds, by an implement invented for the purpofe. This laft is by much the cheapeft and moft expeditious manner of performing the work; if it fhould be found, on further trial, to be equally accurate and effectual in the execution of the bufinefs. This fort of tool or machinery was invented and conftructed on the farm of Charles Gibfon, efq. at Quarmer Park, near Lancafter, and a reprefentation of it is given in the Corrected Agricultural Survey of that county, lately publifhed. See THINNING *and Hoeing Machine for Turnips, &c.*

The other modes of effecting and completing this kind of work, are a great deal more troublefome, laborious, and expenfive than the above, efpecially the firft of them, as many hands and much time are required for doing it in the moft proper and effectual manner by fuch means. Where the hand-hoe is employed, two or three different fized hoes are moftly made ufe of for the purpofe in the different fucceffive thinning hoeings, which, when in the hands of experienced workmen, do the bufinefs in a pretty quick, eafy, and complete manner, as the fupernumerary plants are ftruck and cut out with much exactnefs and regularity. It is conftantly neceffary in fuch cafes to keep the hoes in a pretty fharp ftate, in order to perform the work well, and with neatnefs. The principal objections to doing this fort of labour by the hand, are its tedioufnefs, and the treading which takes place during the operation.

THINNING *out Plants*, in *Gardening*, the pulling or drawing out fuch as are too clofe and thick in fome crops of the general and other kinds, as well as in fome other cafes, fo as that the remaining ones may ftand at proper and fuitable diftances for producing the moft favourable crops, plants, or other productions. This is moftly practifed in the cafes of the main crops of onion, carrots, parfnips, beets, fpinach, and feveral other fimilar kinds, which are fown in the broad-caft manner; in different fmall feed crops, for raifing plants to be afterwards fet out, fuch, for inftance, as the cauliflower, brocoli, cabbage, borecole, lettuce, endive, and many others; and in the producing and bringing forward young tree plants of moft forts in nurfery grounds and other places.

Onion crops are, for the moft part, thinned out at different times, as the demands of the markets, or in other ways may be, fo as to leave the remaining plants at the diftances of four or five inches or more from each other, according to their nature, kinds, and other circumftances; always, however, allowing fufficient room for their full and complete growths. Much advantage is often made in this way by the young onions which are thinned out, which would otherwife be loft and thrown away.

The carrot, parfnip, and beet crops are commonly thinned out at one or two thinnings, the ftanding plants being left at the diftances of about fix or eight inches apart, as the nature of the foil and crops may be. The young plants of the carrot kind, thus drawn, are in fome cafes bunched and made ufe of, efpecially when the crops are late in being thinned out, which fhould always be avoided as much as poffible.

Lettuce and fpinach crops may be thinned out at once to the diftances of fix, eight, or more inches between the plants, in the different kinds, as the nature of them may be, when put in upon the broad-caft plan. The thinnings are of little ufe or value, except for wafte purpofes, fuch as being thrown to the hogs, &c. in thefe inftances. Moft other fimilar forts of crops may be thinned out in the fame manner.

The fmall feed crops of the different kinds fhould conftantly be kept fo thinned out as to prevent the plants of them from being drawn up in a weak manner, and unfit for being fet out; as where the contrary is the cafe, there is always great wafte, and the plants feldom fucceed fo well. They fhould be gradually thinned out by planting, as well as in other ways.

Young tree plants, in moft cafes, require frequently thinning out in their early growths, in order to raife and bring them forward in the beft and moft perfect manner. They fhould therefore, in general, be fo kept thinned out as never to want fufficient room for rifing in the manner which is the moft natural and proper for them, and for preventing the injury they may fuftain by ftanding too clofe in the rows or otherways.

Due, early, and proper thinning out of crops and plants, is of courfe a matter of confiderable importance and utility in the garden culture of different forts of vegetables, trees, and other productions of the fame kinds.

THINNING *and Hoeing Machine for Turnips*, that fort of implement or machine which is contrived for the purpofe of thinning or fetting out this as well as other fimilar kinds of crops that ftand in rows. It is made light, and conftructed fomewhat in the form of the plough, having a fuitable apparatus fo attached to it behind as to be put in motion, and ftrike out the fupernumerary plants as the horfe proceeds regularly along the intervals of the ridges. The horfe is driven by the perfon who holds and directs the tool while at work. It is capable of going over a very confiderable fpace of ground in a fhort time, and if found, on the refult of further trials, to perform the work with due accuracy and correctnefs, will be a very great acquifition to the drill turnip hufbandry, and for different other purpofes of the fame nature.

THIONVILLE, in *Geography*, a town of France, and principal place of a diftrict, in the department of the Mofelle. The place contains 5014, and the canton 13,988 inhabitants, on a territory of 175 kiliometres, in 27 communes; formerly belonging to the duchy of Luxemburgh, and ceded to France by the treaty of the Pyrenées in 1659. N. lat. 49° 21′. E. long. 6° 15′.

THIORSAA, a large turbid river of Iceland, on the road from Skalholt to mount Hetla, the courfe of which is nearly from N.E. to S.W. In its paffage over rugged maffes of lava rifing abruptly from its bed, this river dafhes among the rocks, and forms impetuous rapids and falls.

THIR, in *Chronology*, the name of the fifth month of the Ethiopians, which correfponds, according to Ludolf, to the month of January.

THIRD, TERTIUS. See NUMBER and NUMERATION.

THIRD, in *Mufic*. The 3d is the moft agreeable and neceffary

neceffary concord in counterpoint, throughout the whole fyftem of practical harmony.

There are two kinds of thirds; the major or fharp 3d, which is four femitones or half notes above the bafe; and the minor or flat 3d, which is three.

Very agreeable mufic in two parts may be compofed, and often is compofed, of thirds only. The 3d is wanted with every other concord, and even difcord, except the 4th, when it is ufed as fuch with the 2d inftead of the 9th.

Dr. Pepufch, in his "Treatife on Harmony," has given curious and ample inftructions for the ufe of thirds in compofition.

It would be a curious inquiry, why a 3d was regarded by the ancients as a *difcord;* and why it is called by the moderns an *imperfect concord.* We cannot afford fpace for long difquifitions on every fubject of vain and frivolous curiofity, among which this would probably be numbered. But it feems as if the ancients eftimated the perfection of confonances by the fimplicity of ratios in the divifion of the monochord; regarding the *octave* as the moft perfect concord next to the unifon, as it was produced by a fimple divifion of a ftring into halves, expreffed by - - - $\frac{1}{2}$

The next in perfection was the 5th, produced by a third part of a ftring - - - - $\frac{2}{3}$

After this, the 4th, which was reckoned by the ancients not only a concord, but a *perfect concord,* expreffed by the ratio of - - - - $\frac{3}{4}$

A fourth part of a ftring gives the 15th, or double octave - - - - - $\frac{2}{4}$

The fifth part of a ftring produces the major 3d to the 15th, which, though in the organ the ftop called the *tierce,* it is a major 17th to the diapafon: its ratio is expreffed by - - - $\frac{4}{5}$

The minor 3d is expreffed by - - - $\frac{5}{6}$

The major 6th, compofed of four tones and a femitone major, as $\frac{E}{G}$: its ratio is - - $\frac{3}{5}$

The minor 6th, compofed of three tones and two major femitones, as $\frac{C}{E}$: its ratio is - - $\frac{5}{8}$

The extreme fharp, or, as the French call it, the fuperfluous 6th, compofed of four tones, a femitone major, and a femitone minor, as $\frac{G\sharp}{B\flat}$: the ratio of this 6th is - - - - - - $\frac{72}{125}$

We believe that the triple progreffion of a feries of perfect 5ths made the major 3ds fo extremely harfh, that no natural good ear could admit them among the concords. And in the firft attempts at counterpoint, it was a long time before a 3d was admitted in *difcant,* in which *diateffaronare* and *quintoier,* or a diatonic feries of 4ths and 5ths, now prohibited, was preferred to 3ds and 6ths in fucceeffion.

Third *Borough,* in our *Ancient Law-Books,* denotes a conftable.

Third *Earing,* in *Hufbandry,* the tilling or ploughing of the ground a *third* time.

Third *Eftate.* See Estate, Commons, &c.

Third *Night-awn-hynd.* By the laws of Edward the Confeffor, a gueft, who had lain three nights in an inn, was reputed a domeftic, and his hoft was anfwerable for what offence he fhould commit.

For one night he was accounted *uncuth;* for two nights, *gueft;* and the *third, awn-hynd,* or *hogen-hyne.* "Prima nocte incognitus, fecunda hofpes, tertia domefticus cenfetur."

Third *Order,* a fort of religious order, that obferves the fame rule, and the fame manner of life, in proportion as fome other two orders inftituted before.

The third orders are not originally religious orders, but affociations of fecular, and even married perfons, who conform, as far as their condition will allow them, to the defign, intention, and rules of a religious order, which affociates and directs them.

The Præmonftrantes, Carmelites, Auguftines, and Francifcans, difpute among themfelves the honour of having firft introduced third orders; but the pretenfions of the laft appear to be the beft founded.

The firft contend, that the third order of Præmonftrantes began in the life-time of their founder St. Norbert, who died in 1134.

F. Diego de Coria Maldonado, a Spanifh Carmelite, who has a particular treatife on the third order of Carmelites, derives them immediately, as well as the Carmelites themfelves, from the prophet Elijah.

The third order of Auguftines, if we credit F. Bruno, was inftituted by St. Auguftine himfelf; but the arguments he produces are fo frivolous, that F. Helyot obferves, they are not worth refuting.

The third order of Francifcans was inftituted by St. Francis in 1221, in favour of people of both fexes; who being fmitten with the preachings of that faint, demanded of him an eafy manner of living a Chriftian life; upon which he gave them a rule, the conftitutions of which are not now extant, as written by himfelf, but only as reduced and confirmed by pope Nicholas IV. fixty-eight years afterwards.

Thofe of the firft order of this faint are the monks called *Minor Friars,* comprehending the Cordeliers, Capuchins, and Recollects; the fecond comprehends the nuns of St. Claré; and the third, feveral perfons of both fexes, who live at liberty: and thefe are what we call the *third order.* See Franciscans, &c.

Of this order, which was only eftablifhed for fecular perfons, feveral of both fexes, to attain the greater perfection, have afterwards commenced religious, and formed various congregations, under various names; as "Religious Penitents of the Third Order," &c.

Third *Point,* or *Tierce-point,* in *Architecture,* the point of fection in the vertex of an equilateral triangle.

Arches or vaults of the third point, called by the Italians *diterzo acuto,* are thofe confifting of two arcs of a circle meeting in an angle at top. See Arch.

Third *Point,* in *Perfpective.* See Point.

Third *Rate.* See Rate.

Third *Subfidy Duty.* See Duty.

Third *Sound,* in *Mufic.* See Terzo *Suono,* Tartini, and Stillingfleet.

Third *Year, Tithe of the.* See Tithe.

THIRDENDALE, a liquid meafure ufed at Salifbury, containing three pints.

THIRDINGS, the third year of the corn or grain growing on the ground at the tenant's death, due to the lord for an heriot, within the manor of Turfat, in Herefordfhire.

THIRLAGE, or *Thirlage to Mills,* in *Rural Economy,* a contract or power authorized by law, to prevent the tenants of certain diftricts from carrying their corn to be ground any where elfe than at a particular mill. It was a practice which formerly prevailed much; and it was too often ufed as an engine of oppreffion, that proved extremely galling to thofe who were obliged to fubmit to it, but which at prefent is nearly, if not wholly done away, except in certain places.

The account of the origin and nature of this oppreffive practice,

practice, which has been given by the author of the original Agricultural Survey of Eaft Lothian, in the latter diftrict of country, may not be uninterefting to the curious inquirer. It is conceived that there, in former times, corn was reduced into meal, as in ancient Rome, by a hand mill, which was called a *quern*; and which was ufed in the remote parts of the Highlands of Scotland long after the year 1745.

It is certain, however, that the water machine called the mill, for the grinding of oats into meal, is of high antiquity in the fame country; and as it was introduced before the period of record, it may be fairly faid "caput inter nubilia condit." But from the ancient name of one of the duties, *knavefhip*, which will be afterwards explained, the mill would feem to be of Saxon original.

It feems alfo natural, that a perfon who poffeffed a ftream of water upon his eftate, fhould be invited by his neighbours to be at the expence of erecting a mill upon this ftream; and that they, on the other hand, fhould *thirle*, that is, aftrict and bind their lands, in all time coming, to ufe and frequent this mill with their corns, and to pay a certain proportion of the meal according to the univerfal mode then practifed of paying in kind for the grinding of it.

Anciently, it is contended, there is reafon to believe, the mills were at firft erected upon ecclefiaftical lands, and belonged to the clergy.

It is ftated, that there are three different fpecies of this fort of fervitude known and acknowledged in the law of the above country; but of thefe, two only belong properly to rural economy; however, in order more thoroughly to underftand the fubject, the whole may be fhortly explained.

It is noticed, that the firft and the lighteft fpecies of thirlage, is called the *thirlage of grindable grain*, and it means that the tenants and poffeffors of the aftricted lands (in the law of the above country the *fervient tenement*) fhall be obliged to refort to the mill (the *dominant tenement*) to which thefe lands have been aftricted, with all the oats and barley they fhall ufe for food, and there pay certain dues for the grinding of them.

The fecond, and the oppreffive thirlage, is, it is faid, called the *thirlage of growing corn*. By this covenant of thirlage, it is ftated, that every ounce of corn produced upon the fervient lands, let the quantity be ever fo great, muft be brought to the dominant mill, and there manufactured into meal, and the covenanted or accuftomed duties paid.

It is fuggefted, that the only limitation that this fevere thirlage admitted of, was in favour of feed and of horfe corn.

Sometimes a fpecial covenant was made, by which the poffeffors of the fervient lands paid what was called *dry multure*; that is, they paid a quantity of corn to purchafe the freedom of going to market with the remainder in the fame ftate; and where conftant immemorial ufage has fanctioned this cuftom, the courts of law generally, it is faid, have fo far mitigated the feverity of this fpecies of thirlage, as to find, that the proprietor of the dominant mill can demand no more than that quantity of *dry multure*, which the immemorial ufage has eftablifhed. Such decifions are afferted to be grounded upon the principle of a prefumed contract, of which the record or memory has been loft betwixt thefe parties, whereby the one agreed to pay, and the other to receive, the commutation fixed by the ufage.

The third and laft fpecies of thirlage is, it is obferved, called the *thirlage of invecta et illata*, and belongs properly to *urban* tenements: the meaning of it is, that corn, wherever produced, if brought for confumption within the boundaries of the dominant mill, muft be carried to the mill and manufactured there, and pay the accuftomed duties.

It is ftated that this fpecies of thirlage exifted in moft of the boroughs of the above country; and that the mill generally belongs to the incorporation, where the borough holds directly of the crown, or what are called royal boroughs. But where a borough holds of a fubject fuperior (the lord of the manor), the mill generally belongs to the fuperior, and the accuftomed duties are paid to him, or to his tenant in the mill.

It is to be obferved, the writer fays, that in all thefe thirlages, it was the land of the fervient tenement that was bound; and that although it fhould pafs by purchafe through twenty different hands, every purchafer, and all his people upon thefe lands, were equally bound to frequent the dominant mill.

It is further noticed, that there were alfo three different fpecies of duties paid at the dominant mill; as, firft, the *multure* (*multura*, grinding); fecondly, the *bannock* (loaf); and, thirdly, the *knavefhip*.

It is remarked, that the firft of thefe duties belonged to the heritor and proprietor of the mill; and feems evidently to have been the fine or *premium*, originally fettled, as the inducement for his being at the expence of erecting the mill, and for fupporting the machinery of it in future. The *bannock* was the duty paid to the miller; and the *knavefhip* the duty paid to the under fervants in the mill.

It is ftated, that the quantity of meal paid under the name of multure, varied confiderably in different counties, and even at different mills. It has been known as high as the eleventh boll, and fometimes as low as the twenty-fecond boll; and in one particular inftance fo fmall as the thirty-fecond: but it may be taken, on the average, at nearly the feventeenth boll.

The other duties were alfo various; but they may, it is fuppofed, be taken jointly as equal to the half, or from that to three-fourths of the multure.

But wholly independent of thefe feveral duties, the poffeffors of the fervient tenement were, it is faid, bound to perform certain perfonal fervices to the mill and its appendages: for inftance, when the dam-dyke, or the rampart that directs the ftream of water from the river to the mill wanted repair, or when the aqueducts to and from the mill required to be fcoured, the people of the fervient tenement muft turn out and perform thefe works. When the roof of the houfe in which the mill ftood decayed, they muft find thatch for making that repair, and they muft put it on. When grind-ftones were wanted, or an axle, or any other part of the machinery that required a heavy carriage, they muft go with their horfes and carriage to the neareft place (whatever might be the diftance) to bring thefe articles to the mill.

But this fpecies of thirlage, it is believed, never was known in the above county; or that at leaft, if it was, it has long fince been forgot. Befides, it is noticed, that there was another circumftance peculiarly fortunate, which put it in the power of moft of the landed proprietors of that county, without difficulty, to emancipate their tenants from the thirlage even of *grindable* grain, namely, that the landlord almoft univerfally was proprietor both of the dominant and fervient tenement; and that as he aftricted his tenants to his own mill by a covenant in the leafe, progreffively as the leafes of the mills expired, the landlords in general emancipated their tenants from every fpecies of thirlage, at a converfion of twenty fhillings *per* plough, which was paid by the tenant; and he and his fervants were left at perfect freedom to refort to any mill, where they could get their work beft done, and at the loweft rate.

The cafe, however, it is remarked, was widely different

in

in many parts of the north of the above country; and it is known, from what has already been mentioned, that there were many estates, or *servient tenements*, belonging to one proprietor, which were astricted to mills, or the *dominant tenements*, belonging to another proprietor, and that not a few of these thirlages were the severe one of *growing corns*.

The writer does not think it here necessary to inquire whether these mills were originally erected by the clergy, and since the reformation in religion, have passed into the hands of laymen; or whether, perhaps, if mills are truly of Saxon origin, they were generally, and at once introduced into the above country, when under the Saxons, who certainly were, it is thought, a more enlightened people than the Scottish and Pictish inhabitants of the North, whose ignorance, of course, may have led them more generally to subject themselves in the servitude of thirlage, to invite their clergy, or a few of the more wealthy among them, to undertake the arduous task of erecting mills.

From the near analogy betwixt tithes and thirlage, it has appeared to the writer a matter of just surprise, that the parliament of the above country, which, in the course of a preceding century, first authorised the valuing of tithes for the purpose of fixing a *modus* of payment, and afterwards compelled the lay titulars (proprietors) to sell their tithes at nine, and in some cases at six years' purchase, to the proprietors of the lands, did not introduce a fixed modus for thirlage, which certainly operated like tithes, as a tax upon industry, to bar, or at least to retard agricultural improvement in its progress. See TITHE.

THIRLBY, STYAN, LL.D. in *Biography*, a learned critic, was born about the year 1692 at Leicester, and finished his education at Jesus college, Cambridge, blending promising talents with self-conceit, litigiousness of temper, and a habit of intemperance. He appeared at an early age as a writer of controversial pamphlets, and thus acquiring some degree of reputation, obtained the fellowship of his college at the age of about 21 years. In maturer life he probably applied to study with greater diligence, for his edition of Justin Martyr, to which he was indebted for literary reputation, was published in 1722. Versatile in his disposition, he diverted his attention at this time from divinity to physic, and accepted the post of librarian to the duke of Chandos. In this station he continued for a short time, and being under a necessity of quitting it, he became first a student in civil law, and afterwards in common law. Weary of these pursuits, he resided in the house of his former pupil, sir Edward Walpole, by whose interest he obtained a sinecure place in the port of London, of the value of about 100*l*. a-year. Upon leaving this asylum, he took private lodgings; but continued to indulge his habit of sotting and intoxication. He is said to have contributed some notes to Theobald's edition of Shakspeare; but his self-indulgence and indolence rendered him unfit for mental exertion, and he closed his career in December 1753. His edition of Justin Martyr, censured by some, but regarded upon the whole as a valuable performance, contains Justin's two apologies, and his dialogue with Tryphon the Jew, Greek and Latin, with notes and emendations by the editor, and select notes by former editors. Nichols's Lit. Anecd. Gen. Biog.

THIRLWAL CASTLE, in *Geography*, a boundary fortress between England and Scotland, on the Picts' Wall; 3 miles N.W. of Haltwesel.

THIRON *de Gardais*, a town of France, in the department of the Eure and Loire, 21 miles S.W. of Chartres.

THIRSK, or THRUSK, a borough and market-town in the wapentake of Birdforth, North Riding of the county of York, England; is 23 miles N.W. by N. from the city of York, and 223 miles N.N.W. from London. It is situated in a plain, nearly surrounded by hills, on the banks of a rivulet called Cod-beck, which divides the town into two parts, respectively named the Old Town and the New, which are connected by two small stone bridges. The two towns are distinct, as far as relates to the election of members; but in all other respects are considered as one. The civil government is vested in a bailiff, annually chosen by the burgage holders. The New Town stands within the precincts of the ancient castle of the Mowbrays. In the centre of the town is the market-place; which would be one of the finest in the county, were it not for the tolbooth and shambles, now in a ruinous condition. The market is held on Mondays, and is well supplied with all kinds of provisions. Five fairs are held annually for horned cattle, sheep, leather, and woollen cloth. These fairs attract a considerable number of dealers, and, with the advantage of the great North road from York, are very beneficial to the town, and in some degree supply the want of manufactures, of which here are only a small quantity of coarse linens and sacking, and a few bridles and saddles. The population, as returned to parliament in the year 1811, consisted of 2155 persons, occupying 549 houses. The parish church stands on a rising ground at the northern extremity of the town. The roof, which is elliptical, and of oak, ornamented with carving, is supported by a double row of pillars and pointed arches. In the south wall of the chancel, near the altar, are three ornamented stone seats. The church is generally supposed to have been built out of the ruins of the ancient castle, which was demolished in the reign of Henry II. A moat and rampart are still to be seen, but no vestige of the building remains; and in Camden's time, it was nearly in the same state. It had once, however, been a place of great strength, when held by the potent Mowbray family. It was here that Roger de Mowbray began his rebellion against Henry II. and joined the king of Scotland against his own sovereign. The revolt was suppressed, and the castle of Thirsk, as well as several others belonging to the rebellious lords, were by the king's order destroyed. Besides the parish church, the Calvinists, the Quakers, and the Methodists, have their respective meeting-houses. Here is also a School of Industry for poor girls, who are clothed and taught reading, writing, and arithmetic, plain work, knitting, &c.

That division of the town called *Old Thirsk*, is a borough by prescription, and returns two members to parliament. The right of election is in the occupiers of burgage tenements, now only fifty in number, of which forty-nine are the property of sir Thomas Frankland, bart. Old Thirsk consists of a range of cottages on each side of the turnpike road leading from York to Stockton, and of two squares surrounded by the same kind of buildings. In one of these squares, called St. James's Green, the cattle fairs are held; the other is the scite of an ancient church, of which, time has long since swept away every vestige. In the latter of these squares is an elm-tree of venerable antiquity, from which the place takes its name, Hawm (that is Elm) Green; and under the shade of whose branches the members of parliament are elected. One of the chief inconveniences of Thirsk and the adjacent country, is the scarcity and high price of coal, which is brought from the county of Durham in small carts, containing from eighteen to twenty-two bushels, varying in price according to the season.

In the vicinity of the town is Byland abbey, which was founded

founded in the year 1177, by Roger de Mowbray, when a ftately monaftery and church were erected, and dedicated to the Virgin Mary. This abbey continued to flourifh till the general diffolution in 1540, when the feite and moft of the demefnes were granted to fir William Pickering. At prefent, the ruins and feite belong to the honourable family of Stapylton.

Near the bafe of the Hambleton hills, within four miles of Thirfk, is Thirkleby-Hall, the feat of fir Thomas Frankland, bart. The walks and pleafure-grounds are extenfive and well laid out; and the houfe is an elegant modern ftructure.—Beauties of England and Wales, vol. xvi. Yorkfhire; by J. Bigland.

THIRST, a painful fenfation, occafioned by a vellication of the nerves of the throat or fauces, and producing a defire of drinking. See DIGESTION.

Thirft may be fometimes eluded by rolling a clean bullet or a pebble in the mouth, which occafions an extraordinary iffue of faliva to moiften the throat, &c.

Mr. Boyle mentions a man who could eafily abftain from drinking for nine days, and yet have his diet nothing more liquid than ufual; the fecretions of urine, fweat, &c. being performed all the while regularly, and in the fame quantity as ufual.

In dropfical cafes, where there is not a right fecretion of the urine by the renal glands, and the veffels and parts of the body are loaded with too great a quantity of ferous humours, a great moderation in drink might be attended with good fuccefs, provided fome liquor could be found out to allay that uneafy fenfation. Probably this would be beft performed by mucilages acidulated with fpirit of vitriol or fulphur, or jellies with juice of lemon, &c. and that a fmall quantity of fuch a compofition, now and then ufed, might be of as much real fervice, in quenching thirft, as draughts of liquors, which increafe the fymptoms.

In feverifh diforders, the patient is frequently tormented with a violent thirft, which is moderated by acidulating the barley-water, or fage-tea, with fpirit of vitriol, or with lemon-juice: but by nothing fo much, as allowing the patient fome flices of an orange. Pringle, Obferv. on Difeafes of the Army, p. 135.

THIRSTY SOUND, in *Geography*, an inlet or bay on the N.E. coaft of New Holland, fo called by Cook in 1770, becaufe it afforded no frefh water. It lies in S. lat. 22° 10′, and W. long. 210° 18′; and may be known by a group of fmall iflands lying under the fhore, from two to five leagues diftant, in the direction of N.W., and by another group of iflands that lie right before it, between three and four leagues out at fea. In this inlet is good anchorage in 7, 6, 5, and 4 fathom; and here are places very convenient for laying a fhip down, where, at fpring-tides, the water does not rife lefs than 16 or 18 feet. The N.W. point of Thirfty Sound was called "Pier-Head."

THIRTEEN ISLANDS, a clufter of iflands in the Pacific ocean, among the New Carolinas, fo named by Capt. Wilfon. N. lat. of the moft foutherly 7° 16′. E. long. 144° 30′.

THISATON, a river of Canada, which runs into lake Huron, N. lat. 46°. W. long. 84°.

THISMA, a name ufed by fome for any fubterranean vein, or bed of a mineral.

THISTLE, in *Agriculture*, a well-known prickly troublefome weed, common in corn and other fields. It has been obferved, that wherever thiftles grow naturally, it is a fure fign that the land is ftrong, and of a tolerable good quality; but that they are at the fame time a great annoyance to every plant intended to be cultivated. And it has alfo been well remarked, that there are no weed-plants over which the economical farmer ought to keep a more watchful eye than the thiftle tribe, as they are not only wholly ufelefs, but occupy much ground, and being furnifhed with downy feeds, are capable of being multiplied and carried almoft to any diftance. Befides, they do much mifchief by impeding the work both in handling hay and corn crops. It is of courfe a matter of much confequence to be well acquainted with the qualities of each kind, in order to enable the farmer to judge with certainty how far and by what means their deftruction may be effected in the moft certain and ready manner.

There are a great many forts of thiftles; and thofe which chiefly deferve the attention of the farmer, are the *annual*, *biennial*, and *perennial* kinds.

There are four of thefe plants belonging to the firft divifion or fort, namely, the *mufk-thiftle*, which grows to the height of two or three feet; the heads hang down, and the flowers fmell fomewhat like mufk. It is frequently found occupying whole fields, particularly where the lands are of a chalky or barren quality; and fending forth flowers in July and the following month in great abundance. The *milk-thiftle*, which is found plentiful in moft wafte places, and upon old banks, being well known by its beautiful large leaves, which are variegated with white fpots and veins, as if they had been fprinkled with milk. The flowering feafon of this plant is in Auguft, or thereabouts. The *welted* or *curled* thiftle, which is frequently met with on banks, and by road-fides, but feldom intruding itfelf into fields or paftures. Its time of flowering is June and the following month. See CARDUUS.

And the *common fow-thiftle*, which is a very troublefome weed in fields and gardens; it is found in fome fituations that the plant is fmooth, but in others that it is rough, being prickly on the margins and mid-ribs of the leaves, and alfo on the peduncles and calyces of the flowers, and the ftems or ftalks abound with a lactefcent or milky juice. See SONCHUS.

But in the fecond divifion, or biennial kind, there are not more than three, as the *fpear* or *bull-thiftle*, which rifes about three or four feet in height, the extremity of each leaf running out into a long fharp point, remarkably prickly: hence, in fome places it is called by the name of the bull-thiftle. It has large heads of flowers, and commonly grows by the fides of roads, near dunghills, and not unfrequently in fields and paftures, flowering in June and the following month: the *marfh-thiftle*, which grows very tall and prickly, having numerous heads of flowers, fmall and of a red colour, growing abundantly in wet meadows and in woods, flowering in July and the month which fucceeds it. See CARDUUS.

And the *cotton-thiftle*, which is found plentifully in uncultivated places in many parts. The roots are long and fibrous, and fend forth feveral oblong fharp-pointed whitifh-green finuated leaves, covered with a cottony down, and fet with fpines on their edges. In the middle of thefe fhoots up a ftalk, to the height of five or fix feet, divided towards the top into diverfe branches, fet with leaves at their joints, and having jagged, leafy borders running along them, edged with fpires, as has the main ftalk alfo. Each branch terminates with a fcaly head of reddifh purple florets, having narrow tubes, and cut at their brim into five teeth. They contain flowers, which are fucceeded by fmall oblong feeds crowned with down. The time of its flowering is about July, for the moft part. See ONOPORDUM.

And in the third divifion or fort there are only two; as the

the *corn sow-thistle*, which is a very troublesome weed in arable land, flowering in July and the succeeding month. See SONCHUS.

And the *common* or *field-thistle*, which has many provincial names in different places, as the *horse-thistle*, the *cursed thistle*, &c. This is a thistle which is more general in its growth than any of the others, being found not only by the sides of roads, but also in arable and pasture lands, and it is remarkably prickly, growing from two to three feet in height, but the heads of the flowers are small, and of a purplish colour, though sometimes white; it flowers in July, or about that period. See CARDUUS and SERRATULA.

It is obvious, from what has been said, that the annual and biennial sorts of thistles may be readily removed, by preventing their running to seed and disseminating themselves over the land; which is best effected probably by carefully eradicating them, or frequently mowing them over closely by the surface, and rolling. But in the perennial sorts, from their roots continuing in the earth, increasing and throwing out new shoots or stems every year, there is much more difficulty in extirpating them, and they, perhaps, can be no other way completely destroyed than by rooting them out on arable land by trench or deep ploughing and frequent harrowings, or by fallowing or laying the land down to pasture; for the first of these sorts seldom appears in pasture lands. But for destroying the common thistles, the best method is perhaps by cutting them over in the bleeding season frequently by proper implements. The writer of the Berkshire Agricultural Report, who thinks them particularly noxious, troublesome, and inconvenient among the corn and grass crops, proposes drawing them up by an implement of the forceps kind, somewhat similar to that described under the head noticed below, especially the sort which is termed *serratula arvensis;* or if they be cut over about an inch above the surface of the ground, it is believed they will be liable to rot, on account of the stem being filled with water. They also frequently bleed to death when cut over in this way about the month of August, as hinted at above. See THISTLE-*Drawer*.

Others suggest that thistles might probably be destroyed in arable land by continued fallowing for one or two summers; with such repeated ploughing and hoeing as wholly to prevent their vegetating: but as such a progress would be tedious and expensive, an easy, expeditious, and effectual mode of eradicating them in this case, seems equally wanting and desirable, as in that of grass lands. Thistles are likewise very troublesome in hedges, especially those of the sow and the large rough kinds, and should constantly be rooted out and removed as soon as possible, as no hedge can go on well that is much infested with them. See THISTLE-*Cutter*, WEED, and WEEDING.

It may be noticed, that by an excellent regulation in France, a farmer may sue his neighbour who neglects to thistle his land at the proper seasons, or may employ people to do it at the other's expence. And it were to be wished that a similar law was enacted here, to prevent the wide-spreading mischief occasioned by the seeding of this pernicious weed; among which may be reckoned, besides its choaking the young corn, that if wheat in particular be not well thistled, the reapers take up the grips so tenderly, lest they should prick themselves, that by their loose handling of them, they sometimes leave upon the ground corn enough to sow the whole field. There is much inconvenience often experienced too in working hay from them.

Something in the same way as above has also lately been done here, especially in regard to the removal of them from the sides of highways and roads.

Though the sow-thistle has commonly been considered as a troublesome and injurious weed in tillage lands, it has lately been conceived by some to possess no small degree of nutrient power; and on this ground it has been suggested by the writer of the "Experienced Farmer," that it may be a plant of considerable fattening properties when properly raised and cultivated. When taken young, and cut or broken, it produces something, it is said, like cream; and he has noticed that many animals eat it in preference to every other plant now in vogue. Sheep, when in clover, &c. will feed upon it so greedily as to eat the very roots. Pigs likewise prefer it to almost any other green food. Rabbits will breed more speedily when fed with sow-thistles, than with any other food he knows of, except dandelion; which is of the same nature: and is now sold in Covent Garden market to the breeders of tame rabbits, to make the does take buck more readily. A man of his acquaintance, who was allowed better skill with stallions than the generality of people, used to search for sow-thistles, and give them to his horses to make them serve mares more readily and effectually. When he could not get sow-thistles, he fed them, it is said, with new laid eggs and milk, or cream, if he could get it; but he preferred sow-thistles or dandelion to any thing.

And there is, he contends, a well-known and remarkable proof of the nourishing and feeding quality of the sow-thistle, in the fat wether sheep fed to such an amazing size by Mr. Trimnel, of Bicker-fen, near Boston, upon fen-land. This sheep, it is said, was bred by Mr. Hutchinson, in Hail-fen, from a ram bred by Mr. Robinson of Kirby, near Sleaford. He never ate any corn, oil-cake, or other similar dry food, but fed wholly on grass and herbage. Being turned with many other sheep into a field of clover, he was observed first to search for the sow-thistles, and would eat no other food while any of these could be found in the parts of the field that were burdled off successively, a little at a time. None of the other sheep that fed with him, however, shewed any extraordinary liking for the sow-thistle. A small hut was built for him in the field to repose under in hot weather: and when the part that was hurdled off became bare of food, his attendants, on account of his liking for sow-thistles, gathered a quantity of them for him, which they gave him at particular hours, three times a day, from two to five pounds at a meal.

It is added, that when standing on his feet, he measured only two feet six inches high: he was weighed once a month, and weighed alive twenty-six stone, at fourteen pounds to the stone. He gained only one pound the last month: and as it was judged, therefore, that he was quite ripe, and would not increase any more, but might possibly lose weight the next month, he was killed on the 13th of October 1791, by Mr. Isaac Lumby, of Bicker, being then a four-shear, or four-year-old sheep.

The writer further states, that the skin, hung up by the nose part, measured ten feet two inches from the point of the nose to the tip of the tail, and was sold for 7*s.* 6*d.* in the common course of business. And that the carcase measured five feet from the nose to the tail; the rump or cushion eight inches and a half in depth; plate or fore-flank the same thickness; breast end seven inches; and was one yard five inches and a half round the collar. That the legs were reckoned at 40lbs. each; but if cut haunch of venison fashion, they would, it is said, have weighed 50lbs. each. Mr. Lumby was offered 2*s.* a pound for them; so that he could have sold the two legs alone for 10*l.* when so cut.

 This

This is certainly a remarkable inftance of fatnefs, but it might probably depend more on the difpofition of the animal to take on fat, than the fattening quality of the thiftle or food on which the fheep was fed. Many further trials are neceffary to fully afcertain the point.

Thistle, *Bleffed, carduus benedictus, vel cnicus.* See Centaurea.

As an article of the *Materia Medica*, the bleffed thiftle, which is the hairy wild *cnicus* of Miller, and the *centaurea benedicta* of Linnæus, was formerly much ufed in infufion, as a gentle emetic, in fevers and certain naufeas.

Dr. Lewis has often obferved excellent effects from a light infufion of carduus, in weaknefs of appetite and indigeftion, where the ftomach was injured by irregularities, or oppreffed by vifcid phlegm: nor has he found any one medicine of the bitter kind to fit fo eafily on weak ftomachs, or to heat fo little. Thefe infufions, taken freely, promote the natural fecretions. Drank warm in bed, they commonly increafe perfpiration or excite fweat; and as they act with great mildnefs, not heating or irritating confiderably, they have been ufed, in this intention, in acute as well as chronical cafes. The feeds, which, as well as the leaves, have a confiderably bitter tafte, have fometimes been ufed as fudorifics or diaphoretics, in the form of an emulfion. Cold water poured on the leaves, extracts, in an hour or two, a light grateful bitternefs; by ftanding long upon the plant, the liquor becomes difagreeable: a ftrong decoction is very naufeous and offenfive to the ftomach. The extracts, obtained by infpiffating both the cold infufion and decoction, have the fame differences as the liquors themfelves. Rectified fpirit extracts, in a fhort time, the light bitter part of this plant, but does not take up the naufeous near fo eafily as water. On keeping the watery extracts for fome months, a confiderable quantity of faline matter was formed on the furface, in fmall cryftals, refembling in fhape thofe of nitre, in the tafte bitterifh, with an impreffion of coolnefs. Lewis's Mat. Med. See Centaurea *Benedicta*.

Some diftil a water from it, which they ufe in cordial and fudorific potions.

Thistle, *Carline*. See Carlina.

The root of the *carlina acaulis* of Linnæus, is fuppofed to be diaphoretic, antihyfteric, and anthelmintic. It has been greatly efteemed by fome foreign phyficians, in acute malignant as well as in chronical difeafes, and given in fubftance from a fcruple to a drachm, and in infufion from one to two drachms and more. It is rarely to be met with in our fhops. See Carlina *Caulefcens*.

Thistle, *Diftaff*. See Atractylis.

The roots of the *atractylis gummifera* of Linnæus, or pine-thiftle, which is a native of Italy and the ifland of Candy, yield, if wounded when frefh, a vifcous milky juice, which concretes into tenacious maffes, at firft whitifh and refembling wax, but when much handled growing black; fuppofed to be the *ixion*, and *acanthina maftiche* of the ancients. The juice is faid to have been formerly chewed for the fame purpofes as maftich, and the root itfelf of the fame virtue with that of the carline thiftle. Lewis.

Thistle, *Fifh*, a fpecies of *Carduus;* which fee.

Thistle, *Fuller's*. See Dipsacus and Teasel.

Thistle, *Gentle*, a fpecies of *Carduus;* which fee.

Thistle, *Globe*. See Echinops.

Thistle, *Golden*. See Scolymus.

Thistle, *Hedge-hog*, a fpecies of *Cactus;* which fee.

Thistle, *Ladies*, or *Milk*, a fpecies of *Carduus;* which fee.

Thistle, *Melon*. See Cactus.

Thistle, *Sow*. See Sonchus.

Thistle, *Downy Sow*. See Andryala.

Thistle, *Star*. See Centaurea.

Thistle, *Torch*. See Cactus.

Thistle, *Woolly*. See Onopordum.

Thistle-*Cutter*, in *Agriculture*, a tool of the fward-dreffing kind, for cutting up thiftles and other coarfe weeds and plants.

An effective implement of this fort has lately been invented, delineated, and defcribed by Mr. Amos, in his work on "Agriculture and Planting."

The plan of the whole machine, when complete, is that of a fort of fquare, in which the leading fhare is made of caft-fteel, in the form of an ifofceles triangle, whofe equal fides are fourteen inches long, and its bafe twelve inches, being about one-eighth of an inch thick in the middle, tapering to a very fine edge on the outfides. There are four pieces of afh-wood, three inches fquare, and two feet four inches long, to which the fcythes are fixed, and which are called the fcythe-handles. There are alfo four fcythes, three feet long from point to point, four inches broad at the wideft part, made of caft-fteel, and which, the inventor fays, are manufactured by Meffrs. Hunt and Company, at their caft-fteel manufactory, Brades, Birmingham. There are likewife four other pieces of afh-wood, three inches fquare and two feet five inches long, for throwing the two hindmoft fcythes to their proper diftance, and which are braced two and two together by four bars, which are one by two inches fquare, and eighteen inches and one-fourth long. And there is a main piece of afh-wood, three by four inches fquare, and five and a half feet long, to which all the other pieces are fixed by hooks, and eye-bolts, by means of which the fcythe-handles act as it were upon hinges, and the fcythes are thereby made to form the fame parallel line with the furface of the land, whether it be concave, convex, or level. For this purpofe, it is fuggefted that it might be ufeful to make a joint in the middle of this piece, where the land is uneven. And in the fore part of this piece a fawgate is to be made, three-fourths of an inch from the under fide, at the hind part of the fhare, and one inch from the under fide at the front of the wood, which gives an elevation to the point of the fhare, to receive the fhare where it is fixed.

There are four iron braces, one of the ends of which are fixed in the fcythe-handles, and the other ends to the under fides of the fcythes by a fcrew. There is a ftaple, to which the chain and fwinging-tree is fixed, and by which the machine is drawn. There are two mortife-holes on the fides, which receive the tenons of two upright ftuds, to which pullies are fixed for lifting the fcythes off the ground, where there is any thing to obftruct them or retard their progrefs. Each of thefe ftuds is one and a half by four inches fquare, and three feet long. Two fmall pullies are fixed on each fide of thefe upright ftuds. Through the pullies of the foremoft ftud, a fmall rope paffes (one end of which is fixed to the outfides of the iron braces), and likewife through the pullies of the hindmoft ftud, and then the two ropes unite at about two or three feet behind the whole machine; and through the pullies of the hindmoft ftud pafs two other fmall ropes (one end of each being fixed to the outfide of the hindmoft iron braces), and then the four ropes unite together, where the manager holds them as a coachman does the reins of four horfes. By means of thefe ropes the fcythes may be lifted to any degree of elevation, by which contrivance any unevennefs of the ground, or other obftructions on its furface, fuch as ftones, roots, ant-hills, &c. &c. may be eafily avoided and paffed by.

The fwinging-tree is thirty-three inches long, and the chain

chain which hooks into the ftaple for drawing the machine by, is thirty inches long.

The whole of the fcythes, when properly fixed, projects beyond the wood, and cut the thiftles three-quarters of an inch above the furface of the ground.

In cafes where the fcythes want fharpening, it is obferved that they may be reared perpendicularly up, or taken off entirely; and that, at the fame time, the horfes fhould be ungeared and taken away.

In ufing the machine, it is advifed by the ingenious inventor, that as foon as the thiftles are in full flower it fhould be fet to work, the length way of the ridges; and that if the fcythes are kept very fharp, it will make excellent work. And when the thiftles have been cut, they fhould lie a day or two, it is faid, to perifh by the lofs of their fap-juice: the ground muft then be cleared, and the clofe or field rolled, the crofs way of the ridges, with a very heavy roller, which fo crufhes the hollow ftumps, and renders them fo pervious to water, that their roots foon rot and are deftroyed. But to expedite the operation of the implement, and the deftruction of the weeds and plants, the land fhould be cleaned of all kinds of rubbifh, the latter end of March or beginning of April, being dreffed with the fward-dreffer, and then rolled the crofs way of the land, or ridges, with a weighty roller, as juft mentioned. See SWARD-*Dreffer*.

THISTLE-*Drawer*, an ufeful implement of the forceps kind, which is extremely beneficial in drawing up the common field-thiftle and fome other ftrong forts of weeds. It may be conftructed either of wood or iron, in the latter cafe having fockets for receiving wooden handles. When made of wood, it fhould be of the hard and lefs brittle kind, as good tough afh. It is ufually formed from two to three feet in length, having fix notches or blunt teeth cut in each blade, at the bottom part, where it bites or feizes the plants, and each arm well fitted to the other, turning upon a ftrong pivot or pin. In its operation the thiftle is feized clofe to the ground and firmly held, fo as to be drawn out with confiderable length of root. It has been long in ufe in the northern parts of Lancafhire; and is faid to be lately introduced from Wiltfhire into the county of Gloucefterfhire, in the agriculture report of that diftrict. It is an ufeful and effective tool for the above purpofe, and only cofts about two fhillings when made of wood, and three or four when of iron. It has long been known in the firft of the above counties by the provincial name of *Gripes*.

THISTLE-*Fly*, in *Natural Hiftory*, a fmall fly produced from a fly-worm hatching in the protuberances of the carduus hæmorrhoidalis. In the protuberances of this thiftle, while they are clofed in all parts, the worm of this fly, from whofe injuring it, at the time of depofiting the egg from which it was hatched, the protuberances arofe, undergoes its laft transformation. It here makes of its own fkin a fhell in form of an egg, within which it puts on the nymph ftate. When this nymph becomes a living fly, the leaft part of its difficulty is the finding its way out of this fhell; it has a ftronger prifon than that, and before it can obtain its liberty, muft force its way through the much more clofely compacted fibres of the protuberance of the vegetable. It has, however, no other means of doing this difficult work, but that of inflating its head, and throwing out the bladder or muzzle with which all thefe creatures are provided in this ftate. See THISTLE-*Galls*.

This is a difficult operation, and many of the creatures perifh in the attempt; but what much forwards the fuccefs of it, in many cafes is, that the ftalk of the thiftle often becomes naturally half rotten before the time of the fly's egrefs. Reaumur, Hift. Inf. vol. iv. p. 338.

THISTLE-*Galls*, a name given by the more accurate authors to the protuberances on the ftalk of a fpecies of thiftle, called by authors *carduus hæmorrhoidalis*, from thofe tubercles, which are fuppofed to refemble thofe of the hæmorrhoidal veins in perfons fubject to the piles. Thefe have been fuppofed a natural production of the plant; but they are far otherwife. The whole hiftory of them is, that a certain fpecies of fly always depofits its eggs on the ftalks; and the young ones, when hatched, gnaw their way into the fubftance of the ftalks, and the copious derivation of the juice, occafioned by their fucking, produces the tubercles which are found on it.

Thefe tubercles are of a roundifh or oblong figure, and are of various fizes, from that of a pea to the bignefs of a nutmeg; they are much harder than the reft of the ftalk, approaching to a woody ftructure; when cut open, they are found to contain each feveral oblong and narrow cells; thefe have no communication with one another, and are each inhabited by a fmall white worm, which has two hooks at the head; with thefe it breaks the fibres of the plant, in order to get at its juices. When it has arrived at the time of its change into the nymph ftate, it ceafes to eat, and drawing up its body much fhorter than ufual, its fkin hardens, and forms a fhell, under which it changes into a very beautiful two-winged fly; the wings are whitifh and tranfparent in the middle; and at the edges furrounded with black in the form of a chain of figures like the letter Z; the body and breaft of this fly are of a beautiful black, with fome flight variations of yellow, with which the fhoulders are ftreaked; the anterior part of the head is white, and its back-part edged with a yellow down; the antennæ are reddifh, and the legs are partly black, and partly of a fine clear brown.

In obferving the changes of the worms of thefe galls, there are often obferved fome which go through them in a different manner from the reft, and finally produce a very different fpecies of fly. Thefe are the progeny of the eggs of fome other fpecies of fly, whofe worm being carnivorous, is lodged by the art of its parents, while it is yet in the egg ftate, in the fubftance of this gall, there to prey upon the defencelefs inhabitants.

There are many fpecies of galls the inhabitants of which are expofed to enemies. In thofe it is common to find the proper inhabitant and the devourer in the fame cell; the one feeding on the juices of the plant, the other on its juices; but this is not the cafe here, thefe worms immediately deftroying the proper inhabitants, and being found always alone in their cells. Reaumur, Hift. Inf. vol. vi. p. 221.

THISTLE, *Order of*. See ANDREW.

THISTLE, *our Lady of the*, was alfo a military order, inftituted in 1370, by Louis II. duke of Bourbon. It confifted of twenty-fix knights, of which that prince and his fucceffors were the chiefs. Their badge was a fky-blue girdle; and, on folemn occafions, a mantle of the fame colour, with a gold collar, interwoven with flower-de-luces; among which was the word *efperance*, *hope*, in capitals.

THISTLE-TAKE, a cuftom in the hundred of Halton, in the county of Chefter, whereby, if in driving beafts over the common, the driver permits them to graze, or take but a thiftle, he fhall pay a halfpenny a beaft to the lord of the fee.

At Fifkerton, in Nottinghamfhire, by ancient cuftom, if a native, or cottager, killed a fwine above a year old, he paid the lord one penny, which was alfo called thiftle-take.

THIVA, or STIBES, in *Geography*, a town of European Turkey,

Turkey, in the province of Livadia, anciently called "Thebes," and the capital of Bœotia, situated on a rising ground between two small rivers, supposed to be the Ismenus and Dirce of the ancients. (See THEBÆ.) The town is of an oval form, about three miles in circumference, and the houses are higher and better built than is usual in most parts of Greece. It contains four or five thousand inhabitants, about half Turks and half Christians, which latter have several churches, not remarkable for any thing except some few inscriptions to be seen upon the pavement of the cathedral. The air of the country about Thebes is thick and foggy, whence the ancient inhabitants of Bœotia were accounted dull and phlegmatic, and were neither famous for their wit nor valour. (See BŒOTIA.) Epaminondas raised Thebes to its highest pitch of grandeur; after whose death it was not remarkable for its virtues, but misfortunes, till it sunk into its original obscurity; so that its glory took birth with this great man, and with him expired; 28 miles W.N.W. of Athens. N. lat. 38° 25′. E. long. 23° 34′.

THIVIERS, a town of France, in the department of the Dordogne; 7 miles N.W. of Exideuil.

THIULETIS-TSKALI, a river of Georgia, which runs into the Kur.

THIZY, a town of France, in the department of the Rhone and Loire; 27 miles N.W. of Lyons.

THLASIAS, a term used by the ancients to express an eunuch made by a compression or contusion of the testicles, not by the cutting them out.

THLASIS, a word used by the ancients to express either a contusion without a wound, or a wound made by some blunt instrument, which contused the parts.

THLASMA, a word sometimes used like *thlasis*, to express a contusion either with or without a wound; sometimes applied particularly to a recess of the cranium inward without a fracture, an accident principally affecting children.

THLASPEOS SEMEN, in the *Materia Medica*, the name of a seed produced by the common *thlaspi arvense siliquis latis*, or common treacle-mustard. It used to be an ingredient in several of our shop compositions, and was esteemed attenuating, detersive, and aperient, and is said to promote urine and the menses, and to expel the after-birth.

THLASPI, in *Botany*, θλασπι, an ancient name, which Dioscorides tells us, in his book 2. chap. 186, originated in the broken, or pounded, appearance of the seed, alluding, we suppose, to its smallness. The word therefore is derived from θλαω, *to bruise*, or *beat*. He compares this seed to that of his καρδαμον, our *Lepidium sativum*, or Garden Cress, adding that the seed-vessel is moderately dilated upwards, the flower white, and the plant found about paths, walls, and banks. Every other part of his description, respecting the leaves and stems, is so apposite, that no doubt can remain of his θλασπι being our Shepherd's Purse, which Dr. Sibthorp found common in Greece and the Archipelago, in the early spring. Linnæus might surely have spared his mark of uncertainty concerning the etymology of the above name, in *Phil. Bot.* 183. But as he translates θλαω by the Latin word *comprimo*, to compress, he, most likely, had in view the *Th. arvense*, which several old writers have taken for the plant of Dioscorides, and whose seed-vessel is very remarkably compressed.—Linn. Gen. 334. Schreb. 437. Willd. Sp. Pl. v. 3. 442. Mart. Mill. Dict. v. 4. Sm. Fl. Brit. 683. Compend. ed. 2. 98. Prodr. Fl. Græc. Sibth. v. 2. 7. Brown in Ait. Hort. Kew. v. 4. 80. Juss. 241. Lamarck Illustr. t. 557. Gærtn. t. 141.—Class and order, *Tetradynamia Siliculosa*. Nat. Ord. *Siliquosæ*, Linn. *Cruciferæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of four ovate, concave, somewhat spreading, deciduous leaves. *Cor.* cruciform, equal, of four obovate petals, twice the length of the calyx, with narrow claws. *Stam.* Filaments six, but half the length of the corolla, the two opposite ones still shorter; anthers pointed. *Pist.* Germen superior, roundish, compressed, emarginate; style simple, the length of the stamens; stigma obtuse. *Peric.* Pouch compressed, inversely heart-shaped, emarginate, the style being mostly the length of the notch in which it stands, of two cells, the partition lanceolate, and the valves boat-like, with more or less of a dilated keel. *Seeds* several in each cell, pendulous, inserted into the sutures, roundish, compressed.

Ess. Ch. Pouch compressed, emarginate, inversely heart-shaped; its valves boat-like, keeled. Seeds several.

Obs. Mr. Brown has very happily separated from this genus the Linnæan *Th. campestre*. That species, on account of its solitary seeds, properly belongs to *Lepidium*, to which genus it, as well as *Th. hirtum*, is removed in the new edition of our *Compendium Fl. Brit.* The same ingenious botanist, of whose elucidation and reformation of the cruciform genera we have spoken under the article TETRADYNAMIA, has founded a new genus, called *Aethionema*, upon *Th. saxatile*, with another species, whose pouch has no valves, and only a single seed. With this latter, a Spanish plant, we are unacquainted; but as the *saxatile* has two cells, and many seeds, we can hardly either disjoin it from *Thlaspi*, or unite it with this, though, it seems, they agree in having an unequal insertion of their calyx-leaves, which in *Thlaspi* is equal; and their longer filaments are either combined, or else toothed near the top. As there are but two species, we presume one of these last characters belongs to each. The question seems at least doubtful, and therefore, without presuming to form an opinion respecting Mr. Brown's *Aethionema monospermum*, we prefer keeping his *saxatile* where it is.

The plants of this genus are herbaceous, and most of them annual, with simple *leaves*, and numerous corymbose *flowers*; their surface more frequently smooth, and somewhat glaucous, than pubescent; *stem* leafy and branched.

1. Th. *peregrinum*. Red Penny-Cress. Linn. Sp. Pl. 901. Willd. n. 1. Scop. Carn. v. 2. 17. (Th. capsulâ cordatâ, peregrinum; Bauh. Hist. v. 2. 927, badly copied in Moris. sect. 3. t. 18. f. 30.)—Pouches roundish-heartshaped. Leaves lanceolate, entire.—Native of dry hills, above Heidenschaft in Carniola. *Scopoli*. Of this very rare plant we have never seen a certain specimen. Scopoli says the *stems* are a span high, hard, branched, turning reddish, as well as the *leaves*, as they advance in age. The *leaves* grow on short stalks. *Flowers* small, red, with entire ovate *petals*, and reddish *stamens*. *Anthers* yellow, as well as the short *style*, and the *stigma*, which last is flat at the top. *Seeds* two in each cell, ovate, yellowish, slightly rugged, shining, attached to the falcate *partition*.

2. Th. *arabicum*. Purple Arabian Penny-Cress. Vahl Symb. v. 2. 76. Willd. n. 2. (Th. humile, spicâ purpureâ; Buxb. Cent. 1. 2. t. 2. f. 1. Iberis arabica; Linn. Sp. Pl. 906. Am. Acad. v. 4. Subularia purpurea; Forsk. Ægypt.-Arab. 117.)—Pouch nearly orbicular, compressed, with a notch at each extremity. Lower leaves wedge-shaped; upper oblong-heartshaped, entire, clasping the stem.—Native of Arabia and Cappadocia.—The *root* is tapering, fibrous, annual. *Stem* more or less branched, round, smooth, from three to six inches high, leafy, corymbose. *Leaves* an inch long, acute, entire, smooth, rather succulent, slightly stalked. *Flowers* small, purple or reddish. *Pouch* light green, with a very broad striated border, much exceeding the *style*, and notched at the base as well as summit.

fummit. *Seeds* two in each cell. This fpecies appears nearly related to the foregoing, nor fhould we be greatly furprifed if they proved one and the fame. If Bauhin's delineation of the *pouch* of the former be correct, they muft be diftinct.

3. Th. *arvenfe*. Common Penny-Crefs, or Smooth Mithridate Muftard. Linn. Sp. Pl. 901. Willd. n. 3. Fl. Brit. n. 1. Prodr. Fl. Græc. n. 1. Engl. Bot. t. 1659. Curt. Lond. fafc. 6. t. 43. Fl. Dan. t. 793. (Th. Diofcoridis; Ger. Em. 262. Th. fecundum; Matth. Valgr. v. 1. 519. Camer. Epit. 337.)—Pouch orbicular, compreffed, entire at the bafe. Leaves oblong, toothed, fmooth.—Native of cultivated fields, in moft parts of Europe, but not frequent in England. It is annual, flowering in June and July. Dr. Sibthorp met with it in the countries north of Greece. The *root* is fmall, and tapering. Whole *plant* fmooth, about a foot high, branched; the *ftem* leafy, angular upwards. *Leaves* two or three inches long, clafping the ftem with their arrow-fhaped bafe; their edges wavy and toothed. *Flowers* numerous, fmall, white. *Pouch* large, erect, almoft perfectly orbicular. *Style* much fhorter than the notch in which it ftands. *Seeds* numerous. The warm pungent tafte of this plant is combined with a difagreeable garlick flavour. The *feeds*, as obferved in Engl. Bot. "make an ingredient in that naufeous opprobrium of pharmacy, the Mithridate Confection, the receipt for which may be found, with many excellent critical remarks, in Lewis's Difpenfatory." See MITHRIDATE.

4. Th. *alliaceum*. Garlick Baftard-Crefs. Linn. Sp. Pl. 901. Willd. n. 4. Ait. n. 2. Jacq. Ic. Rar. t. 121. (Th. allium redolens; Morif. fect. 3. t. 18. f. 28.)—Pouch nearly obovate, tumid, with a narrow border. Leaves oblong, obtufe, fmooth, fomewhat toothed.—Native of the fouth of Europe. An annual herb, much refembling the laft, but the *leaves* are blunter, and lefs toothed. The *pouches* are very different, having but a flight border at their upper part only, their bafe being wedge-fhaped.

5. Th. *Pfychine*. Long-ftyled Baftard-Crefs. Willd. n. 5. (Pfychine ftylofa; Desfont. Atlant. v. 2. 69. t. 148. Burfa paftoris hirfuta, erucæ flore, ftilo prominente; Shaw Afric. n. 91. f. 91.)—Pouch abrupt. Style prominent. Leaves heartfhaped-oblong, toothed, downy, clafping the ftem.—Native of the borders of fields in Barbary. *Root* annual. *Herb* larger than the foregoing, and clothed with hoary hairs. *Leaves* rounded, not acute, at the bafe. *Flowers* pale yellow, as large as the Common Muftard. *Pouch* wedge-fhaped, or triangular, being quite abrupt at the end; the *ftyle*, which is as long as the whole pouch, ftanding prominent at the fummit. Willdenow is certainly correct as to the genus.

6. Th. *faxatile*. Rock Baftard-Crefs. Linn. Sp. Pl. 901. Willd. n. 6. Jacq. Auftr. t. 236. (Lithothlafpi quartum, carnofo rotundo folio; Column. Ecphr. 279. t. 277. f. 2. Aethionema faxatile; Br. in Ait. Hort. Kew. v. 4. 80.)—Pouch nearly orbicular; concave above; convex below. Stems moftly fimple. Leaves linear-lanceolate, flefhy, obtufe.—Native of dry hills, and the clefts of rocks, in Italy, Auftria, Switzerland, Greece, and the fouth of France, flowering in April and May. The *root* is perennial, and in fome degree woody, though generally marked as annual. *Stems* annual, afcending, fix or eight inches high, round, leafy, rarely fubdivided. *Leaves* numerous, fcattered, on fhort ftalks, glaucous, fmooth, entire, three quarters of an inch long; the lower ones rather elliptical. *Flowers* fmall, pink, numerous, in denfe terminal *corymbs*, foon elongated into lax *clufters* of glaucous *pouches*, tinged with pink, each on a flender, fpreading, partial ftalk; their border broad, ftriated, fomewhat crenate, emarginate at the top only, where the minute *ftyle* is fituated. The fhrubby habit, glaucous hue, and very pretty little red *flowers* with a pale-green *calyx*, render this one of the moft elegant plants of its natural order. *Iberis faxatilis*, Linn. Sp. Pl. 905, diftinguifhed from this by the accurate Fabius Columna, and figured in the fame plate of his work, is fo like it, that they are hardly to be known afunder, except by the unequal *petals*, proper to *Iberis*, and the downinefs of this latter plant. On a clofe comparifon, the fhapes and furfaces of their *feed-veffels* will be found effentially different.

7. Th. *montanum*. Mountain Baftard-Crefs. Linn. Sp. Pl. 902. Willd. n. 9. Ait. n. 7. Jacq. Auftr. t. 237. (Th. montanum, burfæ paftoris fructu; Column. Ecphr. 275. t. 276. f. 1. Th. præcox; Wulf. in Jacq. Coll. v. 2. 124. t. 9. Lepidium n. 518; Hall. Hift. v. 1. 223.

β. Th. alpinum; Jacq. Auftr. t. 238. Willd. n. 10. Crantz Auftr. fafc. 1. 25. t. 3. f. 1. (Th. minimum; Arduin. Spec. 2. 33. t. 15. f. 2.)

Pouch inverfely heart-fhaped. Leaves fmooth, nearly entire; radical ones obovate, ftalked; the reft feffile, clafping the ftem. Petals thrice as long as the calyx. Stems fimple.—Native of ftony places, on the lofty mountains of Switzerland, Auftria, Dauphiny, and Italy, flowering in April or May. The *roots* are perennial, long, fubdivided at the fummit, each trailing fhoot crowned with a tuft of obovate *leaves*, rarely a little ferrated, their fize, and the length of their *footftalks*, varying according to luxuriance of foil, or a more or lefs elevated place of growth. From the centre of each tuft arifes a folitary, fimple, afcending or upright *ftem*, from three inches to a fpan long, round, fmooth, clothed with numerous, alternate, feffile, cordate or arrow-fhaped, very rarely toothed, *leaves*, whofe bafe is more or lefs elongated and acute; their length three quarters of an inch. *Flowers* in folitary terminal *corymbs*, numerous, large, white and handfome; their broad, obovate, fpreading *petals* at leaft thrice as long as the fmooth, often purplifh, *calyx*. *Pouch* tapering at the bafe; more or lefs deeply lobed at the end, with a *ftyle* almoft as long as itfelf, projecting far beyond the lobes. *Seeds* naturally two in each cell, as Jacquin defcribes them. Haller found one only. This may be accounted for from their being often abortive, as indeed are generally moft of the *pouches* themfelves, the plant increafing much by root. Having had occafion to ftudy this and the neighbouring fpecies very minutely, in our inveftigation of Swifs and Britifh plants, we can with confidence maintain the correctnefs of our fynonyms, on the authority of original fpecimens. Our β alone is entitled to be diftinguifhed as a variety, and that an infignificant one, being merely rendered fmall in fize by its very elevated or expofed fituation. The faithful Jacquin himfelf evidently miftrufted this fuppofed fpecies, though he fays it retained the fame habit when cultivated.

8. Th. *alpeftre*. Alpine Shepherd's Purfe. Linn. Sp. Pl. 903. Willd. n. 12. Fl. Brit. n. 5. Engl. Bot. t. 81. Ait. n. 6. (Th. foliis globulariæ; Raii Syn. ed. 2. 175. ed. 3. 305. Bauh. Hift. v. 2. 926. Th. montanum fecundum badenfe; Cluf. Hift. v. 2. 131. Th. albi fupini varietas; Ger. Em. 268. f. 2. Lepidium n. 519; Hall. Hift. v. 1. 223, on the authority of fpecimens from Davall and Du Cros.)—Pouch obovate, abrupt, fomewhat heartfhaped, with many feeds. Stem-leaves arrow-fhaped. Stems fimple. Style prominent.—Native of mountainous paftures in Switzerland and England, flowering in June and July. It abounds on limeftone rocks, and about lead-mines, in Yorkfhire and Derbyfhire. Many authors have confounded this

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[illegible] with the laſt, from which it differs in having a tufted *root*, not throwing out ſcyons, or runners; uſually taller and more numerous *ſtems*; more glaucous herbage; much ſmaller *flowers*, whoſe *petals* are erect, and though variable in dimenſions, never a quarter ſo large as in *montanum*; but above all, in having at leaſt three or four *ſeeds* in each cell. The *pouches* moreover are always numerous, and all perfect. Their terminal lobes are variable in length or dilatation, but conſtantly much ſhorter than the *ſtyle*. (See the following.) We have often been inclined to remove from this ſpecies to the foregoing the ſynonyms of Bauhin, Cluſius, and Gerarde, cited in *Fl. Brit.* on account of the large ſpreading *petals* of their figures. But this appears to be an inaccuracy on their part. The habit of their plant; ſeveral *ſtems* from the ſimple crown of the *root*; and the copious *pouches* in long continued *cluſters*, all properly belong to our *alpeſtre*, by no means to *montanum*. We have ſome ſuſpicion that the *alpeſtre* is rather biennial than perennial. It never remains long in gardens, but that is no proof, nor have we had an opportunity of watching the plant through a ſeaſon, on its own native hills. Hudſon miſtook the *perfoliatum*, next deſcribed, for *alpeſtre*.

9. Th. *perfoliatum*. Perfoliate Shepherd's Purſe. Linn. Sp. Pl. 902. Willd. n. 11. Fl. Brit. n. 4. Engl. Bot. t. 2354. Jacq. Auſtr. t. 337; not. 237, as in Willdenow. (Th. alterum mitius rotundifolium, burſæ paſtoris fructu; Column. Ecphr. 278. t. 276. f. 2. Th. rotundifolium; Ger. Em. 266. Th. cordatum minus, flore albo, inſipidum; Barrel. Ic. t. 815. Th. tertium pumilum; Cluſ. Hiſt. v. 2. 131. Th. minus Cluſii; Ger. Em. 268. Naſturtium n. 510; Hall. Hiſt. v. 1. 220. Piloſella ſiliquata; Thal. Harcyn. t. 7. f. C, at the end of Camer. Hort.)—Pouch exactly inverſely heart-ſhaped. Stem-leaves heart-ſhaped, ſharpiſh at the baſe, claſping the branched ſtem. Style very ſhort.—Native of calcareous paſtures or rocks, walls, and dry places, in Switzerland, Germany, France, Italy, Greece, and England, flowering in the ſpring. In the laſt-mentioned country it is hardly known any where but in the limeſtone part of Oxfordſhire, about Witney and Burford. We have gathered it at Caſerta, near Naples. The *root* is fibrous and annual. *Stem* branched from the bottom, except on poor ground, uſually from four to ſix inches high, round, ſmooth, leafy. *Leaves* glaucous, ſmooth, various in ſize, entire, or now and then ſlightly toothed; the radical ones ſtalked, ovate, obtuſe; the reſt ſeſſile, alternate. *Flowers* white, ſmall, with narrow, erect *petals*. *Style* ſo ſhort as to be ſcarcely diſcernible between the rounded lobes of the *pouch*. *Seeds* three or four, at leaſt, in each cell. The ſmall annual *root*, uſually branched *ſtem*, and minute *ſtyle*, are quite ſufficient to diſtinguiſh this ſpecies from the laſt, with which it has been confounded; nor is it difficult, with a moderate degree of obſervation, to avoid the error of thoſe old botaniſts, who deſcribed its ſtarved and luxuriant ſtates for diſtinct ſpecies. Ray ſuſpected this, and has adverted to it in his own ſecond edition of the *Synopſis*, by far the moſt exact, p. 176.

10. Th. *luteum*. Yellow Sicilian Shepherd's Purſe. Bivon. Cent. 1. 78. (" Th. montanum, glaſti folio, parvum, perfoliatum, nonnihil ſerratum, ſilicula cordatâ; Cupan. Panphyt. v. 2. t. 256. Th. montanum luteum, glaſti folio, parvum, perfoliatum, nonnihil ſerratum, ſiliculâ cordiformi; Cupan. Hort. Cathol. 212.")—Pouch inverſely heart-ſhaped, nearly orbicular. Leaves toothed, the lowermoſt ſtalked; the reſt claſping the ſtem. Style almoſt equal to the lobes of the ſeed-veſſel.—Native of dry mountainous places near Palermo, flowering in April and May, and ſent us by the baron Bivona. This is a ſmall, ſmooth, glaucous, annual *plant*, from one to three inches high. *Stem* erect, either ſimple, or branched from the baſe. *Leaves* half an inch, more or leſs, in length; the lower ones ſpatulate; the others ovate-oblong, bluntiſh, with a heart-ſhaped baſe; all having one or two large teeth at each ſide. *Flowers* remarkable for being yellow. They are ſmall, not many together, in ſhort terminal *corymbs*, becoming elongated *cluſters* of rather large, rounded, reticulated *pouches*, with a few *ſeeds* in each cell. The *petals* are emarginate, erect, longer than the *calyx*. *Stigma* large, on a level with the lobes of the pouch.

11. Th. *Burſa Paſtoris*. Common Shepherd's Purſe. Linn. Sp. Pl. 903. Willd. n. 13. Fl. Brit. n. 6. Prodr. Fl. Græc. n. 1499. Engl. Bot. t. 1485. Curt. Lond. faſc. 1. t. 50. (Burſa Paſtoris; Ger. Em. 276. Matth. Valgr. v. 1. 521.)—Hairy. Pouch inverſely heart-ſhaped, ſomewhat triangular, ſcarcely bordered. Radical leaves pinnatifid.—A very common weed in cultivated and waſte ground, throughout Europe, as well as in North America, and in moſt countries where European merchandiſe or cultivation has reached. We have already mentioned that this ſpecies is indubitably the θλασπι of Dioſcorides. It flowers at all times, from the beginning of ſpring to the end of autumn. The white tapering annual *root* is diſtinguiſhed by a very peculiar nauſeous ſmoke-like ſcent, when pulled out of the ground. Whole *herb* rough with ſtarry as well as prominent hairs. *Stem* various in height, erect, round, with alternate ſpreading *branches*, though ſometimes ſo ſtarved as to be quite ſimple and ſlender, with all the *leaves* of the plant undivided; in which ſtate the ſpecies is difficult to be recognized. The radical *leaves* are numerous, cloſe to the ground, variouſly pinnatifid, moſtly toothed, ſomewhat lyrate, about two or three inches long; the reſt linear-oblong, acute, ſeſſile, entire or toothed, embracing the ſtem with their elongated heart-ſhaped baſe. *Flowers* ſmall, white, in denſe *corymbs*, often tinged with purpliſh-brown. *Pouches* ſmooth, ſatchel-ſhaped, whence the modern name, diſpoſed in very long, lax, upright *cluſters*. *Style* rather prominent. *Seeds* numerous, ſmall, oval, a favourite food of ſmall birds, as well as the flower-buds. The flavour of both is warm and pungent.

12. Th. *ceratocarpon*. Horned Shepherd's Purſe. Murray in Comm. Goett. v. 5. 21. t. 1. Linn. Suppl. 295. Willd. n. 14. Ait. n. 3. Scop. Inſub. v. 1. 10. t. 4.)—Very ſmooth. Pouch obovate, tumid, with a terminal, double horn-like, compreſſed border. Leaves lanceolate, ſomewhat toothed; arrow-ſhaped at the baſe.—Native of Siberia, from whence Pallas brought the ſeeds. The *root* is annual, tapering. *Stem* ſolitary, erect, twelve or eighteen inches high, leafy, moſtly quite ſimple. *Leaves* all ſmooth, ſlightly toothed, or wavy; the radical ones obovate, on long ſtalks; the reſt ſeſſile. *Flowers* numerous, white, very ſmall. *Pouches* compoſing a long *cluſter*, very conſpicuous for their two ſharp prominent horns, between which ſtands the very ſhort *ſtyle*. *Seeds* large, about two in each cell.

THLASPIDIUM, θλασπιδιον of Cratevas, according to Tragus; a name whoſe etymology has been miſtaken, like Thlaspi, (ſee that article,) from whence it is manifeſtly derived. Tournefort, who in his *Inſtitutiones* 214, adopts this name, for what Linnæus more aptly termed *Biſcutella*, explains it as meaning that the plants which bore it were allied to *Thlaſpi*; and this, no doubt, is correct. But Ambroſini, who conſiders *Thlaſpi* itſelf as applying to the beaten or flattened form of the ſeed-veſſel, deduces the preſent word from θλαω, *to bruiſe* or *beat*, and ασπιδιον, *a little ſhield*, which is evidently applicable to the flat ſhield-like fruit of *Thlaſpi arvenſe*, and is ſo plauſible an explanation, that

that it feems to have chiefly led the modern expounders of ancient writers to take this fpecies for θλασπι of Diofcorides. We have already, in its proper place, fhewn our Shepherd's Purfe to be what he defcribes; and we can underftand the name, as derived from θλαω, in no other light, than alluding to the minute feeds, which feem as if beaten to powder. This is by no means the firft inftance, in which the moft apparently juft etymology, proves not to be the real one.

THLIBIÆ, in *Antiquity*, a kind of eunuchs. See Thlasias and Castration.

THLIPSIS, θλιψις, is ufed, by anatomifts, for the compreffion of any veffel or aperture, by which its cavity is leffened.

THNETOPSYCHITES, compofed of θνητος, *mortal*, and ψυχη, *foul*, in *Ecclefiaftical Hiftory*; a fect in the ancient church, who believed the foul of man perfectly like that of brutes; and taught that it died with the body. See Soul.

We meet with no account of thefe heretics any where but in J. Damafcenus Hæref. 90, unlefs they be the fame with thofe Eufebius fpeaks of, Hift. Ecclef. lib. ix. c. 38, who relates, that in Origen's time, there were heretics in Arabia, who taught, that the foul of man died with the body; but that it fhould rife again with it at the end of the world. He adds, that Origen refuted them in a numerous council, and reclaimed them from their errors. St. Auguftine and Ifidore call them the Arabian heretics.

Marfhall, in his tables, ufes the word *Thenopfychites* inftead of *Thnetopfychites*.

THOA, in *Botany*, a Guiana name adopted by Aublet, and retained by Juffieu, and even Schreber; fee our article Gnetum, to which genus this plant is there, for the firft time, referred, as a fecond fpecies.

THOALABIAN, in *Geography*, a town of Arabia, in the province of Nedsjed; 260 miles E.N.E. of Hajar.

THOANHOA, a town of Cochinchina, at the bottom of a large bay. N. lat. 16° 45′. E. long. 106° 27′.

THOARD, a town of France, in the department of the Lower Alps; 9 miles E.S.E. of Sifteron.

THOCO, an ifland in the Grecian Archipelago, near the coaft of Greece, about eight miles in circumference. N. lat. 37° 20′. E. long. 23° 21′.

THOCOS, θωκος, in *Antiquity*, the fame with *Thacas*.

THOGRAI, in *Biography*, a Perfian of Ifpahan, who was grand vizier to the fultan Malich Mafhud, is celebrated for his poetical talents, a fpecimen of which is given by Pococke; and for a commentary upon the republic of Plato, to whom the Saracens paid little attention. After a ftrange reverfe of fortune, Thograi was put to death by order of the fultan in the year 1121.

THOIRY, in *Geography*, a town of France, in the department of the Ain; 6 miles S.S.W. of Gex.

THOKES, in our *Old Writers*, fifh with broken bellies, forbid by ftatute to be mixed or packed with tale-fifh. 22 Ed. IV. cap. 2.

THOLEN, in *Geography*. See Tolen.

THOLES, in *Sea Language*, denote fmall pins driven perpendicularly into the upper edge of a boat. In rowing, the oar paffes between the two tholes, in the fpace called the *row-lock*. Sometimes there is only one pin to each oar, as in the boats navigated on the Mediterranean fea: in that cafe the oar is hung upon the pin by means of a ftrop.

THOMÆANS, Thomeans, Thomites, or *Chriftians of St. Thomas*, a people of the Eaft Indies, in Cochin, and upon the coaft of Malabar and Coromandel, who, according to tradition, received the Gofpel from the apoftle St. Thomas.

It appears by the teftimony of Cofmas, who wrote about A.D. 547, and whofe work is tranflated by F. Montfaucon, that Chriftianity was eftablifhed in India in the fixth century. We alfo find in the fubfcriptions of the council of Nice, that of a prelate, who calls himfelf bifhop of Perfia. Moreover, an ancient author, cited by Suidas, fays, that the inhabitants of Interior India, (a name which Cofmas gives to the coaft of Malabar,) the Iberians and Armenians, were baptized under the reign of Conftantine.

The princes of the country, and particularly Serant Peroumal, emperor of Malabar, the founder of the city of Calicut, A.D. 825, granted extraordinary privileges to thefe Chriftians.

When Vafco de Gama, the Portuguefe admiral, arrived at Cochin with a fleet, in the year 1502, thefe Chriftians fent deputies to him, imploring his protection, and that of the king his mafter. The admiral treated them kindly, but was in no condition to afford them any effectual affiftance, in relieving them from the yoke of the Pagan kings, to which they were then fubject. The language they ufe *in facris*, is the Syriac, or, as fome fay, the Chaldee; but their ordinary language is the fame with that of their neighbours. The firft miffionaries, who attempted to profelyte them to the church of Rome, were Cordeliers, but their endeavours proved ineffectual. The diftinguifhing opinions and religious rites of thefe Chriftians are as follow.

They are charged with an invincible attachment to the doctrine of Neftorius, and with an obftinate refufal to acknowledge, that the Virgin is the mother of God: they have no images in their churches: they believe that the fouls of the bleffed are not admitted into the prefence of God till after the day of univerfal judgment: they allow only of three facraments, *viz.* baptifm, orders, and the euchariſt: they defer the baptifm of infants for fome time, as for a month, or even for feven, eight, or ten years, after they are born: they make no ufe of holy oil, neither in baptifm, nor in the adminiftration of the other facraments; but after baptizing their infants, they fprinkle the oil of a fpecies of Indian faffron all over their bodies: they allow of no auricular confeffion, treat purgatory as a fable, and their priefts are permitted to marry: they entertain an extraordinary affection for the Neftorian patriarch of Babylon, but will not fuffer any mention of the pope, or of the Romifh churches in their affemblies. Their days of abftinence are Wednefday and Friday, and their faft is very fevere in Lent, during which time they go to church three times a day. They alfo faft in the fame manner during the time of Advent. Befides thefe two greater fafts, which are enjoined on pain of excommunication, they have feveral others of a religious nature. Their women do not enter a church for forty days after their delivery of a male child, nor for eighty days after the birth of a daughter.

Thefe Chriftians are in general poorly inftructed, knowing only the Lord's prayer and the angelical falutation. Their churches are mean and unadorned buildings, and conftructed after the manner of the pagodas. They appear to maintain many of the religious opinions and practices received among Proteftants, and reject either wholly, or in a very great meafure, thofe of the church of Rome. They deny the fupremacy of the pope, and tranfubftantiation, and exclude from the number of facraments, confirmation, extreme unction, and marriage. Such are the errors profcribed by the fynod of Diamper, held in 1599, by Aleixo de Menefes, archbifhop of Goa, in order to unite the Thomæans to the Romifh church. However, notwithftanding the temporary fuccefs that attended the vigorous exertions of the archbifhop, for which he was recompenfed after his return to Europe, with the archbifhopric of Braga, the viceroyfhip of of Portugal, and the presidency of the council of state at Madrid, these Christians, oppressed and abused by the Jesuits, relapsed from the church of Rome soon after the death of the archbishop; and notwithstanding the endeavours of Alexander VII. to conciliate them by the mission of four bare-footed Carmelites, they could no more be reduced to submission. At length, when the Dutch took Cochin, in 1663, the Christians of St. Thomas recovered the liberty which they had formerly enjoyed; but they derived little advantage besides from their new masters. Encyclopédie, and Geddes's History of the Church of Malabar and Synod of Diamper, in his Tracts, vol. v. For a further account of this sect, see CHRISTIANS *of St. Thomas*.

THOMAR, in *Geography*, a town of Portugal, in Estremadura, containing two churches, an hospital, four convents, and about 3600 inhabitants; 63 miles N.E. of Lisbon. N. lat. 39° 34'. W. long. 8° 8'.

THOMAS, surnamed *Didymus*, or the *Twin*, in *Scripture Biography*, one of our Lord's twelve apostles, of whom the evangelist John has given a short account in the 20th chapter of his Gospel. John Chrysostom informs us, that Thomas preached the gospel to the Ethiopians, Parthians, Persians, and Medes, and even, according to tradition, to the Indians, and in the island of Taprobana; and the Christians called after his name in the East, regard him as the founder of their church. See CHRISTIANS *of St. Thomas*, and THOMÆANS.

For an account of the spurious gospel attributed to St. Thomas, we refer to the article GOSPEL.

THOMAS, ANTONY LEONARD, in *Biography*, a distinguished French writer, was born in the diocese of Clermont, in Auvergne, in the year 1732, and designed for the profession of the law; but his attachment to literature induced him to prefer a professorship in the college of Beauvais. His reputation as a man of letters recommended him to the office of confidential secretary to the duke De Praslin, in which he conducted himself with integrity and honour. When he was advised by the duke to become a candidate for a seat in the French Academy, after having five times gained the prize for his compositions, and discovered that he was put forward as a competitor to Marmontel, who was out of favour with persons in power, he refused to be the instrument of such a design. In consequence of this circumstance, the duke dismissed him his office, but procured for him the place of secretary-interpreter for the Swiss Cantons, to which a very inconsiderable salary was annexed; and yet this was the whole benefit which he obtained from court-favour. His career as a writer commenced in 1756, by "Reflections historical and literary on Voltaire's Poem on Natural Religion;" and on all subsequent occasions he proved himself the friend of virtue, and a lover of mankind. His eulogies, particularly those on Des Cartes and Marcus Aurelius, were highly commended. His "Essai sur les Charactères, les Mœurs, et l'Esprit des Femmes," 1772, is a sprightly performance, in which fine writing and philosophical observation are combined. His "Essai sur les Eloges," in 2 vols. 1775, exhibits striking portraits with just ideas. As a poet, he appears to advantage in his "Epitre au Peuple," his "Ode sur les Temps," and his "Poeme de Jumonville." His epic poem, entitled "Le Petreide," the hero of which was czar Peter, was left unfinished. He was distinguished by his singularities, and also by his sympathy with persons in distress, for whose relief he submitted to personal inconvenience and privation. His death took place at the seat of the archbishop of Lyons, in September 1785, at the age of 53. His works, in prose and verse, were published at Paris, in 7 vols. 8vo. Gen. Biog.

THOMAS, CHRISTIAN, an Eclectic philosopher of the German schools, who deserves notice on account of the boldness with which he threw off the yoke of human authority, and the perseverance with which, against much opposition, and in many vicissitudes of fortune, he maintained and exercised the right of free inquiry. He was born at Leipsic in the year 1655, and finished his course of education in the university of his native city. Upon a perusal of Puffendorf's Apology for rejecting the scholastic principles of morals and law, he renounced implicit deference to all ancient dogmas; and engaged in reading lectures on the subject of natural law, first from the text of Grotius, and afterwards from that of Puffendorf, in the full exercise of his own judgment, with prudent caution while his father lived, but after his death, with a boldness which incurred the violent resentment of theologians and professors. In 1687 he published an "Introduction to Puffendorf," in which he deduced the obligation of morality from natural principles, and thus gave great offence. In the following year he became still more unpopular, by commencing a monthly literary journal, entitled "Free Thoughts; or, Monthly Dialogues on various Books, chiefly new," containing a severe attack upon many of his contemporaries. Complaints of the raillery of this satirical work were lodged before the ecclesiastical court of Dresden; and Thomas with difficulty escaped punishment. Some other sarcastical pieces inflamed the resentment of his enemies, and he was charged before the same court by the clergy of Leipsic with a contempt of religion. Soon after he published another satirical work "On the Divine Right of Kings," "A Defence of the Sect of the Pictists," and some other eccentric works of the same general character, for which he was threatened with imprisonment; but obtaining permission from the elector of Brandenburgh to retire, he became a voluntary exile from Leipsic: and soon after was appointed public professor of jurisprudence, first in Berlin, and afterwards at Halle. In these situations he indulged his satirical humour, and his inclination for controversy, as long as he lived; persevering in his endeavours to correct and subdue the prejudices of mankind, and to improve the state of philosophy. He died at Halle, in the year 1728. Thomas was the author of several treatises on logic, morals, and jurisprudence, in which he deviates from opinions generally received; and his latter publications are, in many respects, inconsistent with the former. His principal philosophical works are, "An Introduction to Aulic Philosophy; or Outlines of the Art of Thinking and Reasoning," Leipf. 1688; "Introduction to Rational Philosophy;" "A Logical Praxis," Hal. 1691; "Introduction to Moral Philosophy," 1692; "A Cure for irregular Passions, and the Doctrine of Self-knowledge," 1696; "The new Art of discovering the secret Thoughts of Men;" "Divine Jurisprudence;" "Foundations of the Law of Nature and Nations;" "Dissertation on the Crime of Magic;" "Essay on the Nature and Essence of Spirit, or Principles of Natural and Moral Science," 1699; and "History of Wisdom and Folly."

As a specimen of the peculiar tenets and maxims of this eccentric philosopher, we shall subjoin the following.

"Thought arises from images impressed upon the brain; and the action of thinking is performed in the whole brain. Brutes are destitute of sensation. Man is a corporeal substance, capable of thinking and moving, or endued with intellect and will. Man does not always think. Truth is the agreement of thought with the nature of things. The senses are not deceitful, but all fallacy is the effect of precipitation and prejudice. From perceptions arise ideas, and their relations; and from these, reasonings. It is impossible to to difcover truth by the fyllogiftic art. No other rule is neceffary in reafoning, than that of following the natural order of inveftigation; beginning from thofe things which are beft known, and proceeding, by eafy fteps, to thofe which are more difficult.

"Perception is a paffive affection, produced by fome external object, either in the intellectual fenfe, or in the inclination of the will. Effence is that without which a thing cannot be perceived. God is not perceived by the intellectual fenfe, but by the inclination of the will: for creatures affect the brain; but God, the heart. All creatures are in God: nothing is exterior to him. Creation i extenfion produced from nothing by the divine power. Creatures are of two kinds, paffive and active; the former is matter; the latter, fpirit. Matter is dark and cold, and capable of being acted upon by fpirit, which is light, warm, and active. Spirit may fubfift without matter, but defires a union with it. All bodies confift of matter and fpirit, and have therefore fome kind of life. Spirit attracts fpirit, and thus fenfibly operates upon matter united to fpirit. This attraction in man is called love; in other bodies, fympathy. A finite fpirit may be confidered as a limited fphere in which rays, luminous, warm, and active, flow from a centre. Spirit is the region of the body to which it is united. The region of finite fpirits is God. The human foul is a ray from the divine nature; whence it defires union with God, who is love. Since the effence of fpirit confifts in action, and of body in paffion, fpirit may exift without thought: of this kind are light, ether, and other active principles in nature.

"Good confifts in the harmony of other things with man and his feveral powers. The higheft felicity of man confifts in tranquil delight. The fountain of this delight is the rational love of man and of God. Internal love and reverence are all the homage which nature teaches us to pay to God. With refpect to God, the two capital errors are atheifm and fuperftition. Superftition is worfe than atheifm. The love of God is a fupernatural affection, which prepares the foul for future felicity. The rational love of man comprehends all focial virtues. Rational felf-love includes felf-prefervation, temperance, purity, induftry, fortitude. To wife men, virtue is its own reward. Laws are appointed for the fake of fools, to conduct them to internal tranquillity, and external peace. Of fools, there are three claffes; thofe who difturb external peace; thofe who do nothing to promote it; and thofe who do not enjoy internal peace. The firft have need of authority; the fecond of authority and counfel; the third of counfel alone. The obligation of authority and law extends only to external actions, which are juft when they are conformable to law: juftice is therefore to be diftinguifhed from virtue, which refpects the internal man, and requires a conformity to the law of nature." Brucker by Enfield, vol. ii.

THOMAS. *Chriftians of St. Thomas.* See THOMÆANS.

THOMAS'*s Hofpital.* See HOSPITAL.

THOMAS, *St.*, in *Geography*, an ifland of the Atlantic, near the coaft of Guinea, fituated on the equinoctial line, of a circular form, about ten leagues in circumference, difcovered by the Portuguefe in the year 1640. The climate is infalubrious, and at fome feafons of the year the fky is even darkened by thick fogs, which are difperfed by the winds that blow in the months of July and Auguft. In this ifland the inhabitants have two winters, like thofe of other places that are under the fame parallel, but without the cold that diftinguifhes that feafon in Europe. The rains continue from December to February; and fpring begins with our fummer, in the month of May. During the firft three months of this period, the heat is infupportable, and the firft fettiers gradually inured themfelves to the climate. The foil on this ifland is vifcous and clayey, and mixed with chalk; but it is rendered fertile by the heavy night dews. The plants and fhrubs, which it rapidly produces, are burnt to afhes, and applied as the moft beneficial manure to fugar-canes; which were firft planted here by the Portuguefe: in their endeavours to cultivate which they have been difappointed. Rice and millet fucceed, and vines of the richeft kind, as well as melons, cucumbers, figs, ginger, and all forts of roots, pulfe, and pot-herbs, are cheaply reared, and they arrive at the utmoft perfection. Yams are in this ifland a very wholefome and delicious diet. The land of this ifland is well watered, and much fertilized by its rivers and ftreams. In the centre is a high mountain, covered with wood and fruit-trees, whofe fummit is neverthelefs always covered with fnow. Its quadrupeds, birds, and fifhes, are very various, and abundant; and St. Thomas would be equal to any fpot in the globe, if its temperature correfponded to its other qualities. The inhabitants are the defcendants of the Portuguefe firft fettlers and the negroes, who are retained in the fervice of Europeans, and fuch as prefer a refidence here to Angola. They are for the moft part Roman Catholics, and extremely ignorant, fuperftitious, and bigotted. The ecclefiaftical government is under the direction of the bifhop, who is a fuffragan of the archbifhop of Lifbon. E. long. 8° 6'.—Alfo, a town of Hindooftan, on the coaft of Coromandel. Here was formerly a powerful city, called "Meliapour," or "Meilabour," the capital of the kingdom of Coromandel; but on the ruins of this city the Portuguefe erected the ftately city of St. Thomas. This is inhabited chiefly by weavers and dyers, who manufacture the beft coloured ftuffs in India. The Portuguefe, who rebuilt this place in 1545, have raifed it from a ftate of defolation to a flourifhing ftate, both with regard to its buildings and inhabitants. Whilft the Portuguefe retained it, it was a bifhopric under the archbifhop of Goa; and they had feveral churches, befides monafteries, and a college for the inftruction of the Portuguefe and Malabar children. Here is alfo the famous church of St. Thomas the Apoftle, where it is pretended that he was buried. (See THOMÆANS, and CHRISTIANS *of St. Thomas.*) The city had feven gates, and was, on account of its fituation, guarded by the fea on one fide, and a chain of mountains on the other, very ftrong: neverthelefs it was taken by the Moors after a long fiege, and retained in their poffeffion.—Alfo, a town of Germany, in the archduchy of Auftria; 6 miles N.W. of Grein.—Alfo, a town of Savoy, in the county of Maurienne; 3 miles N. of Monftier.—Alfo, the principal of the Virgin Iflands, in the Weft Indies, about fix leagues in circumference, belonging to the Danes. It abounds with potatoes, millet, manioc, and moft forts of fruits and herbage, and efpecially fugar and tobacco, but is much expofed to the attacks of mofquitos and other vermin. The Englifh had formerly a fpacious fettlement in this ifland; and here is a fafe and commodious harbour, with two natural mounds upon it, fitted for the reception of two batteries to guard its entrance. Nearly in the centre of the harbour is a fmall fort; and about 50 or 60 paces W. of it is the town, confifting chiefly of one long ftreet, at the end of which is the Danifh factory, with convenient warehoufes. On the right fide of this factory is the Brandenburgh quarter, containing two fmall ftreets, full of French refugees from Europe and the iflands. Moft of the houfes are built of brick, and one ftory high. The trade of this fmall ifland is confiderable, particularly in time of peace; as it is the ftaple for fuch articles of traffic as the French, Englifh, Dutch, and Spaniards are not allowed to deal in publicly in their own iflands; and

 in

in war, their privateers bring their prizes hither for sale. N. lat. 18° 22′. W. long. 64° 50′.—Alfo, the capital of Spanifh Guiana, called "San Tomé," which is fituated at the foot of a fmall mountain on the right bank of the Oronoko. For its defence, a fort is placed oppofite to the city and on the left bank of the river; it is furrounded by a number of houfes, dependent, like the fort, on the province of Guiana. They call this place Port Raphael; and it is here the communication between Guiana and the provinces of Venezuela and Comana is found. Between Port Raphael and the city is feen the ifland called "Del Medio," or the Middle, becaufe it is in the middle of the river. It is a rock, which, in its fouthern part, difcovers itfelf in fummer, and is under water in floods. The principal channel is between the city and this ifland: when the water is low it has 200 feet, and on the increafe of the river 50 or 60 more.—Alfo, a town of the United States of America, in South Carolina; 21 miles N. of Charleftown.—Alfo, a town of the ifland of Cuba; 130 miles W.S.W. of Havannah.

THOMAS *de Caftile*, *St.*, a town of North America, in the government of Mexico, and province of Guatimala.

THOMAS's *Bay*, a bay on the W. coaft of Antigua.

THOMAS's *Creek*, a river of South Carolina, which runs into the Great Pedee.

THOMAS's *Gulf*, *St.*, a bay of the Atlantic, on the W. coaft of Africa. S. lat. 24° 50′.

THOMAS's *Head*, *St.*, a cape of England, on the N.W. coaft of the county of Somerfet, at the mouth of the Severn. N. lat. 51° 20′. W. long. 73° 35′.

THOMAS's *Hofpital*. See HOSPITAL.

THOMASBRUCK, in *Geography*. See THAMSBRUCK.

THOMASIUS, JACOBUS, in *Biography*, a writer in hiftory and philofophy, profeffor of eloquence in the univerfity of Leipfic, and chiefly diftinguifhed as the preceptor of the illuftrious Leibnitz, was born at Leipfic in the year 1622. Having obtained diftinction by his lectures and public thefes in his native city, he was advanced to the office of co-rector, firft of the college of St. Nicholas, and afterwards of that of St. Thomas. His erudition was extenfive, nor was he lefs diftinguifhed by his modefty and by his difinclination to controverfy. Among his numerous works, the principal are "Antiquities of Philofophical and Ecclefiaftical Hiftory:" "Differtations on the Stoical Philofophy, and on other Subjects relating to the Hiftory of Philofophy;" and "A Differtation on Literary Plagiarifm, with a Lift of 100 Plagiaries," all in Latin. He died in the year 1684. Brucker. Moreri.

THOMASIUS, CHRISTIAN, fon of the preceding, an eminent jurift, was born at Leipfic in 1655. Having ftudied the law at Francfort on the Oder, he was made a doctor in that faculty in 1679; and returning to his native city, he attended the bar, and wrote fome treatifes on the law. He was the friend of Puffendorf. By oppofing the fcholaftic philofophy in a German journal, commenced in 1688, he excited oppofition, and raifed againft himfelf many enemies. Many circumftances occurred which increafed the number of his adverfaries, and at length he was denounced to the court of Drefden as a heretic and Calvinift. The dread of perfecution induced him to withdraw to Berlin, and the king of Pruffia offered him an afylum at Halle, where he intended to found an univerfity. In this inftitution he occupied the fecond chair of law, and on the death of Stryckius, in 1710, he was advanced to the firft chair. In 1713 he defended concubinage, and being denounced for this opinion by the theological faculty of Halle, orders were iffued for proceeding againft him criminally. But upon the examination of his thefes, by commiffioners, the proceedings againft him were ftopped. The difpute, however, continued; neverthelefs he rofe to the poft of privy-counfellor to the king, and director of the univerfity of Halle, and died in 1728. Mofheim has given this character of Thomafius. "His views were vaft; he aimed at the reformation of philofophy in general, and of the Peripatetic fyftem in particular; and he affiduoufly employed both the power of exhortation and the influence of example, in order to perfuade the Saxons to reject the Ariftotelian fyftem, which he had never read, and which moft certainly he did not underftand. The fcheme of philofophy which he fubftituted in its place was received with little applaufe, and foon funk into oblivion; but his attempt to overturn the fyftem of the Peripatetics, and to reftore the freedom of philofophical inquiry, was attended with remarkable fuccefs, made in a little time the moft rapid progrefs, and produced fuch admirable effects, that Thomafius is looked upon, to this day, as the chief of thofe bold fpirits who pulled down philofophical tyranny from its throne in Germany, and gave a mortal blow to what was called the Sectarian philofophy in that country." Mofheim's Eccl. Hift. Moreri.

THOMASSIN, LOUIS, an ecclefiaftical writer, was born at Aix, in Provence, in 1619, and was admitted into the congregation of the Oratory in the fourteenth year of his age. He afterwards became profeffor of theology at Saumur, and laying afide fcholaftic fubtleties, adopted the method of teaching by the fcriptures, fathers, and councils: and in 1654 he was called to the feminary of St. Magloire at Paris. His "Latin Differtations on the Councils," were publifhed by the defire of the archbifhop of Paris, of which the firft and only volume appeared in 1667, 4to. In the following year he publifhed "Memoires fur la Grace," 3 vols, 8vo., in which work he attempts to conciliate the Greek fathers with St. Auguftine. This was reprinted in 1682, with the addition of two memoirs. In 1678 he publifhed the firft volume of a work, entitled "De la Difcipline Ecclefiaftique," which was followed by a fecond volume in 1679, and a third in 1681. This work was tranflated into Latin, in 3 vols. fol. from refpect to pope Innocent XI. and for the advantage of more unlimited circulation. His other works, which we can merely enumerate, were "Dogmata Theologica," 3 vols. 1680–89; "The Difcipline of the Church and Chriftian Morality;" "On the Divine Service;" "On Feftivals;" "On Fafts;" "On Truth and Falfehood;" "On the Unity of the Church;" "On Alms, Trade, and Ufury;" "Methode d'enfeigner chretiennement la Grammaire, ou les Langues par rapport a l'Ecriture Sainte," 2 vols. 8vo.; and "Gloffaire univerfelle Hebraique," which latter appeared after his death in 1697, folio.

Thomaffin died in the year 1695, having for fome time enjoyed a penfion of 1000 livres granted to him by the French clergy, and of which he gave one half to the poor. One of his biographers characterifes him as "humble, modeft, and mild, fond of ftudy and retirement, and fhunning difputes."—Although his reading was extenfive, his erudition was not of the higheft clafs, and it is faid that his work on Difcipline contains many miftakes where Greek authors are cited. Moreri. Gen. Biog.

THOMASTOWN, in *Geography*, a poft-town of the county of Kilkenny, Ireland, fituate on the river Nore, over which it has a fine bridge. The caftle was built about 1180, by Thomas Fitzanthony, from whom the town takes its Irifh name of *Bally-mac-Andan*; *i.e.* town of Anthony. It was a borough, and fent two members to parliament, but loft that privilege by the Union. The Nore is navigable to this town for ſmall veſſels. It is 59 miles S.S.W. from Dublin, and $15\frac{1}{2}$ N. from Waterford.

Thomastown, a poſt-town of the United States, in the diſtrict of Maine, and county of Lincoln, containing 2100 inhabitants.

THOMISM, or Thomaism, the doctrine of St. Thomas Aquinas, and his followers the Thomiſts, chiefly with regard to predeſtination and grace. See his biographical article.

There is ſome doubt what the true, genuine Thomiſm is: the Dominicans pretend to hold pure Thomiſm; but there are other authors who diſtinguiſh the Thomiſm of St. Thomas from that of the Dominicans.

Others, again, make Thomiſm no other than a kind of Janſeniſm diſguiſed; but Janſeniſm, we know, has been condemned by the popes, which pure Thomiſm never was.

In effect, the writings of Alvarez and Lemos, who were appointed, by their order, to lay down and defend before the holy ſee, the dogmata of their ſchool, have ſince been reputed the rule of pure Thomiſm.

Thoſe two authors diſtinguiſh four claſſes of Thomiſts: the firſt, which they reject, deſtroys or takes away liberty; the ſecond and third do not differ from Molina. The laſt, which Alvarez embraces, admits a phyſical premotion, or predetermination, which is a complement of the active power, by which it paſſes from the firſt act to the ſecond; that is, from complete and next power to action.

This premotion, they hold, is offered in ſufficient grace: ſufficient grace is given to all men; and that they have a complete, independent, next power not to act, and even to reject the moſt efficacious grace.

THOMISTS, a ſect of ſchool divines, who maintain Thomiſm.

The avowed antagoniſts of the Thomiſts are the Scotiſts.

THOMITES. See Thomæans.

THOMMDAMM, in *Geography*, a town of the duchy of Saxe Lauenburg, on the Elbe; 25 miles S.E. of Lauenburg.

THOMPSON, *Sir* Benjamin, *Count of Rumford*, in *Biography*, diſtinguiſhed by his aſſiduity and zeal in the promotion of ſcience, and in deviſing and executing ſchemes of public utility, was born at the village of Rumford, in New England, in the year 1752; and with the aſſiſtance afforded him by a profeſſor of natural philoſophy in the American univerſity of Cambridge, acquired in early life ſuch a degree of knowledge as enabled him to give inſtruction to others. By an advantageous marriage, while he was young, his advancement was accelerated, ſo that he obtained the rank of a major in the militia of his native diſtrict. When the war broke out between the mother-country and her colonies, he took part with the former, and by means of his local knowledge, he rendered himſelf uſeful to the Britiſh generals in America. In proceſs of time he repaired to England, and recommending himſelf to lord George Germaine, the chief miniſter in the American department, he obtained a place in his office. Towards the cloſe of the war, the ſame nobleman, with a view of ſecuring for him a permanent proviſion, ſent him to New York, where he raiſed a regiment of dragoons, and by being appointed lieutenant-colonel, became entitled to half-pay. Upon his return to England, his majeſty, in 1784, conferred upon him the honour of knighthood; and for ſome time he occupied the poſt of one of the under-ſecretaries of ſtate. Soon after he made a tour to the continent, and being warmly recommended by the prince of Deux-Ponts, afterward king of Bavaria, to his relation the reigning elector-palatine, and duke of Bavaria, he was admitted into his ſervice, and occupied an eminent ſtation. He had thus an opportunity of effecting many important and uſeful reforms in the departments of the ſtate, both civil and military. His attention was at this time particularly directed to the ſuppreſſion of mendicity, which prevailed not only at Munich, the capital, but through the whole country, to an extent that rendered the reſtraint and abolition of it a very difficult and hazardous undertaking. With this view he formed a plan for employing all mendicants; and having provided a building for their reception, and materials for their labour, he ſallied forth into the ſtreets of the city on the 1ſt of January 1790 (New-year's day being ſet apart for giving alms in Bavaria), accompanied by the field-officers of the garriſon and the magiſtrates of the city; and arreſting with his own hand the firſt beggar that came in his way, his attendants followed his example, ſo that before night not a ſingle beggar was to be ſeen in the whole metropolis. Thoſe that were arreſted were conducted to the town-hall, where their names were inſcribed, and then ordered to repair to the work-houſe, where they would find employment, and a ſufficiency of wholeſome food. In conſequence of theſe prompt and vigorous meaſures, the evil was redreſſed, and the mendicants were led by habit to prefer induſtry to idleneſs, and decency to the filth, rags, and ſqualid wretchedneſs attendant on beggary. He alſo introduced into Bavaria the culture and uſe of potatoes. For all theſe ſervices ſir Benjamin was decorated by the Bavarian ſovereign with ſeveral orders, promoted to the rank of lieutenant-general, and created a count by the title of his native place, Rumford. During his abode at Munich, he commenced his experiments upon the improvement of fire-places, with reſpect to the economy of fuel, and the convenience of cooking; and alſo his plans for a cheaper and more nutritive mode of feeding the poor, which gave him peculiar celebrity. Having quitted Bavaria in 1799, he reſided for ſome time in this country, purſuing a variety of experiments on the nature and application of heat, and the conſtruction of chimneys, grates, and fire-places. He alſo promoted ſcience both by his own reſearches and experiments, and by liberally exciting emulation in others, upon a more enlarged plan. For the latter purpoſe, he transferred, on an occaſional viſit to this country in 1796, to the Royal Society of London, of which he was a member, 1000*l.* 3 *per cent.* ſtock, the intereſt of which was to be applied every ſecond year as a premium to the author of the moſt important diſcovery on the ſubjects of heat and light in any part of Europe during the two preceding years; the preference to be always given to ſuch diſcoveries as, in the opinion of the preſident and council, tend moſt to the benefit of mankind; which indeed was the leading object of all his reſearches. He alſo ſuggeſted the plan, and aſſiſted in the formation of the Royal Inſtitution, which has produced ſeveral other eſtabliſhments of a ſimilar nature.

In the year 1802 he left England for Paris, which became his fixed reſidence, and where he married the widow of the celebrated chemiſt, Lavoiſier; but this connection proving unhappy, it was ſoon terminated by a ſeparation. The count afterwards retired to a country-houſe at Auteuil, about four miles from Paris, which he rendered a delightful habitation. Beſides the improvement of his grounds, in which he took great pleaſure, he purſued a variety of philoſophical and mechanical reſearches. With his ſuperior talents he combined certain peculiarities, and a tenacіouſneſs, not to call it obſtinacy, of temper, which prevented his enjoying the pleaſures of ſocial intercourſe. Although he diſapproved both the character and politics of the French, he preferred their climate to every other; and he obtained permiſſion from the king of Bavaria to continue in France, and to enjoy his penſion of 1200*l.* a-year. He lived in a ſtate of retirement, and alſo in a courſe of abſtemiouſneſs, which

which debilitated his conftitution, and rendered it incapable of refifting an attack of low fever, by which he was carried off in Auguft 1814, in his 63d year. By his firft wife he had one daughter, now refident at Bofton.

Although count Rumford was not a learned man, he acquired by his knowledge of the French and German languages, and by his extenfive acquaintance, and frequent converfation with literary men, a large ftock of literature and fcience. His peculiar talent was that of contriving inftruments, and devifing experiments for facilitating his refearches in thofe branches of economics and fcientific philofophy to which his attention was directed. He was alfo diftinguifhed by a fteadinefs and perfeverance of purfuit, which were favourable to his attainment of the objects which he had in view. As to his perfon, his ftature was above the middle fize, his countenance was dignified and pleafing, and his manner and tone of voice mild and gentle. He was, neverthelefs, ambitious of diftinction, and too prone to dictate in tranfactions with regard to which other perfons were jointly concerned with himfelf. The papers which he communicated both to the Royal Society and French Inftitute, and which are publifhed in their Tranfactions and Memoirs, are numerous. The only feparate publication of count Rumford was a feries of "Effays, Experimental, Political, Economical, and Philofophical," commencing with the year 1796, and continued to 18 in number, and occupying 4 vols. 8vo. Gent. Mag. for October 1814.

THOMPSON, in *Geography*, a town of America, in the ftate of New York, the capital of Sullivan county; bounded N. by Wawerfing and Neverfink, E. by Mamakating, S. by Deerpark in Orange county, and W. by the Mongaup, which feparates it from Lumberland, Bethel, and Liberty. Its length N. and S. is about 34 miles, and breadth 12. The principal fettlements are Thompfon, Monticello, Bridgeville, and Concord. The whole area of Thompfon is 139,500 acres; and the population by the cenfus of 1810, confifted of 1290 perfons. The principal ftreams are the Neverfink, Mongaup, and Sheldrake.—Alfo, a townfhip of Connecticut, in the county of Windham; 20 miles N.N.E. of Windham: the place contains 2467 inhabitants.

THOMPSON'S *Creek*, a river of South Carolina, which runs into the Atlantic, N. lat. 34° 44′. W. long. 79° 46′.—Alfo, a river of Weft Florida, which runs into the Miffiffippi, N. lat. 30° 59′. W. long. 91° 30′.

THOMPSON'S *Harbour*, a harbour in Hudfon's Bay. N. lat. 60° 20′. W. long. 78°.

THOMPSON'S *Ifland*, a fmall ifland of Upper Canada, at the entrance of the river St. Claire.

THOMPSONSBOROUGH, a town of America, in the diftrict of Maine; 30 miles N.E. of Portland.

THOMSI, a town of Hungary; 11 miles S.W. of Canifcha.

THOMSON, JAMES, in *Biography*, a popular Englifh poet, was born at Ednam, near Kelfo, in Scotland, in the year 1700, being one of the nine children of the minifter of that place. Whilft he was at fchool at Jedburgh, he manifefted no powers fuperior to thofe of other boys, except in a tafte for poetry, which he betimes indulged, and which introduced him, during his vacations, to the fociety of fome neighbouring gentlemen. Of his productions, however, he thought fo humbly, that on New-year's day he committed to the flames thofe of each preceding year. From Jedburgh he was removed to the univerfity of Edinburgh, where he perfevered in the cultivation and exercife of his poetical talents; but upon the death of his father, he complied with the wifhes of his friends by entering on a courfe of divinity. His probationary exercife was the explanation of a pfalm, which was written in a ftyle fo fplendid, as to incur reproof from the theological profeffor, as being altogether unfuitable to the audience which might probably attend his future miniftry. Having no great inclination for the office, this admonition induced him to devote himfelf entirely to poetry: and after fpending fome time as private tutor in the family of lord Binning, he determined, at the fuggeftion of a lady, who was his mother's friend, to try his fortune in London. In 1725 he came to London, and meeting with his college acquaintance Mallet, he fhewed him his poem of "Winter," in an imperfect ftate; who advifed him to finifh and publifh it. Mr. Millar, a well-known London bookfeller, bought it for a fmall fum, and publifhed it in 1726. At firft it attracted little attention; but Mr. Whateley, a gentleman of acknowledged tafte, giving a favourable account of it, brought the poem and its author into notice. The author was introduced to Pope, and recommended by bifhop Rundle to lord chancellor Talbot. In 1727 he publifhed his "Summer," and in the fame year "A Poem facred to the Memory of Sir Ifaac Newton," juft deceafed, and alfo his "Britannia." His "Spring" was publifhed in 1728; and in 1730 the Seafons were completed by "Autumn," and publifhed collectively. In 1728 Thomfon, afpiring to the popularity and emolument of dramatic compofition, fucceeded in introducing upon the ftage of Drury-lane his tragedy of "Sophonifba." Its reception, however, was not very flattering. Soon after he was appointed, by the recommendation of Dr. Rundle, travelling companion to the Hon. Mr. Talbot, the eldeft fon of the chancellor, and had an opportunity of vifiting moft of the courts and countries of the European continent. During this tour, the idea of his poem on "Liberty" was fuggefted to him, and he employed two years in completing it. In confequence of this excurfion, he obtained, by the intereft of Mr. Talbot, the place of fecretary of the briefs, which, being almoft a finecure, afforded him leifure for his private literary purfuits. His poem on "Liberty" was more coolly received than the nature of the fubject led him to expect. When lord Hardwick fucceeded the lord chancellor Talbot, Thomfon loft his place; but upon being queftioned by the prince of Wales, to whom he was introduced, by Mr. (afterwards lord) Lyttelton, as to his circumftances, a penfion of 100*l.* a year was granted to him.

Upon the introduction of his fecond tragedy, "Agamemnon," to Drury-lane, in 1738, he was fo anxious concerning its fuccefs, that he is faid to have been thrown into a copious perfpiration. His "Edward and Eleonora" was prevented from appearing by the interference of the lord chamberlain. The "Mafque of Alfred," performed before the prince at Cliefden-houfe, in 1740, was the joint production of himfelf and Mallet; and in this piece was introduced the famous fong of "Rule Britannia," the production of one or other of thefe two perfons. The moft fuccefsful of Thomfon's dramatic pieces was his "Tancred and Sigifmunda," which appeared at Drury-lane in 1745; but his "crowning performance," as one of his biographers calls it, was "The Caftle of Indolence," publifhed in 1746. Our poet was now rendered independent by the intereft of Mr. Lyttelton, who obtained for him the office of furveyor-general of the Leeward iflands, which, after payment of a deputy, yielded him about 300*l.* a year. Death, however, in confequence of a fever occafioned by a cold, deprived him, in Auguft 1748, of the comparative affluence derived from this appointment. His remains were interred in Richmond church, without any memorial; but in 1762 a monument was erected in Weftminfter Abbey, the expence of which was defrayed out of the profits of an edition of his works, publifhed by

Mr

Mr. Millar. His "Coriolanus" was brought on the ſtage by his executors, in 1749, for the benefit of the ſurviving branches of his family. The prologue, compoſed by Lyttelton, was very feelingly delivered by Quin, the intimate friend of Thomſon.

Thomſon's perſon was large and awkward, and his countenance unanimated; nor did his appearance or manners indicate genius or refinement. With ſelect friends, however, he was eaſy and cheerful, and univerſally beloved for the kindneſs of his heart, and freedom from thoſe paſſions that ſometimes diſgrace men of literary character. He was indolent and ſelf-indulgent in his habits; although "no poet," as his biographer ſays, "has deſerved more praiſe for the moral tenor of his writings. Unbounded philanthropy, enlarged ideas of the dignity of man, and of his rights, love of virtue, public and private, and a devotional ſpirit, narrowed by no views of ſect or party, give ſoul to his verſe when not merely deſcriptive; but no one can riſe from the peruſal of his pages without melioration of his principles or feelings." His poetical merit is moſt conſpicuous in his "Seaſons," and though Dr. Johnſon charges it with a defect of method, yet as a hiſtory of the year through its changes, depending upon the viciſſitude of the ſeaſons, it adheres ſufficiently to its general plan for preſerving a continuity of ſubject, with due allowances for the moral and philoſophical digreſſions by which it is varied. Its diction, though ſomewhat laboured, is energetic and expreſſive. Its verſification, though it does not indicate a nice ear, is ſeldom unpleaſantly harſh. Upon the whole, continues the biographer now cited, "ſcarcely any poem has been more, and more deſervedly, popular; and it has exerted a powerful influence upon public taſte, not only in this country, but throughout Europe. Thomſon's other pieces in blank verſe diſplay a vivid imagination, a comprehenſive underſtanding, and exalted ſentiments, but are not marked with any peculiar character. The addition to his fame as a poet has principally ariſen from his "Caſtle of Indolence," an allegorical compoſition in the manner of Spenſer." Of his tragedies, the beſt that can be ſaid is that they maintain a reſpectable rank among the productions of the modern ſchool of the drama, which, when they diſappear from the ſtage, are ſeldom taken up in the cloſet. Murdoch's Life of Thomſon. Johnſon's Lives of the Poets. Gen. Biog.

THONE, in *Geography*. See TONE.

THONE, in *Agriculture*, a term ſignifying ſomewhat damp and cold, not thoroughly dry. Alſo flaxid or limber, as undried hay, corn, or ſtraw in a moiſt ſtate.

THONGTONG, in *Geography*, a town of the Birman empire; 10 miles N.W. of Raynangong.

THONNA, a town of Saxony, in the principality of Gotha; 12 miles from Gotha.

THONNAUSTAUFF, a town of Bavaria, near the Danube; 3 miles from Ratiſbon.

THONNES, or THONNEX, a town of France, in the department of the Leman; 9 miles S.E. of Annecy.

THONON, or TONON, a town of France, in the department of the Leman, late capital of the duchy of Chablais, on the lake of Geneva, ſituated on a plain a little elevated. It is not environed with walls, but was formerly defended by a ſtrong caſtle, ſurrounded with lofty towers, where Amadeus VIII. and IX. and Louis, dukes of Savoy, reſided for ſome time. The caſtle was burned and demoliſhed, in the 16th century, by the Bernois. It has one pariſh church and ſeveral convents; 18 miles N.E. of Geneva. N. lat. 46° 18′. E. long. 6° 32′.

THOPH. See MACHUL and SISTRUM.

THOPHAIL, ABU GIAFAR, in *Biography*, a celebrated Peripatetic philoſopher and phyſician, was a native of Seville in Spain, and preceptor to Maimonides and Averröes. This philoſopher employed the Ariſtotelian doctrine to the purpoſes of enthuſiaſm, in the elegant tale ſtill extant of "Hai Ebr Yockdan;" a youth who, having been expoſed when an infant on the ſea-coaſt, was nouriſhed by a hind, and grew up in the woods, without any intercourſe with human beings; and who, by the unaided exertions of his own powers, attained to the knowledge of things natural and ſupernatural, and arrived at the felicity of an intuitive intercourſe with the divine mind. This piece is written with ſuch elegance of language and vigour of imagination, that, notwithſtanding the improbability of the ſtory, it has been univerſally admired. It exhibits a favourable ſpecimen of Peripatetic philoſophy, as it was taught among the Saracens; and, at the ſame time, affords a memorable example of the unnatural alliance, which was now ſo generally eſtabliſhed between philoſophy and fanaticiſm. This work was tranſlated by Edward Pococke, jun. from the Arabic into Latin, under the title of "Philoſophus Autodidactus," and printed in 4to. at Oxford, in 1700. It was alſo tranſlated into Engliſh by S. Hoadley, profeſſor of Arabic in Cambridge, ed. Lond. 1711, 8vo., and alſo into Dutch. Thophail is ſaid to have written ſeveral other works, and died at Seville in 1175. Brucker by Enfield. Gen. Biog.

THOR, in *Mythology*, a deity worſhipped by the ancient inhabitants of the northern nations; particularly by the ancient Scandinavians and Celts. Julius Cæſar (Com. lib. vi. c. 17.) ſpeaks of a god of the Gauls, who was charged with the conduct of the atmoſphere, and preſided over the winds and tempeſts, under the name of Jupiter: but Lucan gives him a name, which bears a greater reſemblance to that of Thor, *viz. Taranis*, a word which, to this day, in the Welſh language, ſignifies *thunder*. The authority of this deity extended over the winds and ſeaſons, and particularly over thunder and lightning. In the ſyſtem of the primitive religion, the god Thor was probably one of thoſe genii, or ſubaltern deities, ſprung from the union of Odin, or the Supreme Being, and the Earth. The Edda calls him the moſt valiant of the ſons of Odin; and in the Icelandic mythology, he is conſidered as the defender and avenger of the gods. He always carried a mace, or club, which as often as he diſcharged it returned to his hand of itſelf; he graſped it with gauntlets of iron, and was poſſeſſed of a girdle which had the virtue to renew his ſtrength as often as was needful. With theſe formidable arms he overthrew the monſters and giants, when the gods ſent him to oppoſe their enemies. Thor, Friga, or Freya, and Odin, compoſed the court or ſupreme council of the gods, and were the principal objects of the worſhip and veneration of all the Scandinavians. The Danes ſeem to have paid the higheſt honour to Odin. The inhabitants of Norway and Iceland appear to have been under the immediate protection of Thor: and the Swedes choſe for their tutelar deity Freya, or Frey, an inferior divinity, who, according to the Edda, preſided over the ſeaſons of the year, and beſtowed peace, fertility, and riches.

There was a day conſecrated to Thor, which ſtill retains his name in the Daniſh, Swediſh, Engliſh, and Low Dutch languages, *viz. Thurſday.* This word has been rendered into Latin by *dies Jovis*, or *Jupiter's day;* for this deity, according to the ideas of the Romans, was the god of thunder. Mallet's North. Ant. vol. i. p. 95.

THOR, *Le*, in *Geography*, a town of France, in the department of the Mouths of the Rhone; 9 miles E. of Avignon.

THORA, a town of Hindooſtan, in the circar of Rantampour; 45 miles S. of Rantampour.

THORA,

THORA, in *Botany*. See ACONITUM.

THORACIC, in *Anatomy*, an epithet applied to various parts in and about the cheſt, as to the aorta above the diaphragm, and to ſome branches of the axillary artery (ſee ARTERY); to ſome branches of the axillary plexus of nerves (ſee NERVE); to the trunk of the abſorbing ſyſtem of veſſels. See ABSORBENTS.

THORACICI, in the *Linnæan Syſtem of Ichthyology*, the name of the third order of bony fiſhes, reſpiring by means of gills only: the character of which is, that the bronchia are oſſiculated, and the ventral fins are placed underneath the thorax. This order in Gmelin's edition of the Linnæan ſyſtem, includes nineteen genera, and a good number of ſpecies. The genera are, the *cepola*, *echeneis*, *coryphæna*, *gobius*, *cottus*, *ſcorpæna*, *zeus*, *pleuronectes*, *chætodon*, *ſparus*, *ſcarus*, *labrus*, *ſciæna*, *perca*, *gaſteroſteus*, *ſcomber*, *centrogaſter*, *mullus*, and *trigla*.

THORÆ RADIX, in the *Materia Medica*, the name of a root which keeps its place in the catalogues of officinal ſimples, but is ſeldom uſed. See ACONITUM and ANTHORA.

The plant which produces it is the *thora valdenſis* of Gerarde. It is kept in the gardens of the curious, but grows wild in the mountainous parts of Germany. The root is compoſed of a number of granules or ſmall lumps, like that of the common ranunculus; the leaves are roundiſh, and ſtand on ſmall pedicles, and the ſtalks are about ſix inches high, and the flowers yellow, and like thoſe of our common wild ranunculuſes.

The root is acrid and corroſive, and the juice of the leaves is ſaid to poiſon animals, and to have been uſed by the ancients for that purpoſe.

THORAME, in *Geography*, a town of France, in the department of the Lower Alps; 13 miles E. of Digne.

THORAX, in *Anatomy*, that diviſion of the ſkeleton which contains the bones forming the cavity of the cheſt; or it is uſed to denote the cavity of the cheſt. See LUNG, where the bones and their articulations are deſcribed, as well as the cavity they form, and its contents.

THORAX. For an account of the operation of tapping, refer to EMPYEMA, PARACENTESIS, and WOUNDS *of the Thorax*.

The ſubject of wounds of the cheſt will be found in the article WOUNDS.

THORDO, DIACONUS or LEGIFER, in *Biography*, deſcended from an ancient family, was provincial judge in North Jutland, and flouriſhed in the time of Waldemar III., or about the year 1350. He was the author of the following work; " Conſtitutio Voldemari Regis, per Thordonem Legiferum, &c." Ripis, 1504, et Havn. 1508, 4to.; tranſlated into Latin together with Waldemar's Jutland Laws, and afterwards publiſhed in Ludewig's " Reliquiæ MSS." tom. xii. and alſo in German by Eric Krabbe, in " Weſtphal's Monuments." Gen. Biog.

THORDSEN, or THEODORI STURLA, called alſo *Frode* or *Polyhiſtor*, was born in Iceland, about the beginning of the 13th century. His father was Thordur Sturleſon, brother to the celebrated Snorro. (See STURLESON.) He is repreſented to be one of the greateſt Icelandic poets of his time, as well as an eminent lawyer and hiſtorian. His talents excited enemies, ſo that he was forcibly carried away from the iſland in 1263, and conveyed to Norway, where he was favourably received by the king Magnus Lagebæter, admitted into his council, and appointed his hiſtorian and dapifer, one of the higheſt offices at the Norwegian court. Afterwards, however, he returned to Iceland, and having been chief juſtice of the country for many years, died in 1284. His works are " Landnama Saga," or " Liber Originum Iſlandiæ," publiſhed entire by biſhop Thordur Thorlakſen, Skalholt, 1688, 4to., and by J. Finnæus, Havn. 1774, 4to.:—A continuation of " Sturlunga Saga," or the hiſtory of the Sturla family, and almoſt the whole of Iceland, during his time, which was begun by the learned biſhop Brand:—" The Hiſtory of King Haager Haagenſen," publiſhed at the expence of the crown-prince Frederic:—" The Hiſtory of King Magnus Lagebæter," compiled from the public records of the kingdom, the greater part of which has been loſt. Gen. Biog.

THORESBY, RALPH, an eminent antiquary, tbe ſon of a conſiderable merchant of an ancient family at Leeds, where he was born in the year 1658. His father belonged to the body of Preſbyterians, and being addicted to antiquarian ſtudies, founded the collection entitled " Muſeum Thoreſbianum." The ſubject of this article was intended for a mercantile profeſſion, and in order to complete his education, begun at Leeds, and proſecuted in London, he was ſent, in his twentieth year, to Rotterdam, to acquire the Dutch and French languages. But his father dying in 1679, he ſucceeded him in buſineſs, married, and ſettled in his native town. To antiquarian reſearches, for which his father's example had given him an early taſte, he devoted much time and attention. In the earlier period of his life he had been an occaſional conformiſt, in common with many of thoſe who were called Diſſenters, and diſguſted by the indiſcreet zeal of his paſtor in maturer life, as well as probably influenced by his dioceſan, archbiſhop Sharp, he joined in full communion with the eſtabliſhed church. His connection and correſpondence with perſons engaged in ſimilar purſuits with his own were gradually enlarged: and upon communicating, by Dr. Martin Liſter, an account of ſome Roman antiquities diſcovered in Yorkſhire, to the Royal Society, he was admitted a member of that learned body in 1697. In 1714 he publiſhed a work in which he had been long engaged, containing a hiſtory of his native town, and entitled " Ducatus Leodenſis; or the Topography of Leedes, and Parts adjacent," together with a catalogue of the antiquities, &c. contained in the Muſeum Thoreſbianum. An hiſtorical part, to which he often refers, and comprehending a view of the ſtate of the northern diſtricts of this kingdom in remote ages, was left in MS. continued to the ſixth century; which MS. being communicated to the editors of the Biographia Britannica, was by them printed entire in the article " Thoreſby." He publiſhed alſo " Vicaria Leodenſis, or the Hiſtory of the Church of Leedes," Lond. 1724, comprehending obſervations on the origin of parochial churches, and the ancient manner of building them, together with biographical memoirs of ſeveral clergymen. In the following year he was ſeized with a paralytic affection, which terminated bis life at the age of ſixty-eight years. Poſſeſſing an extenſive acquaintance with the hiſtory of his country, genealogy and heraldry, and ancient coins and medals, he always manifeſted a diſpoſition to aſſiſt thoſe who were engaged in works of the antiquarian and biographical deſcription. The ſentiments of Mr. Thoreſby were liberal and Catholic; his manners regular, and his diſcharge of ſocial and religious duties exemplary. Biog. Brit.

THORIGNY, in *Geography*, a town of France, in the department of the Channel; 6 miles S.S.E. of St. Lo.—Alſo, a town of France, in the department of the Yonne; 18 miles S.S.E. of Provins.

THORLASKEN GUDBRAND, in *Biography*, an Icelandic writer and prelate, was born at Stadarbakke, in the diſtrict of Holum, in 1542. In 1561 he was ſent to the univerſity of Copenhagen; in 1564 he became rector of the ſchool

school of Holum; and in 1570 he was appointed bishop of that diocese. With a view of diffusing knowledge, he established a printing-press, first at Rupusel, and afterwards at Holum, which he personally superintended. He was one of the most learned of the Icelandic bishops, but too arbitrary in the exercise of his episcopal functions. He died in 1629, in the 85th year of his age. Many considerable works, partly his own, and partly those of others, issued from his press. He also constructed a map of Iceland, which was engraved by Ortelius. Gen. Biog.

THORN, in *Geography*, a city of Prussia, situated on the Vistula, formerly the chief city of Polish Prussia. It was founded by Herman Balck, first grand-master of the Teutonic order, who built the castle of Thorn in 1231. In the following year, the foundation of the town was laid; but the building was discontinued in 1235, on account of the inconvenient situation, and Thorn was built about a German mile farther up the river, on the spot where it now stands. It is supposed to have been called Thorn, because the knights of the Teutonic order, by building this city, opened themselves a *thor* or door into Prussia. When the knights of the Teutonic order enormously abused their power throughout all Prussia, Thorn was the first city which formed the noble scheme of shaking off their oppressive yoke. The inhabitants then put themselves under the protection of Casimir the Great, king of Poland, upon advantageous conditions, as a free city. Thorn has ten gates, and is divided into the Old and the New Town, each of which had formerly its respective council, magistracy, and police. But, in 1454, they were incorporated into one city. They are, however, separated from each other by a wall and moat within the town; and without, they are defended in common by a fine double wall and moats. Thorn was formerly strongly fortified; and it gradually improved its advantageous situation, so as to become a place of very considerable trade, and one of the principal of the Hanse towns. It likewise carried on an extensive commerce in the Baltic, independently of the other cities of that confederacy; for before the river widened so much, and consequently became shallower, ships of burden could come up to the very city. From various causes, in little more than half a century, Thorn greatly declined from its flourishing condition; for it surrendered by capitulation, in 1655, to Charles Gustavus, king of Sweden; and, in 1658, after a vigorous siege, it was taken by the Poles and Brandenburghers. In 1703, it was bombarded and taken by Charles XII. king of Sweden, who not only exhausted it by the heaviest contribution, but also demolished all the fortifications, contrary to the articles of capitulation. Between the years 1708 and 1710, great numbers of its inhabitants were swept away by the plague. In the following years, the revenues of the city suffered considerably by the confederations in Poland, and no less by the commotions occasioned by the competitors for the crown of that kingdom. In 1793, some Prussian troops entered this town, and from that time it has formed part of the dominions of that king; the king of Prussia taking possession of Thorn and Dantzic, together with the palatinates of Posnania, Kalish, &c. agreeably to a proclamation, published on the 25th of March. The soap, ginger-bread, &c. of Thorn, are every where in great request; and, accordingly, great quantities of them are exported. The asparagus that grows wild on some of the city lands, is not inferior to that which is cultivated with so much care in other countries; 70 miles S. of Dantzic. N. lat. 52° 55′. E. long. 18° 30′.

THORN, or *Thoren*, a town of France, in the department of the Lower Meuse. It had a noble abbey, whose superior was a princess. This abbey was assessed in the matricula at one horse or twelve florins; 7 miles S.W. of Ruremond.

THORN, in *Botany*, a name generally given to all trees, or the larger kinds of shrubs, which are armed with spines or prickles, but more particularly applied to the Linnæan genus CRATÆGUS, now sunk in MESPILUS. (See those articles.) Otherwise this name is almost as vaguely applied as its Greek and Latin synonyms, ακανθα and *spina*, neither of which is strictly appropriated to any one plant, or family of plants. Ακανθα, in Dioscorides, is the name of that well-known herb, whose leaves compose the ornamental part of a Corinthian capital, and which is the Brank-ursine, or *Acanthus* of modern botanists, as well as of the generality of writers. But he applies the same likewise to a kind of thistle. The *Acanthus* of Virgil can scarcely be any thing else than the Common Holly, *Ilex Aquifolium*, though we do not find that this idea has occurred to his critics or illustrators. This shrub, so abundant in Italy, cannot be traced, under any other name or allusion, in the poet; while the bright aspect, the saffron or scarlet colour, the pliant twigs of his *Acanthus*; but, above all, its being evergreen and bearing berries, *Georg*. 2. 119, and subjected in winter to the shears of the gardener, *ibid*. 4. 137, are circumstances strikingly appropriate to the Holly, not to the Brank-ursine; though the name may allude to the prickly foliage of either.

THORN-*Apple*. See DATURA, and DATURA *Stramonium*.

THORN, *Black*, or *Sloe-tree*, a species of the *prunus*, called *prunus sylvestris*. See PRUNUS and SLOE.

THORN, *Box*. See LYCIUM.

THORN, *Buck*. See RHAMNUS, and RHAMNUS *Catharticus*.

THORN, *Christ's*. See PALIURUS and RHAMNUS.

THORN, *Cockspur*. See CRATÆGUS, MESPILUS, and PYRUS.

THORN, *Egyptian*, a name sometimes applied to a plant which is armed with strong thorns or prickles, and which is said to have been lately found to make a good hedge-plant when kept low by being well cut in. It is also a very ornamental shrubby tree-plant for pleasure-grounds. See ACACIA.

THORN, *Evergreen*. See MESPILUS and PYRUS.

THORN, *Glastonbury*, a variety of the hawthorn. See CRATÆGUS and MESPILUS.

THORN, *Goat's*, a species of *Astragalus*; which see. See also TRAGACANTHA.

THORN, *Haw*. The fruit of this thorn has been found useful by farmers in feeding team and other horses. See CRATÆGUS and MESPILUS.

THORN, *Lily*. See CATESBÆA.

THORN, *Purging*. See RHAMNUS.

THORN, *Scorpion's*, a species of *Ulex*; which see.

THORN, *Spanish Hedge-hog*, a species of *Anthyllis*; which see.

THORN, *White*, a species of *Cratægus*; which see. See also MESPILUS.

THORN, in *Vegetable Physiology*. See SPINA and FULCRA.

THORN-*Hedges*, in *Agriculture*, a term often applied to such as are made of that plant, whether of the white or black kind. They in most cases form the best fences. See FENCE, QUICKSET, QUICKSET-*Hedge*, &c.

THORNBACK, in *Ichthyology*, the English name of a species of ray-fish, the *raia clavata* of Linnæus, prickly on the back, and with tuberculose teeth, and a transverse cartilage in the belly: the young fish have very few spines on them, and their backs are often spotted with white, and each spot encircled with black. (See RAIA.) This species frequents our fandy fhores, is very voracious, and feeds on all forts of flat fifh, and is particularly fond of herrings and fand-eels, and fometimes eats cruftaceous animals, fuch as crabs. The thornbacks begin to generate in June, and bring forth their young in July and Auguft, which (as well as thofe of the fkate) before they are old enough to breed, are called *maids*. They begin to be in feafon in November, and continue fo later than fkate; but the young of both are good at all times of the year. Pennant.

THORNBURGH, in *Geography*, a town of Virginia; 74 miles S. of Wafhington.

THORNBURY, an ancient market-town in the lower divifion of the hundred of the fame name, in the county of Gloucefter, England; is fituated 24 miles S.W. from the city of Gloucefter, and 122 miles W. by N. from London. The town confifts principally of three ftreets, in the form of the Roman Y, "having firft," fays Leland, "one longe ftrete, and two hornes goyne owt of it." The corporation is compofed of a mayor, twelve aldermen, and a town-clerk; but the power of thefe officers is become much limited by difufe. A weekly market is held on Saturdays, but is not much frequented: here are three annual fairs. The church is fpacious and handfome: the tower is lofty, and ornamented with rich open-worked battlements, and eight pinnacles. The population, as returned under the act of the year 1811, amounted to 1083; the number of houfes to 216. At the north end of the town are the remains of an unfinifhed caftle, which was commenced by Edward Stafford, duke of Buckingham, but ftopped when he was beheaded in 1522. This caftle may be confidered as particularly deferving notice, from its affording fome interefting fpecimens of the laft gradation of caftellated architecture. The former fplendour of Richmond and Nonfuch, which were contemporary with it, are known only by defcription and engravings; and Hampton Court, though it rofe under the hands of Wolfey at the fame period, is certainly lefs rich in the minute and capricious ornaments peculiar to the buildings of Henry VII. and his fucceffor. A fmall part moft refembling Thornbury, is feen at Windfor Caftle, in an addition made by the firft-mentioned fovereign. It is evident, from a furvey made in the year 1582, that the whole fouthern fide was habitable, and that it confifted of feveral chambers, of magnificent dimenfions. The tower, the walls of which are perfect, was divided into four rooms, the duke's own apartments: this ftands at the fouth-weft angle of the caftle. The duke was meditating the completion of the quadrangle which would have inclofed an area of two acres and a half, when his fatal attainder clofed his views for ever. Within the circuit walls twelve acres were inclofed: annexed to them are fmall rooms, intended as barracks for foldiers. In the reign of Elizabeth, the principal timbers were taken away; and time has forwarded the dilapidation. A fingular coincidence has been remarked between the front of Thornbury caftle and that of Chriftchurch, Oxford; and it appears as if the rivalry of the duke and cardinal Wolfey was exerted even in their architecture. — Beauties of England and Wales, vol. v. Gloucefterfhire; by J. Britton and E. W. Brayley. Lyfons's "Gloucefterfhire Antiquities," folio.

THORNE, a market-town in the lower divifion of the wapentake of Strafford and Tickhill, in the Weft Riding of the county of York, England; is fituated near the fouth bank of the river Don, at the diftance of 10 miles N.E. from Doncafter, 29 miles S. by E. from York, and 167 N. by W. from London. The town appears to be in a progreffive ftate of improvement: it carries on a confiderable commerce by the Don; and veffels trade regularly to London. Ships of a fize fufficiently large for the coafting trade, are built at the fuburb called Hangman Hill, on the banks of the river, which is alfo the landing-place for all the merchandize. A canal cut from the Don to the Trent paffes within a furlong on the weft fide of the town. A weekly market is held on Wednefdays; and two fairs annually, each of three days continuance, for horned cattle, woollen cloth, &c. According to the population returns of the year 1811, Thorne contained 637 houfes, the number of inhabitants being 2713. The country about Thorne is for the moft part fertile; but low, flat, and totally unpicturefque. On the eaft fide of the town is a field of rich fandy loam, and more elevated than the other lands in the vicinity. Beyond this are vaft moors, which however are moftly drained and inclofed.

At the diftance of about three miles weftward from Thorne, and on the Doncafter road, is Hatfield, a large village, famous in the annals of hiftory for the battle fought there A.D. 633, by Edwin, the firft Chriftian king of Northumbria, againft Cadwallo, king of Wales, and Penda, the Pagan king of Mercia. This conflict, which was extremely fanguinary, terminated fatally for the Northumbrians: their monarch, and his eldeft fon Offrid, were flain, their kingdom fubdued, and their country laid wafte. This village was the birth-place of William de Hatfield, the fecond fon of king Edward III. The extenfive level of Hatfield Chace is faid to contain within its limits 180,000 acres, of which nearly one-half was formerly a great part of the year under water. It was fold by Charles I. to Cornelius Vermuiden, a naturalized Dutchman, without the confent of the commiffioners and tenants, to drain and cultivate; which he effected at the expence of about 400,000*l.*, but the affair involved him in ruinous law-fuits. In the year 1811, an act was obtained for inclofing between eight and nine thoufand acres of rich common in this neighbourhood, which muft be ultimately productive of great public and private advantage. — Beauties of England and Wales, vol. xvi. Yorkfhire; by J. Bigland.

THORNE, a fmall ifland of Denmark, in the Little Belt, near the ifland of Funen. N. lat. 59° 15′. E. long. 9° 53′.

THORNESS BAY, a bay on the N.W. coaft of the Ifle of Wight, between Newtown and Cowes.

THORNEY, a market-town in the north part of the hundred of Witchford, and county of Cambridge, England; is fituated in the north-weft fide of the county bordering on Northamptonfhire, 10 miles W. from March, 5 miles S.E. from Crowland, and 84 miles N. from London. It is furrounded by low and fertile grounds, which are now in a very complete ftate of drainage, the expence of which is defrayed by an annual tax of about a fhilling *per* acre. Its ancient appellation was Ankeridge, which it obtained from the anchorites who dwelt in a monaftery, or rather an affemblage of hermitages, founded here about the year 662, by Saxulphus, the firft abbot of Peterborough. The Danes deftroyed thefe hermitages in 870, and the place lay wafte till 972, when Ethelwold, bifhop of Winchefter, founded on the fcite an abbey for Benedictine monks, which became an opulent eftablifhment, and ranked among the mitred abbeys. In the year 1085, the ancient church was taken down, and a new one commenced by the abbot Gunter, but it was not completed till 1128. This ftructure poffeffed confiderable magnificence, and was, according to Brown Willis, "at leaft five times as large as at prefent." When the abbey was diffolved by Henry VIII. great part of the church was deftroyed; but the remainder efcaped by being made parochial. The weft front, which is the entrance to the church,

church, is the moft perfect part of the ancient building. The revenues of the abbey were eftimated, at the diffolution, at 411*l.* 12*s.* 11*d.* clear yearly value. Great part of its poffeffions, with the fcite, was granted in 1549 to John, lord Ruffell, anceftor to the duke of Bedford, who is lord of the manor, and owner, not only of the town, but alfo of 19,000 acres of the furrounding lands. This extenfive property is divided into farms from 25*l.* to 400*l.* *per annum*, generally in a very improved ftate of cultivation. A market is held on Thurfdays, and two annual fairs were granted for Thorney to Francis, earl of Bedford, in the 13th year of Charles I. by the charter of incorporation for the government of the Bedford Level. The inhabitants of the parifh, who are chiefly the defcendants of French Proteftants, are ftated in the population return of the year 1811, to amount to 1675: the number of houfes being 251.—Lyfons's Magna Britannia, vol. ii. part 1. Cambridgefhire. Beauties of England and Wales, vol. ii. Cambridgefhire; by J. Britton and E. W. Brayley.

THORNEY *Ifland*, a fmall ifland, in a bay of the Englifh Channel, near the coaft of Suffex, about four miles in circumference, with a village of the fame name, at the mouth of the Lavant; 7 miles S.W. of Chichefter.

THORNHILL, *Sir* JAMES, in *Biography*, may be called the father of hiftoric painting in England. He was the fon of a gentleman of an ancient family in Dorfetfhire, and was born at Weymouth in 1676. His family having fallen in fortune, he was obliged to refort to fome profeffion for fupport, and guided by an early tafte for painting, fixed upon that art as a bafe on which to raife a fortune and a name. He came to London, and was affifted by the celebrated phyfician Sydenham, who placed him under the tuition of an artift of little note, whofe name is not known, and to whom, from the ftate of the art at the time, he muft have been far lefs indebted for the progrefs he made, than to his own ingenuity and induftry. After having practifed for a while with fome celebrity, he travelled to Holland and to Flanders; and thence vifited France, but did not proceed to Italy. Moft probably his object in this journey was only to acquire a knowledge of colouring; and he might have fatisfied his mind on compofition and form, by having fpent three years in copying the cartoons of Raphael, which he was permitted to do by the favour of the earl of Halifax. Thefe copies are in oil, and were bought after his death by the then duke of Bedford; and by his grace's fucceffor, the late duke, were prefented to the Royal Academy. They are wrought with care, but lack the delicacy of character and feeling obfervable in the originals. On his return to England, his reputation was increafed, and honour and employment accompanied it. Queen Anne commiffioned him to paint the interior of the cupola of St. Paul's, which he did in eight compartments. The fubject affigned him was the hiftory of St. Paul; and he treated it with confiderable grandeur of ftyle, both as to compofition and execution; but his defign wanted chaftity and fimplicity, and the heads of his figures have not fufficient refinement of expreffion. It was, however, the firft attempt by an Englifhman of the kind, and fully juftified the preference given to him over La Guerre and La Foffe, who were then painting the halls and ftaircafes of our nobility. He was afterwards employed to decorate an apartment at Hampton Court, with emblematical allufions to the hiftory of the queen, and her union with her confort, George, prince of Denmark. But his grand work is the great hall at Greenwich Hofpital, where he has painted naval trophies and allegorical figures in great profufion; and if much praife cannot be given to the purity of the defign, it ought not to be withheld from the brilliancy and vigour of the execution. Altogether, it is a work unrivalled in its kind here, and well entitled him to the honour of knighthood, which George I. foon after conferred upon him. This was fome compenfation to him for the mortification of having his demand for thefe paintings contefted, and being in the end paid only at the labourer's rate of fo much *per* fquare yard, (40*s*).

He had the honour of fo far re-eftablifhing his family influence as could be effected by being chofen to reprefent his native town in parliament; but he did not enjoy his honours long, as he died at the early age of 57, leaving a fon, named alfo James, for whom he had procured the appointment of ferjeant-painter to the king, and a daughter married to Hogarth.

THORNY TREFOIL, in *Botany*. See FAGONIA.

THORNY *Reft-Harrow*, in *Agriculture*, a frequent weed in poor barren pafture land, which is not removed without difficulty, in confequence of its perennial nature.

THOROE, in *Geography*, a fmall ifland of Denmark, in the Little Belt, near the ifland of Funen. N. lat. 55° 15′. E. long. 9° 53′.

THOROLD, a townfhip of Upper Canada.

THOROUGH, the common name of an inter-furrow between two ridges. They fhould always be clean and well-drawn.

THOROUGH-*Bafe*, or accompaniment to a continued bafe by figures.

Thorough-bafe is but an aukward tranflation of the Italian terms *baffo continuo*, by which *accompaniment by figures*, without any other guide for the right-hand on keyed inftruments, was at firft called.

The French term *accompagnement* is the fhorteft and moft comprehenfive title for the harmony expreffed by figures over the bafe; if, as Rameau has done in his "Code de Mufique," we add "for the harpfichord or organ," as there are feveral other kinds of accompaniment befides that on keyed-inftruments.

Rameau defines *accompaniment* or *thorough-bafe* in the following manner. "Accompaniment on the harpfichord or organ, confifts in the execution of a complete and regular harmony, by feeing only the notes of one part of that harmony; and this part is called the bafe, being in reality the bafis or foundation of the whole compofition. This bafe is played with the left-hand, and its harmony with the right."

We fhall endeavour to affift our mufical reader, who has every thing to learn in the art of accompaniment, more by example than precept, and fhall give him a feries of progreffive leffons in the mufical plates, which will explain the whole myftery of mufical combinations from the common chord, to the moft extraneous harmony.

We take it for granted that he is perfectly acquainted with the mufical fcale or gammut, in the bafe and treble clefs at leaft, as well as with the time-table; and that the accidents of flat, fharp, and natural, are familiar to him.

The firft thing, therefore, that we fhall recommend to his ftudy, is a table of intervals, both in notes and figures. See *Plate* II.

N° 1. prefents a fcale in half notes, in which all the flats occur, from the unifon to the 9th; another fcale expreffed by fharps.

2. Number of femitones above the bafe in each interval.

3. Common chords, major and minor, to all the twelve femitones, modulating by 5ths.

4. Modulation in common chords, major and minor alternately, the bafe falling a 3d at each change. And in

 order

order to familiarize the ftudent to thefe chords in every part of the inftrument, he is advifed to make three voyages round the harmonical world: beginning with the 8th uppermoft, then the 5th, and laftly the 3d; and if no miftake is made, the laft chord in each of thefe circumnavigations will be an octave above the firft. But all difficulty in thefe exercifes will be removed, if it be remembered that, in going from chord to chord, only one note is to be changed by the right-hand, which note is always the octave of the new bafe.

5. Exercife of common chords in accompanying the hexachords in all the keys, major and minor, to their fundamental bafes: in the practice of which, dots are placed on the notes in the treble, which are to be played with the little finger. And though only the firft hexachord, or fix notes, is written backwards, each of them is intended to be played backwards as well as forwards.

Many years ago, we tried to reduce all the rules of thorough-bafe to the compafs of a *meffage-card*, and almoft all the combinations expreffed by figures to common chords. And now, if the preceding exercifes of the hand in common chords have done their duty, the ftudent will perceive, from an engraving of the two fides of this *thorough-bafe card*, that what has been explained in words and figures on one fide, is illuftrated with notes on the other.

The fecond card goes fomewhat deeper into harmonical myfteries, by what the French call *la regle de l'octave*, or rule for accompanying with a fpecific chord every note of the key, afcending and defcending; which, if practifed well in all the 24 keys, and impreffed on the memory, will enable the ftudent to figure a bafe himfelf, or to play without figures; and by a feeming divination, without a treble part, to know the harmony that belongs to each bafe of a regular compofition, in a diatonic afcent and defcent.

After thefe chords are literally at the *fingers'-ends* of the ftudent, the following eight rules and exceptions in playing without figures muft be obferved.

1. An accidental *fharp* note in the bafe is generally accompanied with a $^{6}_{5}$, and changes the key to the half note above fuch fharp.

2. An accidental *flat* note in the bafe is generally accompanied with a $^{4}_{2}$, and changes the key to the 4th below fuch flat.

3 To the 5th of a key, if repeated at a clofe, two chords are generally played in modern mufic; the $^{6}_{4}$ and $^{5}_{3}$: in old mufic, the $^{5}_{4}$ $^{-}_{3}$, and fometimes the 7th with the common chord.

4. When the bafe moves *per faltum*, a 3d, 4th, 5th, or 6th, common chords will do.

5. When the bafe rifes a 4th, and falls a 5th alternately, and the contrary, each note may be accompanied by a 7th.

6. In fyncopated or binding notes the $\substack{6\\4\\2}$ are played to the laft part of the ligature, by *anticipation*.

7. Slow notes in the bafe, in old mufic, are generally accompanied, as on the plate, by a $^{4}_{3}$ and $^{9}_{8}$ alternately.

8. *Sufpenfions* of a whole chord, or part of a chord, are expreffed by a dafh (—) preceding the refolution.

The reverfe of the fecond card contains explanations of thefe eight rules in notation.

It muft be remembered, that whoever is ambitious of playing thorough-bafe *without figures*, muft previoufly poffefs the art of accompanying readily *with figures*. See COMPOSITION and COUNTERPOINT, to which thorough-bafe is the beft introduction: as what is good in playing, would be good, as far as *harmony* is concerned, in writing. Invention, fancy, and good tafte, are neceffary to break thefe chords into *melody*.

THOROUGH-*Wax*, in *Botany*. See BUPLEURUM.

THORP ARCH, in *Geography*, a village of England, in the county of York, where is a medicinal fpring, impregnated with fulphur and fteel; 3 miles S.E. of Wetherby.

THORP, *Bifhop's*, a village of England, in the county of York, where the archbifhop has a palace, built by archbifhop Gray in 1241; 3 miles S. of York.

THORPNESS, a cape on the eaft coaft of England, in the county of Suffolk, forming the fouthern part of Solebay.

THORSAKER, a town of Sweden, in Geftricia; 21 miles S.W. of Gefle.

THORSBERG, a mountain of Norway, in the province of Aggerhuus; 18 miles W. of Tonfberg.

THORSHAVEN, a fea-port town of the ifland of Stromoe, and capital of ali the Faroer iflands, as well as the common market, and refidence of the landvogt, and king's counfel.

THORSTORP, a town of Sweden, in Weft Gothland; 28 miles S.E. of Gotheborg.

THOS, THOUS, Θως, in *Zoology*, a name given to an animal of the wolf-kind, but larger than the common wolf, common in Surinam. It is a fpecies of the canis, with a light bent tail, and white belly. It never touches men or cattle, and rather provides its food by cunning than open force; preying chiefly on poultry and water-fowl.

THOTCHI, or THATCHI HOTUN, in *Geography*, a town of Chinefe Tartary; 368 miles W. Tourfan. N. lat. 42° 52'. E. long. 83° 24'.

THOTRA, a town of Hindooftan, in the circar of Rantampour; 40 miles S.S.W. of Rantampour.

THOU, JAMES AUGUSTUS DE, (THUANUS,) in *Biography*, an eminent magiftrate and hiftorian, was the fon of Chriftopher de Thou, prefident of the parliament of Paris, diftinguifhed for integrity and patriotifm, and born at Paris in the year 1553. In the college of Burgundy, where he was placed at the age of ten years, his education was interrupted by a fever, which feemed for fome time to have proved fatal to him; but upon his recovery he ftudied the civil law, firft at Orleans, and afterwards at Valence, under the celebrated Cujacius, in which latter place he commenced an intimate acquaintance with Jofeph Scaliger, which was continued through life. Upon his return to Paris in 1572, he witneffed the horrors of the maffacre of St. Bartholomew, and this fcene impreffed him with an eternal deteftation of bigotry and intolerance. He was originally deftined for the church, with the profpect of valuable preferments, which his uncle, the bifhop of Chartres, intended to refign to him. In the mean while he travelled to Italy, the Low Countries, and Germany; but upon the death of his brother, his views were changed, and the law became his deftined profeffion. After the death of his father, whofe memory he held in high veneration, he was made mafter of requefts in 1584; and in 1587, he married Marie Barbanfon, a lady of a noble family. Upon the revolt of Paris, on occafion of the league, in 1586, he repaired to Henry III. at Chartres, and was deputed by him to confirm the province of Normandy in its allegiance. On the affaffination of the duke of Guife, his family at Paris received public infults, which made it neceffary for his wife to make her efcape in difguife, and he went to the king at Blois, who was almoft deferted, and induced him to form a coalition with Henry, king of Navarre. Being at Venice, he was informed of the affaffination of Henry III., after which he immediately joined the legitimate fucceffor to the crown,

crown, Henry IV., at Chateaudun. The king, fully apprized of his excellent qualities, repofed confidence in him, and employed him in many interefting negociations. On the death of Amyot, the king's principal librarian, De Thou was nominated his fucceffor; and in 1594 he fucceeded his uncle as "prefident á mortier." He officiated as one of the Catholic commiffioners at the theological conference of Fontainebleau between Du Perron and Du Pleffis Mornai; and in the regency of Mary de Medicis, he was one of the directors-general of the finances. At the conference of Loudun, he acquired diftinguifhed reputation by his virtue and ability; and he was joined with cardinal Du Perron in a commiffion for the reform of the univerfity of Paris, and the conftruction of the college-royal, the edifice of which was begun under his fuperintendance. Although De Thou was occupied in a variety of public tranfactions, he referved time for the cultivation of literature, and particularly for that of Latin verfe, in which latter department he publifhed, in 1584, a didactic and defcriptive poem, "De Re Accipitraria," (on Hawking,) which was well received by the learned. He alfo gave to the public other pieces of Latin poetry, fome of which were on fcriptural fubjects. But his "Opus majus," as we may call it, which has eftablifhed his permanent fame, was "The Hiftory of his own Times," the firft part of which appeared in 1604. The condemnation of this interefting work reflects indelible difcredit on Henry IV. and his court: the ground of their enmity feems to have been the freedom with which he fpoke of the popes, clergy, and the houfe of Guife, and the difpofition he manifefted to extenuate the offences charged upon the Huguenots, and to extol the virtues and abilities of that fect. Our author's Hiftory, when completed, confifted of 138 books, comprehending the events from 1545 to 1607. No perfon could be better qualified for undertaking fuch a work; and when we confider his native candour and love of truth, no one was more likely to execute it with impartiality. Mr. Hayley, in his "Effay on Hiftory," has with equal juftice and eloquence characterized this illuftrious writer in the following lines:

"There, in the dignity of virtuous pride,
Thro' painful fcenes of public fervice try'd,
And keenly confcious of his country's woes,
The liberal fpirit of Thuanus rofe:
O'er earth's wide ftage a curious eye he caft,
And caught the living pageant as it paft:
With patriot care moft eager to advance
The rights of nature, and the weal of France!
His language noble, and his temper clear
From faction's rage, and fuperftitious fear!
In wealth laborious! amid wrongs fedate!
His virtue lovely, as his genius great!
Ting'd with fome marks that from his climate fpring,
He priz'd his country, but ador'd his king;
Yet with a zeal from flavifh awe refin'd,
Shone the clear model of a Gallic mind."

To this work De Thou has annexed "Commentaries or Memoirs of his own Life."

Having loft his firft wife in 1601, whofe virtues he celebrated in a Latin poem; and having no iffue, he married, in 1603, a fecond wife, of a noble family, by whom he had three fons and three daughters, and fhe died in 1616. This lofs, and the calamities that befel his country on the murder of Henry IV., are fuppofed to have haftened his own death, which happened in 1617, at the age of 64 years. His library, which was very valuable, and which by his will was to have been kept undivided in his family, was neverthelefs fold after the death of one of his fons. The moft complete edition of De Thou's Hiftory is that publifhed at London in 1733, by Buckley, in 7 vols fol. with memoirs of his life, and other pieces not before publifhed. Dr. Mead, always diftinguifhed as the munificent patron of letters, contributed to render this edition peculiarly valuable, by the purchafe of Carte's papers, which he had collected during his refidence in France.—Mem. of De Thou, by himfelf. Moreri. Nouv. Dict. Hift. Gen. Biog.

The eldeft fon of De Thou, *viz. Francis Auguftus de Thou*, born in 1607, inherited the virtue and talents of his father, and became a mafter of requefts, and afterwards grand-mafter of the royal library, and acquired, by the gentlenefs of his manners and profound learning, general efteem. But falling under the difpleafure of cardinal Richelieu, he was kept out of all confidential employments; and by this flight he was induced to join the party of the favourite Cinqmars, who entered into a fecret negociation with Spain. De Thou was implicated in the confpiracy, and capitally condemned. He was beheaded at Lyons, in 1642, at the age of 35, dying with great refolution, and univerfally lamented; a victim to the vindictive feeling of Richelieu, becaufe his father, in his Hiftory, had fpoken in opprobrious terms of one of his family.

THOUARCE', in *Geography*, a town of France, in the department of the Mayne and Loire; 12 miles S. of Angers.

THOUARE', a town of France, in the department of the Lower Loire; 5 miles N.E. of Nantes.

THOUARS, a town of France, and principal place of a diftrict, in the department of the Two Sevres, near the river Thoue. The place contains 2035, and the canton 13,950 inhabitants, on a territory of $317\frac{1}{2}$ kiliometres, in 24 communes; 31 miles W. of Poitiers. N. lat. 46° 58'. E. long. 0° 8'.

THOUE, a river of France, which runs into the Loire, a little below St. Florent.

THOUGHT, Sentiment, a general name for all the ideas confequent on the operations of the mind, and even for the operations themfelves.

As, in the idea of thought, there is nothing included of what we include in the idea of an extended fubftance; and that whatever belongs to body, may be denied to belong to thought; we may conclude, that thought is not a mode of extended fubftance, it being the nature of a mode not to be conceived, if the thing, of which it is the mode, be denied. Hence we infer, that thought, not being a mode of extended fubftance, muft be the attribute of fome other fubftance very different.

F. Malebranche, with the fpirit of a Cartefian, denies that a man who thinks ferioufly on the matter, can doubt but that the effence of the mind confifts altogether in thought, as that of matter does in extenfion; and that, according to the various modifications of thought, the mind fometimes wills, fometimes imagines, &c.; as, according to the various modifications of extenfion, matter is fometimes water, fometimes wood, fire, &c. By the way, by thought he does not mean the particular modifications of the foul, *i. e.* fuch or fuch a thought, but thought, or thinking in the general, confidered as capable of all kinds of modifications, or ideas; as by extenfion he does not mean fuch or fuch an extenfion, as a fquare, oval, or the like, but extenfion in the abftract, confidered as fufceptible of all kinds of modifications or figures.

He adds, that he takes it to be impoffible to conceive a mind which does not think, though it be eafy to conceive one which does not feel, or imagine, or will; in like manner as it is impoffible to conceive a matter which is not extended, though it be eafy to conceive one that is neither earth nor metal, nor fquare, nor round, nor that is even in motion.

Hence it may be concluded, that as it is poffible there may be matter which is neither earth nor metal; nor fquare, nor round, nor even in motion; it is alfo poffible, that a mind may neither perceive heat nor cold, nor joy nor grief, nor imagine any thing, nor will any thing; fo that thefe modifications are not effential to it. Thinking alone, therefore, according to this author, is the effence of the mind, as extenfion alone is the effence of matter.

But this doctrine is not now generally received. The followers of fir Ifaac Newton, and the new philofophy, deny extenfion to be the effence of matter; and the followers of Mr. Locke deny thought to be the effence of the mind.

Thoughts, or *Thaughts*, in a *Boat*, a name given by feamen to the benches on which the men fit down to row.

THOUINIA, in *Botany*, a noble genus, though confifting of only one known fpecies, fo named by the writer of this, in grateful remembrance of his diftinguifhed friend M. André Thouin, member of the Inftitute, and at prefent Profeffor of Agriculture at Paris. This gentleman is one of the original foreign members of the Linnæan Society, and ranks among the beft and moft philofophical cultivators, as well as botanifts, of this or any age. The prefent plant was felected out of the large and fine collection of new and rare fpecimens, given by himfelf to the younger Linnæus, chiefly from the herbarium of Commerfon. We were not aware of its having been named *Humbertia* by its difcoverer, or Endrachium by Lamarck (fee the latter article); where we have remarked that the name is barbarous; we fhould therefore not have adopted it, if known. *Humbertia* is not accounted for, there being no botanift on record of the name of Humbert, nor has any body explained or defended this appellation. The younger Linnæus had indeed eftablifhed a *Thouinia*, *Suppl.* 9, after Thunberg; neither of them fufpecting their plant to be a real *Chionanthus*, the *zeylanica* of *Linn. Sp. Pl.* 11. Swartz moreover, in his *Prodr.* 14, added a fecond fpecies to this fuppofed genus, which he afterwards diftinguifhed from it, by the name of Linociera, under which head our doubts refpecting even that matter are recorded. Confidering therefore our original name no more juftly fuperfeded than our genus, we cannot allow it to give place to M. Poiteau's *Thouinia*, *Ann. du Mufée fafc.* 13, though De Theis has decided otherwife.—Sm. Plant. Ic. 7. Schreb. 793. Willd. Sp. Pl. v. 1. 935. Mart. Mill. Dict. v. 4. (Endrachium; Juff. 133. Humbertia; Lamarck Dict. v. 1. 356. Illuftr. t. 103.)—Clafs and order, *Pentandria Monogynia*. Nat. Ord. *Convolvuli*, Juff.

Gen. Ch. *Cal.* Perianth inferior, permanent, of five roundifh, coriaceous, concave leaves; the three outer ones moft thick and rugged, naked; two inner membranous at the margin, filky at the back. *Cor.* of one petal, twice the length of the calyx, bell-fhaped, plaited, externally briftly; its margin in five triangular blunt fegments. *Stam.* Filaments five, awl-fhaped, fmooth, declining, twice the length of the corolla, and inferted into its bafe; anthers incumbent, heart-fhaped, of two lobes. *Pift.* Germen fuperior, ovate, very hairy; ftyle of the length, figure, and fituation of the ftamens, a little fwelling upward; ftigma obtufe, notched. *Peric.* Berry globofe, coriaceous, ftanding on the permanent calyx, of two cells. *Seeds* two in each cell, triangular, fomewhat ovate.

Eff. Ch. Calyx inferior, of five unequal leaves, permanent. Corolla of one petal, bell-fhaped; externally briftly. Style fimple. Berry coriaceous, of two cells. Seeds two in each cell.

Obf. We fee no reafon to adopt Juffieu's or Lamarck's idea of this fruit. They call it a coriaceous, or woody, *capfule*, which does not burft. Commerfon, who alone has examined it frefh, denominates it a *drupa*, which term we would reftrain to pulpy fruits with a fingle *nut*, and therefore we judge the prefent to be a *bacca*, however tough or dry its fubftance may appear when dry.

1. T. *fpectabilis*. Beautiful Thouinia. Sm. Pl. Ic. t. 7. Willd. n. 1. (Humbertia madagafcarienfis; Lamarck n. 1. "H. æviternia; Commerf. MSS. et Ic. Endrach-Endrach; Flac. Hift. Madagafc. 137. f. 100. Arbre immortel.")—Native of Madagafcar; unknown in the gardens of Europe. A tall and large *tree*, whofe wood is yellowifh, compact, heavy, as hard as iron, and almoft incorruptible even under ground. *Lamarck.* The *branches* are round, fcarred, filky towards the ends, where they bear tufts of *leaves*, intermixed with axillary *flowers*. The *leaves* are fcattered, two or three inches long, obovato-lanceolate, obtufe, entire, fmooth and fhining, with a ftrong mid-rib, on channelled filky *footftalks*, without *ftipulas*. *Flowers* on folitary, axillary, fimple *ftalks*, rather fhorter than the leaves, each with a pair of fmall *bracteas* about the middle. Of the colour of the *corolla* we have no account; its length is about an inch; and the filky hairs on the outfide, in a dry ftate, are of a fhining brown. *Fruit* the fize of a fmall plum.

THOUN, in *Geography*, a town of Perfia, in the province of Khoraffan; 75 miles W. of Herat.

THOURY, a town of France, in the department of the Eure and Loire; 3 miles E. of Janville.

THOUSAND. See Numeration.

Thousand *Years' Reign*. See Millennium.

Thousand *Iflands*, in *Geography*, a clufter of fmall iflands in the Straits of Sunda. S. lat. 5° 33′. E. long. 106° 33′.—Alfo, a number of fmall iflands in the river St. Laurence, a little below lake Ontario; the part of the river being called Thoufand Ifland Lake.

Thousand *Lakes*, a name given to a number of fmall lakes in America, near the river Miffiffippi; 60 miles above St. Anthony's Falls.

Thousand *Rocks*, rocks in the river St. Laurence; 72 miles S.W. of Montreal.

THOWLES, in a *Boat*. See Tholes.

THOYNARD, Nicholas, in *Biography*, a native of Orleans, was born in 1629, and at an early age a proficient in the learned languages, and in medallic fcience. His own original works were few, but he was liberal in the affiftance he afforded to other writers. He publifhed two fhort Latin differtations on particular medals, and notes upon "Lactantius de Mortibus Perfecutorum," and alfo a Critique on R. Simon's tranflation of the New Teftament; but his principal performance was "A Concord of the Four Evangelifts," in Greek and Latin, which was printing at the time of his death at Paris in 1706, and appeared in 1707, with learned notes, chronological and hiftorical. In this work he maintains that St. Matthew, of all the evangelifts, paid the leaft regard in his narrative to the order of time. This work was printed at confiderable expence, and is now rare. Moreri.

THOYT. See Thaut.

THRACE, in *Ancient Geography*, an extenfive country of Europe, fituated in the S.E. Its natural boundaries are, on the S. the Ægean fea, the Propontis, and the Bofphorus of Thrace; on the E. the Euxine fea. Its limits to the N. and W. are not fo determinately afcertained. A penin-

A peninfula to the S., between the Melanic gulf and the Hellefpont, made part of the continent of Thrace, but it affumed the name of the Cherfonefus of Thrace.

The continent may be confidered as divided into fix parts: *viz.* 1. The part bounded to the W. by the river Melas, which difcharged itfelf into a gulf of the fame name. To the S. it had the Cherfonefus and the Propontide, and to the E. the Bofphorus of Thrace and the Euxine fea. The chief towns of this part were, on the borders of the Propontide, Ganos, Bifanthe or Rœdeftus, Perinthus called alfo Heraclea, Selymbria, Byfantium; and on the Euxine fea, Dercon, Salmydeffus.

2. The fecond part of Thrace extended from Melas to the Hebrus. It had feveral towns on the banks of the Hebrus, of which, the principal were Philipopolis and Adrianopolis, called alfo Oreftes, and Trajanopolis. The Hebrus took its rife in mount Hæmus, and difcharged itfelf into the Melanic gulf, near the town of Enos.

3. The third part lay between the Hebrus and the lake Biftonis to the W., confifting, according to fome authors, of two fubdivifions, *viz.* from the Hebrus to Liffus, and from Liffus to the lake Biftonis. On the fea-coaft was fituated Maronea, and in the interior of the country Scaptahyla, enriched by its mines.

4. The fourth part was narrow, and lay between the lake Biftonis and the Neftus to the W. The Neftus had its fource to the N.W. of mount Rhodope, and near it were the towns of Jamphorinum and of Nicopolis ad Neftum.

5. The fifth part was fituated N. of the Tæarus, a river which had its fource in the mountains S. of Delnetum, and not far from the Euxine fea, and which ran into the Hebrus on the left fide of it.

6. The fixth part lay N. of that part of the Hebrus which ran from Beffa towards the S.E. to Oreftis. In this part were the towns of Berœa and that of Cabyla, S. of the Hæmus.

The Cherfonefus of Thrace had for its boundaries to the S.E. the Hellefpont and a fmall portion of the Propontide; to the N. the continent of Thrace; to the N.W. the Cardiac or Melanic gulf; this is the peninfula of Romania; and a wall feparated it from the continent.

Thofe who feek the origin of the Thracians in the Old Teftament, trace them to Tiras, one of the firft defcendants of Japhet. But whatever was the origin of thefe ancient people, it is certain that they were warlike and ferocious, and lived very much like favages. They were divided into different hordes, like the ancient Scythians or modern Tartars. This country, on account of the coldnefs of its climate, attributed to its mountains, was regarded by the Greeks with a kind of horror.

Thrace, in the Notitia Imperii, is divided into fix provinces, *viz.* Europe, Rhodope, Thrace, Heminont, the fecond Mœfia, and Scythia. According to the Notitia of Hierocles, thefe fix provinces contain 53 cities, of which the Thrace of Europe contained 14.

Thrace was anciently governed by kings; of thefe, the firft who gave them laws for regulating and civilizing their manners was Zamolxis, a difciple of Pythagoras. Our limits will not allow us to trace its fubfequent hiftory, as far as it is known. The whole, or various parts of this country were poffeffed by Philip of Macedon, by the Athenians, by the Lacedæmonians, and by Alexander, who made a conqueft of the whole country, nor did they recover their liberty till after his death. Lyfimachus, one of the fucceffors of Alexander, was vanquifhed by a defcendant of one of the ancient fovereigns of Thrace. But the tranquillity of the country was of fhort duration; for a party of Gauls, under Brennus, ravaged Greece, and took poffeffion of Thrace. The Thracians afterwards exterminated the Gauls, and reftored the race of their ancient kings. This prince, whofe name was Seuthes, and his defcendants, reigned without interruption till the time of Vefpafian, who reduced Thrace into a Roman province. It afterwards became fubject to the Turks, who now poffefs it. See ROMANIA.

THRACES, or THRACIANS, in *Antiquity*, were an order of gladiators, reputed to be the moft fierce and cruel of all. They were fo called, either becaufe they were natives of Thrace, or wore armour after the manner of that country. The particular weapon they ufed was the *fica*, or faulchion, and their defence confifted in a *parma*, or a little round fhield, proper to their country.

THRACIA GEMMA, a ftone mentioned by Pliny, and defcribed by him to be of three kinds: the one of a plain green, but a confiderably deep and ftrong colour; the other of a paler green, without variegation; and the third fpotted with blood-coloured fpots. This is a fhort defcription, but the ftone feems to have been a jafper, of the nature of our green Oriental jafper and heliotrope.

THRACIUS LAPIS, in the *Natural Hiftory of the Ancients*, a ftone often mentioned, and firft called *Benæ lapis*, from the place where it was firft found, which was in the neighbourhood of Bina, or Bena, a town in Thrace. It has been by fome authors allowed a place in the catalogues of the materia medica; but it is impoffible for us to fay, with any certainty, which, of feveral fubftances now known (which all anfwer in fome degree to the accounts left us of it) is the real body they meant by that name.

It was an inflammable body, found in mines, and in the beds of rivers; and, in burning, afforded a very offenfive fmell.

Some of the late authors have fuppofed it was our common pit-coal the ancients expreffed by this name; others, that it was jet; and others, the common cannel coal. Hill's Theophraftus, p. 34.

THRANITÆ, in the *Roman Trireme-gallies*, or thofe which had three rows of rowers; thofe of the upper row were called by this name, the fecond the *zygitæ*, and the loweft *thalamitæ*.

The *zygitæ*, or middle row of men, in thefe veffels, took up but very little room, having a conveniency of moving their hands and oars under the feats of thofe who fat next before them. See ENNERIS and POLYCROTA.

THRAPSTON, in *Geography*, a fmall market-town in the hundred of Navisford, and county of Northampton, England; is fituated on the fouthern banks of the river Nen, 22 miles N.E. by E. from the town of Northampton, and 75 miles N.N.W. from London. The town, in general, is well-built; and at the weft end is a handfome ftone bridge croffing the Nen. By this river a confiderable trade is carried on with Lynn, Northampton, and various other towns in its courfe. The country round Thrapfton is open, and affords extenfive profpects: from an eminence, half a mile to the fouth-eaft, may be feen at one view thirty-fix church towers and fpires. An annual court-leet and court-baron is held here; at which are appointed the governing officers, a conftable, and a thirdborough; and alfo bread-weighers, whofe office is to fee that the bread, butter, and every other marketable commodity, is good and of juft weight. A well-fupplied market is held on Thurfdays; it is the largeft mart for hogs in the country: that branch alone returns every market-day, on an average, about 500*l.* Here are alfo two annual fairs, befides a large market, equal to either of the fairs, which is held yearly at Michaelmas. The population return of the year 1811, ftates the number of houfes in this town to be 133, occupied by 708 perfons. It appears from Leland, that there was formerly a monaftic eftablifhment here. He fays, "At the very end of Thrapefton bridge ftand ruines of a very large hermitage, and principally welle buildid, but a late difcoverid and fuppreffid."—Beauties of England and Wales, vol. xi. Northamptonfhire; by J. Evans and J. Britton.

THRASEA Pætus, in *Biography*, a Roman fenator, who deferves to be recorded for his integrity and patriotifm, was a native of Padua; educated in Stoical tenets, and a great admirer of Cato of Utica, whofe life he compofed. As a fenator, he was a ftrenuous affertor of the liberty that remained under imperial defpotifm, and on this account he expofed himfelf to the obloquy of all the fycophants of power. His integrity commanded the acknowledgment of Nero, the execrable tyrant who put him to death, and many inftances occur of his undaunted fortitude in maintaining it. We can only felect the following: After Nero had committed the deteftable crime of matricide, when the fervile fenate was decreeing folemn thankfgiving and annual feftivals to commemorate the event, Thrafea, who, we are told, had been accuftomed to fuffer other adulations to pafs in filence, or with a flight affent, marked the profligacy of thefe motions by walking out of the fenate-houfe; thus openly expofing his life to a danger which he contemned; for, conformably to the Stoical principles, he was ufed to fay, 'Nero may kill me, but he cannot hurt me.' But though Thrafea often efcaped the brutal vengeance of this imperial tyrant, his fate was at length decreed. In the year 66, the 13th of Nero, this monfter having imbrued his hands in the blood of many of the moft illuftrious Romans, now refolved, fays Tacitus, to extirpate virtue itfelf, by the deftruction of Thrafea Pætus and Barcas Soranus. The amount of the charges againft Thrafea only evinced his contempt of the bafe adulation of the fenate, and his difpleafure with the vices and enormities of the reign. No defence could be of any avail, and therefore Thrafea prepared in filence to fubmit to his fate. When the determination of the fenate was announced to him, he was in his garden furrounded by a number of illuftrious perfons of both fexes, and attentively liftening to Demetrius, a Cynic philofopher, who was difcourfing on the nature of the foul, and its feparation from the body. Having received the decree of the fenate, he retired into his bed-chamber, and laid bare the veins of both arms, and then bled to death. Tacit. Annal. Suetonius. Dion Caff. Plin. Epift.

THRASHING, &c. in *Agriculture*. See Threshing.

THRASOS, a term ufed by Hippocrates, to exprefs a wildnefs and fiercenefs in the eyes of perfons who approach to a delirium.

THRASYBULUS, in *Biography*, an eminent Athenian, was the fon of Lycus, and the reftorer of liberty to his country. When the government of the 400 fucceeded the overthrow of the democracy in the year B.C. 411, he was commander of a galley; and in connection with Thrafyllus, he deftroyed the ariftocracy in the camp at Samos, and re-eftablifhed democracy there, and then propofed the recall of Alcibiades, in exile at Magnefia, and reftored him to his country. Thrafybulus and Thrafyllus, having purfued the Peloponnefian fleet, brought it to an action in the ftraits between Seftos and Abydus, in which the Athenians captured 20 fhips of the enemy, with the lofs of 15 of their own. Another engagement foon after occurred, and the refult of the arrival of Alcibiades's fquadron was a complete victory on the part of the Athenians. When Alcibiades was made general of the Athenian forces both by fea and land, he nominated Thrafybulus for one of his colleagues; but a mifunderftanding afterwards taking place between them, Thrafybulus impeached Alcibiades before an affembly of the Athenians, and procured his difgrace. On occafion of the eftablifhment of the thirty tyrants at Athens by the influence of the Lacedæmonians, Thrafybulus was one of feveral other citizens who took refuge in the Theban territory; and zealous for the emancipation of his country from fervitude, he engaged a fmall body of fugitives to join him in an expedition to Attica, and took poffeffion of the important fortrefs of Phyla, on the frontiers of Bœotia. Befieged by the Greeks, Thrafybulus by his activity repulfed them, and even followed them in diforder to Athens. Having alfo furprifed a poft which they occupied near Phyla, the thirty tyrants removed from Athens to Eleufis, and Thrafybulus feized this opportunity of attacking the Piræus, and his enterprife fucceeded. He then iffued a proclamation, animating the Athenians to refift their tyrants, and to reftore a free government. Having done this, he eftablifhed himfelf in the Piræus. The conftitution of Athens was then changed, by fubftituting inftead of the thirty tyrants, ten magiftrates, one from each tribe. The Lacedæmonians ftill retained their influence over thefe magiftrates, who fent to Sparta foliciting affiftance againft Thrafybulus. At length, however, this refolute commander prevailed fo as to open a negotiation between the Athenians and the Spartan government, which terminated in the withdrawing of the Spartan garrifon, and the re-eftablifhment of a popular conftitution at Athens. This happy clofe of the conteft was followed by the union of citizens of both parties, in a folemn thankfgiving to Minerva at her temple in the citadel, when Thrafybulus exhorted them to future concord. The remaining tyrants at Eleufis endeavoured to foment diffenfions in Athens; but the bufinefs terminated in an act of amnefty or oblivion, which was paffed by the influence of Thrafybulus in the affembly of the people, and ratified by an oath. This revolution happened in the year B.C. 401. In accomplifhing this event, Thrafybulus acted with the moft difinterefted patriotifm; for the thirty tyrants, when he feized the caftle of Phyla, had offered to make him one of their number, and to pardon any twelve of the exiles whom he might name; to which offer he replied, that exile was much more honourable than any civil authority purchafed on fuch conditions. Thrafybulus remained for fome time in unmolefted retirement, enjoying the honour accompanying the olive wreath, which, according to the fimple manners of the age, was beftowed upon him for his fervices. But in the year B.C. 390, after the death of Conon, the foreign poffeffions and influence of the Athenians were in danger of being loft; and therefore a fleet of forty fhips was placed under the command of Thrafybulus, with which he failed to the Hellefpont. On this occafion he induced two Thracian princes to become allies to Athens, and compelled the Byzantines and the inhabitants of fome other cities to abolifh their ariftocratical governments, and accept of the Athenian model and alliance. He next proceeded againft the ifle of Lefbos, in the Lacedæmonian intereft, and reduced the whole ifland to obedience. Thence he failed for Rhodes, having previoufly raifed fupplies from the maritime towns of Afia, and the capital of Pamphylia. He alfo indulged his men in private pillage; and thus fo much provoked the inhabitants, that they made an attack in the night on the tents, and put a number of the Athenians to the fword, among whom was Thrafybulus himfelf. Such was the inglorious termination of a life that had been devoted to the benefit of his native country. Corn. Nepos. Un. Hift. Gen. Biog.

THRAVE, or Threave, *of Corn*, in moft parts of England, is twenty-four fheaves, or four fhocks of fix fheaves to to the ſhock: though, in ſome counties, they only reckon twelve ſhocks to the thrave.

King Athelſtan, anno 923, gave by charter, to St. John of Beverley, four thraves of corn for every plough-land in the Eaſt Riding of Yorkſhire.

> "Ya fou *threve* be heaven king,
> Of ilka plough of eſt riding."

THRAUPIS, in *Ornithology*, a name given by many authors to the bird more commonly called citrinella.

THRAUSMA, a name given by the ancients to a kind of gum ammoniacum, which was drier than the common, and more eaſily crumbled to pieces.

THRAUSTOMICTHES, in *Natural Hiſtory*, the name of a genus of compound earths. The word is derived from the Greek θραυστος, *brittle*, and μιχθεις, *mixt*.

The bodies of this genus are loams compoſed of ſand and a leſs viſcid clay, and are therefore of a friable or crumbly texture.

The earths of this genus are generally uſed to make bricks; and there are ſeveral ſpecies of them. Hill.

THREAD, in the *Linen Manufacture*, a ſmall line or twiſt of flax, the weaving of which compoſes cloth. There is a ſtronger kind made uſe of to ſew the ſeams of linen garments, or to mend them. The ſame term is applicable to cotton or wool. See SPINNING.

Thread, ſays an eminent French writer (Pajot des Charmes), bleached by the oxygenated muriatic acid, may be uſed by the ſempſtreſs with much greater ſpeed and briſkneſs than thread of the ſame quality bleached in the field: it is leſs brittle, and may be ſtruck much more effectually home to its place in weaving, and does not move afterwards. This information, he ſays, was received by him from impartial and unprejudiced manufacturers.

The thread of the Laplanders is very fine, white, and ſtrong, but it is of a very different nature from our's; they know nothing of flax or hemp, nor of any other plant whoſe ſtalks might ſupply the place of theſe in making thread, but their's is made of the ſinews of the rein-deer.

They kill of theſe animals a very great number continually, partly for food, partly for the ſkins, which they uſe in clothing themſelves, covering their huts, and on many other occaſions; the ſinews of all they kill are very carefully preſerved, and delivered to the women, whoſe province it is to prepare this neceſſary matter. They beat the ſinews very well, after having ſteeped them a long time in water, and then they ſpin them out.

The thread they thus make is of any degree of fineneſs they pleaſe; but it is never any longer than the ſinew from which it is made. They uſe this in ſewing their clothes, ſhoes, gloves, &c. and the trappings of their rein-deer. The threads of the ſame ſinew are laid up together, and are all of a length; and as the different ſinews afford them very different lengths, they accordingly pick out ſuch as the preſent uſe requires, both in regard to length and fineneſs. This ſort of thread is made with much more labour than our's; but it is greatly ſuperior to it on many occaſions, where ſtrength is rather required than beauty.

Theſe people have, beſides this, a way of making a ſort of yarn of ſheep's wool, which they weave into garters and a ſort of ribbands, uſed by way of ornament; but they place no value on it, becauſe of its want of ſtrength. Scheffer's Hiſt. Lapland.

THREAD, in *Botany*, is underſtood of thoſe capillaments uſually found in the middle of flowers, as in the lily, tulip, roſe, &c. There are two kinds; thoſe which ſupport apices, are particularly called *ſtamina*; and thoſe which have none, *piſtilla*.

THREAD, *Gold*. See GOLD.

THREAD, *Virgin's*. See VIRGIN.

THREADS, *Air*, a term uſed by ſome to expreſs thoſe fine long white filaments, or thready ſubſtances, which we meet with in vaſt numbers floating about in the air in Auguſt and September.

The world has been much perplexed about the generation of theſe, till it was known that they were the work of ſpiders, and that they ſerved thoſe creatures to move from place to place by. They are long, downy, and very ſoft, and though they hold together when untouched, they ſtick to the fingers in handling, and eaſily break with a light touch.

The general method of theſe creatures ſpinning and weaving the webs, is by letting down the thread, then drawing it after them, and ſo diſpoſing it as they think proper; but in the midſt of their work of this ſort, if they are cloſely obſerved, they will be ſometimes found to deſiſt, and turning the tail to the contrary way of the wind, they will emit a thread with great violence, no leſs than that with which a jet of water is diſcharged from a cock. In this manner they continue darting forth the thread, which the wind takes, and carrying it forwards, it ſoon becomes many yards long. Soon after this the creature will throw herſelf off from the web, and truſting herſelf to the air with this long tail, will aſcend ſwiftly, and to a great height with it. The fragments of theſe lines, or the whole lines, and the ſpiders attached to them, though unobſerved, make theſe air-threads, and the uſe nature deſtines them for, is evidently the wafting of the creature along the air, and giving it an opportunity of preying on gnats, and many other inſects that inhabit the air, out of the reach of theſe creatures by any other means.

When the threads are newly ſpun, they are always ſingle, and are generally ſeen aſcending higher and higher in the air; but when they are ſeen coming down, they are found ſometimes compoſed of three or four others, and either without any ſpider at the ends, or with two or three, or more. It is plain that this happens from the meeting of theſe threads one with another in the air, and their tangling together; and this incommodes the creatures, and brings them down.

Theſe are what fill the air with the looſe threads we ſee in autumn; and as theſe ſoon entangle together, and bring one another down, it is no wonder that they are more frequent in the lower regions of the air, than thoſe with the ſpiders adhering to them, which uſually riſe to great heights, and ſuſtain themſelves there. And hence the origin of the threads was much perplexed among the enquirers, becauſe they were found without any mark of the animal to which they owed their exiſtence. The buſineſs of feeding is not all the uſe of theſe threads, but the creatures evidently ſport and amuſe themſelves by means of them, floating about in the air, and changing height and place at pleaſure.

When a ſpider has once raiſed itſelf from the earth in this manner, it does not deſcend always on the ſame thread it aroſe by, but draws that up at times, and winds it up into a hank with its fore-feet, and darts out another by way of ſupport; and the new thread is made more or leſs long, as it is intended for a higher or lower flight. Philoſ. Tranſ. N° 50.

THREAD *of Glaſs* may be obtained of indefinite minuteneſs by means of the blow-pipe. When no thicker than fine

fine hair, it is extremely flexible and elastic; and if still finer, it may be wound almost like common thread without breaking. The way of doing it is very simple. A piece of glass tube is heated in the lamp, and the end drawn out into a thread by means of another piece of glass cemented to it. When a fine thread is once drawn, the end is carried round a reel or wheel two or three feet in diameter, and by turning the wheel and continuing to heat the tube, an endless thread is drawn out, winding round it as long as the artist pleases or the glass lasts. The quicker the wheel revolves, and the hotter the glass is kept, the finer is the thread, which may thus be made as delicate as a single silk-worm's thread, with extreme flexibility. Different coloured threads are made in this way by using very deeply coloured glasses instead of common glass.

Threads, in *Glass*. See Glass.

THREAF, in *Agriculture*, a term signifying a handful, a bundle, or a pottle, in different districts of the country.

THREATENING Letters, in *Law*. By statute 9 Geo. I. c. 22. amended by stat. 27 Geo. II. c. 15. knowingly to send any letter without a name, or with a fictitious name, demanding money, venison, or any other valuable thing, or threatening (without any demand) to kill any of the king's subjects, or to fire their houses, out-houses, barns or ricks, is made felony without benefit of clergy. This offence was formerly high treason, by 8 Hen. V. c. 6.

The offence of sending letters, threatening to accuse any person of a crime punishable with death, transportation, pillory, or other infamous punishment, with a view to extort from him any money or other valuable chattels, is punishable by stat. 30 Geo. II. c. 24. at the discretion of the court, with fine, imprisonment, pillory, whipping or transportation for seven years. Blackst. Com. book iv.

THREATS, a species of personal injury. Threats and menaces of bodily hurt, through fear of which a man's business is interrupted, are comprehended under this description. A menace alone, without a consequent inconvenience, does not constitute the injury; but, to complete the wrong, there must be both of them together. The remedy for this is in pecuniary damages, to be recovered by action of trespass, *vi et armis;* this being an inchoate, though not an absolute violence. Blackst. Com. book iii.

THREAVE. See Thrave.

Three *Chapters*. See Chapter.

Three *Legs*, *Compasses of*. See Compasses.

Three, *Ombre by*. See Ombre.

Three, *Rule of*. See Rule.

Three-*legged Staff*, an instrument consisting of three wooden legs, made with joints, so as to shut all together, and to take off in the middle, for the better carriage; and usually having on the top a ball or socket: its use is to support and adjust instruments for astronomy, surveying, &c.

Three-*pointed Pick*, in *Agriculture* and *Rural Economy*, a tool of the pick-kind, having the broad end formed in a three-toothed manner, about six inches in length, of great strength, and having the width, from the outsides of the teeth or prongs, of about six inches. The other end is formed in the gently curving ordinary one-pointed manner. When complete, it is provided with a handle of the strong wooden kind, inserted into the eye or socket of the head-part.

Three-*pronged Fork*, a name sometimes applied to the common fork which is employed for various purposes on farms. See Prong and Spud.

Three-*share Horse-hoe*, a light three-shared tool of the horse-hoe kind, for one horse, which is often found very convenient and useful in working the intervals of ridged turnip crops, and those of similar kinds, as well as for different other purposes of tillage husbandry.

It is constructed and wrought somewhat in the form and manner of the common plough, the hoe parts being so contrived and set as to pare and clean the sides and bottom of each of the ridges in the same operation. See *Horse-Hoe*.

Three *Brethren Hill*, in *Geography*, a town of Scotland, in the county of Selkirk; 5 miles N.W. of Selkirk.

Three *Brothers*, three islands in the Indian ocean. S. lat. 3° 44′. E. long. 62° 25′.—Also, three islands in the East Indian sea. N. lat. 10° 42′. E. long. 108°.—Also, three small islands on the coast of Guiana, in the mouth of the Essequibo.—Also, three small islands in the Indian sea, near the E. coast of Madagascar. S. lat. 13° 20′. E. long. 51° 10′.—Also, three small islands in the East Indian sea. S. lat. 5° 30′. E. long. 132° 15′.—Also, three small islands in the Atlantic, near Prince's island. N. lat. 1° 32′. E. long. 7°.—Also, three small islands in the East Indian sea, near the W. coast of Amboyna. S. lat. 3° 39′. E. long. 128° 18′.—Also, small islands in the East Indian sea, near the S.W. coast of Celebes. S. lat. 5° 25′. E. long. 119° 38′.—Also, small islands in the bay of Gunong Tellu, on the coast of Celebes. S. lat. 1°. E. long. 120° 27′.—Also, small islands in the Indian sea. S. lat. 6°. E. long. 71° 36′.—Also, three hills on the N.E. coast of Terra del Fuego; 9 miles W. of Cape St. Diego.—Also, three hills on the E. coast of New Holland, so called by captain Cook. S. lat. 31° 40′.—Also, three islands on the Spanish Main, near the Mosquito shore. N. lat. 11°. W. long. 82° 52′.

Three *Creek Run*, a river of Virginia, which runs into the Nottoway, N. lat. 36° 36′. W. long. 77° 12′.

Three *Hill Island*, a small island in the Mergui Archipelago. N. lat. 10° 13′.

Three *Hills Island*, one of the New Hebrides, in the South Pacific ocean, about 12 miles in circumference. S. lat. 17° 7′. E. long. 168° 35′. See Hebrides.

Three *Island Harbour*, a bay on the coast of Patagonia, in the Straits of Magellan; 8 miles N.N.W. of Batchelor's river.

Three *Islands*, small islands in the East Indian sea, near the E. coast of Bintang. S. lat. 1° 10′. E. long. 105° 2′.—Also, small islands in the Indian sea, near the coast of Africa. S. lat. 4° 50′.

Three *Islands Bay*, or *Harbour*, a bay on the E. coast of the island of St. Lucia.

Three *Kings*, an island in the South Pacific ocean, near the N. coast of New Zealand, discovered by Tasman. S. lat. 34° 12′. E. long. 172° 12′.

Three *Rivers*. See Trois *Rivières*.

Three *Rivers Harbour*, a bay on the E. coast of the island of St. John, in the gulf of St. Laurence. N. lat. 46° 8′. W. long. 62° 10′.

Three *Sisters*, three small islands on the W. side of Chesapeak bay.—Also, small islands in the East Indian sea. S. lat. 5° 42′. E. long. 105° 41′ 36″.

Three *Stone Oar*, a rock, near the W. coast of Cornwall. N. lat. 50° 11′. W. long. 5° 32′.

Three *Sugar Loaves*, small islands in the Mergui Archipelago. N. lat. 9° 13′.

THRELKELDIA, in *Botany*, has been so named by Mr. R. Brown, in memory of Dr. Caleb Threlkeld, a Dublin physician, who published a *Synopsis Stirpium Hibernicarum*

rum in 1727. This is an alphabetical catalogue, principally founded on the papers of Dr. Thomas Molyneux, or the communications of other people; nor does it, according to our judgment, entitle its editor to any ſcientific rank.—Brown Prodr. Nov. Holl. v. 1. 409.—Claſs and order, *Triandria Digynia*. Nat. Ord. *Holeraceæ*, Linn. *Atriplices*, Juſſ. *Chenopodeæ*, De Candolle, Brown.

Eſſ. Ch. Calyx pitcher-ſhaped, with an abrupt inner margin. Petals three, membranous. Stamens oppoſite to the petals, inſerted into the receptacle. Capſule membranous, imbedded in the pulpy permanent calyx. Seed ſolitary, ovate.

1. T. *diffuſa*. Spreading Threlkeldia.—Gathered by Mr. Brown on the ſouth coaſt of New Holland, and in Van Diemen's iſland, growing on the beach. This is a ſmall, diffuſe, ſmooth *ſhrub*. *Leaves* alternate, ſemicylindrical. *Flowers* axillary, ſolitary, ſeſſile, without *bracteas*. *Seed* furniſhed with albumen, which is embraced by the circularly inverted embryo. *Brown*. We have preſumed to take for *petals*, though by no means pertinaciouſly, what Mr. Brown, led by the analogy of the natural order of the plant, conſiders as mere ſcales belonging to the *calyx*.

THRENGI, or Threnges, in our *Ancient Cuſtoms*, a denomination given to vaſſals, but not thoſe of the loweſt degree, but ſuch as held lands of the chief lord; otherwiſe called *drengi*, or *drenches*.

"Quia vero non erant adhuc tempore regis Willielmi milites in Anglia, ſed threnges; præcipit rex, ut de eis milites fierent ad defendendam ferram: fecit autem Lanfrancus threngos ſuo milites, &c." Somm. Gavelk.

The name was impoſed by the Conqueror: for when one Edward Sharnbourn, of Norfolk, and others, were ejected out of their lands, they complained to the Conqueror, inſiſting that they were always on his ſide, and never oppoſed him; which, upon inquiry, he found to be true; and therefore he commanded that every one ſhould be reſtored to their lands, and be for ever after called *drenches*, or *threnges*. Spelm. Du-Cange.

THRENODY, Threnodia, formed of θρηνος, *mournful*, and ᾠδη, *ſong*, a mournful or funeral ſong.

THRESHER, in *Ichthyology*, a name ſometimes given to the ſea-fox.

Thresher, in *Agriculture*, a perſon employed in threſhing out grain and other ſeed crops by means of the flail. See Threshing, and Threshing-*Machine*.

THRESHING, the act of beating out the corn or other produce from grain or other crops. The flail was the implement formerly uſed for threſhing of corn, and which ſeparated the grain from the ſtraw and huſks effectually and expeditiouſly; but which is now become much too tedious and expenſive, as well as liable to many other objections, and always bruiſes a great many ſeeds, beſides leaving many in the ears. It has been attempted to avoid theſe inconveniencies by proper machines provided with a number of flails, or other parts anſwering the ſame purpoſe, made to move by the power of water, wind, ſteam, or horſes. Of theſe, various ſorts have been lately invented, and brought to very great perfection. See Threshing-*Machine*.

Although there are many different methods made uſe of in ſeparating the grain from the ear of the corn, that by the flail is the moſt general and common.

Sometimes two perſons threſh together: and where more than two are employed together, which is ſometimes the caſe, there muſt be frequent interruptions, and a conſequent loſs of time. It is ſuggeſted alſo, that the tool by which this ſort of buſineſs is performed, ſhould be well adapted to the ſize and ſtrength of the perſon who uſes it, for preventing prejudicial fatigue. The beſt method of attaching the different parts of the implement together, is probably, it is thought, by means of caps and thongs of good tough leather. Iron is, however, ſometimes employed. In the execution of the work, when the corn is bound into ſheaves, it is uſual for the threſhers to begin at the ear-ends, and proceed regularly to the others; then turning the ſheaves in a quick manner by means of the flail, to proceed in the ſame way with the other ſide, thus finiſhing the work in a quick eaſy manner by their becoming looſe and open.

It is, however, obſerved by the author of the "Experienced Farmer," that threſhing with the flail is uncertain when moſt carefully performed, for the threſher may beat a long time and not meet with every head, which with the machine it is hardly poſſible to miſs; and that the grain waſted by the uſe of the flail is certainly great. In ſhort, he is of opinion that the corn loſt by threſhing with the flail, is more than would pay for threſhing it by the machine all over the kingdom.

In ſome places it is the practice to threſh by the meaſure of grain, as the buſhel, quarter, &c. while in others it is done by the threave of twenty-four ſheaves, and in ſome by the day.

In whatever way the farmer has this ſort of buſineſs performed, there is always much neceſſity for his conſtant inſpection, in order to prevent the frauds and impoſitions that are too frequently practiſed upon him by the perſons engaged in the execution of it.

The flail practice, however, from its being ſo extremely ſlow, tedious, and expenſive, and at the ſame time requiring a great number of labourers, is perhaps only capable of being had recourſe to with advantage on the ſmaller kinds of grain-farms, that are cheaply ſituated in regard to the command of workmen, and where the expence of having large machines would be much too great for the quantity of grain which they produce. But even in theſe caſes, if the ſmall horſe or hand threſhing engines that are conſtructed on cheap ſimple principles, and which occupy but little room, ſhould be brought to perform the buſineſs in an eaſy, expeditious, and effectual manner, which ſeems not improbable from the improvements that have been recently made in this ſort of machinery, it will moſt probably be to the advantage of ſuch farmers to abandon it, as the ſaving in various ways muſt ſoon repay them the expence of the machine, and at the ſame time afford them a conſiderable profit.

It is moreover ſtated, that where threſhing is performed by the flail, expenſive barn-floors, either of the fixed or moveable kind, will conſtantly be neceſſary; but that the latter ſort may ſometimes be capable of being converted to other purpoſes, which may render it uſeful in other views and intentions, and thereby leſſen the heavy charge of providing them. See Threshing-*Floor*.

It is ſtated by the author of "Practical Agriculture," that the ſuperiority of the method by machinery over that of the flail is very conſiderable in many other reſpects, beſides thoſe of its executing the work in a much more clean and perfect manner, more cheaply, and with much greater diſpatch, ſo as to admit of the farmer being preſent during the proceſs in moſt caſes.

It has been further ſaid, that the flail is a tool which is only fit for the rude or ſavage ſtate of a people; while the threſhing by the machine can be performed at any ſeaſon, as when the weather is wet, and when no other ſort of work can be done, eſpecially of the out-door kinds; and it will employ women and children, or boys, as well as other forts of labourers. By the ufe of it, the farmer is enabled to get the advantage of markets, as he has thereby the power of felling and delivering almoft any quantity within a little time; and by threfhing out and placing the corn in a fecure ftore room or granary, the great lofs often occafioned by vermin may be wholly prevented and removed. Numerous other beneficial confequences may likewife refult from the practice of threfhing by means of machinery, but particularly that of faving the heavy expence of raifing and upholding many different large buildings of the barn kind, on extenfive farms of the arable defcription.

It may be ftated, that the writer of the Account of the State of Agriculture in the County of Kent, found, on having different parcels of wheat-ftraw, of thirty-fix pounds each, threfhed out clean by the flail, by different farmers, and the fame weight of ftraw threfhed after it came from the machine, the average produce of corn left in the ftraw by the common mode of threfhing was half a pint in every thirty-fix pounds of ftraw, more than that left in by the machine method. And that, befides, fufficient fupplies of both corn and ftraw may at any time be almoft immediately provided, either for the purpofes of feed, the market, or the feeding of animals, without the other operations of the farm being in any degree interrupted. It is likewife obtained with much lefs wafte of the grain, and with lefs danger of its being injured by being bruifed. Likewife, that from the then increafing fcarcity of labourers, the great advance in the price of labour in all the well-cultivated diftricts, and the impoffibility of having this fort of work performed in a clean and exact manner by the flail, the neceffity as well as utility of the machine are eftablifhed. And it is further contended, that the principal obftacles to machines of this nature being more generally made ufe of, are thofe of expence in their conftruction and erection, and the littering flovenly practice which prevails in fome of the more fouthern diftricts of harvefting or fecuring the grain crops in a loofe uneven manner. But the firft of thefe objections may probably, it is fuppofed, be obviated by the conftruction and introduction of hand, or one-horfe, or ox-threfhing machines; and the latter by the daily difcoveries that are making in the improvement of this fort of machinery.

It is conceived, that the oppofition that has been raifed againft this practice, on the ground of its being calculated to deprive and prevent the labourers of employment during the winter feafon, is fcarcely deferving of notice, as experience has fully fhewn that no injurious confequences can refult from it, as there muft always be work enough of other kinds at fuch periods, where farms are under a judicious mode of cultivation.

It is on the whole fuppofed, however, that the faving of expence in this mode of threfhing over that of the flail, muft differ much according to the nature and manner of conftructing the machinery, the power by which it is wrought, and alfo on the ftate and condition of the grain at the time of performing the operation, as well as the full manner and regularity with which it is fupplied and managed. By fome farmers it is confidered as nearly, if not quite, one half, while others make it much lefs than that proportion. But with the beft conftructed machinery, there can be little doubt but that it will be performed on an average of different forts of grain, and different ftates of them, at lefs than one-third the expence of the flail method, without taking into the account any thing for the vaft faving in grain, in which fome reckon a profit of at leaft 5 *per cent.*; others, as equal to the feed and prices of threfhing, which is fomewhat more than half the price in the flail method; or either of the other operations that may be performed at the fame time with the fame machinery, fuch as thofe of winnowing or cleaning the corn, cutting ftraw into chaff, bruifing and grinding the grain for cattle food, breaking bones for manure, and various other purpofes and works.

In addition to the advantages that have been chiefly confidered in refpect to thefe machines, there is another which, in the then fcarcity of procuring labourers, and indeed at all feafons and times, muft be of great importance to the farmer, which is that of their enabling him to perform his work with greater certainty and convenience, and at much lefs expence of labour. It has indeed been ftated by a writer, in a late periodical work on farming, that with a machine, two labourers on a farm will be equal to four without it; as they are left at liberty, during the winter months, for performing various other forts of farm labour.

It has already been noticed, that the charge of this fort of work with thefe machines will vary confiderably, according to the manner in which they are conftructed. In the Agricultural Survey of the County of Kent, the expences and produce of threfhing *per* day, in different forts of corn, with an engine of the common conftruction, without the late improvements, are ftated in the manner following:

Eftimate of Threfhing Expences, &c. by the Machine.

For Wheat.

	£	s.	d.
Eight men, at 1*s.* 4*d.* each - - -	0	13	4
Four boys, at 1*s.* each - - - -	0	4	0
Four horfes, at 2*s.* 6*d.* each - - -	0	10	0
Cleaning and meafuring 24 qrs. at 3*d.* each -	0	6	0
	1	13	4

This is about 1*s.* 4*d.* *per* quarter, or nearly half the price of the flail method.

For Barley.

	£	s.	d.
Cleaning and meafuring 32 qrs. at 3*d.* each -	0	8	0
Other expences, as above - - -	1	7	4
	1	15	4

This is fomewhat more than half the price of the flail method, this fort of grain having of late been ufually threfhed at about 1*s.* 6*d.* the quarter.

For Oats.

	£	s.	d.
Cleaning and meafuring 40 qrs. at 1*d.* each -	0	3	4
Other expences, as before - - -	1	7	4
	1	10	8

This is a little more than half the price of that by the flail; this fort of grain being commonly threfhed at about 1*s.* 3*d.* *per* quarter.

The expences are here, however, calculated confiderably too low for the fucceeding times, as the men would fince require 2*s.* or 2*s.* 6*d.* and the horfes 5*s.* or 6*s.* each at leaft for the day.

But in the improved machinery of this kind fewer hands are required, and a number of other operations are performed

formed at the ſame time, which greatly leſſens the expences of executing the work.

In threſhing with a powerful improved machine belonging to Mr. Harbottle, on the Riminham farm in Berkſhire, according to the writer of the Agricultural Report of that diſtrict, the comparative calculations of expence and ſaving ſtand as below.

Eſtimate for Wheat.

	£	s.	d.
A man to feed the machine with ſheaves, at *per* day	0	2	6
A woman to throw up the ſheaves into the ſheaf-ſhelf, at *per* day	0	0	8
A girl or boy to hand and unbind the ſheaves to the man who feeds, at the ſame	0	0	8
A man to riddle or ſift the corn from cockles, or ſmall chaff, at	0	2	6
A woman to aſſiſt him	0	0	8
Two men to remove the ſtraw, and to make it up into bundles, at 2*s.* 6*d.*	0	5	0
A boy to drive the horſes, and attend to their paces, at	0	1	6
In all eight perſons	0	13	6
Four horſes, at 7*s.* 6*d.* *per* day, a liberal allowance	1	10	0
Expence of threſhing 20 qrs. which is done in the day of 12 hours	2	3	6
Ditto by the flail, at 3*s.* 6*d.* *per* quarter, ſuppoſing a man can threſh a quarter in the day, which is too much	3	10	0
Saving by the machine in 20 qrs.	1	6	6
Or by the quarter	0	1	4

Eſtimate for Barley.

	£	s.	d.
Two men to feed and looſe bands, at 2*s.* 6*d.*	0	5	0
Two women to pitch up and ſupply machine, at 8*d.* each	0	1	4
Two women to riddle, at 8*d.*	0	1	4
Two men to remove ſtraw, at 2*s.* 6*d.*, and one boy ditto, at 1*s.* 6*d.*	0	6	6
One boy to drive	0	1	6
In all nine perſons	0	15	8
Four horſes, at 7*s.* 6*d.* each	1	10	0
	2	5	8
Uſual price by the flail, 2*s.* 2*d.* *per* quarter, 30 qrs. the quantity done in the day of 12 hours	3	5	0
Saving on the above quantity	0	19	4
Or by the quarter	0	0	8

Eſtimate for Oats.

	£	s.	d.
Nine perſons employed, as for barley, and the ſame number of horſes	2	5	8
Uſual price by the flail 2*s.* *per* quarter, on 40 qrs., the quantity done in the day of 12 hours	4	0	0
Saving on the above quantity	1	14	4
Or by the quarter	0	0	10½

It ſhould be noticed, that theſe calculations are made fully to the higheſt, which is ſo much the more in favour of the machine.

In ſome of the northern diſtricts, the execution of this ſort of buſineſs by the machine is ſometimes undertaken by labourers, the farmer finding horſes. By this method, in Yorkſhire, the work coſts for wheat 1*s.* the quarter, and oats 6*d.* And in Northumberland they make uſe of a machine, which threſhes at the rate of 33 buſhels *per* hour, or 264 in the day of eight hours. In this machine, the expences in the attendance of the threſhing and dreſſing parts of it being merely that of three women; one to feed in, another to hand the ſheaves to the feeder, and a third to take away and riddle the corn after it is winnowed; conſequently the threſhing and dreſſing the above number of buſhels only coſts 1*s.* 6*d.*, while the threſhing the ſame quantity by the flail would be $\frac{1}{25}$th part, or 10½ buſhels, which at 2*s.* the buſhel is 21*s.*; to which muſt be added 2*s.* for the expence of a man and two women to aſſiſt in winnowing, which makes in all 23*s.*

But in the Agricultural Survey of the County of Norfolk, there is an account of the expence of threſhing with the machine in compariſon with that of the flail, which furniſhes a very different reſult. The machine was built by a perſon from Leith in Scotland, for Mr. Bevan, and coſt 100*l.*; and ſtrongly ſhews, it is thought, that bad machines are worſe than the old method of the flail.

Threſhing by Means of the Flail.

	£	s.	d.
Forty coombs of barley, at 7*d.* come to	1	3	4
To dreſſing of ditto	0	2	0
	1	5	4
Fifty coombs of oats, at 6*d.*	1	5	0
Dreſſing ditto, at 1*s.* *per* ſcore	0	2	6
	1	7	6
Forty coombs of rye, at 9*d.*	1	10	0
Dreſſing ditto, at 1*s.* *per* ſcore	0	2	0
	1	12	0
Forty coombs of wheat, at 1*s.*	2	0	0
Dreſſing ditto	0	2	0
	2	2	0

Threſhing by the Machine.

	£	s.	d.
Forty coombs of barley take eight horſes, at 2*s.* 6*d.*	1	0	0
Ten men, at 1*s.* 6*d.* each	0	15	0
To dreſſing ditto, five men one day	0	7	6
	2	2	6
Thus barley coſts more by 17*s.* 2*d.*			
Fifty coombs of oats take eight horſes, at 2*s.* 6*d.*	1	0	0
Ten men, at 1*s.* 6*d.* each	0	15	0
To dreſſing ditto	0	7	6
	2	2	6
Thus oats coſt more by 15*s.*			
Forty coombs of rye take eight horſes, at 2*s.* 6*d.*	1	0	0
Ten men, at 1*s.* 6*d.* each	0	15	0
To five ditto, at 1*s.* 6*d.* one day dreſſing	0	7	6
	2	2	6
Thus rye coſts more by 10*s.* 6*d.*			

Forty

	£	s.	d.
Forty coombs of wheat take eight horfes, at 2s. 6d. - - - - - -	1	0	0
Ten men, at 1s. 6d. each - - - - -	0	15	0
Five ditto to drefling - - - - -	0	7	6
	2	2	6

And wheat cofts more by 6d.

The calculations of the expences are here made greatly under the rate of wages and hire of horfes which has fince taken place.

The above fhould lead the farmer to be careful in putting up thefe machines; and to be certain of their being conftructed in fuch a way, as to anfwer the purpofe in a perfect manner before he begins the work.

It is well obferved by Mr. Somerville, in the Agricultural Report of Eaft Lothian, in calling the attention of the public to the unrewarded merits of Mr. Mickle, in bringing the threfhing machine to a ftate of perfection, that it is computed, by thofe who have paid every poffible attention to the fubject, that in Britain about 7,500,000 acres are annually employed in raifing grain, the produce of which, if averaged at three quarters *per* acre, amounts to 22,500,000 qrs.; and, as it is admitted that the furplus quantity gained by the ufe of threfhing machines is at leaft a twentieth part more than when the flail is ufed, it will appear that 1,112,500 qrs. would be faved annually, were the whole of the grain in the kingdom threfhed in that way; the value of which, if only calculated at 32s. *per* quarter, would be 1,781,250l.; to which adding the favings of expence, at 1s. *per* quarter, upon 22,500,000 acres, *viz.* 1,125,000l., it would make the enormous fum of 2,906,250l. fterling; a fact almoft incredible to any but thofe who have turned their attention to the fubject, and are well acquainted with the great difference between the threfhing-machine and the flail.

All forts of grain fhould be in a proper, hard, dry condition, when it is to be threfhed out, otherwife the work cannot be performed in a clean and perfect manner, whether it is to be executed by the flail or the machine.

It is a remark of the time of Lifle, founded on his own extenfive experience, that wheat threfhed in damp weather generally yields but little flour, with a great deal of bran, when it is ground; and that if it be put into facks, it will grow mufty in lefs than three weeks, let the weather be ever fo dry afterwards: but if, on the contrary, it be threfhed when the air is perfectly clear and dry, it will keep well in facks for a long time, efpecially if thefe are laid upon treffels high enough to fecure them from the dampnefs of the ground or floor.

But for keeping of the meal or flour, in general, there is no better way than firft to bolt and clean it from the bran or hufks, which is apt to make it mufty, and then to tread it down as hard as poffible, and head it up clofely in clean, dry, tight, and well-bound cafks, which muft be laid in a cool dry place.

It may be noticed, that the beards of barley come off beft, in threfhing, when the fheaves or fwarths of this corn have taken the dew before their being houfed. It will keep well in the mow unthrefhed for one year; but for making it into malt, which muft be done before the heat of the fummer comes on, it fhould not be kept above a year and a half, or at moft two years: otherwife it will be filled with weevils or infects; unlefs it has been previoufly cured in a ftove or kiln.

But oats, from their being defended with a double hufk, are the grain leaft fubject to harbour vermin. The beft way to keep them after they are threfhed, which fhould be done when dry, is to dry them well on a kiln, and then to barrel them up in clean clofe cafks.

As for beans and peas, they always threfh beft after they have fweated in the mow, which they are very apt to do; as the whole crop of either of them never ripens altogether, the green parts heat, and communicate their ferment to the whole heap. The danger to be guarded againft is, that they do not heat too much. For this reafon, farmers generally choofe to ftack them without doors, rather than to houfe them; that they may be the more thoroughly dried by the fun and air. As beans are a very large feed, and confequently full of moifture, it is found beft to let thofe that are intended for keeping, fweat and feafon in the mow until March, when they may be threfhed without danger, for beans never give again, after they have once been thoroughly dried and hardened.

And vetches, when wanted for fowing immediately after they are cut, may be threfhed very well on a hurdle, with a cloth; though they then be too foft, notwithftanding their being ripe, to be threfhed on a floor, where the flail and the threfher's feet would bruife and break them.

In general, in the bufinefs of threfhing, as the work proceeds, it will from time to time be neceffary to remove all the long ftraw from the corn beaten out of it, which laft always lies underneath, with a prong or fork, and then the pieces of ftraw, broken ears, &c. with a wooden rake. The remaining grain fhould then be fhovelled up on one fide of the floor, and the work be repeated till enough be threfhed out to make what is commonly called a clearing. The heap fhould then be wholly paffed through a wide fieve, which retains only the bits of ftraw, and fuch fragments or ends of the ears as have efcaped the flail. Thefe frequently contain fome good corn, and form an ufeful fodder for moft forts of animals, being what are commonly called *cavings*, as feen below.

Much labour may often be faved in the ufe of the fieve by faftening a loop to its rim, and refting it thereby on a hook fufpended by a rope. This will fuftain half the weight of the corn, and the neceffary circular motion may more eafily be given to it.

After much threfhed grain has thus accumulated on the threfhing-floor, and the fhort ftraw and chaffy matter have been feparated from it, as juft noticed, by paffing it through a wide riddle or fieve for the purpofe, which fhould always be done before too much grain has been collected, as in that way the bruifing of it is more effectually prevented; it muft be put by to afford more room. The fhort chaffy fubftance thus feparated from the grain is in fome diftricts denominated *cavings*, or *caving-chaff*, and is capable of being employed with advantage, as feen above, in the feeding of horfes, or neat cattle and fheep. When this has been done, the loofe grain fhould be thrown into a chamber or other place conveniently formed for receiving it, where it fhould remain till a fufficient quantity has been collected to render the clearing and cleaning of it by fome kind of machine for the purpofe, requifite. But the improved threfhing machines render this unneceffary, as they drefs or clean it at the fame time it is threfhing out. See WINNOWING *Machine*.

Furze tops in their young ftates of growth are in fome northern fituations beat or threfhed by the flail, and in that way bruifed as horfe-food, where proper machinery for this purpofe is not at hand. The work-horfes during their ufe have little other food, it is faid, though performing great labour.

From the whole of what has been faid, it is evident that the farmer fhould always confider well before he decides on the mode of threfhing which may be the moft proper and advan-

advantageous, as well as the moſt ſuitable, to the ſort of farm which he holds.

Threshing-*Floor*, the floor on which grain is threſhed out in the barn or other place. All floors of this ſort ſhould be well formed and conſtructed, of whatever ſort of materials they are made, as without it they give way and fall to pieces. When the material employed in this intention is wood, the timber ſhould always be of the beſt kind, and well ſeaſoned, being put together in a careful and firm manner; and when of the earthy kind, the different matters be well reduced, wrought together, and laid up for ſome length of time before the floor is formed, being then laid down in a ſmooth even manner, and made firm and ſolid by frequent ramming with a proper tool for the purpoſe, until the flooring ſubſtance, whatever it may be, becomes quite dry.

It has been obſerved, that as grain is threſhed out by machinery, from the circumſtance of its being ſeparated from the ſtraw immediately, and not permitted to remain upon the floor for above an hour or two, when brought to market, is always much drier, looks better, and brings a higher price than that which is threſhed by the hand, and ſuffered to remain upon the floor for weeks, where it becomes muſty, loſes its colour, and is ſo raw, that much of it is bruiſed and rendered uſeleſs in the working. Therefore, if the flail-mode of threſhing is ſtill purſued, it is ſuppoſed that the inconveniences above-mentioned may, in ſome degree, be remedied, by paying proper attention to the materials of which the floor is made, and raiſing it ſufficiently above the reach of moiſture. Where the barns are very extenſive, and the price of wood uncommonly high, as is the caſe at preſent, a very good and durable threſhing-floor may ſometimes be made by laying an uniform ſtratum of round gravel, covering it with a coat of well-tempered clay; above which, a mixture of clay, brick-duſt, forge-aſhes, and a ſmall proportion of lime, will make it a hard uniform floor, proper and ſuitable for the purpoſe of threſhing upon. It is obſerved that the brick-duſt and forge-aſhes ſhould previouſly be beaten very ſmall, and well incorporated with the clay, uſing a ſufficiency of water to bring the whole to the conſiſtence of mortar; in that ſtate the lime, having been previouſly ſlaked, ſhould be incorporated with the other ingredients; the whole ſmoothed over with the back of the ſpade, and allowed to remain in a round heap for two or three weeks, at the end of which time it ſhould be turned over in the ſame manner as plaſter lime, and after being rendered ſufficiently ſoft with water, it may be ſpread upon the floor, an operation that will require ſome pains on the part of the workman. The floor, in the firſt inſtance, ſhould have the coat of clay, that is laid above the gravel, rendered perfectly ſmooth and uniform, by rolling, beating, or otherwiſe; the finiſhing coat, compoſed of the mixture above-mentioned, may then be applied, taking care to break the ſurface of the clay with ſhallow lines, in the way practiſed by plaſterers, for the purpoſe of making one coat adhere to another in a firm and perfect manner.

Many other ſorts of materials, ſomewhat of this nature, are made uſe of for threſhing-floors in different diſtricts of the kingdom.

The following plan has been ſuggeſted as the means of excluding rats and mice from the barn and threſhing-floors. Firſt, that when the floor is entirely of wood, the ſpace between the ſleepers, upon which the boards are laid, ſhould be entirely filled with waſhed gravel, well beat down, an operation which, when properly done, will effectually prevent the entrance of either rats or mice; where this precaution is not taken, when the floor is laid, openings ſhould be made at the bottom of the wall large enough to admit cats, a contrivance that will have the two-fold effect of deſtroying the vermin, and affording a free circulation of air. Secondly, that when the floor is of clay, the vermin generally burrow under the foundation, and have the entry to their retreats at the bottom of the wall: in ſuch caſes, their acceſs into the barn will be, in ſome meaſure, if not entirely, prevented, by mixing a conſiderable quantity of broken glaſs with the materials with which the threſhing-floor is made. It does not appear neceſſary to mix the glaſs with the clay over the whole floor; perhaps two feet from the wall quite round will be ſufficient. And thirdly, that the top of the wall, as furniſhing a temporary retreat for vermin, deſerves alſo to be noticed: in every inſtance it is cuſtomary for the maſon to level the top of the wall previous to the roof being put on, which, when the building is finiſhed, is left in that ſtate, by which a conſiderable ſpace remains for the ſhelter of rats and other vermin: to prevent this, as ſoon as the roof is finiſhed, the building of the wall on the inſide ſhould be continued upwards till it joins the roof, to which it ſhould be cloſely united by hard plaſtering. It is ſuppoſed, by theſe precautions, and ſmooth plaſtering, the walls of barns as well as the threſhing-floors may be preſerved free from vermin.

Threshing-*Machine*, an engine of the mill kind, contrived for the purpoſe of threſhing grain, ſeeds, and pulſe out of the ſtraw or the ear.

This is a ſort of mill or machine that has been chiefly conſtructed on the ſame principles as thoſe of the flax-mill, and which is capable of being wrought by different powers, as thoſe of horſes, oxen, wind, water, and ſteam; but thoſe of water and animals are the moſt proper and convenient in moſt inſtances: in ſome caſes, the grain being beaten or ſwingled out of the ears by means of beaters attached to a cylinder that has much velocity, while in others it is rubbed out by ſuitable means againſt confined cylinders, as will be more fully ſeen and explained in what is ſaid below.

There is ſome reaſon to ſuppoſe, that the original hint or notion of theſe mills or machines, was derived a long time ago from Holland or the Low Countries, and thence brought into the northern parts of this country, where the different parts of the machinery of them have ſince been gradually undergoing much modification and improvement, to render them more ſuitable and efficient for the purpoſe; ſo that they have now attained a conſiderable ſtate of perfection in moſt parts of the kingdom. The firſt of theſe improved machines was, as Mr. Somerville ſays, invented by a Mr. Menzies, brother to the then ſheriff *depute* of the county: the machinery was driven by a water-wheel, which put in motion a number of flails of the ſame kind with thoſe uſed in threſhing by the hand. Trials made with theſe machines were ſo far ſatisfactory, that a great deal of work was done in a given time, but owing to the velocity required to do the work perfectly, they ſoon broke, and the invention fell into diſgrace.

Some time in the year 1758, another attempt was made by a farmer in the pariſh of Dumblane, in Perthſhire. His machine was conſtructed upon principles ſimilar to the flax-mill, having an upright ſhaft with four arms incloſed in a cylinder, three feet and a half in height and eight in diameter, within which the ſhaft and its arms were turned with conſiderable velocity by a water-wheel. The ſheaves, being preſented by the hand, were let down from the top upon the arms, by which the grain was beat out, and together with the ſtraw deſcended through an opening in the floor, where they were ſeparated by riddles and fanners, alſo turned by the water-wheel.

And it is added, that, about twenty years after this, a third attempt was made by a Mr. Elderton, near Alnwick, and a Mr. Smart, at Wark, both nearly about the fame time. Their machines were fo conftructed as to act by rubbing, in place of beating out the grain. The fheaves were carried between an indented drum, about fix feet in diameter, and a number of rollers of the fame defcription ranged round the drum, towards which they were preffed by fprings, in fuch a way as to rub out the grain when the drum was turned round. Upon trial, this method of conftruction in thefe machines was alfo found defective, as along with its doing very little work in a given time, it bruifed the grain, and fo materially hurt its appearance, as to leffen its value confiderably in the markets.

It is further ftated that the machine, in its then imperfect ftate, was feen by the late fir Francis Kinloch, bart. of Glimerton, a gentleman well acquainted with mechanics, and who had paid much attention to country affairs: it occurred to him, that the machine might be rendered more perfect, by inclofing the drum in a fluted cover, and fixing on the outfide of it four fluted pieces of wood, capable of being raifed a little from the circumference by fprings, in fuch a way as to prefs againft the fluted cover, and to rub out the grain as the fheaves paffed between them; but after repeated trials, it was likewife found to bruife the grain nearly as much as the model from which it was copied. In that ftate it remained for fome time, and was afterwards fent by fir Francis to a very worthy and ingenious character, Mr. Mickle of Know-Mill, in his neighbourhood, (a millwright by profeffion,) who had for a confiderable time employed his thoughts upon the fame fubject. After much confideration, and feveral trials, it appeared to Mr. Mickle, that the purpofe of feparating the grain from the ftraw might be accomplifhed upon a principle different from any that had hitherto been attempted, namely, by fkutches acting upon the fheaves by their velocity, and beating out the grain, in place of preffing or rubbing it out. Accordingly a model was conftructed at Know-Mill, in which the grain was beat out by the drum, to which it was prefented through two plain feeding rollers, which were afterwards altered for fluted ones. The firft machine, on a large fcale, executed upon this principle, was, it is faid, done by a fon of Mr. Mickle's, for a Mr. Stein of Kilbagie, in the year 1786, which, when finifhed, performed the work to the fatisfaction of all parties. A patent was afterwards applied for and obtained in 1788. Since that period, as well as the firft introduction of thefe machines, many other improvements have been made on them by different ingenious artificers in many different places; a fcreen has been added for the grain to pafs through into a winnowing machine, and a circular rake to remove the ftraw from it; as before this addition, the ftraw was forced out from the beater upon the upper barn-floor, and required much time and labour in fhaking and putting it into order, which by this contrivance is faved. And befides having a fufficient degree of velocity, without its being fo great as to injure the machinery, it is found that a point upon which the clean threfhing of all forts of grain materially depends in the ufe of this machine, is the management of the iron covering, under which the beating-wheel, having fix or more beaters, moves: in fome machines this is fixed, while the beating-wheel is capable of being raifed or depreffed at pleafure; but a more late improvement is to render the iron roof moveable and the wheel fixed, the iron being placed fo clofe to the beaters, that the grain is rubbed as well as fhaken out of the ear. And in fome cafes the beaters are fomewhat rounded, but the flat form is probably better.

Different machines of this fort are alfo faid to have been lately conftructed fo as to work with chains inftead of cogs, and to perform the bufinefs in a fatisfactory manner. Another great improvement is likewife believed to have been made on the feeding rollers; which is that of having the upper roller, inftead of being one folid cylinder of wood, with rods of iron fixed upon it, as was formerly the cafe, an octagon or decagon of caft iron, and divided into four parts, which are loofely joined into each other, fo that in turning round, each part can rife or fall in a feparate manner, according as the corn is fpread out in a thicker or thinner way. The advantage is, that by means of this contrivance the corn is regularly held; whereas, by the roller being all of one piece, if at one part the grain fhould happen to be more in a heap or lump than at another, the whole roller is raifed, and a great part of the grain paffes through, without having been held fufficiently to the beaters, and is confequently imperfectly threfhed out.

This fort of machine is fometimes conftructed with a vertical fhaft, on which is fixed in a horizontal manner an iron bevil wheel, fix feet in diameter, which drives another about eighteen inches diameter upon a tumbling fhaft, upon which is alfo an iron fpur-wheel, three feet fix inches in diameter, driving one about ten inches upon a fhort iron fhaft, which likewife carries a drum or pulley, three feet fix inches in diameter, from which a fix-inch ftrap drives one nine or ten inches in diameter, hung upon the iron fhaft or fpindle which runs quite through the wood-beater or barrel, two feet in diameter, and three feet in length, having fixed upon it, by means of ftrong fcrews into its iron bonds, twelve wrought-iron bars, about an inch fquare, which beater making upon its horizontal axis about three hundred revolutions in a minute, and confequently nearly three thoufand fix hundred ftrokes in that fpace of time; the corn being carried to it by means of a cloth, which is moved forwards by rollers, lying nearly upon a flat furface of fix feet long, by three feet wide, two to three feet high from the ground-floor, which is a very convenient pofition to feed upon, and paffing between a pair of fluted rollers, over a bar, comes in contact with the beater, through a cavity, which may be varied by fcrews, from an inch in width, to the thicknefs of a grain of corn, when the ftraw is immediately delivered, perfectly clean upon the floor on the outfide of the machine, no more injured for thatch, or other purpofes, than by the flail, and the corn in its paffage under the beater is filtered through a wooden frame to the floor, where it remains for removal. Upon this kind of threfhing-machine many different trials have been made in the view of afcertaining what fort of power, conftruction, and velocity or fpeed, would produce the beft and moft beneficial effects on the work, and many improvements have been fuggefted which we have not room for reciting.

Some machines of this fort have large wooden fly-wheels, of from twelve to fifteen feet diameter, fixed upon the tumbling-fhafts, which run over or above the horfe's heads, perhaps made of fir-timber, as cork unfortunately is feldom to be met with; but as their fpeed, in fuch a fituation, can rarely afford any affiftance, the lighter they are, the lefs impediment, it is fuppofed, they will produce. The bars or beaters are alfo fometimes as much as an inch and a half, or two inches thick, from the barrel or roller upon which they are fixed, and the roller itfelf three feet or more in diameter; but fo much of the bar is certainly, it is thought, unneceffary, as exceeds the length of ftraw drawn in by the rollers, during each interval between the ftrokes, and which is feldom more than half an inch; confequently, whatever is more than three quarters, produces an increafed impediment.

ment. The greater the diameter of the fame beater, from meeting with the principal refiftance, fo much farther from the centre, of courfe, the proportionately greater power is required to work it; but this laft defcription of beater is faid, in general, to be found to make the beft work, and the reafon is thought obvious: they are neceffarily driven by water, fteam, or a number of horfes, and, it is concluded, calculated to make the fame number of revolutions in a minute as one of two feet, in which cafe their velocity, on which all depends, is juft half as much more — a moft important point indeed. The means of regular fteady driving is likewife of material importance in all machines of this nature, where animal labour is neceffary.

A very powerful improved machine belonging to Mr. Harbottle, of the Riminham farm, near Henley on Thames, confifts of a horfe-wheel which contains 136 teeth, or pinion wheel with 26, a large wheel with 88, another with 21, the fame with 88, and a further one with 21, forming the drum. Underneath the drum is the contrivance for winnowing, or the wheel that feparates the chaff from the corn, by blowing it back into a bin below the feeder, and allowing the corn to fall into a box, from whence it runs. Every revolution of the horfe-wheel in this machine produces eighty-eight and a half of the drum; and as the horfe-wheel goes about three rounds of twenty-four yards each *per* minute, or two miles and a half in an hour, the drum of confequence muft revolve on its circumference, of three yards and a half, 265 times in a minute, or 927 yards. The feeding-board is five feet four inches wide. The drum-wheel is four feet four inches diameter, being covered with fheet-iron, and has four beaters, which project four inches; making the above number of revolutions to one of the horfe-wheel, and the horfes going the above diftance in the hour; in a path twenty-feven feet diameter. The cogs of the wheels are of white thorn properly feafoned, working into others of caft-iron; payed only with black lead, not any greafe being employed. The level of the ftage on which the men ftand to feed, is eight feet above tho barn-floor in which the machine is fixed.

The drums of threfhing-machines, it is remarked, in general revolve from fixty to a hundred times for one revolution of the horfe-wheels; and that in proportion as thefe move flower, the horfes muft go fafter, fo that the utmoft nicety is neceffary to properly adjuft this: as if the horfes are under the neceffity of trotting, they are greatly injured in long continued exertion, and if they move too flowly, the work is imperfectly performed. A fteady common walk is the pace at which horfes fhould be kept, and the drums of machines fhould be formed accordingly, in order fully to effect their work, and at the fame time to enable the horfes to do a good day's labour without too much fatigue and inconvenience.

This machine will threfh, it is faid, from twenty to thirty quarters of wheat in twelve hours in great perfection; from thirty to forty-five of barley in the fame time; and from forty to fifty quarters of oats. It threfhes every thing perfectly clean when the grain is in fheaves. But though it cleans the corn from chaff, as feen above, winnowing is required afterwards. It was feen with one feeder to threfh twenty-two large and long fheaves in three minutes, without any variation in the ordinary movement of the horfes. This machine was conftructed by Elliott of Hexham, in Northumberland, and coft about 200*l.*, without the expences of fitting up, &c.

It is ftated, in the Effex Agricultural Report, that Mr. Newman of Hornchurch has a threfhing-mill which was built by two young millwrights from Somerfetfhire, in which there are two new circumftances of improvement, one of which is a movement fo prepared, as that the perfon who feeds the mill, by putting his foot on a pedal can lift one of the fluted cylinders out of its work, fo that the wheat-ears having been advanced far enough to be threfhed, the ftraw may be drawn back again and be prevented from being broken; the other is a click, or iron, which admits the horfes to be ftopped fuddenly without ftopping the beaters; by which the connection is removed for a moment, fo that one operates without the other: this is of capital importance in working the machine. Reprefentations of thefe improvements are given in the above work.

Thefe machines have occafionally grinding-mills combined with them, and are in this way found very convenient and advantageous. The Hon. Newton Fellows, in Devonfhire, has been at very great expence, it is faid, in erecting a threfhing-mill connected with one for grinding, both of which are wrought by a never-failing ftream of water. The power of this mill or machine is faid to be calculated as equal to fixteen horfes. And together with its power and capability for threfhing, winnowing, and dreffing every kind of corn, the pair of ftones for grinding attached to it are about four feet in diameter, to which a bolting-machine or apparatus is added.

In working, this threfhing-machine is capable of difcharging about twenty-five bufhels of wheat, and nearly forty bufhels of barley or oats in the hour. The barn, or place where the machine is placed, being filled with the wheat or other corn; the manual affiftance for performing the bufinefs is diftributed through it in this manner: one man and two women for unbinding the fheaves of corn and feeding the rollers, which laft are grooved and divided into lengths of fix or eight inches: on the ftraw being difcharged from the machine, one perfon attends to fhake it well over a large open fcreen, whence it is toffed over to another perfon, who removes it out of the way. At and under each of the winnowing-machines, fieves are placed to receive the grain coming directly from the machine, which is then put into the hopper of the fan of the fecond winnowing-machine, from which it is again received into another fieve, and thence difcharged into the hopper for grinding, for the market, or for other purpofes: in paffing through this little fan, fuch a feparation takes place as completely to divide the head from the tail corn. A cylindrical pearl-barley machine or apparatus is alfo applied and ufed to cleanfe the wad of its fmut, and thus by taking off the downy end of the grain, a much finer fample of both wheat and flour is obtained. This is preferred to the brufh apparatus; for although that may cleanfe the body of the grain, it will not carry off the down from its end, which may reafonably be fuppofed to contain the germ of fmut, or to form the neft of other animalculæ equally injurious to fuch grain when ufed as feed on lands.

There is in this machine only one labouring man employed to five women, which is an advantage of great importance in many fituations. The introduction of fuch machinery as this is therefore of great benefit in bettering and improving the rural condition of the country.

But, befides machines of this fort being conftructed for performing the different operations of threfhing, winnowing, grinding, and bolting, they have fometimes contrivances for other purpofes, as an iron hopper axis for grinding apples; and a contrivance for fhelling clover feed, and the haddocks of wheat. Thefe two additions belong to a threfhing-machine of Mr. Vinns in the above diftrict; and fome others are occafionally met with in other places which are a little different in their nature, but unneceffary to be here defcribed.

In the general conftruction of thefe machines, they are commonly,

commonly, as has been feen, made of two defcriptions, large and fmall kinds; the former of which probably not only perform their work more expeditioufly, but in a more perfect manner, though their expence is an objection to them on fmall farms. They require very different ftrength of teams or other powers in working them, according to their fizes, the nature of their conftruction, and other circumftances.

It is ftated, that in fome large machines of this kind, the rollers take in about three hundred inches of grain in a minute. The medium length of the ftraw being eftimated at about thirty inches, and fuppofing half a fheaf to be introduced into the machine at a time, the whole fheaf will be equal to fixty inches, and the machine, when fupplied with a middling quantity of water, will threfh five fheaves in a minute. But in refpect to the performance of thefe mills, much muft depend on the attention with which they are fed, as a fmall neglect in this point will make a very confiderable difference in the quantity of work that is performed in a given time.

In regard to the expence of thefe machines, it muft depend upon the fize and power which they poffefs of performing work, the number of other operations which they perform at the fame time, and whether they be fixed or moveable. According to fome perfons well informed on the fubject, a fixed mill that requires the power of two or three horfes, will coft from fixty to a hundred guineas. This will threfh about fifteen quarters of wheat, and from that to twenty of barley, oats, peas or beans in the courfe of eight or nine hours.

It is noticed, that the only defect of machines worked by wind, upon their firft introduction, confifted in the rifk to which they were expofed, by ftopping them to take in the fails, which could fcarcely be done during a brifk gale: in that way it fometimes happened, that when the wind frefhened confiderably after the machine was fet a going, either the fails were torn to pieces, or the arms broken off. That defect, however, is now remedied by a late invention of Mr. Mickle, by which the whole fails can be taken in, or let out, in lefs than half a minute, merely by a perfon pulling a rope within the houfe; by this contrivance the fails are, with eafe and expedition, proportioned to any degree of wind, an uniform motion is produced, and all danger of ftraining or hurting the machine is avoided.

It is further obferved, that the number of hands required for working one of thefe machines, is from five to fix; but that this depends greatly on the conftruction of the machine, fome of them being fo contrived, that the work can be performed with much fewer hands.

It is, however, noticed in the Agricultural Survey of Norfolk, that a machine erected by Mr. Johnfon, at Lempfton, appears to be one of the beft, if not the very beft, of the larger kind that has yet been met with. The movements in it are uncommonly fmooth. It requires from fix to eight horfes, fix men, and one woman; it threfhes, without any queftion, much cleaner than the flail, and, without any doubt, cheaper. To bring it to its prefent perfection, as he was determined to carry his point, he never ftopped till it worked to his mind; and having completed it, the repairs fince have been quite trifling. The common complaint of their being always out of order is attributed to original errors or inattention in the conftruction of them. The arrangement is excellent, it is faid, in this machine, for difpofing of the chaff, colder, ftraw, and corn, at once, in their refpective places, without any confufion or after-removals; and it takes up a very fmall part of a barn. It was built by Mr. Wigful of Lynn.

Mr. Whiting, of Fring, has alfo a large threfhing-mill, built by Mr. Fordyce, an engineer from Scotland. It coft him 200*l.*: is worked by fix horfes; threfhes twenty-four coombs of wheat in the day, fifty-five of barley, and from fixty-three to eighty-four of oats. It has five beaters on the drum-wheel, and the fluted fegment of a cylinder which covers the drum in two parts, with an unfluted plate between them, which is raifed or funk by a fhort lever: this is a guard againft ftones getting in. In another circumftance alfo it is fingular; there is a long platform, with a rolling cloth bottom: the whole raifed or funk at pleafure, for delivering the corn, acrofs the floor fpace of the barn, from the goff in which the corn is ftacked, to the other end in which the mill is built; which faves much labour, and works to his fatisfaction.

The horfe-wheel is here upon a different conftruction from the common ones, working by a cogged-wheel of fmall diameter below, inftead of above the horfes; and the communicating fpindle under their path; but it is faid to be hard work.

And Mr. Coke, of Holkham, is ftated to have a very large machine, which coft about 600*l.* Befides threfhing, it grinds corn, works two chaff-cutters, and breaks oil-cake. It threfhes fixty-four coombs a day.

Mr. Reeves, of Heverland, has a threfhing-mill which is, the writer thinks, ftill nearer to perfection than any other he has feen; it was made by Afbey, works with two or three horfes, and coft a hundred guineas. He found it at work, threfhing oats; it does for barley as well as for any other grain, threfhing thirty-two coombs in a day of feven hours and a half; more of oats; forty of peas; and thirty of wheat: its day's work of wheat, threfhed the day before he faw it, was thirty-one coombs, which were ftanding facked in the barn. It varies confiderably in the beating-drum cylinder from the others he has feen, it being of a much larger diameter, and has eleven beaters.

At Brightwell-Grove, in Oxfordfhire, according to the Agricultural Report of that diftrict, there is a threfhing-machine, belonging to Mr. Lowndes, which was conftructed by Raftrick, and in which there is fome novelty of contrivance: it works by means of four horfes: the drum-wheel, in this cafe, is three feet and a half in diameter, makes two hundred and fixty revolutions in a minute, and, having fixteen beaters, it gives 4160 ftrokes in that time: there is a rake with four fets of teeth which takes the ftraw, and delivers it to a fecond drum-beating cylinder two feet in diameter. This drum is termed the dreffer, and turning in an oppofite direction to the motion of the ftraw, beats it down, and in its defcent ftrikes it againft a circular board, faced with bars fhod with iron, through the fpace of eighteen inches, by which the ftraw receives feveral additional ftrokes, which, it is conceived, have a great effect in diflodging that corn which has not been completely feparated in paffing the principal drum. This is the addition not ufual in thefe machines. Thefe are wrought four hours at a time, in which eight quarters of wheat are threfhed out. Every thing is threfhed perfectly clean; and the ftraw is not broken more than by the flail. Twelve quarters of barley are threfhed in four hours, and fixteen have been done in that length of time. The horfes, in this machine, are not attached in the draught, in the manner which refembles pufhing, by advancing with the lever before them, but in the common drawing method, with the lever behind them, in which way they are fuppofed by fome to do the work much better.

This machine was feen to threfh forty-three fheaves in ten minutes. It dreffes at the fame time; and there is a chaff-cutter,

cutter, as well as a corn grinding-mill with ftones, for farm ufe, attached, and wrought or not, at pleafure.

It is perhaps only in places fituated in the immediate vicinity of a colliery, and where, from the cheapnefs of fuel, they are capable of being worked at a very trifling expence, that fteam can be had recourfe to as the moving power of thefe machines. See STEAM, and STEAM-*Engine*.

With regard to fmall machines, it is faid in the Eaft Lothian Agricultural Report, that they have been introduced there, upon a reduced fcale, at a price fo low as 40*l.*: that thefe fmall machines, having little work to do, and that little being, in general, done flowly, anfwer the purpofe tolerably well; but though cheaper in the firft inftance, they are, in the end, more expenfive than larger ones, a certain degree of ftrength being abfolutely requifite to do the work perfectly. If the parts of the machine are below that degree of ftrength, the work is either ill done, or the machine is deftroyed, by being exerted above what it is able to bear.

The writer of the Effex Agricultural Survey too ftates, that in that diftrict at prefent many are made by Balls of Norfolk, the price fifty guineas, and do their work very clean and well for all forts of corn, but do not drefs. They have been applied to white clover, and have done it to the fatisfaction of the growers, by paffing it through twice or thrice. In one erected by Mr. Vaizey, which is worked by horfes, one man feeds, two fupply, a boy drives, and two men clear away the ftraw. He has threfhed fixty quarters of wheat with it in eighteen hours. It coft 52*l.* 10*s.*, and 10*l.* putting up; the fhed added about 20*l.*, two winnowing machines 15*l.* 15*s.*; in all, complete, about 100*l.* But in this a greater number of horfes are ufed than are noticed above. The owner has no fault to find with its performance, but is very well fatisfied with it. He has applied it to cobbing white clover with great fuccefs; by paffing it thrice through the mill, he got from three jags, feven bufhels of clean feed in four hours. And one built by Dickfon of Ipfwich, for Mr. Sanxter, goes with two or four horfes, and coft fifty guineas. It is fuppofed that it will threfh twenty quarters of wheat *per diem*. But it is now fifty-five guineas, put up and ready to work. Two horfes work it, without hard labour. The laft year's wheat, which was very badly threfhed at 7*s.* *per* quarter, was done by this machine perfectly well. Alfo at Little Wakering, Dr. Afplin has a machine which the writer faw working with one horfe, which moved with great eafe, driven by a little girl; one man and two boys work it, and it does three quarters of wheat in a day. The writer examined the ftraw for about a quarter of an hour, and did not find a fingle kernel in it. The price is fixty guineas. The conftruction in this machine varies from the others he has feen, in the wheels which communicate the motion. The doctor threfhes only wheat with it, though it will do for all forts of grain. He thinks it anfwers greatly, and is perfectly fatisfied with it. It was made by Turbot, Bankfide, Weftminfter, but they are now made by Jones, Clement's-Lane, Clare-market, London.

There are many other perfons who put up thefe machines at an equally reafonable rate, and fo as to work with much perfection.

Where machines of this fort coft about one hundred guineas, the annual expence in intereft of capital and repairs cannot be more than from 10*l.* to 12*l.* at moft, except in the expences of teams and the labour of the perfons employed in the execution of the bufinefs and work about them.

The expenfive machines which have rollers for rubbing out the grain inftead of beaters, are thought in general to perform the bufinefs in the moft perfect manner, though they require more power to work them.

It is, however, thought by fome to be utterly impoffible to build threfhing-machines which will do juftice to the owners for any fuch fum as 50*l.*, or thereabouts, as their durability and fuccefs depend materially on their firmnefs, ftrength, folidity, and other circumftances of the fame nature, which are by no means attainable for any fuch money. Yet many of thefe fmall machines of one or two horfe power, are faid to perform their work well, and at the rate of fix quarters of wheat, and the relative proportions of other forts of grain, in the courfe of the day. They are ftated to be made in feveral different diftricts, at the prices of from thirty to fifty guineas, fo as to threfh well at nearly the above rate, and to have, in fome inftances, other additions, fuch as chaff-cutters, &c. made to them. In particular cafes, they are thought not to break the wheat-ftraw fo much as the flail; and though wheat and beans are moftly well threfhed by them, barley is under the neceffity of being often twice paffed through fuch machines, as feen above. They do not drefs in general; but fometimes head feed clover in a pretty perfect manner, as noticed already.

Small threfhing-machines have likewife been conftructed fo as to be wrought by hand, in fome diftricts, both in the northern and fouthern parts of the kingdom, and been afferted by fome to perform their work in a clean and fatisfactory manner; but from their moftly wanting that degree of velocity, in being wrought in this manner, which is effential to good work of this kind, they have not yet become in any way general. Indeed, in fome diftricts in the fouth, the working of them by the hand not being found to fucceed well in actual practice, the ufual feeding rollers have been applied with the horfe-tackle, at the additional charge of about 20*l.*, which has enabled them, it is faid, to do the work properly, and in an eafy manner, even by the power of one horfe. Where the teeth of the iron wheels in fuch machines have been found too fine for the increafed force made ufe of in this way, vertical wooden wheels and pinions have been put in their place, which have contributed to the ftrength and preferved the fimplicity of the machinery.

Threfhing-machines have now been known, and in fome meafure employed, in the northern parts of this country for more than half a century, and are at prefent very general in thofe that are any way improved; but in the more fouthern diftricts, they have only been attended to, in any confiderable degree, for the fpace of the laft thirty or forty years, yet their ufe and application are faft becoming general among the more extenfive farmers whofe farms are of the arable kind. In fhort, it is not improbable but that in a little time the machine will be the moft prevalent method of threfhing out corn. And it has been fuggefted, that parifh machines of this nature, in centrical fituations, would perhaps not be lefs ufeful or convenient than parifh mills, while, at the fame time, they might be eafily fo regulated as to be rendered of great general benefit to the community, as well as advantageous in the way of private fpeculation to individuals. Something of this fort is faid to be already the cafe in fome diftricts of the North, and would, it is believed, be defirable in all, for the convenience and accommodation of the fmall farmer; as the fame conveyance that brought the corn to be threfhed, might take back the ftraw and grain, and in this way little wafte of labour or time be fuftained, while the faving would be confiderable and certain.

It may be noticed alfo, that in all cafes where threfhing-machines are made ufe of, they fhould be well fuited to the

 extent

extent of the farms, and be erected in fuch a manner as to be convenient for having the contents of the ftacks brought to them. In this view it has been fuggefted, in the Report on Agriculture for the Weft Riding of Yorkfhire, that the barns to which they are attached fhould extend into the yards in which the ftacks are contained; as in that way the labour and time will be confiderably leffened of fupplying them with corn in the ftraw for being threfhed. And it has been juftly remarked, by an intelligent promoter of agricultural improvements, that this machine has not been attended with one-half of the advantage which might have flowed from fo ufeful a difcovery, for want of combining the ufe of it with the various connected circumftances of the farm-yard. The bufinefs of ftacking corn, for inftance, muft, it is conceived, receive an entirely new arrangement in confequence of building a threfhing-mill or machine. By means of no other additional expence than that of an iron railway, and placing the ftacks on frames refting on block-wheels, two feet in diameter, a very confiderable annual expence in time and labour muft, it is fuppofed, be faved in carting ftacks to the barns, in lofs of corn, and in waiting for good weather, as well as in the faving of threfhing by flails, and all the attendant evils of pilfering and leaving corn in the ftraw. This is a material object, which it is thought cannot receive too much attention from both landlord and tenant. It is contended that there cannot be the fmalleft doubt of the propriety or profit of having one of thefe machines fixed in the principal farm-yard. But that where the farm is large, and ftacks confequently fcattered over various fields or parts of it, then it may be right to have a moveable one alfo; but fo many operations are wanting at home, that one fhould certainly be fixed. The circular form of the railway upon which the ftacks are brought to the mill or machine, is confidered neceffary in fuch cafes, as being the only one which permits a choice of any particular ftack to threfh, without waiting for all or many others being done before it can be got at; but a ftraight line leading to and paft the mill or machine is admiffible, except for this circumftance, though much inferior, in fome other points, to the circular form. In forming this plan, a fort of railway fhould be fo contrived as that a horfe or two may be fufficient to draw all common ftacks to the mill or machine. And it is directed that the wooden ftumps on which the frame refts fhould be tinned, or laid in the common manner with brafs latten, which is more durable than common tin, to keep out rats. Alfo, that as the power applied to the threfhing-mill in other ways is at hand, and applicable alfo to the above fort of work of drawing the ftacks, it may be ufed for the purpofe in many cafes.

Threshing-*Mill Barn* or *Building*, that fort of barn, fhed, or other building which is calculated for receiving, or which contains this kind of mill or machine.

In this intention, an upper floor, raifed eight, nine, or ten feet from the ground, in proportion to the height or fize of the animals, and the arrangement of the machinery which is to be employed, will be required, and which fhould reach from end to end of the barn or building, as a repofitory for the unthrefhed corn, which fhould be there lodged and depofited, at leifure times, from the ftack-yard, or other places, in order to be ready to feed the mill or machine with from this upper floor. The ground-floor fhould contain the large mill-wheel, and a horfe-path round it, all the lower parts of the machinery, a dreffing-room for the grain, and a wide open fpace for ftraw of different forts, which is there to be piled up, ready for the cattle-fheds, on each fide of this repofitory of fodder.

The expences of thefe prepared barns or buildings, will probably not only be much leffened, but wholly done away, in fome cafes, by the ufe of the threfhing ftack farm-yard, which has been defcribed in fpeaking of the mills or machines for this ufe, and much convenience and accommodation be thereby gained to the farmer in the difpatch of the bufinefs, &c.

On the whole, by thefe means the labouring teams and hands will be enabled to perform the work of threfhing at fuch wet, ftormy, and leifure periods as will render it the leaft troublefome and expenfive to the farmer. See Threshing-*Machine*.

THRESHOLD Point, in *Geography*, a cape on the north-weft coaft of New Guinea. S. lat. 0° 37′. E. long. 132°.

THREX, among the Romans. See Thraces.

THRIFT, in *Botany*. See Statice.

THRIHING. See Trihing.

THRIMSA, in *Antiquity*, a filver coin, the value of which has occafioned a variety of conjectures. Lambard, who gave the firft eftimate of it, makes it a three-fhilling piece, in which opinion he is followed by fir Henry Spelman. Bifhop Nicholfon apprehends, that it was the name of their common coin, and that the thrimfa, fceata, and penny, were all of them the fame. Somner, from the import of the word, and the value given to the thrimfa in the Saxon laws, rates it at three-pence. Selden, Brady, and Hickes, are of opinion, that this coin was either the laft tremiffis of the Franks and Germans, and confequently four-pence, or the third part of the Saxon fhilling, *i. e.* three halfpence and one-third of a halfpenny in their money. Mr. Clarke adopts, and endeavours to eftablifh the opinion of Somner, who obferved, from the laws of Athelftan, that the price of a thane's life was, by the Angli, valued at 2000 thrimfas, which, by the Mercian eftimate, was 1200 fhillings; and if each of thefe fums denotes the fame value, which is probable, the thrimfa muft be to the fhilling as 2000 is to 1200, or three parts in five of a Saxon fhilling, *i. e.* three-pence.

The thrimfa was firft coined in the reigns before Athelftan, during their greater affluence in cafh, and defigned merely for the convenience of exchange, as the moft proper divifion that could be made in their money without a fraction, between the fhilling and the penny. But when the fhilling was reduced, it was of little ufe, and by degrees entirely laid afide.

Dr. Hickes obferves, that the method of computing by thrimfas was chiefly ufed in the more mercantile parts of this kingdom, among the Eaft and Weft and South Saxons, and poffibly coined only among them; for it appears that the inland provinces, the Mercians, reckoned generally by the fhilling. Clarke's Conn. of the Roman, Saxon, and Englifh Coins, p. 229, &c.

THRIN, in *Geography*, a river of Norfolk, which joins the Yare at Yarmouth.

THRINAX, in *Botany*, θριναξ, *a fan*, in allufion to the form of its leaves; a name beftowed by the younger Linnæus on the little Fan Palm of Jamaica, when he firft diftinguifhed this plant generically from *Corypha*, to which it had been referred by Browne. To that genus it is, as Swartz obferves, very clofely allied, differing chiefly in the want of a corolla.—Swartz Prodr. 57. Ind. Occ. v. 1. 613. t. 13. Schreb. Gen. 772. Willd. Sp. Pl. v. 2. 202. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 2. 307.—Clafs and order, *Hexandria Monogynia*. Nat. Ord. *Palmæ*.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, minute, hemifpherical, with fix fmall, erect, marginal teeth. *Cor.* none. *Stam.* Filaments fix, erect, equal, thread-fhaped, about

about twice the length of the calyx, inserted at the base of the germen; anthers terminal, erect, linear, longer than the filaments, cloven at each end. *Pist.* Germen half immersed in the base of the calyx, ovate; style cylindrical, thickish, erect, the length of the filaments; stigma very large, funnel-shaped, oblique, of a single, dilated, ovate, rather tumid, lip, finely crenate at the margin, rarely accompanied by another lip. *Peric.* Drupa small, globular, naked, rather dry. *Seed.* Nut solitary, large, globose, brittle, of one cell, with a solitary kernel.

Eff. Ch. Calyx with six teeth. Corolla none. Stigma funnel-shaped, oblique. Drupa globular, with a single seed.

1. Th. *parviflora.* Small Jamaica Fan Palm; Palmetto Royal; or Palmetto Thatch. Willd. n. 1. Ait. n. 1.—Native of the sea-coast, and other barren dry situations, in Jamaica and Hispaniola. *Swartz.* The *stem* is from ten to twenty feet high, unarmed; tumid at the base. *Leaves* collected about the top, stalked, from one to two feet long, palmate, plaited like a fan; their segments lanceolate, ribbed and streaked, rigid, nearly equal. *Footstalks* longer than the leaves, roundish, somewhat compressed, smooth, flexible, unarmed. *General Sheath* compound. *Flower-stalk* terminal, solitary, nearly erect, two or three feet long, panicled, imbricated with *partial sheaths*, or *bracteas*; its *branches* alternate, subdivided, spreading; the ultimate ones opposite or ternate, crossing each other. *Flowers* stalked, opposite or ternate, small, perfect. *Anthers* yellow.—Brown says, Hist. of Jamaica, 191, this tree covers whole fields in many parts of that island, thriving better on the rocky hills, than on the low moist plains near the sea. The copious little berries serve as food for birds and wild beasts. The trunk, seldom more than four or five inches in diameter, ten or fourteen feet high, is called the *Thatch-pole*, and is much used for piles in wharfs and other buildings made in the sea; for it stands the water well, and is never corroded or touched by worms. The split footstalks make baskets, bow-strings, ropes, &c. being very strong and tough. The leaves are called *thatch*, and are used as such, for outhouses especially, being found to resist the weather for many years. Such coverings of buildings have only the inconvenience of harbouring rats or other vermin, which prevents their general use.

THRINCIA, so called by Roth, from θριγκος, *the battlement of a wall*, to which he compares the seed-crown of the marginal florets. The Italian name *Trinciatella*, used by Camerarius, *Hort. Med.* 173, for *Hyoseris radiata*, may, as Dr. Roth supposes, have a similar origin; but it comes directly from the Italian verb *trinciare*, to cut, alluding to the remarkable segments of the leaf in that plant.

This genus of *Thrincia* consists of two species, *Leontodon hirtum* of Linnæus, and *Hyoseris taraxacoides* of Villars, excluding the synonyms of the latter. We see no occasion to separate them from *Apargia* of Schreber and Willdenow, the *Hedypnois* of Hudson. Having, in the *Prodr. Fl. Græc.* v. 2. 142, adopted Hedypnois; and in p. 130 of the same volume, Apargia; we refer the reader to the former in its proper place, and shall here introduce the latter, with its full characters and synonyms.

Apargia, Απαργια, an ancient Greek name, with whose original meaning, or application, we are unacquainted. Dalechamp has applied it to something of the *Hieracium* kind; and Schreber, after Scopoli, to the genus now before us, with which we hope it will remain.—Schreb. Gen. 527. Willd. Sp. Pl. v. 3. 1547. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 4. 445. Sm. Prodr. Fl. Græc. Sibth. v. 2. 130. Compend. Fl. Brit. ed. 2. 117. Marsch. a Bieberst. Caucas. v. 2. 247. (Hedypnois; Hudf. Fl. Angl. 340. Sm. Fl. Brit. 823. Leontodon; Juss. 170. Thrincia; Roth. Catal. v. 1. 97. Willd. Sp. Pl. v. 3. 1554. Ait. Hort. Kew. v. 4. 447. Virea; Gærtn. t. 159.)—Class and order, *Syngenesia Polygamia-æqualis.* Nat. Ord. *Compositæ semiflosculosæ*, Linn. *Cichoraceæ*, Juss.

Gen. Ch. *Common Calyx* oblong, permanent, imbricated, of several linear, parallel, unequal, longitudinal, incumbent scales; those at the base very small. *Cor.* compound, imbricated, uniform; the florets numerous, all perfect, equal, monopetalous, ligulate, linear, abrupt, with five teeth. *Stam.* Filaments five, capillary, very short; anthers united into a cylindrical tube. *Pist.* Germen nearly obovate; style thread-shaped, the length of the stamens; stigmas two, recurved. *Peric.* none, except the permanent, straight calyx, at length reflexed. *Seeds* solitary, oblong, striated, crowned with sessile feathery down, somewhat chaffy in the lower part, and often unequal in the marginal florets; somewhat stalked in the central ones, frequently accompanied by shorter hairs or plumes. *Recept.* dotted, naked, or very slightly hairy.

Eff. Ch. Receptacle naked, dotted. Seed-down feathery, sessile, unequal. Calyx imbricated, with small scattered scales at the base.

This genus, though very natural and well defined, has the general habit of *Hedypnois*, or of *Hieracium*, agreeing with the latter in having some caulescent species, though in most the *flower-stalks* are radical and single-flowered. The *leaves* are variously toothed or sinuated, mostly hairy, rarely villous. *Flowers* of a full yellow. *Root*, except in our thirteenth species, perennial, tuberous. We adopt the English name of Hawk-bit from Petiver.

1. A. *aurantiaca.* Orange-coloured Hawk-bit. Willd. n. 1. "Waldst. et Kitaib. Hung."—"Stalk radical, single-flowered, naked; tumid and hairy in the upper part. Calyx hispid. Leaves lanceolate-oblong, slightly toothed."—Found on the lofty mountains of Hungary. *Leaves* three or four inches long, smooth. *Stalk* six inches high, smooth, except just below the flower. *Calyx* clothed with rigid blackish hairs. *Corolla* orange-coloured. *Seed-down* sessile, feathery. It differs from the next in having no scales on the *stalk*, which is more tumid in its upper part; very smooth *leaves*; and a different-coloured *flower*. *Willd.*

2. A. *alpina.* Alpine Hawk-bit. Host. Syn. 423. Willd. n. 2. (Leontodon alpinum; Jacq. Austr. t. 93. L. pyrenaicum; Gouan. Illustr. 55. t. 22. f. 1, 2. Hedypnois pyrenaica; Villars Dauph. v. 3. 78, from the author. Picris saxatilis; Allion. Pedem. v. 1. 211. t. 14. f. 4. Taraxacum foliis integris dentatis, calyce hispido, pappo plumoso; Hall. Helvet. ed. 1. 741.)—Stalk radical, solitary, single-flowered, scaly; slightly tumid, and somewhat hairy, at the top. Calyx hispid. Leaves lanceolate-oblong, slightly toothed, somewhat hairy.—Native of grassy pastures, on the Alps of Austria, Switzerland, Dauphiny, and Italy. Haller found it on mount St. Gothard, Schleicher on mount Fouly, and the late Mr. Davall on St. Bernard. Our synonym of Haller's first edition, misquoted by Willdenow, rests on the authority of Allioni. We do not find the plant in his subsequent publications. The *root* is tuberous, perennial, with long fibres. *Leaves* from three to eight, radical, stalked, erect, obtuse, two or three inches long; tapering at the base; distantly toothed about the middle or lower part: rough, with shaggy short hairs, particularly about their rib and *footstalk*; which latter is sometimes red or purple. *Flower-stalk* from three to ten inches high, slender, erect, bearing a few scattered linear scales, and one yellow *flower*, hardly so big as our common Dandelion, whose *calyx-scales* are narrow, black with shaggy hairs.

3. A.

3. A. *crocea*. Saffron-coloured Hawk-bit. Willd. n. 3. (Leontodon croceum; Haenke in Jacq. Coll. v. 2. 16.)—"Stalk radical, solitary, single-flowered, slightly scaly; tumid and hairy above. Calyx hispid. Leaves smooth, runcinate, with a triangular terminal lobe."—Gathered by Haenke on the alpine heights of Judenberg, in Upper Stiria, where it inhabits dry, open, barren pastures, but is elsewhere rarely to be seen. This is said by Willdenow to be like the preceding, but different in the above-described figure of its *leaves*, which are only sometimes hairy. *Flower* an inch and half, or two inches, in diameter, very handsome, and readily distinguished from all the surrounding species of its own tribe, by its colour, which is that of tincture of saffron.

4. A. *hastilis*. Shining Spear-leaved Hawk-bit. Host. Syn. 423. Willd. n. 4. Ait. n. 1. (Leontodon hastile; Linn. Sp. Pl. 1123. Jacq. Austr. t. 164. L. protheiforme B & C; Villars Dauph. v. 3. 87. Picris, n. 26; Hall. Helvet. v. 1. 12.)—Stalks radical, single-flowered, smooth as well as the calyx. Leaves obovato-lanceolate, smooth, with numerous slightly hooked teeth.—Native of the south of Europe; very abundant in Switzerland. The *leaves* are often a foot long, tapering at the base into purplish, flat, winged *footstalks*; their surface smooth, even, and somewhat glaucous; their margin cut into many deep, acute, triangular teeth, partly hooked backward. *Stalks* several, round, very smooth, glaucous, very rarely divided, twelve or eighteen inches high. *Flower* bright yellow, an inch and half wide, with scarcely any perceptible hairs on the *calyx*; drooping when in bud. Sometimes the *flower-stalks* bear a few linear distant scales.

5. A. *dubia*. Doubtful Hawk-bit. Willd. n. 5.—"Stalk single-flowered, radical, nearly naked; hairy, as well as the calyx, above. Leaves lanceolate, toothed at the base, slightly clothed with forked hairs."—Communicated to Willdenow by Hoppe, from the Saltzburg alps, under the above name, which seems to us but too well applied. We have not indeed seen a specimen of this plant. Willdenow describes it as intermediate between the last and *A. hispida*. The *stalks* are mostly furnished with one small scale, and are tumid under the *flower*, whose *calyx*, as well as the upper part of the stalk, are beset with short forked hairs. The *leaves* seem smooth at first sight, but bear scattered, white, forked hairs.

6. A. *tuberosa*. Knotty-rooted Hawk-bit. Willd. n. 6. Ait. n. 2. Sm. Fl. Græc. Sibth. t. 797, unpubl. (Leontodon tuberosum; Linn. Sp. Pl. 1123. Dens leonis bulbosus; Ger. Em. 290. Chondrilla altera Dioscoridis, &c.; Lob. Ic. 232.)—Stalks radical, single-flowered, naked, somewhat hairy. Calyx hairy. Leaves pinnatifid, runcinate, somewhat lyrate, rough with forked hairs. Root of many ovate tapering knobs.—Native of the south of Europe and the Levant; very common in the sandy meadows of Greece, Cyprus, and Zante. The modern Greeks name it ῥαδίκι, or *radish*; and it may be, as some old botanists have thought, the χονδρίλλη ἑτέρα of Dioscorides, but this is hard to determine. The perennial *root* is a cluster of sessile ovate knobs, above an inch long, tapering into radicles. *Leaves* numerous, spreading, dark green, obtuse, either simply runcinate, with a large terminal lobe, or deeply, sometimes interruptedly, pinnatifid, and bluntly toothed. *Flower-stalks* several, a span high, ascending, striated, more or less hairy; purple, like the *footstalks*, at their base. *Calyx* slender, with acute scales. *Flowers* above an inch wide, full yellow; red underneath.

7. A. *incana*. Hoary Hawk-bit. Scop. Carn. v. 2. 113. Willd. n. 7. Ait. n. 3. (Hieracium incanum; Jacq. Austr. t. 287. Linn. Sp. Pl. ed. 1. 799. H. sextum montanum; Clus. Hist. v. 2. 141. Ger. Em. 302. Leontodon hispidum β; Linn. Sp. Pl. ed. 2. 1124.)—Stalks radical, single-flowered, almost naked, hoary as well as the calyx. Leaves lanceolate, erect, very minutely and sparingly toothed, hoary with starry hairs.—Found on hills and mountains in Germany, Switzerland, Carniola and France. The *root* is long and woody, divided at the crown, where its bears several tufts of straight, upright, more or less acute, very hoary, *leaves*, tapering at the base, from three to five inches long, with a few little, marginal, glandular teeth. *Stalks* often solitary in each tuft, a foot high, swelling at the top. *Flowers* light yellow, an inch and a half broad. *Calyx-scales* narrow, acute. The uniformly entire *leaves*, though beset with a few glandular teeth, and the structure of most other parts, when minutely examined, render this plant sufficiently distinct from *A. hispida*, hereafter described, with which Linnæus subsequently confounded it as a variety.

8. A. *Taraxaci*. Dandelion-leaved Hawk-bit. Willd. n. 8. Ait. n. 4. Compend. Fl. Brit. n. 3. (Hedypnois Taraxaci; Villars Dauph. v. 3. 80. t. 26. Fl. Brit. 825. Engl. Bot. t. 1109. Hieracium Taraxaci; Linn. Sp. Pl. 1125. Retz. Obs. fasc. 4. 30. t. 2. Lightf. Scot. 435. Picris n. 27; Hall. Hist. v. 1. 12. P. Taraxaci; Allion. Ped. v. 1. 211. t. 31. f. 1.)—Stalks radical, mostly single-flowered; tumid and hairy at the top. Leaves smooth, with recurved teeth. Calyx hairy.—Native of watery pastures on the loftiest mountains of Lapland, Scotland, Wales, Switzerland, Savoy, and Dauphiny, flowering in July or August. *Root* abrupt, with long lateral simple fibres. *Herb* very variable in the breadth of its *leaves*, as well as the number, height and luxuriance of its *flower-stalks*. The former are either lanceolate, and almost linear, or spatulate and obovate, sharp or blunt, from two to four inches long, with shallow or very deep, always runcinate, teeth. The latter are ascending or erect, solitary or in pairs, sometimes, though rarely, divided, naked or furnished with a few linear scales, shaggy with black hairs at the top, as is likewise the broad and thick *calyx*. *Flowers* an inch broad, or more, of a full yellow, with brownish terminal teet. *Germen* surmounted with a taper neck, like a stalk, but as the seed swells, this appearance vanishes, and the feathery *down* is truly sessile. *Receptacle* naked. Willdenow justly remarks, that Gouan's synonym is misapplied to this species in the *Fl. Brit.* We have now quoted it more correctly under our second *A. alpina*, to which some of the slender varieties of the present bear a great resemblance. Solander, as well as Linnæus, thought this plant a mule between *Hieracium alpinum* and *Leontodon Taraxacum*, merely because its *flowers* resembled one, and its *leaves* the other. The generic character differs from both.

9. A. *autumnalis*. Autumnal Hawk-bit. Hoffm. Germ. for 1791. 274. Willd. n. 9. Ait. n. 5. Compend. Fl. Brit. n. 4. (Hedypnois autumnalis; Fl. Brit. n. 4. Engl. Bot. t. 830. Leontodon autumnale; Linn. Sp. Pl. 1123. Hieracium minus; Fuchs Hist. 320. H. minus, sive leporinum; Ger. Em. 296.)—Stalks radical, branched; their ultimate divisions scaly. Leaves lanceolate, toothed, or pinnatifid, smoothish.—Native of meadows and pastures throughout Europe, flowering in autumn; very common in Britain. The *root* is abrupt, with very long and copious fibres. *Leaves* numerous, variously and unequally pinnatifid, or merely toothed, rarely a little rough or shaggy, oblique, or somewhat serpentine, in their general form or position. *General stalks* one or more, a foot or two in height, spreading, curved and zigzag, alternately branched, not quite without pubescence, terminating in a few long scaly

partial

partial stalks, which are hollow, and each contains a peculiar tuft of very white cotton, remarked by the Rev. Mr. Holme. *Calyx*, and top of each *stalk*, a little downy. *Flowers* bright lemon-coloured, hardly an inch broad, often reddish on the outside. *Seeds* slender, all crowned with sessile feathery down. Sometimes the *flowers* are proliferous, like the Hen-and-chicken Daisy.

10. A. *crispa*. Curled Hawk-bit. Willd. n. 10. Ait. n. 6. (Leontodon crispum; Villars Dauph. v. 3. 84. t. 25. Hieracium alterum saxatile montanum; Column. Ecphr. 244. t. 243. H. parvum hirtum, caule aphyllo, crispum ubi siccatum; Bauh. Hist. v. 2. 1038.)—Stalks radical, almost naked, single-flowered, hairy as well as the calyx. Leaves with various divaricated teeth and segments, rough with dense three-forked hairs. Seeds with a rough elongated beak.—Native of rocks in Dauphiny, Switzerland, and Italy.—The *root* is said to be very long, thrusting itself deep into the scarcely visible clefts of large rocks, and sending forth many long, simple, lateral fibres. *Leaves* numerous, in dense spreading tufts, from two to four inches, Columna says more than six, in length, pinnatifid in a rather lyrate manner, some of their segments or teeth turned various ways, especially, as J. Bauhin observes, when dry; they are densely clothed, on both sides, with prominent hairs, whose peculiarly white tips have three or more spreading forks or points. *Flower-stalks* ascending, a span high, furrowed, bearing a few linear scales near the top. *Flower* full an inch broad. *Seeds* uniform, each terminating in a long, tapering, brown, minutely rough beak, which looks like a stalk to the dense feathery *down*. This species comes very near the following, but appears to be essentially distinguished by the beak of the *seeds*. Villars confounds its synonyms with those of *A. hirta*, which differs very materially in having a scaly short crown to its marginal *seeds*, as will hereafter be described.

11. A. *hispida*. Rough Hawk-bit. Willd. n. 11. Ait. n. 7. Compend. Fl. Brit. n. 1. (Hedypnois hispida; Fl. Brit. n. 1. Engl. Bot. t. 554. Leontodon hispidum; Linn. Sp. Pl. 1124. Curt. Lond. fasc. 5. t. 56. Fl. Dan. t. 862. Hieracium dentis leonis folio, hirsutum; Ger. Em. 303.)—Stalks radical, naked, single-flowered. Leaves with reversed teeth, rough. Florets hairy at their orifice; glandular at the tip. Seeds scarcely beaked.—Very common in meadows, pastures, and waste ground, throughout Europe, from Sweden to Greece, flowering in summer. The *root* is tapering, zigzag, long and slender. *Leaves* oblong, more or less deeply toothed, or in some measure pinnatifid, their teeth acute, pointing downwards; they are much less densely hairy than those of the last, their hairs generally simply forked only; but we are aware of the uncertainty of this character. *Stalks* several, upright, striated, clothed with similar hairs. *Flowers* drooping while in bud; afterwards erect, bright yellow, an inch and half broad. *Calyx* hairy; its outer scales lax and scattered. *Florets* with a tuft of long yellow erect hairs, at the top of their tube externally; their summit terminates in five teeth, at the back of each of which Mr. Sowerby first detected a small triangular cluster of brown glands. These two characters serve admirably to distinguish the present species from every other British one, but the first of them, if not the other, is found in *A. crispa*. The *seeds* however have not near so long a beak as in that species, and they differ from *A. hirta* in being all uniformly furnished with a feathery *crown*. It is curious to trace an assertion of the *seed-down* being stalked in this species, published by Willdenow, taken from Haller, on the authority of Reichard. On turning to Haller, n. 25, we find he trusted to Berkhey, who, in his *Flores Compositi*, t. 6. f. 10, has figured a *seed*, supposed to belong to the plant before us. On examination however its crown proves to consist of simple, not feathery, rays, and therefore it has nothing to do with any *Apargia*. We mention this circumstance, to shew the mischief of taking things for granted; not only in botanical criticism, but any other inquiry of the human mind.

12. A. *hirta*. Deficient Hawk-bit. Hoffm. Germ. for 1791. 274. Compend. Fl. Brit. n. 2. (Thrincia hirta; Roth. Catal. v. 1. 98. Willd. Sp. Pl. v. 3. 1554. Ait. Hort. Kew. v. 4. 447. Hedypnois hirta; Fl. Brit. n. 2. Engl. Bot. t. 555. Leontodon hirtum; Linn. Sp. Pl. 1123. Curt. Lond. fasc. 6. t. 59. Rhagadiolus n. 7; Hall. Hist. v. 1. 5, with some doubtful synonyms.)—Stalks radical, naked, single-flowered. Leaves toothed, rough. Calyx nearly smooth. Outer row of seeds destitute of down.—Native of gravelly heaths and waste ground throughout Europe. Dr. Sibthorp gathered it, along with our violets and primroses, in Arcadia. Mr. Curtis observes that this species seldom occurs on the same spot with the preceding, of which Mr. Hudson made it a variety. Other botanists have found great difficulty in distinguishing them under all their various appearances, whilst Haller, and more recently Roth and Willdenow, have separated them generically. Linnæus thought the simple hairs of the plant before us afforded a good mark; but this is fallacious. The herbage of both is nearly the same, or at least their varieties closely approach each other. The *flowers* of both droop in the bud, but those of *A. hirta* are the smallest; their *florets* orange beneath, destitute of hairs about the orifice, and of glands at the summit. The most essential difference of all is found in the *seeds* of the circumference, which have no feathery *down*, but instead thereof a crown of short jagged scales. The *root* is abrupt, or bitten off, not tapering.

13. A. *annua*. Annual Hawk-bit. (Thrincia hispida; Roth. Catal. v. 1. 99. Willd. Sp. Pl. v. 3. 1555. Hyoseris taraxacoides; Villars Dauph. v. 3. 166. t. 25, excluding the synonyms.)—Stalks radical, naked, single-flowered. Leaves lanceolate, toothed, rough with forked hairs. Calyx hoary and hispid. Outer row of seeds destitute of down: those of the disk beaked.—Native of Spain and France, in sandy ground. The annual fibrous *root* distinguishes this from all the other known species, and especially from the last, with which the short crown of its outer row of *seeds* agrees. The rest of the *seeds* however are elongated at the summit into a slender beak, which elevates the feathery *down*, as on a longish stalk, but is not really such. The rough and hoary *calyx*, and the brighter green of the *leaves*, are further differences. The name of *hispida* being preoccupied, see sp. 11, we are obliged to select a new one for the present species.

14. A. *Villarsii*. Villarsian Hawk-bit. Willd. n. 12. (Leontodon hirtum; Villars Dauph. 82. t. 25, excluding the synonyms.)—"Stalks radical, naked, single-flowered, nearly smooth as well as the calyx. Leaves deeply toothed, or pinnatifid, rough with simple awlshaped bristles."—Native of dry sunny rocks in Dauphiny. Willdenow, who had a dried specimen, says the *leaves* are hoary with copious white hairs. We have not seen the plant, nor dare we attempt any illustration of it; Villars having so confounded various synonyms under this and his *Leontodon protheiforme*, p. 87. t. 24, that, even with some of his specimens before us, the descriptions are not satisfactory.

15. A. *caucasica*. Caucasian Hawk-bit. Marsch. a Bieberst. Caucas. v. 2. 247.—"Stalk radical, single-flowered, smooth. Calyx hairy. Leaves runcinate, rough, sparingly clothed with simple depressed hairs."—Native of

 grassy

graſſy paſtures on the Caucaſian alps, flowering in Auguſt and September. *Root* perennial, abrupt. *Leaves* with triangular, nearly entire lobes pointing backward, beſprinkled on the upper ſide with decumbent hairs, ſo ſparingly that they ſeem altogether ſmooth. *Stalk* longer than the leaves, ſtriated, naked except a minute ſcale or two; a little tumid and downy under the *calyx*, which is blackiſh, though hiſpid with whitiſh hairs. *Flower* of a full yellow. *Seeds* ſmooth to the naked eye; their down ſeſſile, feathery. This plant has the habit and ſtature of *A. hiſpida*, n. 11, but differs in the want of hairs on the *ſtalk*, as well as in the form and poſition of the pubeſcence of the foliage.

16. A. *coronopifolia*. Bucks-horn-leaved Hawk-bit. Willd. n. 13. (Leontodon coronopifolium; Desfont. Atlant. v. 2. 229. t. 214.)—Stalks radical, ſingle-flowered, ſcaly, ſhorter than the leaves, hairy as well as the calyx. Leaves pinnatifid, with blunt lobes, rough with forked hairs.—Native of the ſandy deſerts of Barbary, near Caſsa. The whole plant is rough with branched hairs. *Leaves* three or four inches long, ſpreading on the ground, unequally, but rather regularly, pinnatifid. *Stalks* ſeveral, aſcending, an inch or two high. *Flowers* yellow, an inch broad.

17. A. *hiſpanica*. Spaniſh Hawk-bit. Willd. n. 14. Marſch. a Bieberſt. Caucaſ. v. 2. 248. (Leontodon hiſpidum; Cavan. Ic. v. 2. 39. t. 149, excluding the ſynonym.)—Stems leafy, moſtly ſingle-flowered, hairy as well as the calyx. Leaves oblong-lanceolate, toothed or pinnatifid, rough, with forked hairs.—Native of hilly ſituations in Spain, flowering the beginning of May. Frequent alſo in Tauria. This, as Willdenow remarks, differs as much as poſſible from *A. hiſpida*. The whole herb is even more rough or briſtly than that ſpecies. *Stems* ſix inches high, furniſhed with lanceolate ſcales, accompanied by ſome oblong, obtuſe, entire or toothed, *leaves*, an inch or inch and half long. The *radical leaves* are more numerous and longer, tapering at the baſe, gradually dilated upward, bluntly toothed, or in ſome degree pinnatifid. *Flowers* terminal, ſolitary, pale yellow, nearly an inch and half broad. *Calyx* with numerous long, narrow, very hairy ſcales. The hairs of the ſtem and other parts are white, ſometimes forked.

18. A. *aſpera*. Branching Rough Hawk-bit. "Waldſt. et Kitaib. Hung. v. 2. 114. t. 110." Willd. n. 15. Ait. n. 8. — Stem leafy, ſomewhat branched, hairy. Calyx ſmooth. Leaves lanceolate, runcinate, hairy, with forked briſtles.—Native of rocky woods in Hungary, near the baths of Hercules. Very nearly akin to the laſt, but the more branching *ſtem*, runcinate *leaves*, and ſmooth very cloſe-preſſed ſcales of the *calyx*, fringed at the edges only, not lax and hairy, appear ſufficient, as Willdenow thinks, to diſtinguiſh this ſpecies.

19. A. *ſtrigoſa*. Briſtly Hawk-bit. Marſch. a Bieberſt. Caucaſ. v. 2. 249. (Scorzonera aſperrima; Willd. Sp. Pl. v. 3. 1507. S. hiſpida; Forſk. Ægypt.-Arab. 215.)—"Stem leafy, hiſpid, bearing one or two flowers. Calyx hoary; the margin and keel of its ſcales fringed with briſtles. Leaves lanceolate, toothed, hiſpid, with forked hairs. Seeds rough."—Native of dry open places in Iberia, and the eaſtern part of Caucaſus, flowering in June. Forſkall found it at Eſtac, near Marſeilles. We have already deſcribed this under the article Scorzonera, n. 32. The able author of the *Flora Taurico-Caucaſica* ſays, "the *leaves* and *ſtems* are extremely hiſpid; the *calyx* only hoary, except the edges and keels of the ſcales. *Stems* bearing one or two *leaves*, and from one to three *flowers*, like *A. hiſpanica*. *Florets* pale yellow; the outermoſt purple beneath. *Seeds* brown, linear, tapering much at the top, as in the *Scorzoneræ*; they are rough with minute prominent points. *Down* feathery. The habit of this plant, and its affinity to *A. hiſpanica*, n. 17, and *incana*, n. 7, make it rather an *Apargia* than a *Scorzonera*." We have ſeen no ſpecimen. The regularly imbricated membranous-edged ſcales of the *calyx* in the latter, and the naked tips of its *ſeed-down*, are ſufficient indications of that genus, and if not found in the preſent plant, there can be no doubt upon the ſubject; but of this we are left in ignorance.

20. A. *variegata*. Party-coloured Hawk-bit. Willd. n. 16. (Hieracium variegatum; Lamarck Dict. v. 2. 362.)—Stem nearly leafleſs, ſomewhat branched, ſhaggy. Radical leaves oblong, ſtrongly toothed, hairy towards the edges. Calyx-ſcales ſpatulate, flat; downy at the baſe and margin.—Gathered by Commerſon at Monte Video. The *root* ſeems rather woody. *Stems* ſeveral, ſix inches high, each terminating in one large yellow or orange-coloured *flower*, and bearing ſeveral linear acute ſcales, with the rudiments of branches; but we find none of the pinnatifid ſtem-leaves mentioned in Lamarck. The numerous *radical leaves* are two inches long, tapering at the baſe, bluntiſh, with coarſe blunt unequal teeth, green, not hoary; ſhaggy with ſimple briſtly hairs about the margin and mid-rib on both ſides. The dilated, obtuſe, ſmooth ſcales of the *calyx* are more regularly and copiouſly imbricated than uſual in this genus, and are prettily variegated with white marginal cottony down. The *ſeed-down* is feathery, but of the *ſeeds* or *receptacle* we can ſee nothing.

21. A. *hieracioides*. Corymboſe Hawk-bit. Willd. n. 17.—"Stem branched at the top, hairy. Leaves oblong-lanceolate, hairy, toothed. Hairs forked."—Native of Galatia. Willdenow, who had a dried ſpecimen, deſcribes this plant as reſembling *Hieracium murorum*. The *ſtem* is erect. *Leaves* ſeſſile, an inch and a half long. *Flower-ſtalks* ſcaly and hairy. *Down* ſeſſile, feathery. *Receptacle* naked.

THRINIUM-Gild. See Trinium-*Gild*.

THRIO, Θρια, in *Antiquity*, a feſtival in honour of Apollo.

THRIPS, in *Natural Hiſtory*, a name uſed among the ancients to expreſs a ſort of worm hatched from the egg of a beetle: which, while in the worm-ſtate, eats its way into wood, and forms cells and cavities in it of various ſhapes, and in various directions, often reſembling the figures of letters or other things. See Enxylon.

The ancient Greeks are ſaid to have uſed ſmall pieces of the wood thus eroded in particular forms, as ſeals, before the engraving of theſe utenſils was invented; and indeed they muſt very well have ſerved this purpoſe, ſince it is ſcarcely poſſibly to conceive how one of theſe pieces of corroded wood ſhould be counterfeited, or the impreſſion imitated.

Lucian mentions his marking his olives with a ſignature of one of theſe pieces of wood greatly eroded, and uſes the word *thrips*, not as the name of the animal, but of the piece of wood eroded by it. Theophraſtus, Pliny, and Ariſtotle, alſo uſe the ſame expreſſion; and we find that the word thrips was as frequently uſed to ſignify the pieces of wood eroded, as the animal which eroded them.

Thrips, in the *Linnæan Syſtem of Zoology*, is a genus of the order of Hemiptera, the characters of which are, that the roſtrum is obſolete, being hidden within the mouth; the antennæ filiform, and as long as the thorax; the body ſlender, and of equal thickneſs; the abdomen reflexible, and often bent upwards; the four wings extended, incumbent, narrow,

row, and croffing one another at fome diftance from their bafe. The thrips has fix feet, and the tarfus of each foot has only two articulations. Gmelin enumerates the following eleven

Species.

Paradoxa. Brown, with abbreviated wings, and antennæ pectinate, fiffile and filiform. Found in China, but Gmelin doubts whether it be of this genus.

Physapus. With glaucous elytra or fhell-wings, and black body. Found frequently on flowers in Europe.

Minutissima. With glaucous elytra and body, and brown eyes. Found as the former.

Juniperina. With fnowy elytra and brown body. Found in the galls of the juniper.

Ulmi. Black, with fnowy ciliated wings, and acuminated anus. Found gregarious on the bark of the elm.

Urticæ. Yellow, with whitifh elytra. Found folitary on the leaves of the nettle, vine, and hazle.

Fasciata. With elytra banded with white and black, and brown body. Found on flowers in Europe.

Fusca. Blackifh, with glaucous elytra. Found in Denmark: the female probably fafciated?

Obscura. Yellowifh, with palifh elytra, and eyes and wings of the abdomen black. Found in Denmark.

Rufa. Red. Found on the fpikes of wheat; if it be not the larva of the minutiffima.

Variegata. Variegated. Found on flax.

The thrips is highly injurious and deftructive to many forts of fine fruited trees, but particularly fo to thofe of the grape or vine kind. The beft and moft effectual means of preventing its mifchievous effects, in fuch cafes, is probably that of frequent good wafhing of the trees with common water, by the engine or otherwife. It has lately been advifed that this fhould be done every evening, as, when performed in the heat of the fun, the vines are materially injured. Indeed all fuch trees fhould, it is fuppofed, be well wafhed every evening, until the berries begin to colour, whether infefted with infects or not, but efpecially in the former ftate; after which it is to be wholly difcontinued.

Where there is a neglect of wafhing the trees in this or fome other way, the thrips, for the moft part, makes its appearance. In fuch cafes, thefe infects may without much difficulty be deftroyed by the fumigation of tobacco and damp hay; the plants or trees being well wafhed after it by pure water.

The *white-bug* is another infect which is often very hurtful to peach-trees and vines in forcing-houfes; and the caufe of which is believed to be much owing to the trees not being daily properly wafhed in the above manner. Each of thefe forts of trees ftand in need of particular management in clearing them of this infect.

The *brown-bug* too occafionally makes its appearance on, and is hurtful to peach-trees in fuch fituations, efpecially when they are fhaded, or approach near the flues of the houfes. Proper wafhing of the trees, in thefe cafes, with lime-water, in the winter feafon; and fyringing them with it as foon as the leaves have fallen off, are often very effectual in removing fuch infects.

The *green-fly* is alfo very deftructive to peach-trees, efpecially when in the forcing ftate. Thefe are the moft effectually deftroyed by means of well wafhing the trees daily in a regular manner, after the work of forcing is begun. It is the common practice of moft gardeners to difcontinue fuch wafhings as foon as the flowers begin to make their appearance, but others have lately continued them with fuppofed advantage, and not found them to prevent the fruit from fetting. If any flies of this fort prefent themfelves, they may be kept under by proper watering or wafhing, as above, and by carefully picking off the firft buds on which they appear, which is found to prevent them from breeding, and to render the ufe of tobacco-fmoke unneceffary. Fumigations of this fubftance are, however, fometimes beneficial in thefe cafes in removing the vermin.

This and the *blue-fly* too are often very injurious to plum-trees, efpecially after they have been affected with the honey-dew. The manner of getting rid of them in fuch cafes, which has lately been recommended, is that of watering the trees in a plentiful manner two or three times a week, if the weather be dry; and during the continuance of the above fort of dew upon the trees, preparing the water with a little common falt and the fluid part of a good portion of broom that has been boiled. This mixture, it is faid, effectually kills the flies, while it does no injury to the trees, if care has been taken not to ufe too large a proportion of falt. This practice alfo tends to make the trees fhoot ftronger, and to hinder fuch infects from breeding.

There is another infect which has lately been found to be greatly injurious to apple and other fruit trees, but which is yet only little known to gardeners. It is the *Tortrix wœberana*, which may be feen well defcribed in the fecond volume of the "Tranfactions of the Horticultural Society of London." It is there ftated to be occafionally very hurtful to fuch trees, not only in the larva ftate, but others; and that its attacks are by no means confined to the difeafed parts of fuch trees. The infect in its perfect ftate is a fmall moth, which is very abundant in gardens and fruit grounds.

In what regards the means of removing and deftroying fuch infects when their attacks become injurious, the hints given below are thrown out. The firft and moft effential procefs evidently is, it is thought, to cut away the edges of the cankery parts where they are chiefly found, making the wound fmooth, and covering it with any compofition likely to prevent the moth from depofiting her *ova* or eggs there again. One precaution is neceffary, which is to put into boiling water, or to bury at a confiderable depth, the cut-out pieces of decayed bark containing the larvæ; which, if left near the tree, would foon crawl from their holes or other places, and remount it; thus defeating the labour of the horticulturalift, who often, from neglecting a flight additional trouble, lofes the benefit of more painful exertions. Where the larvæ are found to have infinuated themfelves generally into the rough bark of old trees, it would probably, it is thought, be advifable to fcrape off the whole of the lifelefs bark, and fuch portions of the alburnum as are injured, as fuggefted by Mr. Knight on another occafion; a procefs which, there can be no doubt, it is faid, would be advantageous to the tree in other refpects, as pointed out by the above writer. And where projecting faw-duft-like maffes fhew that the larva has attacked even fmooth-barked trees, the infertion of a blunt pricker into the hole would probably, in moft cafes, fuffice to deftroy it, and do lefs injury to the tree than fuffering it to attain its growth. But the mode which is moft to be recommended in this, as in the cafe of almoft all infects hurtful to fruit or other trees, is, it is faid, to deftroy the moths themfelves by collecting them from off the trees, or other places, during the fummer months, which might be done by children properly directed and provided with fuitable means for the purpofe, or in other ways. The deftruction of every female moth, before the depofition of its eggs, may, it is faid, be fairly calculated to prevent the exiftence exiſtence of ſome hundreds of larvæ; and thus, in any garden or fruit-ground not in the neighbourhood of others, where the ſame methods are neglected, the whole race might, it is ſuppoſed, be extirpated in a few years.

THRISSA, in *Ichthyology*, the name given by the Greeks and by the modern Latin writers to the fiſh which we call the ſhad, or the mother of the herrings.

THRIVING, in *Neat Cattle*, a term made uſe of by graziers and other ſtock-farmers to ſignify the property they have of doing well on the food they conſume, or of fattening kindly, in contradiſtinction to that of a ſtunted unthrifty growth, or bad ſort of feeding. It is moſtly known by the hides or coats of the beaſts having a mellowneſs of feel in handling them, with a fineneſs and ſleekneſs in their appearance. This depends, in a very great degree, upon the pile and growth of the coats, for the ſhorter and ſleeker they are, the more thriving the beaſts; as, on the contrary, in proportion to length and hardneſs, is the unthriſtineſs of the ſtock.

A coarſe, rough, thick hide is an indication too of hardneſs of fleſh in beaſts; while, on the contrary, fineneſs and cloſeneſs of grain in it, give the feel of fine texture in the hide.

Theſe circumſtances demand great attention in chooſing neat cattle for all purpoſes.

THRIVING *Drinks*, ſuch drinks as are prepared and given to neat cattle, or other beaſts, when in a low unthrifty ſtate. They are moſtly compoſed of the powders of different ſorts of aromatic ſeeds, ſuch as thoſe of aniſeeds, carraway ſeeds, and grains of paradiſe, in the proportion of about two ounces of each: which are mixed well together and put into a quart of warm ale, in which they are given to the beaſts; or of ſweet fennel ſeeds and cummin ſeeds, each two ounces, long pepper, ginger, turmeric, and elecampane, each one ounce, mixed together, to be given in the ſame way as above, to which ſometimes a little freſh butter and treacle or coarſe ſugar are added. Snake-root and gentian root, in powder, too, are ſometimes employed in ſuch drinks.

As the principal effect of ſuch drinks, for the moſt part, depends upon the eſſential oil the ſubſtances may contain, they will be ſomewhat preſerved and increaſed by giving them in the above manner.

The moſt proper management for the beaſts in theſe caſes, is to change their food as much as poſſible for the better, letting them have occaſional good maſhes of ſcalded bran, ground malt, or other ſuch ſubſtances, with a ſmall proportion of ground oats or barley meal put into them: warm water may alſo ſometimes be neceſſary.

By the uſe of drinks of this ſort, very reduced cows and other neat cattle may often be readily reſtored and brought into a thriving condition.

THRIXSPERMUM, in *Botany*, ſo called by Loureiro, from θριξ, *a hair*, and σπερμα, *ſeed*. We cannot ſay much for the conſtruction of this word, which ſhould have been *Trichoſpermum*, provided there be no dormant claim to that name; but it is not worth changing, till we are better aſſured of the genus.—Loureir. Cochinch. 519.—Claſs and order, *Monandria Monogynia*. Nat. Ord. *Orchideæ?*

Gen. Ch. *Common Calyx* catkin-like, linear, compreſſed, fleſhy, with alternate, acute, ſingle-flowered ſcales. Perianth none. *Cor.* Petals five, linear-awlſhaped, long, erect, nearly equal. Nectary attached to the receptacle, between the two lowermoſt petals, deeply divided into two lips; the inner one three-cleft, embraced by the petals, its lateral ſegments ſhort and blunt, the middle ſegment longeſt, conical, aſcending; outer one ovate, undivided, prominent beyond the petals. *Stam.* Filament ſolitary, thread-ſhaped, ſhort, attached to the piſtil; anther ovate, of two cells, with a lid. *Piſt.* Germen thread-ſhaped, ſtraight, bearing the flower; ſtyle thick, unequal, ſtanding on the baſe of the nectary; ſtigma ſimple. *Peric.* Capſule oblong, triangular, the angles acutely emarginate, of three valves and one cell. *Seeds* numerous, long, very ſlender, like hairs.

Eſſ. Ch. Petals five, linear, erect. Outer lip of the nectary ovate, prominent.

1. Th. *centipeda*. Nhánh goì rít of the Cochinchineſe. Found in Cochinchina, creeping upon the native trees. The *ſtem* is paraſitical, long, compreſſed, perennial, creeping by means of ſimple, very ſhort, lateral roots. *Leaves* linear-lanceolate, entire, ſmall, ſheathing, reflexed. *Flowers* pale yellow, with a reddiſh *nectary*, in ſtraight, lateral, catkin-like, two-ranked *ſpikes*.

We gueſs this to be allied to ſome of thoſe paraſitical *Orchideæ*, formerly referred to *Epidendrum* by Linnæus; and by Swartz chiefly to *Cymbidium*. The ſtructure of the whole tribe is ſo obſcure, that Loureiro may very well be excuſed if we cannot entirely unravel his deſcription.

THROANA, in *Ancient Geography*, a town of India, on the other ſide of the Ganges, which Ptolemy aſſigns to the people called Leſti, or pirates.—Alſo, a town of Serica, near the mountains in the vicinity of Aſmiræa. Ptolemy.

THROAT, the anterior part of an animal, between the head and the ſhoulders, in which is the gullet.

Phyſicians include, under the word throat, all that hollow, or cavity, which may be ſeen when the mouth is wide open.

It is ſometimes alſo called *iſthmus*, becauſe it is narrow, and bears ſome reſemblance to what is called by geographers *iſthmus*.

THROAT, *Sore*, in *Medicine*. See QUINZY.

THROAT, *Wounds of*, in *Surgery*. See WOUNDS.

THROAT, in *Architecture*, *Fortification*, &c. See GORGE and GULA.

THROAT, in *Ship-Building*, the inſide of knee-timber at the middle or turn of the arms. Alſo, the middle part of the floor-timbers; the inner part of the arms of an anchor, where they join the ſhank; and the inner ends of booms and gaffs, where they traverſe round the maſt.

The throat is oppoſed to peek, which implies the outer extremity of the ſaid gaff, or that part which extends the ſail behind. Hence the ropes employed to hoiſt up and lower a gaff, being applied to thoſe parts of it, are called the throat and peek haliards. Falconer.

THROAT-*Wort*, in *Botany*, the name of a perennial weed common in paſture grounds. The ſtalk is cornered and undivided. The flowers grow in bunches at the top of the ſtalk. They are erect, of a beautiful purple colour, and divided in the middle into five acute ſegments. It is a very pernicious weed when ſuffered to get a-head in ſuch lands, and not capable of being deſtroyed without conſiderable difficulty and trouble. See TRACHELIUM.

This plant yields, when wounded, a milky juice in great plenty, and this, if received into a ſhell or other ſmall veſſel, curdles immediately, and the whey runs from the thick part: this whey is of a brown colour, whereas that of the wild lettuce is of a fine purple, and dries into a cake that may be crumbled into a purple powder. The juice of the throat-wort ſmells ſour, and its curdled part, being dried, burns like reſin at the flame of a candle. Phil. Tranſ. N° 224.

THROATING, in *Agriculture*, the act of mowing beans againſt their bending, which is never done but in a thin crop. But in ſuch it is often neceſſary, in order to cut them with the moſt perfection and advantage. They ſhould

ſhould never be allowed to become too ripe when intended to be cut in this manner. The term is alſo occaſionally applied to ſome other purpoſes in huſbandry.

THROGGY, in *Geography*, a river of Monmouthſhire, which runs into the Severn, 4 miles S.W. of Chepſtow.

THROMBUS, from θρομβος, *coagulated blood*, a clot of blood. The term has alſo been applied to a tumour, formed of a collection of extravaſated blood under the integuments after bleeding. When ſuch an extravaſation, though of ſome extent, is not conſiderable, it is uſually called an *ecchymoſis*; which ſeé.

A thrombus ſometimes depends on the ſurgeon having totally divided the vein; but much more frequently on his not having made the opening in the veſſel properly correſpond to that in the ſkin. The patient's altering the poſture of his arm, while the blood is flowing into the baſin, will often cauſe an interruption to the eſcape of the fluid from the external orifice of the puncture; and, conſequently, it inſinuates itſelf into the cellular ſubſtance in the vicinity of the opening in the vein. In proportion as the blood iſſues from the veſſel, it becomes effuſed between the ſkin and faſcia in the interſtices of the cellular ſubſtance, and this, with more or leſs rapidity, and in a greater or leſſer quantity, according as the edges of the ſkin impede more or leſs the outward eſcape of the fluid. Sometimes, alſo, a thrombus forms after veneſection, when the uſual dreſſings, compreſs, and bandage, have been put over the puncture, and the patient imprudently makes uſe of the arm on which the operation has been done. This is more particularly liable to happen when a very large opening has been made in the vein.

The accident is not attended with any danger when the extravaſation is inconſiderable; for, in this circumſtance, the tumour generally admits of being eaſily reſolved by applying to it linen dipped in any diſcutient lotion. If the ſwelling ſhould be more extenſive, applying to it a compreſs wet with a ſolution of common ſea-ſalt, is deemed a very efficacious plan of promoting the abſorption of the extravaſated blood. Brandy, and a ſolution of the muriate of ammonia in vinegar, are likewiſe eligible applications.

It ſometimes happens, that a thrombus induces inflammation and ſuppuration of the edges of the puncture. The treatment is now like that of any little abſceſs: a common linſeed poultice may be applied, and any conſiderable accumulation of matter ſhould be prevented, by making an opening with a lancet in proper time. As ſoon as the inflammatory ſymptoms have ceaſed, diſcutients ſhould be reſorted to again, for the purpoſe of diſperſing the remaining clots of blood and ſurrounding induration. Cooper's Dict. of Practical Surgery.

THRONE, θρονος, a royal ſeat, or chair of ſtate, enriched with ornaments of architecture and ſculpture, made of ſome precious matter, raiſed one or more ſteps, and covered with a kind of canopy.

Such are the thrones in the rooms of audience of kings, and other ſovereigns.

THRONI, in *Ancient Geography*, a town of the iſle of Cyprus, upon the ſouthern coaſt, S.W. of Leucolla, and at ſome diſtance N.W. of the promontory of Pedalium. Near this town was a promontory of the ſame name, according to Ptolemy.

THRONION, or THRONIUM, a town belonging to the Locrians, ſituated, according to Strabo, 20 ſtadia from the ſea.

THRONIUM, a town of the Abantide, which was a diſtrict of Theſprotia, in Epirus, towards the Ceraunian mountains. On the return from the war of Troy, when the ſhips of the Greeks were diſperſed, the Locrians of Thronium, and the Abantes of Eubœa, were driven with eight veſſels towards the Ceraunian mountains. They eſtabliſhed themſelves in this place, and built a town, which they called Thronium, and they gave the country the name of the Abantide. They were afterwards expelled by the Apolloniates.

THROO, or THROUGH, in *Agriculture*, a term ſignifying a breadth, ſlip, or width of corn, which a ſet of reapers, &c. drive before them at once, whether it conſiſt of one or more lands or ridges. The mode of reaping by means of throos is very common in ſome of the northern counties of the kingdom, and ſuppoſed by ſome to greatly expedite the work.

THROPPLE, among country people, denotes the wind-pipe of a horſe.

THROSTLE, or *Song-Thruſh*, *Mavis*, or *Turdus muſicus* of Linnæus, in *Ornithology*, is called by authors the *turdus viſcivorus minor*, to diſtinguiſh it from the larger ſpecies, called in Engliſh the *miſſel-bird*, and uſually known among us by the ſimple name of *thruſh*. It is called *viſcivorus* by authors, from its reſemblance in colour to the other *viſcivorus*, not from its feeding on the miſletoe-berries, as that does.

It reſembles the miſſel-thruſh in colour, except that the inner coverts of the wings are yellow.

It feeds on worms, ſnails, and ſmall inſects, and remains with us the whole year. It builds with moſs and ſtubble, and lines the neſt with mud. On this it lays five or ſix eggs, which are of a blueiſh-green, variegated with a few black ſpots. It ſits on hedges and buſhes, and ſings very agreeably.

The throſtle is the fineſt of our ſinging-birds, not only for the ſweetneſs and variety of its notes, but for the long continuance of its harmony; as it obliges us with its ſong for nearly three parts of the year. See TURDUS.

THROSTLING, a diſeaſe of black cattle, proceeding from humours gathering under their throats; by which means their throats are ſo dangerouſly ſwelled, that they will be choaked, unleſs ſeaſonably relieved by bleeding.

THROUGH-STONE, in *Rural Economy*, a term which ſignifies a long ſtone which paſſes the whole breadth of the wall in making fences of that kind, and which binds them together in a more perfect manner than would otherwiſe have been the caſe. It is always of great importance to have plenty of throughs in fences of this nature, from almoſt the bottom part to near the top.

THROW, the provincial name of a turner's lathe. There is a great variety of theſe ſorts of tools in uſe for different purpoſes. See LATHE.

THROW *the Glove*. See GLOVE.

THROWED SILK. See SILK.

THROWSTER, one who prepares raw ſilk for the weaver, by cleanſing and twiſting it. See MILLING and SILK.

THRUM, in *Gardening*, among the cultivators of fine flowers, is a term applied to the thread-like internal buſhy parts of them, and which, in ſome ſorts of good flowers, ſuch, for inſtance, as the auricula and other ſimilar kinds, ſhould be of a bright colour, and the chives, or thready briſtles, of which it is compoſed, clear and ſhining with ſpangles, ſomewhat like gold-duſt; and they ſhould alſo be diſtinct from each other, leaning inwardly towards the pipe; as when they appear clotted together, or look battered or mis-ſhapen, the beauty of the flowers to which they belong is much impaired; which is not unfrequently occaſioned by the wild and other bees, which, when in ſearch of honey or food, are apt to greatly hurt ſuch parts of fine flowers.

flowers. The bees, in such cases, should be carefully taken by proper means, and be prevented as much as possible from collecting their food from such fine kinds of flowers.

THRUM-*Cap Island*, in *Geography*, a low woody island, of a circular form, and not much more than a mile in compass, in the South Pacific ocean, covered with verdure of many hues, but without inhabitants, discovered and so called by Cook in April 1769. S. lat. 18° 35′. W. long. 139° 48′.

THRUM-*Wort*, in *Agriculture*, a troublesome weed in some lands of the rather moist down kind, which is of the perennial sort.

THRUMMING, in *Rigging*, denotes interplacing short pieces of thrums, or rope-yarn, in a regular manner into matting, through intervals made by a fid, or large needle.

THRUSH, an affection of the inflammatory and suppurating kind in the feet of the horse, and some other animals. In the horse it is an inflammation taking place in that part of the foot termed the sensible frog, which is mostly occasioned from want of due cleanliness in it, especially in those of the team or working sort, from the heels being in a contracted state, or from shoeing upon erroneous and bad principles, but most commonly from the last of these causes. See SHOEING.

The disease may be known to be present in this, as well as in other animals, by a tenderness and uneasy feel being shewn on pressing the frog, or affected part, and its being accompanied with a discharge of matter of the purulent kind, as well as by other similar appearances.

The means of removing the complaint in the horse, when inflammation is chiefly present, consist first in taking away the shoe, and lowering the heels, in such a manner as that the frog or diseased part may come in contact with the ground or floor: after which the animal may be suffered to stand some days without shoes, the part being well washed two or three times a day with a common stable brush, and a solution of soft soap in rain-water, an application composed of white vitriol, Armenian bole, and alum, in fine powder, of each half an ounce, mixed up with common tar, in a sufficient proportion to make a sort of ointment, being then had recourse to as a dressing. This may be used spread upon lint, being applied between the cleft of the frog, or affected part, and renewed as often as there may be a necessity.

It is likewise advised by some, that all the diseased parts, in such cases, should be carefully removed by means of a drawing-knife, and that if the animal be not allowed to have rest, a bar-shoe must be had recourse to, until the disease becomes quite removed. It is thought, too, that three or four pints of blood may often be taken away with advantage in cases where there is much inflammation, and mashes with nitre be given in the evenings. Much benefit also may sometimes be found from the use of diuretic balls, and from the foot affected being fomented with warm water, in which a handful of common salt has been dissolved, just before the application of the above dressing. Great utility is occasionally derived, too, from the insertion of a seton or rowel in the chest, or other proper part, and letting it continue some time. See SHOE.

In cases where the complaint proceeds chiefly from contracted heels, some suppose the only certain and effectual mode of removing the affection is, perhaps, that of the use of the artificial, or patent frog, not long ago invented by Mr. Coleman, who has bestowed much attention on the feet of animals, especially of the horse. See FROG.

In other animals, where the hoofs, claws, or other parts of the feet are affected with inflammation, and collections or discharges of matter, in some measure of the thrush kind, or having some resemblance to it, the best means of relief are probably those of first trying the effects of discutient saturnine applications, and if these do not succeed, to have recourse to warm emollient fomentations or poultices, then cutting or paring the parts down so as to lay them well open, and let out any thing they may contain, dressing the openings with mild escharotics, as there may be occasion. In this way, very troublesome affections of this sort may often be speedily removed.

THRUSH, in *Medicine*. See APHTHÆ and INFANT.

THRUSH, in *Ornithology*, is the *turdus viscivorus* of Linnæus, and the largest of the genus. See TURDUS and MISSEL-*Bird*.

THRUSH, *Wind*. See RED-*Wing*.

THRUSHEL, in *Geography*, a river of England, in the county of Devon, which runs into the Tamer, opposite to Launceston.

THRUSK. See THIRSK.

THRUST, in *Fencing*, is an action of which there are three kinds. *To thrust in carte*, is to throw your hand as far as possible on the inside, with the point of your sword towards your adversary's breast: *to thrust seconde*, is to have your arm in a perfect opposition to your adversary's, holding your head inside: *to thrust tierce*, differs from carte only by the position of the hand, which must be reversed.

THRUSTING, or *Hand-pressing*, in *Dairying*, is a term applied to the practice of squeezing and forcing the liquid parts contained in the curd out of it by the hand, or other such means, after it has been properly reduced, and placed by a cloth in an upheaped or conical manner in the vat or hoop.

THRUSTING-*Screw*, in *Rural Economy*, a contrivance of the large screw kind, calculated for affording due pressure in the making of cheese with facility and convenience. These screws are perfectly simple, and capable of being made either of wood or iron; but the latter material is probably by much the best. They may be wrought in several different ways, but it is commonly done by means of a sort of lever applied in some manner or other, not unfrequently through a hole for the purpose in the head of the large screw. In some districts they have them fixed up to the under-sides of the floors above the pressing-rooms, and the power of them so managed as to be regulated at pleasure. By means of these thrusting-screws, it is evident that the pressure can be gradually increased, as there may be occasion, from the first application to the concluding hard or heavy pressure in finishing the work. This command of power is, of course, a circumstance of great utility and advantage in such business.

THRUSTINGS, a term applied in cheese-making, in some districts, to the *white* whey, or that which is the last pressed or forced out of the curd by the hand and other means, after it has been put into the cheese vat. In some instances in the process and practice of making butter of the whey kind, these thrustings are set by in earthen pans for the purpose, in order to acidulate, or *carve*, as it is called in some places, either by means of the warmth of the season, or of a room, for being churned, in the same way as in the common manner practised, in many places, for making butter from milk. See WHEY.

These thrustings, probably, form and constitute the best butter of the whey sort, though it is made from that fluid managed in other ways, as seen under the head just referred to above.

THRYALLIS, in *Botany*, an ancient Greek name for something of the Mullein kind, whose woolly leaves served to to make wicks for lamps. It is not eafy to conceive how Linnæus came to apply this name here, nor can we trace out any thing to account for his having done fo. We moft readily agree with De Theis, that the fhrub about to be defcribed has nothing in common with *Verbafcum* but its yellow flowers. (See Diofcorides, book 4. chap. 104.)—Linn. Gen. 213. Schreb. 289. Willd. Sp. Pl. v. 2. 570. Mart. Mill. Dict. v. 4. Juff. 251.—Clafs and order, *Decandria Monogynia*. Nat. Ord. *Tricoccæ*, Linn. *Acera*, Juff.

Gen. Ch. *Cal.* Perianth inferior, in five deep, lanceolate, erect, permanent fegments. *Cor.* Petals five, roundifh, fpreading. *Stam.* Filaments ten, awl-fhaped, longer than the calyx; anthers roundifh. *Pift.* Germen obtufe; ftyle thread-fhaped, the length of the ftamens; ftigma fimple. *Peric.* Capfule with three fides, and three angles, obtufe, feparable into three parts; its cells burfting at the external angle. *Seeds* folitary, very fmooth, obovate; obtufe at the bafe, with an incurved point.

1. Th. *brafilienfis*. Brafilian Thryallis. Linn. Sp. Pl. 554. Willd. n. 1. (Fruticefcens herba; Marcgr. Braf. 79. f. 3.)—Native of Brafil. A little *fhrub*, with round, jointed, reddifh branches. *Leaves* on reddifh footftalks, oppofite, ovate, entire, about an inch long; pale green above; whitifh beneath, with a flender mid-rib. *Stipulas* briftle-fhaped. *Clufters* terminal, folitary, from fix or feven inches to a foot long, with very flender partial *ftalks*, longer than the *flowers*, and very fhort fetaceous *bracteas*. *Flowers* fmall, elegant, yellow, bordered with red, with which colour alfo their yellow *ftamens* are fpeckled. *Fruit* three-lobed. Neither the plant nor its flower has any remarkable odour.—Linnæus appears to have examined a dry fpecimen of this plant, but it is wanting in his herbarium, as well as in every other that we have feen. His idea of its natural order is furely lefs correct than Juffieu's. Specimens without fruit are not unlikely to have been overlooked for fome nondefcript *Bannifteria* or *Malpighia*.

THRYANDA, in *Ancient Geography*, a town of Afia Minor, in Lycia. Steph. Byz.

THRYOCEPHALUM, in *Botany*, a genus of Forfter's, named from θρυον, *a fort of rufh*, and κεφαλη, *a head*, becaufe of the habit of the plant, and its little round head of flowers. This genus is the fame as Kyllingia. (See that article.) The only fpecies mentioned by Forfter, is there confidered by us as *K. monocephala*. Vahl, in his *Enum. Plant.* v. 2. 381, refers it to *K. triceps*, probably becaufe he faw a fpecimen with a compound head. This very circumftance ftrengthens his own fufpicion, that thefe two fuppofed fpecies of *Kyllingia* are not, in reality, diftinct. Our fpecimen from Forfter himfelf has a very flight indication of a fmall lateral head, by the fide of the principal one, nor can it be otherwife diftinguifhed from *K. monocephala*. In the ftructure or appearance of any other part, we cannot difcern the leaft difference between *monocephala* and *triceps*, in feparating which we confided more in thofe who have originally defcribed thefe plants, than it feems they deferved.

THRYOESSA, or Thryon, in *Ancient Geography*, called from the time of Strabo Epitalium, fituated on the left banks of the Alpheus, E. of Olympia.

THUAREA, in *Botany*, bears that name in honour of M. Aubert du Petit Thuars, a French botanift of the prefent day, who is cited for the genus itfelf in Perf. Syn. v. 1. 110.—Brown Prodr. Nov. Holl. v. 1. 197.—Clafs and order, *Triandria Digynia*. Nat. Ord. *Gramina*.

Eff. Ch. Calyx-glumes of one valve, two-flowered, fpiked, unilateral, on a dilated common ftalk; the lowermoft ones only partly perfect; the reft male only; the inner floret of the lowermoft glume male, its outer valve refembling the calyx. Nectary of two fcales at the bafe of the germen. Stigmas feathery. Seed wrapped in the corolla, and enfolded in the hardened, clofed, involute ftalk.

The *ftems* are creeping, very long, with erect, fhort, undivided, leafy branches. *Spike* folitary, terminal, fhort, for a long time half enclofed in a leaf-like fheath. The *common ftalk* is thick and coriaceous, not membranous, as M. du Petit Thuars terms it, he having, as Mr. Brown fuppofes, confounded that part with the fheath. *Flowers* feffile, in a fimple row, one or two of the loweft only being perfect, the remaining four, five, or fix, in the contracted portion of the fpike, males.

Mr. Brown obferves, that this genus of graffes is not very diftantly related to Panicum (fee that article); efpecially to *P. dimidiatum*, Retz. Obf. fafc. 6. 23; but in *Thuarea*, the *calyx-glumes* are, with refpect to the *ftalk*, inverted, and want an outer value. In ftructure this genus agrees, in many particulars, with Spinifex, (fee that article,) in which the fexes are indeed more feparated, and therefore a requifite abundance of males is provided. The figure and economy of the *common-ftalk*, or *rachis*, too is different; though that part is permanent in both genera, and affifts in both, though not in the fame manner, to difperfe the *feeds*.

The only fpecies of which we can give an account are the three following, though Mr. Brown mentions alfo a *T. farmentofa*.

T. *latifolia*. Br. n. 1.—"Perfect flowers two. Stems downy. Leaves lanceolate, filky on both fides."—Gathered by fir Jofeph Banks, in the tropical part of New Holland.

T. *media*. Br. n. 2.—"Perfect flowers folitary. Leaves linear-lanceolate; their under fide fmooth, as well as the ftem."—Found by Mr. Brown, in the tropical part of New Holland.

T. *involuta*. (Ifchæmum involutum; Forft. Prodr. 73. Willd. Sp. Pl. v. 4. 741.)—Perfect flowers folitary. Leaves lanceolate, nearly fmooth on both fides.—Gathered by Forfter in the Society Ifles, and fome other places within the tropics. The fpecimen given by him to the younger Linnæus is marked *Taheité*. The erect *ftems*, or *branches*, are but two or three inches high, fimple, ftriated, fmooth, each bearing at the bottom one lanceolate, acute, ftriated *leaf*, about its own length; fheathing at the bafe; becoming involute in drying. Sometimes there is another *leaf*, about half as long, with a fheath almoft an inch in length, near the middle of the branch. *Spike* fcarcely an inch long, terminal, of about four *flowers*, fpringing laterally from the hollow of a concave pointed leaf, rather fhorter than the reft. *Calyx* ribbed. *Corolla* fmooth. Feathery *ftigmas* very confpicuous in the lowermoft *flower*.

THUBUNA, Tubnab, in *Ancient Geography*, a town of Mauritania Sitifenfis, according to Ptolemy; fituated in the mountains, between two rivers, S.W. of Igilgili.

THUBURSICA, a town of Africa, in New Numidia. Ptol.

THUBUTIS, a town of Africa Propria, near Bullaria. Ptol.

THUCCA, or Tucca, *Dugga*, a town of the interior of Africa, mentioned by Ptolemy; fituated at the extremity of a fmall chain of hills about two miles S. of Tiburficumbure. On this fcite were found many maufoleums, and the portico of a temple ornamented with beautiful columns. Here was alfo an aqueduct.

THUCYDIDES, in *Biography*, a celebrated Greek hiftorian, was born in the 77th Olympiad, about 470 B.C.

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The name of his father was Olorus, or Orolus, that of a Thracian prince, indicating a connection with Thrace, in which he feems to have poffeffed gold-mines, and to have had influence over its chiefs. He belonged to one of the principal families at Athens, and was related to that of Miltiades. His education was that which diftinguifhed Athenians of rank: Antiphon being his preceptor in rhetoric, and Anaxagoras in philofophy. When he heard Herodotus recite his hiftory at the Olympic feftival, he is faid to have fhed tears; and Herodotus obferving it, congratulated Olorus on his fon's difpofition. At the commencement of the Peloponnefian war he was at Athens, and fhared in the calamity of peftilence that then occurred; and in the eighth year of that war he had a command in Thrace, and was oppofed to the Spartan general Brafidas, who furprifed the town of Amphipolis, for the lofs of which Thucydides was punifhed by banifhment, though it does not appear that he could have prevented it. During the twenty years of his exile, he devoted himfelf to literary refearches and obfervations through different parts of Greece, and thus collected materials for the hiftory which he was projecting. He refided for a confiderable time in Thrace, but the place and time of his death are not afcertained. Dodwell conjectures that he paffed his 80th year, and died in Thrace. His hiftory comprehends the tranfactions of the firft twenty years of the Peloponnefian war, difpofed in eight books; more limited in its compafs than that of Herodotus, but not merely rivalling but furpaffing it in hiftorical merit, more efpecially if we admit what a modern writer fays of it, "that the firft page of Thucydides is the commencement of real hiftory." The diftinguifhing characteriftics of this hiftorian are diligence of refearch, and the felection of the beft authorities, and perfect impartiality. To thefe qualities we may add fagacity in inveftigating caufes and effects, and a philofophical fpirit in forming a difcriminating judgment of human affairs. His narration is occafionally very interefting, and indicates the writer of genius. His ftyle, which has undergone much criticifm, is of that kind which the ancients termed the auftere, aiming at force and brevity rather than harmony, elegance, or perfpicuity. Its concifenefs and frequent tranfpofitions render it frequently obfcure, nor is this defect compenfated by its energy and elevation. The moft valued editions of this work are Hudfon's, Oxon. 1696; Waffe and Ducker's, Amft. fol. 1731; and the Leipfic, 2 vols. 4to. 1790—1804. Voff. Hift. Græc. Gen. Biog.

THUDACA, in *Ancient Geography*, a town of Africa, in Mauritania Cæfariana, near Tingis. Ptol.

THUELATH, a maritime town of Africa, on the coaft of Libya, between Autolatæ and Thagana. Ptol.

THUEYE, in *Geography*, a town of France, in the department of the Ardeche; 18 miles W. of Privas.

THUJA, in *Botany*, θυιον, θυια, or θυα of the Greeks, the name of a tree, whofe very durable wood ferved, according to Theophraftus, to make images. Its root in particular, being curioufly twifted or veined, was ufed for the moft valuable ornamental works. This plant was probably the *Juniperus Oxycedrus*, very common throughout Greece and the Archipelago, of which Mr. Hawkins is of opinion that the moft ancient ftatues were made. It is the Small Cedar, κεδρος μικρα of Diofcorides, and ftill univerfally bears the name of κεδρος in modern Greek. Our prefent genus of *Thuja* has nothing in common with this claffical plant, except being an aromatic evergreen tree, of the fame natural order, with a very durable wood; but it is not a native of Greece or the Levant.—Linn. Gen. 500. Schreb. 651. Willd. Sp. Pl. v. 4. 508. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 5. 321. Purfh 646. Juff. 413. Tourn. t. 358. Lamarck Illuftr. t. 787. Gærtn. t. 91.—Clafs and order, *Monoecia Monadelphia*. Nat. Ord. *Coniferæ*, Linn. Juff.

Gen. Ch. Male, *Cal.* Catkin ovate, compofed of a common ftalk, on which the flowers ftand oppofite, in three rows, each flower having for its bafe a nearly ovate, concave, obtufe fcale. *Cor.* none. *Stam.* Filaments in each flower four, but fcarcely vifible; anthers as many, attached to the bafe of the fcale above mentioned.

Female on the fame plant, *Cal.* Catkin nearly ovate, with oppofite flowers, and confifting of two-flowered, ovate, convex fcales, converging longitudinally. *Cor.* none. *Pift.* Germen minute; ftyle awl-fhaped; ftigma fimple. *Peric.* Cone ovate-oblong, obtufe, burfting lengthwife, into oblong imbricated, nearly equal, obtufe, externally convex fcales. *Seeds* folitary, oblong, each furrounded by a longitudinal membranous emarginate wing.

Eff. Ch. Male, Catkin with imbricated fcales. Corolla none. Anthers four.

Female, Catkin becoming an imbricated cone, with two-flowered fcales. Corolla none. Seed furrounded by a vertical membranous wing.

Obf. Linnæus indicates the clofe relationfhip of this genus to *Cupreffus*. They are neverthelefs diftinguifhed by the peltate fcales of the *cone* in the latter, and its angular, obtufe, fcarcely winged, *feeds*, or *nuts*.

1. Th. *occidentalis*. American Arbor-vitæ. Linn. Sp. Pl. 1421. Willd. n. 1. Ait. n. 1. Purfh n. 1. "Michaux Arb. For. v. 3. 29. t. 3." (Arbor vitæ; Cluf. Hift. v. 1. 36. Ger. Em. 1369.)—Young branches two-edged. Leaves imbricated in four rows, compreffed, ovate, fomewhat rhomboid, dotted. Inner fcales of the cone abrupt, tumid under the point.—Native of North America, from Canada to the mountains of Virginia and Carolina, bloffoming in May. It is rather fcarce in the fouthern ftates, and only found on the fteep banks of mountain torrents. The branches are extremely tough. *Purfh.* This tree was introduced into our gardens in Gerarde's time, or before, and is much efteemed for ornament and fhelter in fhrubberies, or for platted and clipped hedges in nurfery-gardens, in which laft ftate it is really very beautiful. By a ftrange miftake of Linnæus, this fpecies is handed down as a native of Siberia; becaufe Gmelin, *Fl. Sib.* v. 1. 182, mentions a *Thuja*, to which he mifapplies the fynonyms of the prefent, but which by his own account is different; for he fays it is "paler than the garden kind, and fmaller in all its parts." It was brought him by a travelling furgeon, from rocks near Pekin in China, and could be no other than the *Th. orientalis*, hereafter defcribed. *Th. occidentalis* is a perfectly evergreen *tree*, of humble growth, much branched, very different from moft others in the compreffed vertical afpect of its younger fhoots, and their clofely imbricated *leaves*, which are fmall, obtufe with a point, fmooth; thofe of two oppofite rows compreffed and keeled; the intermediate ones flat, with a glandular point, or cell of refin, at the back. The *flowers* appear in May, and are fmall, folitary, terminal; the males yellowifh, and moft abundant. *Cones* ripened the following year, drooping, each the fize of a filberd-kernel, confifting of about half a dozen lax, fmooth, coriaceous *fcales*. The fmell of the bruifed plant is fomething like Savine, aromatic, but not agreeable. The *wood* is not hard, but tough and extremely durable, on which laft account it is much efteemed in America for making pales and fences.

2. Th. *orientalis*. Chinefe Arbor-vitæ. Linn. Sp. Pl. 1422. Willd. n. 2. Ait. n. 2. Gærtn. f. 1. "Schkuhr Handb. v. 3. 285. t. 309. (Thuya; Gmel. Sib. v. 1. 182 Th. n. 3; Duhamel Arb. v. 2. 320. t. 90, the two lower figures.

figures. Very bad.)—Young branches two-edged. Leaves imbricated in four rows, compreffed, ovate, fomewhat rhomboid, with a central furrow. Inner fcales of the cone obtufe, with a recurved dorfal point.—Native of rocky fituations in China. *Gmelin.* On mountains in Japan. *Thunb. Jap.* 266. A hardy tree in our gardens, which appears to have been cultivated by Miller in 1752. It flowers at the fame time as the former, but though a much more handfome tree, is lefs common. The very copious and crowded young *branches* are more erect, more flender, and rather lefs compreffed than the former, and the *leaves* are furrowed, without any refinous dot. The differences between thefe two fpecies are accurately marked in our fpecific characters, adopted from Linnæus and Willdenow. The inner fcales of the *cone* in that before us are remarkably hooked. Gærtner obferves that the wing of its *feed* is hardly difcernible.

3. Th. *articulata.* Jointed Arbor-vitæ. Vahl. Symb. v. 2. 96. t. 48. Desfont. Atlant. v. 2. 353. t. 252. Willd. n. 3. (Th. aphylla; Linn. Sp. Pl. 1422, as to the fynonym of Shaw, and part of the character taken from thence, but not of Am. Acad. v. 4. 295; fee TAMARIX. Cypreffus fructu quadrivalvi, foliis equifeti inftar articulatis; Shaw Afric. n. 188. f. 188.)—Young branches jointed, rather compreffed, with four furrows. Leaves minute, concave, pointed, four at the top of each joint; glandular at the back. Cones quadrangular, of four hooked fcales.—Native of the mountains of Barbary, where it is not uncommon. A *tree* from fifteen to thirty feet high, with round *branches*, the younger ones repeatedly fubdivided, in a partly oppofite, partly alternate manner, moderately compreffed, compofed of a feries of linear, fmooth, brittle joints, from a quarter to half an inch long, and marked with four longitudinal furrows, which are continued to the interftices of the four minute fcale-like *leaves* crowning each of thefe joints. Willdenow, mifled by the analogy of other fpecies, and the figures of authors, fuppofes each *joint* to be an affemblage of *leaves*, from which error the faithful defcriptions of Vahl and Desfontaines might have guarded him. *Catkins* terminal, folitary; the males ovate-oblong, of many fcales; females roundifh, of much fewer. *Fruit* fomewhat depreffed, about the fize of a black currant, with four protuberant angles, and crowned with as many intermediate reflexed points. The *fcales* feparate at the angles, but are firmly united at their bafe. *Seeds* fmall, with a broad kidney-fhaped wing. The late celebrated Brouffonet obferved the refin called Gum Sandarache to be procured from this tree. Dale attributes it to the Common Juniper. Such being the hiftory of the fpecies before us, the *Th. aphylla* of Linnæus becomes a nonentity.

4. Th. *dolabrata.* Sculptured Arbor-vitæ. Linn. Suppl. 420. Willd. n. 4. Thunb. Jap. 266. (Quai, vulgò Fi no ki et Ibuki; Kæmpf. Am. 884.)—Young branches two-edged, jointed; convex on one fide; concave and white on the other; joints obovate. Leaves lateral, oppofite, keeled, compreffed.—Native of Japan. Thunberg obferved it in the countries of Oygawa and Fakonia, between Miaco and Jedo; and it was planted along the high road on the hill of Fakonia. He fpeaks of it as a *tree* of vaft height and dimenfions, the moft beautiful of all the evergreen tribe. The *branches* are alternate, repeatedly fubdivided, compreffed and clothed with imbricated *leaves*. At firft fight the young *branches* appear covered with four rows of *leaves*, but the analogy of the foregoing fpecies, even of the firft of all, leads us to believe the intermediate row, on each fide, is an obovate furrowed joint, infenfibly terminating in a fhort broad *leaf*, while the more obvious *leaves* are oppofite, laterally inferted into the bafe of the joint at each fide, and about the fame length; each of them ftrongly compreffed, with a thick keel, and incurved point. Their great peculiarity confifts in being all convex and green on the upper fide of the branch; concave and as if whitewafhed, like the furrows of the joints, on the under. This gives the plant an artificial, but moft elegant, appearance. The *flowers* we have not feen. Kæmpfer fays the *fruit* is warty, the fize of a pea.

5. Th. *cupreffoides.* African Arbor-vitæ. Linn. Mant. 125. Willd. n. 5. Ait. n. 3. Thunb. Prodr. 110. (Th. aphylla; Burm. Prodr. 27, excluding the reference to Shaw.)—Young branches but flightly compreffed. Leaves imbricated in four rows, even. Cones nearly globofe, of four acute warty fcales.—Native of the Cape of Good Hope, from whence Dr. Roxburgh introduced it to Kew Garden in 1799. The growth of the *tree* is tall and clofe, like that of the Cyprefs. *Leaves* clofely imbricated, not fpreading. *Fruit* of the fize and appearance of the Cyprefs, nearly globular, with four obfolete angles, feparating into four thick acute valves or fcales, tuberculated externally, keeled within. *Seeds* numerous, each terminated by a membranous obovate wing. Linnæus adds to this defcription, "*Ramuli minime articulati more Equifeti.*" If *minime* be not printed by miftake for *minimi*, we prefume this alludes to Shaw's fynonym, cited in the *Mantiffa* with many fcruples, and certainly not belonging to this but to *articulata*, our third fpecies.

THUJA, in *Gardening*, contains plants of the hardy, evergreen tree-kind, of which the fpecies cultivated are, the American arbor-vitæ (T. occidentalis); and the Chinefe arbor-vitæ (T. orientalis).

In the firft of thefe fpecies there are different varieties; as the American fweet-fcented, and the variegated-leaved.

Method of Culture.—Thefe plants may be increafed by feeds, layers, and cuttings. Good feeds fhould be obtained from the native fituations of the trees, and be fown foon after they are ripe, or as foon as they can be obtained, in autumn or fpring, in pots or boxes of light earth, covering them half an inch deep, placing the pots, &c. in a fheltered warm fituation, or under the fhelter of a frame in bad weather, efpecially when fown in autumn, that they may be protected from fevere frofts: they fometimes come up in the fpring, but are frequently apt to remain in the ground till the fecond year. When the plants are come up, the pots fhould be placed in an eaft border to have only the morning fun, but open to the free air, giving frequent but very moderate waterings all the fummer; and in winter removing the pots again to a fheltered place till fpring, when they may be pricked out in nurfery-rows; or, when they are fmall and weakly, continued in the pots another year, placing them in a fhady fituation during fummer, and in a fheltered place in winter; and in the fpring following planting them out in the nurfery, in rows a foot or two afunder, in order to acquire fize and ftrength for planting out where they are to remain.

The layers fhould be made from the young fhoots of one or two years growth, which may be laid down early in autumn, bending down the branches to the earth, and laying all the young wood in by flit or twift-laying, with the tops only appearing a little above ground; fhortening any that have much longer tops than the others: they moftly emit roots in the earth, and form proper plants by the autumn following; when, or rather in fpring after, they fhould be feparated from the ftools, and be planted in nurfery-rows, to remain two or three years, or till of a proper fize for the fhrubbery, &c.

The cuttings fhould be made from the ftrong young fhoots of the fame year's growth, which fhould be planted

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in the autumn in a ſhady border, taking the opportunity of ſhowery weather, if poſſible, for the buſineſs; they ſhould be cut off with a ſmall part of the old wood, where practicable, and be planted in rows a foot aſunder, cloſing the earth well about them: they will be properly rooted in one year for planting out in wider nurſery-rows: they may alſo be planted in pots, and placed in a hot-bed, in order to have them more forward.

And they all may be planted out into the borders, &c. in the autumn or early ſpring months.

Theſe trees in their native ſituations grow to very conſiderable ſizes and magnitudes, but in this climate they are of much inferior growths, ſeldom riſing to any great height or thickneſs. They ſucceed beſt in the countries from which they are brought, in rather moiſt ſoils; but here they thrive perfectly in any tolerably good common kind, and in any ſituation. They have a beautiful form of growth, being much and finely branched from their very bottoms, and conſtantly cloſely adorned with leaves, which are of a very minute ſize, and arranged in a curiouſly compact imbricated manner, diſplaying a continual verdure and ornamental variety at all times of the year.

They are highly ornamental evergreens, proper for adorning the ſhrubbery and other parts, having a fine effect alſo when diſpoſed ſingly in borders, &c. and in open ſpaces of graſs; in all of which ſituations they ſhould be ſuffered to grow with their full branches, in their own natural way, except reducing with a knife any low ſtraggling or rambling branches occaſionally: this is all the culture they require afterwards.

They may alſo be employed as timber-trees, in the evergreen foreſt-tree plantations.

And thoſe in the pots, as the Chineſe arbor-vitæ, may be placed among other potted plants to adorn any particular compartment, and in aſſemblage with greenhouſe plants for variety.

THUILLIER, Vincent, in *Biography*, a learned Benedictine, was born at Coucy, in the dioceſe of Laon, in 1685; and entered into the congregation of St. Maur in 1703, where he was diſtinguiſhed for his talents. Having officiated as profeſſor of philoſophy and theology in the abbey of St. Germaine-des-Pres, he was made ſub-prior, and died in 1736. With his extenſive literature, he combined a lively imagination and a turn for ſatire, which involved him in ſeveral controverſies. He firſt oppoſed, and then warmly defended the bull "Unigenitus," on which ſubject he publiſhed two treatiſes. But he was more uſefully employed in a French tranſlation of Polybius, which appeared in 1721–28, in 6 vols. 4to. His verſion is elegant and faithful. Moreri.

THUIN, in *Geography*, a town of France, in the department of Jemappe, on the Sambre; 14 miles S.E. of Mons. N. lat. 50° 20′. E. long. 4° 21′.

THUIR, a town of France, in the department of the Eaſtern Pyrenées; 7 miles S.W. of Perpignan.

THULDEN, Theodore Van, in *Biography*, was one of the moſt diſtinguiſhed among the pupils of Rubens, whom he aſſiſted in forwarding the pictures of the Luxembourg gallery. He was born at Bois-le-Duc in 1607. He painted a conſiderable number of large works for the churches and public buildings of the principal towns and cities in Flanders; ſome of which have been honoured by being conſidered as from the hand of Rubens. Among the beſt of them are the Martyrdom of St. Sebaſtian, at Mechlin; the Martyrdom of St. Adrian, at Ghent; and the Aſſumption of the Virgin, formerly in the church of the Jeſuits, at Bruges. He was engaged at Paris, which he viſited in 1633, to paint a ſeries of pictures of the life of the patron ſaint of the Mathurins, St. John of Matha, which he afterwards etched and publiſhed in twenty-four plates. He is alſo the author of ſeveral other etchings from his own works and thoſe of others; particularly of 58 plates of the life of Ulyſſes, from pictures painted at Fontainebleau by Primaticcio, of moſt of which there is now no other remembrancer than his etchings. He died in 1676, at the age of 69.

THULE, or Thyle, in *Ancient Geography*, an iſland of the Northern ocean, deſcribed in a very vague manner by the ancients: but which ſome maintain to have been the Shetland iſles. Virgil (Georg. l. i. v. 30.) and Seneca (Medea, v. 379.) call this iſland "Ultima Thule." It is difficult to aſcertain its preciſe ſituation. Strabo aſcribes the ignorance and uncertainty that prevailed with regard to this iſland to its great diſtance, and charges Pytheas with having made many falſe reports concerning it. Ptolemy places the middle of this iſland in 63° of latitude, and ſays, that at the time of the equinoxes, the days were 24 hours, which could not have been true at the equinoxes, but muſt have referred to the ſolſtices; and, therefore, this iſland is ſuppoſed to have been in 66° 30′ lat. or under the polar circle. Stephanus Byzantinus ſays of this iſland, "Thula inſula magna in oceano ſub Huperboreas partes ubi Æſtivus dies ex viginti horis æqualibus conſtat, nox vero ex quatuor. Hybernæ vero dies é contrario." From this account it appears that the ancients deſcribed an iſland which was ſituated three degrees on this ſide of the polar circle; but its ſituation, if ſuch an iſland exiſted, ſtill remained very uncertain. As the ancients have not given us the dimenſions of this iſland, ſome authors have concluded that the appellation of Thule was given to Scandinavia, of which the ancients had a very imperfect knowledge. According to Procopius (l. iii. de Bell. Goth. c. 14.) a party of the Etulians, when vanquiſhed by the Lombards, ſought an abode towards the extremities of the earth. With this view they traverſed the country of the Sclavonians; and in their progreſs entered into the country of the Varnæ, and into Denmark, and at length arrived on the ocean, where they embarked, and then landed on the iſland of Thule. This iſland, he adds, is ten times larger than Great Britain, and is far remote from the northern coaſt, a great part of it being deſert. The habitable part was occupied by thirteen different claſſes of people, who had their reſpective kings. Towards the ſummer ſolſtice, the ſun appeared 40 days ſucceſſively above their horizon; ſix months afterwards, the inhabitants had 40 days of night, which they paſſed in a ſtate that was truly deplorable, as their commerce was totally interrupted. By the account of Procopius, it appears that the place to which he refers muſt have been beyond the polar circle, and of courſe beyond 63° lat., where Ptolemy placed the middle of Thule. Procopius ſays, that he often wiſhed to viſit this iſland, but was never able to accompliſh his object; but he profeſſes to have derived his information from perſons who had actually viſited the country, and he deſcribes its aſpect, and productions, and the manners of its inhabitants. His details correſpond to the accounts that have been given of the ancient ſtate of Lapland (which ſee); but this could not have been the Thule of the ancients. The deſcriptions tranſmitted to us from the ancients of their pretended iſle of Thule are ſo intermixed with fabulous and incredible relations, that ſome modern geographers have even doubted whether ſuch an iſland as they deſcribe ever exiſted; others have ſuppoſed that they refer to Scandinavia, or ſome country far diſtant to the north, of which they could have no certain and fatisfactory accounts; and others again have been of opinion, that no iflands to which modern voyagers have had accefs, correfpond more exactly to their reports than the ifles of Shetland, N. of Scotland. See Zetland *Iflands*.

Thule, in *Geography*, a town of Weftphalia, in the bifhopric of Paderborn; 6 miles W.S.W. of Paderborn.

Thule, a river of Wales, in the county of Glamorgan, which runs into the Lloghor, near its mouth.

Thule, *Southern*, a part of Sandwich Land, obferved by Capt. Cook in January 1775, in S. lat. 59° 13′ 30″ and W. long. 27° 45′, and fo called becaufe it is the moft fouthern land that has ever yet been difcovered. It exhibits a furface of vaft height, and is every where covered with fnow. Some thought that they faw land in the fpace between Thule and Cape Briftol: Cook thought it more than probable that thefe two lands are connected, and that this fpace is a deep bay, which he called Forfter's bay.

THUM, a town of Saxony, in the circle of Erzgebirg; 7 miles S. of Chemnitz. N. lat. 50° 37′. E. long. 12° 50′.—Alfo, a town of Bavaria, in the bifhopric of Bamberg; 3 miles S.S.W. of Forcheim.

THUMATA, in *Ancient Geography*, a town of the Arabs, placed by Pliny on the banks of the Tigris, at a confiderable diftance from the town of Petra.

THUMATHA, a town fituated in the interior of Arabia Felix, between Chabuata and Olaphia. Ptol.

THUMB, Pollex, in *Anatomy*, one of the members or parts of the hand. See Extremities.

Thumb-*Stall*, a ferrule made of iron, horn, or leather, with the edges turned up, to receive the thread in making fails. It is worn on the thumb to tighten the ftitches while fewing.

THUMELITHA, in *Ancient Geography*, a town of Africa, in Interior Libya, near the fource of the river Cinyphis. Ptol.

THUMEREVILLE, in *Geography*, a town of France, in the department of the Mofelle; 6 miles S.W. of Briey.

THUMERSTONE, in *Mineralogy; Axinite*, Haüy. This mineral was called Thumerftone by Werner, from Thum, in Saxony, the place where it was found; and Axinite by Haüy, from the flattened fharp edges of the cryftals refembling the edge of an axe. This is the firft character which ftrikes the eye when this mineral is prefented for infpection. It is moft commonly found cryftallized, but fometimes maffive or diffeminated. The form of the cryftals is a very compreffed oblique rhomboidal prifm. The primitive cryftal, according to Haüy, is a four-fided prifm, whofe bafes are parallelograms with very oblique angles: the larger angle being 101.32, and the fmaller 78.28. In the fecondary cryftals, the acute edges are generally truncated. It is cryftallized alfo in oblique four-fided tables. The form of the cryftals is fometimes very difficult to be determined; they not unfrequently interfect one another, forming a cellular aggregation. The external luftre is generally fplendent; internally it is gliftening or fhining, and is vitreous. It is tranfparent or tranflucent. The fracture is fine-grained and uneven; in the tranflucent varieties, it fometimes approaches to fplintery; and in the tranfparent varieties, to the fmall and imperfectly conchoidal. It fcratches glafs; is harder than felfpar, but not fo hard as quartz; it is fragile, and fufible by the blow-pipe into a greenifh-white glafs, but if laid on charcoal into a black glafs. The fpecific gravity is from 3.2 to 3.3. The colours of this mineral are moft commonly a clove-brown of various degrees of intenfity, inclining to violet and green. It is fometimes green and opaque: according to Brongniart, this is owing to a mixture of chlorite. It has been obferved, he remarks, that the cryftals which are coloured with this earth are the moft regular. The conftituent parts are given by Klaproth and Vauquelin as under.

	Klaproth.		Vauquelin.
Silex - - -	52.70 and	50.50	44
Alumine - -	25.79	16.	18
Lime - -	9.39	17.	19
Oxyd of iron -	8.63	9.50	14
Oxyd of manganefe	1.	5.25	4
Potafh - -		0.25	

This mineral occurs in Saxony, France, Switzerland, and Spain, and at mount Atlas, in Africa. It is found alfo maffive and cryftallized near St. Juft, in Cornwall, at the Botellock mine, affociated with common garnet, and in veins between Marazion and Penzance.

The moft beautiful variety is met with in a rock of ferpentine, near Balme d'Auris, in Dauphiny, in the department of the Ifère, where it generally occurs in well-defined cryftals, fometimes colonrlefs and tranfparent, but more frequently of a dull reddifh-violet colour, whence it obtained the name of violet fchorl of Dauphiny. The cryftals of thumerftone, which are not fymmetrical, become electric by heat: it is indeed a general law, that all minerals which poffefs the pyro-electric property, are defective in the fymmetry of the cryftals.

THUMLITZ, in *Geography*, a river of Saxony, which runs into the Mulda; 3 miles S. of Grima.

THUMMIM, in the *Scripture Learning*. See Urim and Thummim.

THUMNA, in *Ancient Geography*, the name of two towns fituated in the interior of Arabia Felix; one between Mochura and Aluare, and another between Mariama and Vodona. Ptol.

THUN, in *Geography*, a town of Switzerland, in the canton of Bern, at the diftance of about 12 miles from the town of Bern. It occupies the bottom and brow of a hill, and ftretches on both fides of the Aar. It contains 1200 inhabitants, enjoys confiderable immunities, has its own magiftrates and courts of juftice, in which the bailiff from Bern always prefides, and from whofe decifion an appeal always lies to the capital. The inhabitants employ themfelves in carding and fpinning filk for the manufactures of Bafle. Some of the burghers poffefs large herds of cattle. To the N.E., on an eminence, ftand the church, and the caftle, which is the refidence of the bailiff. N. lat. 46° 44′. E. long. 7° 31′.—Alfo, a lake of Switzerland, in the canton of Bern; about four leagues long, and one broad, and probably very deep: the borders are richly variegated, and prefent feveral fine points of view, much heightened by many rugged rocks rifing boldly from the margin of the water. The river Aar paffes through the lake of Brientz, and then enters that of Thun, from which it is again difcharged, paffing between two level promontories, prettily fprinkled with trees, on one of which ftands the caftle of Schadao; 15 miles S.S.E. of Bern.

THUNA, a town of Cachemire; 45 miles S. of Cachemire.

THUNBERGIA, in *Botany*, received that name firft from profeffor Retzius, and next in the *Supplementum Plantarum*, from the pen of the younger Linnæus, in honour of their mutual friend, fir Charles Peter Thunberg, knight of the order of Wafa, by whofe difcoveries that work was peculiarly enriched with new and curious fpecies, efpecially from the Cape of Good Hope. This illuftrious veteran ftill fits

fits in the professorial chair of Rudbeck and Linnæus at Upsal, after having essentially added to the general stock of knowledge by his Travels to Japan, his Floras of that country and of the Cape, and his very numerous academical dissertations. The liberal communications, and amiable character of professor Thunberg, have secured him no less personal esteem than his extensive application and knowledge. His constitution, though shaken by a terrible misfortune in his voyage, the accidental use of white lead in his food, which proved fatal to some of his mess-mates, has still carried him on to the advanced age of 73.—Retz. Act. Lund. v. 1. 163. Linn. Suppl. 46. Schreb. Gen. 426. Willd. Sp. Pl. v. 3. 388. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 4. 65. Thunb. Nov. Gen. 21. Prodr. 106. Juss. 103. Lamarck Illustr. t. 549.—Class and order, *Didynamia Angiospermia.* Nat. Ord. *Personatæ*, Linn. *Acanthi*, Juss.

Gen. Ch. *Cal.* Perianth inferior, double, permanent: the outermost of two ovate, obtuse, ribbed, equal leaves, as long as the tube of the corolla: inner of one leaf, in many, about twelve, awl-shaped erect segments, not one-third so long as the former. *Cor.* of one petal, salver-shaped: tube gradually dilated upwards: limb in five deep, nearly equal, obovate, very abrupt segments, about half the length of the tube. *Stam.* Filaments four, awl-shaped, inserted into the tube, the two lower ones shortest, all included within the tube; anthers arrow-shaped. *Pist.* Germen superior, roundish; style thread-shaped, erect, hardly so long as the tube; stigma of two rounded flat lobes. *Peric.* Capsule globose with a beak, smooth, or two cells and two valves, bursting lengthwise: the beak linear, obtuse, compressed, furrowed; partition obovate, emarginate, perforated below the summit, membranous at the sides, permanent. *Seeds* two in each cell, kidney-shaped, rugged, convex on the outside, concave on the inner, with a longitudinal furrow.

Eff. Ch. Calyx double; the outer of two leaves; inner in many awl-shaped segments. Corolla salver-shaped, with five regular lobes. Capsule beaked, of two cells.

Obs. Linnæus remarks that this genus agrees in many points with *Barleria*. Thunberg takes the outer calyx-leaves for bracteas, but this is not countenanced by the altogether peculiar appearance of the inner calyx, by no means like an external perianth.

1. T. *capensis.* Diffuse Thunbergia. Linn. Suppl. 292. Willd. n. 1. Retz. Act. Lund. v. 1. 163, with a figure.—Leaves roundish-ovate, obtuse. Stem diffuse.—Native of the Cape of Good Hope. The *root* seems to be perennial. *Stems* a finger's length, diffuse, simple, leafy, square, hairy. *Leaves* opposite, on short hairy stalks, entire or somewhat toothed, hardly an inch long, strongly reticulated with veins: very rough with minute bristles above; hairy beneath. *Flowers* yellow, on simple, solitary, striated, erect, axillary, hairy *stalks*, twice the length of the leaves. *Outer calyx* very hairy; inner rigid, with almost pungent points. *Corolla* about an inch long, its segments somewhat rounded. *Capsule* rigid, about the same length.

2. T. *fragrans.* Twining Thunbergia. Roxb. Corom. v. 1. 47. t. 67. Willd. n. 2. Ait. n. 1. Andr. Repos. t. 123.—Leaves ovate-oblong, somewhat heart-shaped, acute. Stem twining.—Common in hedges, among bushes, on the banks of water-courses, about Samulcotah, flowering in the wet and cold seasons. Dr. Roxburgh never met with it any where else. He says the plant possesses a peculiar and agreeable fragrance, and the beauty of its *flowers*, though not fragrant, entitles it to a place in the flower-garden. No scent has been discovered in any part of this plant in our stoves, where it blossoms freely all summer long. The long and twining *stems* readily distinguish this species from the foregoing, as well as the elongated form of the *leaves*, which are occasionally angular, or toothed, near the base. The *flowers* are white, larger, and with a narrower tube than the *capensis*, their segments more abrupt or somewhat notched.

It appears by the Linnæan herbarium that the younger Linnæus had originally destined the name of *Solandra* for this genus.

Another *Thunbergia* was previously established by Dr. Montin, in the Stockholm Transactions for 1773, but the noble plant on which it was founded proved a GARDENIA. See that article.

THUNDER, a noise in the lowest region of the air, excited by a sudden explosion of electrical clouds; which, on this account, are called thunder-clouds.

Seneca, Rohault, and other authors, both ancient and modern, account for thunder by supposing two clouds impending over one another, the upper and rarer of which, becoming condensed by a fresh accession of air raised thither by warmth from the lower parts of the atmosphere, or driven upon it by the wind, immediately falls forcibly down upon the lower and denser cloud: by which fall the air interposed between the two being compressed, that next the extremities of the two clouds is squeezed out, and leaves room for the extremity of the upper cloud to close tight upon the under; thus a great quantity of air is enclosed, which, at length escaping through some winding irregular vent or passage, occasions that noise which we call thunder.

But this could only reach to the phenomena of thunder heard without lightning; and, therefore, recourse has been had to another solution. It has been said, that thunder is not occasioned by the falling of clouds, but by the kindling of sulphurous exhalations, in the same manner as the noise of aurum fulminans.

"There are sulphurous exhalations," says sir Isaac Newton, "always ascending into the air when the earth is dry; there they ferment with the nitrous acids, and sometimes taking fire, generate thunder, lightning, &c."

That, besides the vapours raised from water, &c. there are also exhalations carried off from sulphur, bitumen, volatile salts, &c. is past all doubt; the vast quantity of sulphurous and bituminous matter all over the surface of the earth, and the volatile salts of plants and animals, afford such an ample stock of them, that it is no wonder the air should be filled with such particles, raised higher or lower, according to their greater or less degree of subtlety and activity; and more copiously spread in this or that quarter, according to the direction of the winds.

Now, the effects of thunder are so like those of fired gunpowder, that Dr. Wallis thinks we need not scruple to ascribe them to the same cause; and the principal ingredients in gunpowder, we know, are nitre and sulphur; charcoal only serving to keep the parts separate, for their better kindling.

Hence, if we conceive in the air a convenient mixture of nitrous and sulphurous particles, from the sources above mentioned; and those, by any cause, to be set on fire, such explosion may well follow; and with such noise and light, the two phenomena of thunder, as in the firing of gunpowder; and being once kindled, it will run from place to place, this way or that, as the exhalations happen to lead it; much as is found in a train of gunpowder.

This explosion, if high in the air, and remote from us, will do no mischief; but if near us, may destroy trees, animals, &c. as gunpowder would do in the like circumstances.

This nearness, or distance, may be estimated by the interval

terval of time between the flaſh and the noiſe. Dr. Wallis obſerves, that, ordinarily, the difference between the two is about ſeven ſeconds, which, at the rate of 1142 feet in a ſecond of time, gives the diſtance about a mile and a half; but ſometimes it comes in a ſecond or two, which argues the exploſion very near us, and even among us. And in ſuch caſes, the doctor aſſures us, he has more than once foretold the miſchiefs that happened.

Upon the whole, that there is in lightning a ſulphurous vapour has been argued from the ſmell of ſulphur which attends it, and from the ſultry heat in the air which uſually precedes it; and that there is a nitrous vapour along with it, the ſame writer concludes hence, that we know of no other body ſo liable to a ſudden and violent exploſion. And as to the kindling of theſe materials, we know that a mixture of ſulphur and ſteel-filings, with a little water, will of itſelf break forth into actual flame. Nothing, therefore, is wanting to the exploſion but ſome chalybeate or vitriolic vapour; and, among the various effluvia from the earth, the doctor does not doubt but there muſt be ſome of that kind; but, in proof of what he leaves as a probability, the following facts have been alleged.

In hiſtory, we meet with inſtances of its raining iron in Italy, and iron-ſtones in Germany. Jul. Scaliger tells us, he had by him a piece of iron rained in Savoy. Cardan reports 1200 ſtones to have fallen from heaven, ſome of them weighing 30, ſome 40, and one 120 pounds, all very hard, and of the colour of iron.

The matter of fact is ſo well atteſted, that Dr. Liſter, in the Philoſophical Tranſactions, builds a whole theory of thunder and lightning on it; maintaining that they both owe their matter to the vapour or exhalation of the pyrites.

The noiſe of thunder, and the flame of lightning, are eaſily made by art. If a mixture of oil or ſpirit of vitriol be made with water, and ſome filings of ſteel added to it, there will immediately ariſe a thick ſmoke or vapour out of the mouth of the veſſel; and if a lighted candle be applied to this, it will take fire, and the flame immediately deſcend into the veſſel, and this will be burſt to pieces with a noiſe like that of a cannon.

This is ſo far analogous to thunder and lightning, that a great exploſion and fire are occaſioned by it; but in this they differ, that this matter when once fired is deſtroyed, and can give no more exploſions; whereas, in the heavens, one clap of thunder uſually follows another, and there is a continued ſucceſſion of them for a long time. M. Homberg explained this by the lightneſs of the air above us in compariſon of that here, which therefore would not ſuffer all the matter ſo kindled to be diſſipated at once, but kept it for ſeveral returns.

Ever ſince the year 1752, in which the identity of the matter of lightning, and of the electric fluid, has been aſcertained, philoſophers have generally agreed in conſidering thunder as a concuſſion produced in the air by an electrical exploſion. For the illuſtration and proof of this theory, ſee Lightning. See alſo Electricity.

We ſhall here obſerve, that Mr. Henry Eeles, in a letter written in 1751, and read before the Royal Society in 1752, conſiders the electrical fire as the cauſe of thunder, and endeavours to account for it on this hypotheſis; and he tells us, that he did not know of any perſon's having made the ſame conjecture. Phil. Tranſ. vol. xlvii. p. 524, &c.

That rattling in the noiſe of thunder, which makes it ſeem as if it paſſed through arches, or were broken variouſly, is probably owing to the ſound being excited among clouds hanging over one another, and the agitated air paſſing irregularly between them.

See this phenomenon particularly accounted for under Lightning.

Thunder-*Bolt*. If what we call lightning acts with extraordinary violence, and breaks or ſhatters any thing, it is called a thunderbolt, which the vulgar, to fit it for ſuch effects, ſuppoſe to be a hard body, and even a ſtone.

But that we need not to have recourſe to a hard ſolid body to account for the effects commonly attributed to the thunderbolt, will be evident to any one, who conſiders thoſe of the pulvis fulminans, and of gunpowder: but more eſpecially the aſtoniſhing powers of electricity, even when collected and employed by human art, and much more when directed and exerciſed in the courſe of nature.

When we conſider the known effects of electrical exploſions, and thoſe produced by lightning, we ſhall be at no loſs to account for the extraordinary operation vulgarly aſcribed to thunderbolts. As ſtones and bricks ſtruck by lightning are often found in a vitrified ſtate, we may reaſonably ſuppoſe, with ſignior Beccaria, that ſome ſtones in the earth, having been ſtruck in this manner, firſt gave occaſion to the vulgar opinion of the thunderbolt.

Places ſtruck with thunderbolts were held ſacred among the ancients. Nigidius has a curious treatiſe on the thunderbolt.

The ancient painters and poets have armed Jupiter with a ſort of flaming dart, called a thunderbolt. Thus, it is ſaid, he became maſter both of gods and men.

Theſe thunderbolts are forged for Jupiter, according to the poets, by the Cyclopes.

The thunderbolt, in antiquity, repreſented ſovereignty, and a power equal to the gods; on this account, Apelles painted Alexander, in the temple of Diana of Epheſus, holding a thunderbolt in his hand: and on medals, the thunderbolt is ſometimes found to accompany the emperor's heads, as that of Auguſtus.

Appian informs us, that the thunderbolt was the principal divinity of Seleucia; adding, that it was adored, even in his time, with various hymns and ceremonies.

Thunder-*Clouds*, in *Phyſiology*, are thoſe clouds which are in a ſtate fit for producing lightning and thunder. From ſignior Beccaria's exact and circumſtantial account of the external appearances of thunder-clouds, we ſhall extract the following particulars.

The firſt appearance of a thunder-ſtorm, (which generally happens when there is little or no wind), is one denſe cloud, or more, increaſing very faſt in ſize, and riſing into the higher regions of the air. The lower ſurface is black, and nearly level; but the upper finely arched, and well defined. Many of theſe clouds often ſeem piled upon one another, all arched in the ſame manner; but they keep continually uniting, ſwelling, and extending their arches.

At the time of the riſing of this cloud, the atmoſphere is generally full of a great number of ſeparate clouds, motionleſs, and of odd and whimſical ſhapes. All theſe, upon the appearance of the thunder-cloud, draw towards it, and become more uniform in their ſhapes as they approach, till, coming very near the thunder-cloud, their limbs mutually ſtretch towards one another; they immediately coaleſce, and together make one uniform maſs. Theſe he calls *adſcititious* clouds, from their coming in, to enlarge the ſize of the thunder-cloud.

But ſometimes the thunder-cloud will ſwell, and increaſe very faſt, without the conjunction of any adſcititious clouds; the vapours in the atmoſphere forming themſelves into clouds wherever it paſſes. Some of the adſcititious clouds appear like white fringes at the ſkirts of the thunder-cloud, or under the body of it, but they keep continually growing darker and darker, as they approach to unite with it.

When the thunder-cloud is grown to a great ſize, its lower ſurface is often ragged, particular parts being detached towards the earth, but ſtill connected with the reſt. Sometimes the lower ſurface ſwells into various large protuberances, bending uniformly toward the earth. And ſometimes one whole ſide of the cloud will have an inclination to the earth, and the extremity of it will nearly touch the earth. When the eye is under the thunder-cloud, after it is grown larger, and well formed, it is ſeen to ſink lower, and to darken prodigiouſly; at the ſame time that a number of ſmall adſcititious clouds (the origin of which can never be perceived) are ſeen in a rapid motion, driving about in very uncertain directions under it. While theſe clouds are agitated with the moſt rapid motions, the rain generally falls in the greateſt plenty, and if the agitation be exceedingly great, it commonly hails.

While the thunder-cloud is ſwelling, and extending its branches over a large tract of country, the lightning is ſeen to dart from one part of it to another, and often to illuminate its whole maſs. When the cloud has acquired a ſufficient extent, the lightning ſtrikes between the cloud, and the earth, in two oppoſite places, the path of the lightning lying through the whole body of the cloud and its branches. The longer this lightning continues, the rarer does the cloud grow, and the leſs dark is its appearance; till, at length, it breaks in different places, and ſhews a clear ſky. When the thunder-cloud is thus diſperſed, thoſe parts which occupy the upper regions of the atmoſphere are equally ſpread, and very thin; and thoſe that are underneath are black, but thin too; and they vaniſh gradually, without being driven away by any wind.

Theſe thunder-clouds were ſometimes in a poſitive as well as negative ſtate of electricity. The electricity continued longer of the ſame kind, in proportion as the thunder-cloud was ſimple and uniform in its direction; but when the lightning changed its place, there commonly happened a change in the electricity of the apparatus over which the clouds paſſed. It would change ſuddenly after a very violent flaſh of lightning, but the change would be gradual when the lightning was moderate, and the progreſs of the thunder-cloud ſlow. Beccar. Lettere dell' Elletriciſmo, p. 107; or Prieſtley's Hiſt. Electr. vol. i. p. 397, &c. See LIGHTNING.

THUNDER-*Houſe*, in *Electricity*, is an inſtrument invented by Dr. James Lind of Edinburgh, for illuſtrating the manner by which buildings receive damage from lightning, and to evince the utility of metallic conductors in preſerving them from it.

A (*Plate* XV. *Electricity*, *fig.* 2.) is a board about three quarters of an inch thick, and ſhaped like the gable-end of a houſe. This board is fixed perpendicularly upon the bottom board B, upon which the perpendicular glaſs pillar C D is alſo fixed in a hole about eight inches diſtant from the baſis of the board A. A ſquare hole I L M K, about a quarter of an inch deep, and nearly an inch wide, is made in the board A, and is filled with a ſquare piece of wood, nearly of the ſame dimenſions. It is nearly of the ſame dimenſions, becauſe it muſt go ſo eaſily into the hole, that it may drop off, by the leaſt ſhaking of the inſtrument. A wire, L K, is faſtened diagonally to this ſquare piece of wood. Another wire, I H, of the ſame thickneſs, having a braſs ball, H, ſcrewed on its pointed extremity, is faſtened upon the board A: ſo alſo is the wire M N, which is ſhaped in a ring at O. From the upper extremity of the glaſs pillar C D, a crooked wire proceeds, having a ſpring ſocket F, through which a double knobbed wire ſlips perpendicularly, the lower knob, G, of which falls juſt above the knob H. The glaſs pillar D C muſt not be made very faſt into the bottom board; but it muſt be fixed ſo that it may be pretty eaſily moved round its own axis, by which means the braſs ball G may be brought nearer or farther from the ball H, without touching the part E F G. Now when the ſquare piece of wood L M I K (which may repreſent the ſhutter of a window or the like) is fixed into the hole ſo that the wire L K ſtands in the dotted repreſentation I M, then the metallic communication from H to O is complete, and the inſtrument repreſents a houſe furniſhed with a proper metallic conductor; but if the ſquare piece of wood L M I K is fixed ſo that the wire L K ſtands in the direction L K, as repreſented in the figure, then the metallic conductor H O, from the top of the houſe to its bottom, is interrupted at I M, in which caſe the houſe is not properly ſecured.

Fix the piece of wood L M I K, ſo that its wire may be as repreſented in the figure, in which caſe the metallic conductor H O is diſcontinued. Let the ball G be fixed at about half an inch perpendicular diſtance from the ball H, then, by turning the glaſs pillar D C, remove the former ball from the latter; by a wire or chain connect the wire E F with the wire Q of the jar P, and let another wire or chain, faſtened to the hook O, touch the outſide coating of the jar. Connect the wire Q with the prime conductor, and charge the jar; then, by turning the glaſs pillar D C, let the ball G come gradually near the ball H, and when they are arrived ſufficiently near one another, you will obſerve, that the jar explodes, and the piece of wood L M I K is puſhed out of the hole to a conſiderable diſtance from the thunder-houſe. Now the ball G, in this experiment, repreſents an electrified cloud, which, when it is arrived ſufficiently near the top of the houſe A, the electricity ſtrikes it, and as this houſe is not ſecured with a proper conductor, the exploſion breaks part of it, *i. e.* knocks off the piece of wood I M.

Repeat the experiment with only this variation, *viz.* that this piece of wood I M is ſituated ſo that the wire L K may ſtand in the ſituation I M; in which caſe the conductor H O is not diſcontinued; and you will obſerve that the exploſion will have no effect upon the piece of wood L M, this remaining in the hole unmoved; which ſhews the uſefulneſs of the metallic conductor.

Farther, unſcrew the braſs ball H from the wire H I, ſo that this may remain pointed, and with this difference only in the apparatus repeat both of the above experiments, and you will find that the piece of wood I M is in neither caſe moved from its place, nor any exploſion will be heard, which not only demonſtrates the preference of conductors with pointed terminations to thoſe with blunted ones, but alſo ſhews that a houſe furniſhed with ſharp terminations, although not furniſhed with a regular conductor, is alſo ſufficiently guarded againſt the effects of lightning.

Mr. Henly, having connected a jar containing 509 ſquare inches of coated ſurface with his prime conductor, obſerved that if it was ſo charged as to raiſe the index of his electrometer to 60°, by bringing the ball on the wire of the thunder-houſe, to the diſtance of half an inch from that connected with the prime conductor, the jar would be diſcharged, and the piece in the thunder-houſe thrown out to a conſiderable diſtance. Uſing a pointed wire for a conductor to the thunder-houſe, inſtead of the knob, the charge being the ſame

ſame as before, the jar was diſcharged ſilently, though ſuddenly; and the piece was not thrown out of the thunder-houſe. In another experiment having made a double circuit to the thunder-houſe, the firſt by the knob, the ſecond by a ſharp-pointed wire, at one and one-fourth of an inch diſtance from each other, but of exactly the ſame height (as in *fig.* 3.) the charge being the ſame; although the knob was brought firſt under that connected with the prime conductor, which was raiſed half an inch above it, and followed by the point, yet no exploſion could fall upon the knob; the point drew off the whole charge ſilently, and the piece in the thunder-houſe remained unmoved. Phil. Tranſ. vol. lxiv. part i. p. 136. See POINTS, in *Electricity*.

THUNDER-*Stone*, in *Natural Hiſtory*, the ſame with that called by authors brontia.

THUNDER-*Storm*. See THUNDER-*Clouds*.

THUNDER *Bay*, in *Geography*, a bay in lake Huron, about nine miles long, and nearly as many broad. The Indians who reſide near, and all European travellers who have paſſed this bay, agree to call it by the preſent name, on account of the continual thunder they obſerve. N. lat. 44° 50′. W. long. 83° 30′.—Alſo, a bay on the N. part of lake Superior.

THUNDERING LEGION, *Legio Fulminans*, was a legion in the Roman army, conſiſting of Chriſtian ſoldiers, who in the expedition of the emperor Marcus Aurelius Antoninus againſt the Sarmatæ, Quadi, and Marcomanni, A.D. 174, are ſaid to have ſaved the whole army, then ready to periſh with thirſt, by procuring, with their prayers, a very plentiful ſhower on them; and at the ſame time a furious hail, mixed with lightning and thunderbolts, on the enemy, and thus he obtained a deciſive victory.

This is the account commonly given by eccleſiaſtical hiſtorians; and the whole ſtory is engraven in bas-relievos on the Antonine column. And hence aroſe the denomination *thunderers:* though ſome ſay, that the legion thoſe Chriſtians were of was called the *thundering legion* before.

This deliverance has been thought by many to have been miraculous, owing to the prayers of the Chriſtians who were in the Roman army; and it has been ſuppoſed, that the emperor wrote a letter to the ſenate on this occaſion, which was very favourable to the Chriſtians; others, however, have thought, that the Chriſtians, by a pious ſort of miſtake, attributed this unexpected and ſeaſonable ſhower, which ſaved the Roman army, to a miraculous interpoſition; and this opinion, ſays Moſheim, is indeed ſupported by the weightieſt reaſon as well as by the moſt reſpectable authorities; and the letter of Marcus Antoninus is allowed, even by the defenders of the miracle of the thundering legion, to have in it manifeſt tokens of ſpuriouſneſs, to be the work of a man unſkilful in Roman affairs, and who probably lived in the ſeventh century. Moſheim ſums up the arguments on this ſubject in the following manner: it is certain, he ſays, that the Roman army encloſed by the enemy, and reduced to the moſt deplorable and even deſperate condition by the thirſt under which they languiſhed in a parched deſart, was revived by a ſudden and unexpected rain. It is alſo certain, that both the Heathens and the Chriſtians looked upon this event as extraordinary and miraculous; the former attributing it to Jupiter, Mercury, or the power of magic; the latter to Chriſt, interpoſing, thus unexpectedly, in conſequence of their prayers. It is ſtill farther beyond all doubt, that a conſiderable number of Chriſtians ſerved, at this time, in the Roman army, and it is extremely probable, that in ſuch trying circumſtances of calamity and diſtreſs, they employed the merciful interpoſition and ſuccours of their God and Saviour. And as the Chriſtians of the time looked upon all extraordinary events as miracles, and aſcribed to their prayers all the uncommon and ſingular occurrences of an advantageous nature that happened to the Roman empire, it will not appear ſurpriſing, that upon the preſent occaſion they attributed the deliverance of Antoninus and his army to a miraculous interpoſition which they had obtained from above. But, on the other hand, it muſt be carefully obſerved, that it is an invariable maxim univerſally adopted by the wiſe and judicious, that no events are to be eſteemed miraculous, which may be rationally attributed to natural cauſes, and accounted for by a recourſe to the ordinary diſpenſations of providence; and as the unexpected ſhower, which reſtored the expiring force of the Romans, may be eaſily explained without riſing beyond the uſual and ordinary courſe of nature, the concluſion is manifeſt; nor can it be doubtful in what light we are to conſider that remarkable event. Eccl. Hiſt. vol. i. 8vo. edit.

Mr. Moyle and Mr. King had a curious and intereſting controverſy on the ſubject of the thundering legion. The learned Dr. Lardner has collected into one view every thing relating to it of importance, in his Collection of Jewiſh and Heathen Teſtimonies, vol. ii. ch. xv. ſect. iii. p. 221, &c.

THUNGEN, in *Geography*. See TIENGEN.

THUNOE, a ſmall iſland of Denmark, between the coaſt of Jutland, and the iſland of Samſoe. N. lat. 55° 58′. E. long. 10° 27′.

THUNUDROMUM, in *Ancient Geography*, a town, with the title of a Roman colony, in Africa, in New Numidia, according to Ptolemy. It is named Tynidrumenſe Oppidum by Pliny.

THUNUSDA, a town of Africa Propria, according to Ptolemy, denominated by Pliny Thunuſidenſe Oppidum.

THUPÆ, or THUPPÆ, a town of Africa, in the interior of Libya, upon the ſouthern banks of the Niger. Ptol.

THUPPA, a town of Africa, in the interior of Libya, upon the northern bank of the river Gira.

THUR, in *Geography*, a river of Switzerland, which riſes in the ſouth part of the county of Toggenburg, and runs into the Rhine, 7 miles S.S.W. of Schaffhauſen.

THURE, a town of France, in the department of the Vienne; 4 miles W. of Chatellerault.

THUREN, a river of France, which riſes in the department of the Upper Rhine, paſſes by Thann, &c. and joins the Ill at Enſiſheim.

THURGAU, a country of Switzerland, with the title of landgravate; bounded on the north by Swabia and the lake of Conſtance, on the eaſt by the lake of Conſtance, on the ſouth by the territories of St. Gall, and on the weſt by the cantons of Zurich and Schaffhauſen. It receives its name from the river Thur, and, in its moſt extenſive ſenſe, comprehends all the extent of country on both ſides of that river. Though ſomewhat mountainous towards the ſouth, yet it affords rich paſtures; and its other parts, as approaching nearer to levels, produce plenty of grain, with vegetables and fruits of all kinds, as alſo wine. The country is populous, and well cultivated, containing ſix towns, with ſeveral handſome burghs, a great number of ſeats, and upwards of 170 villages. About one-third of the inhabitants conſiſts of Roman Catholics, and in church affairs are ſubject to the biſhop of Conſtance. The other two-thirds, ever ſince the year 1543, have been Calviniſts. The Thurgau is a very ancient landgravate, which, on the extinction of the counts of Old or Hohen Frauenfelden, devolved to thoſe of Kiburg, and, on their failure, to the counts of Habſburg, with whom it came to the houſe of Auſtria, which continued poſſeſſed of it till 1460, in which year the Switzers, being at war with the archduke Sigiſmund, wreſted this country from him, which, by by the peace concluded at Conſtance in the following year, was confirmed to them. The cantons to which the territorial ſovereignty of this country belongs, are the eight old cantons of Zurich, Bern, Lucerne, Schweitz, Underwalden, Zug, and Glaris; but it was not till the peace of Arau, that the ſecond was admitted by the others as a co-ſovereign. Theſe eight every two years alternately appoint a landvogt over it, who reſides at Frauenfeld; and ſince the year 1449, the cantons of Friburg and Soleure have alſo obtained a ſeat in its criminal court.

THURGOLAND, a townſhip of Yorkſhire, in the Weſt Riding; 4 miles S.W. of Barneſley.

THURIA, in *Ancient Geography*, a town of Meſſenia, on the river Aris, S.W. of Alagonia. It had a temple dedicated to the goddeſs Aſtarte, a Syrian divinity, ſuppoſed to be the ſame with Venus.—Alſo, an iſland on the Ægean ſea, near Naxos, according to Plutarch.

THURIBULUM, among the Romans, a cenſer, or veſſel, in which incenſe was burnt at ſacrifices.

THURIFICATI, in *Church Hiſtory*, a deſignation given to thoſe who, to avoid the perſecution of the Roman emperors, offered frankincenſe to the heathen gods.

THURII Montes, in *Ancient Geography*, mountains of Italy, in Magna Græcia.

THURINGII, Thuringians, a people of Germany, ſuppoſed by ſome authors to have been a part of the Vandals. They have been ſcarcely known in hiſtory ſince the fall of the Roman empire. Towards the end of the fifth or commencement of the ſixth century, Thuringia had a king, or at leaſt a warlike chief.

THURINGIA, in *Geography*, a circle of Saxony, which forms the N. part of the landgravate of that name. The country is well watered, yields good paſturage, and abundance of corn, particularly wheat, which is excellent, as alſo fine timber-wood, ſafflower, aniſe, fennel, and wine; and has alſo a conſiderable breed of horſes, horned cattle, and ſheep. Of theſe natural productions of the country, a great part is exported. Thuringia contains in it 60 towns, 674 villages, and 300 noble eſtates. The modern Thuringia, which lies nearly between the Saale and the Werra, is but a part of the ancient Thuringia, a country formerly comprized under that name, extending itſelf much farther every way. In the ſixth century, the Franks and Saxons ſubjected the Thuringians to their dominions, whoſe country from that time forwards became divided into the North and South. North Thuringia, towards the N., extends itſelf beyond Harzwalde, quite to the river Elbe, and belonged to the Saxons. It was united with the duchy of Saxony, loſt its name, and was at length annexed to Eaſtphalia, or to the eaſtern part of the county of Saxony. South Thuringia belonged to the Franks, and comprized in it the modern Thuringia, together with a large ſhare of the modern Franconia, Heſſe, &c. Till the eleventh century, it ſtood under the emperors and kings, and beſides the counts, we find alſo ſome dukes mentioned, to whom the German kings entruſted the government of this country. Ever ſince the thirteenth century, the marggraves of Meiſſen, who afterwards became electors of Saxony, have been in poſſeſſion of the landgravate of Thuringia, which was at one time divided among ſeparate lines, but returned again by the extinction of the latter to that of Meiſſen. It has been ceded to Pruſſia by the king of Saxony.

THURIS, in *Ancient Geography*, a town ſituated in the interior of Arabia Felix. Ptol.

THURIUM, a town which ſucceeded the ancient *Sybaris*; which ſee.

THURLES, in *Geography*, a poſt-town of the county of Tipperary, Ireland, ſituate on the river Suire, which divides it nearly into two equal parts. There was formerly a caſtle belonging to the knights of St. John of Jeruſalem, and there are ſtill ſome ruins of a monaſtery. Thurles is 70 miles S.W. from Dublin.

THURLMERE, a lake of England, in the county of Cumberland, from whence a river runs to the Derwent; 3 miles S.E. of Keſwick.

THURLOE, John, in *Biography*, ſecretary of ſtate to the Protectorate, was the ſon of Thomas Thurloe, rector of Abbot's Roding, in Eſſex, where he was born in 1616. He was brought up to the law, and in 1644–5, by the intereſt of Oliver St. John, was appointed one of the ſecretaries to the parliamentary commiſſioners at the treaty of Uxbridge. Advancing through other offices, he went as ſecretary to lord chief juſtice St. John, and Mr. Strickland, in their embaſſy to the States-General. In 1652 he roſe to the office of ſecretary to the council of ſtate; and when Cromwell, in 1653, aſſumed the protectorate, he was nominated his ſecretary, on whom he repoſed peculiar confidence. In 1655 he was entruſted with the management of the poſt-office; and in 1656 he repreſented the iſle of Ely in parliament. On the death of Cromwell he ſigned the order for proclaiming Richard, and in the following parliament was returned member for the univerſity of Cambridge. He retained his office of ſecretary under Richard, and alſo under the parliament that depoſed him. On the reſtoration, he was accuſed of high treaſon and examined, but ſoon ſet at liberty. He then retired to his ſeat in Oxfordſhire, and viſited London, at his chambers in Lincoln's Inn, in term-time. Charles II. often invited him to take a part in his adminiſtration: but he declined it, alleging that perhaps he ſhould not be able to ſerve the king, as he had done the protector, in connection with men of different characters and principles; the protector, as he told his majeſty, was uſed "to ſeek out men for places, and not places for men." The abilities of Thurloe for public life were diſtinguiſhed, and his character in private life no leſs amiable. He died in Lincoln's Inn, where he was maſter of the bench, in 1667–8, and was interred in the chapel. His ſtate papers formed a valuable hiſtorical collection, and were publiſhed by Dr. Birch, in 7 vols. fol. 1742. Biog. Brit. Gen. Biog.

THURLOW, in *Geography*, a townſhip of Upper Canada.

Thurlow's *Iſland*, a narrow iſland in the Pacific ocean, near the coaſt of North America, about 24 miles in length from E. to W. N. lat. 50° 24′. E. long. 233° 35′.

THURMAN, a poſt-townſhip of the United States, in the ſtate of New York, and county of Waſhington, erected in 1792 from Queenſbury, and then compriſing a great extent of territory, which has been ſince ſubdivided into other towns. Thurman is bounded N. by Cheſter and Johnſburg, E. by Caldwell and Bolton, S. by Saratoga county, and W. by Montgomery county. The firſt ſettlements commenced about 1786, and in 1810 there were about 200 families, moſtly Scots, and the reſt from the eaſtern ſtates. It has one Preſbyterian and one Methodiſt meeting-houſe, and a pretty competent number of common ſchool-houſes and ſchools. The whole townſhip is well watered, and Crain's mountain in the W. part of it is rich in mineral treaſures. Much of this weſtern part is ſtill unſettled.

THURN, a town of the duchy of Stiria; 5 miles S. of Windiſch Gratz.

Thurn *Am Hardt*, a town of the duchy of Carniola; 2 miles S. of Gurckfeld.

THURNAU, a town of Germany, in the principality of Culmbach; 5 miles S.S.W. of Culmbach. N. lat. 50° 2′. E. long. 11° 26′.

THUR-

THURNEISSER, Leonard, in *Biography*, a man of great temporary celebrity in chemiſtry and the occult ſciences, was born at Baſle in the year 1530. Having imprudently, in 1547, when a boy, married a widow, who proved unfaithful; and having involved himſelf in debt, he found himſelf under a neceſſity of leaving both his wife and his native place. Accordingly, in 1548 he went to Straſburg, and from thence he proceeded to Conſtance, having, by diligent application to his trade of a goldſmith, amaſſed a conſiderable ſum of money. He employed himſelf in the conſtruction of mathematical inſtruments, and in a variety of metallurgic operations with ſuch reputation, that he was entruſted with the direction of the ſmelting works at Eberſwold in the Tyrol. During his abode at Conſtance, he married the daughter of a goldſmith by whom he had been employed, and in 1558 retired with her to Tarenz in the Upper Innthal, where he formed metallurgic eſtabliſhments on his own account, and conſtructed furnaces, together with a manufactory for the preparation of ſulphur. Here he was viſited by ſeveral perſons of eminence, and became known to the emperor Ferdinand; and patroniſed by the emperor's ſon, the archduke Ferdinand, he travelled, by his conſent, in 1560, to Scotland and the Orkney iſlands, and in 1561 to Portugal and Spain, and alſo to ſome parts of Africa and Aſia. On the ſummit of mount Sinai he received the order of St. Catharine; and in his way home he viſited Candia, Greece, Italy, and Hungary. When he arrived in the Tyrol, he found his eſtabliſhments in great confuſion; but he was enabled by the government of Inſpruck to revive and ſupport them. He was then deputed by the archduke to examine the mines in Hungary and Bohemia; but notwithſtanding this high patronage, he involved himſelf in debt, and by his pride and extravagance forfeited the favour of his patrons. In 1569 he obtained leave to viſit Lower Germany, for the purpoſe of making ſome obſervations in natural hiſtory, and of ſuperintending the printing of ſome of his works. During the leiſure afforded by ſome of his ſea-voyages, he had compoſed, in German verſe, a work intitled "Archidoxia," or an account of the influence which the planets have on the human body, and on all the employments of man; together with a ſecret introduction to alchemy. He had prepared alſo another work, called the "Quinteſſence," in which he pointed out the connection between medicine and alchemy, and gave inſtructions how to extract from all ſubſtances their quinteſſence or ſubtile parts. He pretended alſo to have made ſome other curious diſcoveries, which we cannot detail. At Munſter he publiſhed, in 1569, the firſt edition of his "Archidoxia," in 4to.; and his "Quinteſſence" was printed there, alſo in 4to., in 1570. Theſe works were afterwards enlarged and publiſhed in folio. Thurneiſſer, quarrelling with the biſhop, left Munſter and removed to Frankfort on the Oder, to print his "Piſon," or Deſcription of Rivers, by which, together with his calendar and book on plants, he acquired the greateſt ſhare of his reputation. Having cured the margravine of Brandenburg of a dangerous illneſs, the margrave appointed him his phyſician, and defrayed the expence of bringing his wife and family from Conſtance. In 1572 he publiſhed his work "On Urine," in which he aſſerts, that by examining the urine of Sigiſmond I. of Poland, he had diſcovered the nature of his diſeaſe, and predicted his death, with the day on which it would happen. Under the patronage of the margrave of Brandenburg he went on proſperouſly with his laboratory and printing-preſs; and indulged in the moſt expenſive and ſplendid mode of dreſs and living. His viſitors were numerous, and of the firſt rank; and among his correſpondents were the emperor Maximilian, and Elizabeth queen of England. He was conſulted not only in all kinds of diſeaſes, but on witchcraft, magic, and other ſuch matters. His printing-preſs was in high eſtimation. By printing, and the ſale of his MSS. and preſcriptions, he acquired great wealth. For the MSS. the elector, John Gruge, gave him 9000 dollars; and there was formerly in the king's library at Berlin, a MS. entitled "De Tranſmutatione Veneris in Solem," for which an annual penſion of 600 dollars was ſettled on him and his children. He was the firſt perſon who formed a collection of natural curioſities in the Marche of Brandenburg. He had alſo a garden filled with plants for the ſtudy of botany, and a menagerie, containing a collection of various animals from all parts of the world. In 1575 he loſt his ſecond wife, who arranged all his affairs with great prudence; and this was the era of his downfall. From opulence he was reduced to poverty. His reputation as a phyſician declined. Dr. Hoffman of Francfort, in his oration "De Barbarie Imminente," was formidable to his credit, and he contrived means to prevent its being printed till the year 1578. Thurneiſſer, fearing utterly to loſe his character, prepared for his departure from Berlin, and retired to Baſle, where, in 1580, he married a third wife. Withdrawing from domeſtic diſquiet into Italy, he is ſaid to have converted, in the preſence of the grand duke, Franceſco de Medici, one half of an iron nail into gold. This ſingular man died in 1595, or 1596, in a monaſtery at Cologne, after requeſting that his body might be interred cloſe to that of Albert the Great. A liſt of his works is given by Haller in his Bibliotheca. Gen. Biog.

THUROTZ, in *Geography*, a river of Hungary, which runs into the Waag, 12 miles N. of St. Martin. It gives name to a county.

THURROCK GRAYS, or Great Thurrock, a market-town in the hundred of Chafford, and county of Eſſex, England; is ſituated 22 miles S.S.W. from Chelmsford, and 24 miles E. by S. from London. It acquired the appellation of Grays from the noble family of that name, who poſſeſſed the manor for upwards of three centuries, from the year 1194, when it was granted to them by king Richard I. The town conſiſts principally of one irregular ſtreet, on the banks of a ſmall creek from the Thames, navigable for hoys and veſſels of ſmall burthen. A weekly market is held on Thurſdays, chiefly for the ſale of corn, and is much frequented: here is alſo an annual fair. The church is built in the form of a croſs, with a tower on the north ſide. By the return under the population act of the year 1811, this pariſh was ſtated to contain 214 houſes, and 1055 inhabitants.

In the adjacent pariſhes of Chadwell and Little Thurrock are various caverns, or holes, of unequal depths and dimenſions, formed in the chalk, which here conſtitutes the upper ſtratum: they appear to open from the top by a narrow circular paſſage, which near the bottom begins to ſpread, and communicates with ſubterranean apartments of different forms. Dr. Derham meaſured ſix of theſe caverns, and reports them to be of various depths, from fifty to eighty feet. The origin of theſe excavations is uncertain; the opinion of ſome modern writers, that they were the granaries of the Britons, ſeems by far the moſt rational ſuppoſition. They are alſo called Dane Holes, and traditionally reported to have been uſed as receptacles or hiding-places for plunder during the frequent incurſions of the Danes into this iſland.—Beauties of England and Wales, vol. v. Eſſex; by J. Britton and E. W. Brayley.

THURSDAY, the fifth day of the Chriſtians' week, but the ſixth of that of the Jews. See Thor and Week.

Thursday, *Holy*. See Holy.

Thursday, *Maunday*. See Maunday *Thurſday*.

THURSIO, in *Ichthyology*, a ſpecies of fiſh mentioned by Pliny, lib. ix. cap. 9. It is thought by ſome to be the *phocæna*, or porpeſs; and by others the ſturgeon.

THURSO, or Thorsay, in *Geography*, a market-town in the ſhire of Caithneſs, Scotland, is ſituated on the northern ſide of the coaſt, at the extremity of a ſpacious bay, on the eſtuary of the river Thurſo, at the diſtance of 279 miles N. from Edinburgh. The town is irregularly built. A new town, on a regular plan, has been lately commenced at Thurſo, in conſequence of which, the incloſed lands let for five guineas *per* acre *per annum*. Here is a fine bay or harbour, which is progreſſively much improved in convenience and ſecurity. Eight veſſels belong to the town, and are chiefly employed in conveying ſalmon to London. Although the cuſtoms of this port are very inconſiderable, yet the following officers are regularly ſtationed here; a collector, comptroller, land-ſurveyor, land-waiter, two eſtabliſhed tideſmen, and one extraordinary tideſman. Thurſo is a borough of barony, holding of ſir John Sinclair as immediate ſuperior. The charter of erection was granted by Charles I. in 1633, in favour of John Maſter, of Berriedale, by which it was entitled "to all the privileges, immunities, and juriſdictions, belonging to a free borough of barony in Scotland." It is governed by two baillies and twelve counſellors, who are appointed by the ſuperior, and hold their offices during his pleaſure. A well-ſupplied market is held on Fridays; and here are two annual fairs, one of which continues for ten days. The principal manufacture of the town is coarſe linen cloth: in the neighbourhood are a bleach-field and a tannery, both of which are proſperous. In the population return of the year 1811, the town and pariſh of Thurſo were eſtimated to contain 592 houſes, inhabited by 3462 perſons. The pariſh extends about three miles from the town in every direction, except to the north-weſt, where it is bounded by the ſea. The rocks that bound the coaſt exhibit various ſcenes of natural grandeur. The Clett is an inſulated rock about 160 yards long and 80 broad; it is elevated about 400 feet above the ſurface of the ſea; and during the ſpring ſeaſon, is frequented by innumerable flocks of ſea-fowls.

Thurſo Eaſt, anciently called Thurſo Caſtle, once the reſidence of the earls of Caithneſs, is now the ſeat of ſir John Sinclair, bart. a native of Thurſo; a gentleman whoſe exertions will ever be revered by men of ſcience for "The Statiſtical Account of Scotland." In the park are the ruins of a ſmall chapel, where earl Harold the younger was buried, and where a neat modern monument has been erected by the above-mentioned baronet.—Beauties of Scotland, vol. v. Carliſle's Topographical Dictionary of Scotland, vol. ii.

Thurso, a river of Caithneſs, which runs into the ſea, at the town of Thurſo.

THURUS, in *Natural Hiſtory*, the name of a creature deſcribed by Geſner, and ſome others, as a diſtinct ſpecies of wild bull; but the accounts of it ſeem either fabulous or miſtaken deſcriptions of the wild bull.

THURY, in *Geography*, a town of France, in the department of the Yonne; 10 miles S.E. of St. Fargeau.—Alſo, a town of France, in the department of the Oiſe; 7 miles S.E. of Creſpy.

THUS, a town of Perſia, in the province of Khoraſſan; 200 miles N.N.W. of Herat.

Thus, a river of Perſia, which riſes near Meſghid, in Khoraſſan, and runs into the Caſpian ſea, 40 miles N.W. of Zaweh.

Thus. See Frankincense.

Thus *Judæorum*, called alſo *caſcarilla* and *cortex eleutheriæ*, in the *Materia Medica*, is the bark probably of the ſhrub deſcribed by Cateſby, under the name of *ricinoides elæagni folio* or *ilathera*, the *croton caſcarilla* of Linnæus, which grows plentifully in moſt of the Bahama iſlands; thence it is brought to us in curled pieces, or rolled up into ſhort quills, about an inch wide; covered on the outſide with a rough whitiſh matter; and browniſh within; and exhibiting, when broken, a ſmooth cloſe blackiſh-brown ſurface. The bark, freed from the outer coat, has a light agreeable ſmell, and a moderately bitter taſte, accompanied with a conſiderable aromatic warmth. It is eaſily inflammable, and yields, whilſt burning, a fragrant ſmell, ſomewhat reſembling that of muſk. Stiſer was the firſt who employed this bark as a medicine in Europe; who relates that a tincture of it in alkalized vinous ſpirits, or in dulcified alkaline ſpirits, proved carminative and diuretic, and did ſervice in arthritic and ſcorbutic caſes. In 1694 and 1695, it was employed by Apinus in an epidemic fever of the intermittent kind. The gentlemen of the French Academy found this bark of excellent ſervice againſt an epidemic dyſentery in 1719, when the ipecacuanha proved ineffectual. At preſent it is of great eſteem among the Germans, as a warm ſtomachic and corroborant, in flatulent colics, internal hæmorrhages, dyſenteries, the diarrhœa of acute fevers, and, mixed with the Peruvian bark, in common intermittents.—Among us it has been lately received into practice; but its uſe, ſays Dr. Lewis, is not yet become ſo general as it well deſerves to be. Its virtues are partially extracted by water, and totally by rectified ſpirits. Lewis's Mat. Med.

Thus, in *Sea Language*, the order by which the pilot directs the helmſman to keep the ſhip in her preſent ſituation when ſailing with a ſcant wind, ſo that ſhe may not approach too near the direction of the wind, and thereby ſhiver her ſails, nor fall to leeward, and run farther out of her courſe. Falconer. See Steering.

THUSCUS Vicus, in *Ancient Geography*, the name of one of the ſeven mountains of Rome, called alſo Cœlius Mons.

THUTHOA, a river of the Peloponneſus, in Arcadia, which diſcharges itſelf into the Ladon.

THUYA, in *Botany*. See Thuja.

THWAITE, in *Ichthyology*. See Shad.

THWART, in a boat, the ſeat or bench of a boat on which the rowers ſit to manage the oars. Hence *thoughts*, (which ſee,) is uſed in the ſame ſenſe.

Thwart *the Hawſe*, in *Sea Language*. See Athwart.

Thwart *Ships*, acroſs the ſhips. See Athwart.

Thwart *the Way*, in *Geography*, a ſmall iſland in the Straits of Sunda. S. lat. 5° 55′. E. long. 105° 43′.—Alſo, a ſmall iſland in a bay on the coaſt of New Guinea. S. lat. 2° 15′. E. long. 136° 54′.

THWARTER, Trembling, or *Leaping-Ill*, a diſeaſe in ſheep, of the ſhaking, jumping, and convulſive kind. Theſe different terms, ſome of which were formerly particularly uſed in one part and another in another, eſpecially in the northern diſtricts of the kingdom, are now ſaid to be had recourſe to indifferently, and applied indiſcriminately to all diſeaſes which, on a dry ſoil, proceed from a weak and enfeebled ſtate of body and barren ſeaſons. Under this threefold name, ſome ſay they have ſeen ſheep ſuffering by diſeaſes, which at leaſt had much reſemblance to thoſe of ſeveral other ſorts, as the apoplectic, paralytic, rheumatic, &c.; and that even when an old ſheep falls down, and dies of weakneſs and exhauſtion, the manner of its death differing ſomewhat from that of the hog-ſheep, it is frequently aſcribed by ſhepherds to the thwarter or trembling-ill.

There is, on the whole, ſo much contrariety of opinion, and diverſity in the deſcriptions of the diſeaſe, its cauſes, and the means of cure, that the writer of a paper on ſome of the diſeaſes of ſheep, in the third volume of the "Tranſactions of the Highland Society of Scotland," has divided and conſidered it under two diſtinct ſpecies.

The *firſt* variety, it is ſaid, is much more rare than formerly, and is ſcarcely known in the Highlands of the above country. It appears moſtly in the ſpring and harveſt ſeaſons. It affects ſheep of all ages and kinds, but never when in good condition, exiſting chiefly on dry farms, which have a northern expoſure, and which are evidently overſtocked; but on theſe only when the ſpring is ſevere and dry, or when early April graſs has been cut down by froſts, and the ſheep can find no ſucculent food or any thing green. Its production is favoured by a long continuance of eaſterly winds; and in cold weather, ewes are ſometimes attacked by it, even after they are fleeced. In theſe circumſtances they become extremely emaciated, eſpecially when heavy with lamb in many of them, or giving ſuck; and when at this time they get an overſtretch in running or leaping, or even an haſty ſtart, or cruſh in the fold, numbers fall a prey to this diſorder.

The appearances are, that ſome ſheep, it is ſaid, will fall down and die in two or three minutes; others will loſe the power of one ſide, and lie ſprawling until they die of hunger; others again will lie ſhivering, and very ſick at times, until death alſo comes on; and ſome will go a long time quite lame, until they are likewiſe quite exhauſted. Others deſcribe it as of two kinds; in one, ſometimes ſeizing the whole ſyſtem, when there is a general trembling over the whole body, and in the other, ſometimes affecting the legs only, when the animal immediately falls down, and the ſhaking, which is uninterrupted, is confined to the legs. Some ſay that the animal gradually loſes the power of its legs and body, until it becomes quite weak, always lying at laſt upon one ſide. Thoſe ſheep which die of it in ſpring, are lean and uſeleſs; but the mutton of fat hog-ſheep carried off by it in the autumn is not uneatable. It is ſometimes extremely fatal. In one inſtance, out of a flock of forty ſcore, ſeventeen ſcore were, it is ſtated, loſt in one ſpring. It was formerly thought to be contagious, and although this can ſcarcely be the caſe, it is certainly moſt deſtructive when it firſt comes among a flock; and when ſheep are brought from a clean ground to one infected with it, great numbers of them are ſure of dying. Thoſe which ſurvive it one ſeaſon, are ſure to relapſe the next ſpring.

Udder-locking ſhould be entirely laid aſide, as in one inſtance, one-twentieth of a large parcel of ewes is ſaid to have died of the diſeaſe, in the courſe of a week after they had been udder-locked. See Udder-*Locking*.

It is alſo ſaid to be uſeful during the early ſpring months to provide them with ſufficient food and ſhelter; and to avoid overſtocking, if the early graſs has been blighted, to paſture them in a rich park or other ground, on water-meadow, or on moſs and early rye-graſs.

The *ſecond* variety of the diſeaſe is, it is remarked, chiefly confined, in the above part of the kingdom, to the flocks in the ſouth of it, more eſpecially about the banks of the river Tweed, and of thoſe which diſcharge themſelves into it. It is ſaid to be a complaint almoſt unknown to the farmers on the Pentland range, and to the north of the Forth. In thoſe places where it prevails, it is ſometimes peculiarly fatal, and a farmer often loſes more of the flock by it alone, than all the other diſeaſes put together.

The appearances when it firſt comes on, which is generally during the ſummer or harveſt months, are, that the animal turns ſomewhat ſtupid and neglects its food, dozes round, in ſome meaſure, as in the ſturdy, and frequently leaps up, as if to clear any buſh or dike before it; at times, it will eat voraciouſly, and again refuſe all ſuſtenance for a conſiderable time. It continues frequently leaping during the day, and the neck is often ſtiff, and turned on one ſide; convulſions take place in the limbs which cauſe the animal to fall down, make curious contortions, and at times run to a little diſtance; the body ſometimes partakes of theſe, when the ſheep becomes totally incapable of motion, and dies from want of food, which the jaws will not open to admit, being cloſely wedged together. In this ſtate, it is unable to follow the flock, and the wool claps to the body. It lies for a long time motionleſs, and at length dies. After lying motionleſs for a conſiderable time, in thoſe caſes where the diſeaſe is not ſo violent, and the ſpaſm of the jaw not ſo ſevere, it gradually relaxes, and the ſheep will eat the whole of the food within reach quite bare, although the power of the limbs is totally gone, leaving the earth quite red and naked all round them. If the ſhepherd be attentive, and lifts them from place to place, and the ſeaſon be pretty well advanced, they often ſlowly recover, and are again reſtored to the uſe of their limbs. When they lie in this inactive ſtate, if the weather be warm, maggots are very apt to breed in them; and if not attended to, ſoon deſtroy them.

The diſeaſe moſtly appears at the periods ſtated above, eſpecially during hot and ſultry weather, and ariſes either from the ſheep being put into violent motion by dogs, or overheated by the ſun; in which caſes, in a few hours afterwards, it makes its appearance by the ſtiff neck, or ſome of the other ſigns coming on. When the ſheep are expoſed to fatigue, it will take place, if the weather be warm, independent of violent motion. They are commonly the *fatteſt* of the flock that are cut off by it. It not unfrequently ariſes from the braxy, of which it is moſtly a favourable ſign. It is never ſevere, however, when it is the conſequence of that diſeaſe, and the ſtiff neck never accompanies it.

In regard to the means of cure in the *firſt* ſort, they are various. When the ſheep fall down ſuddenly, and are threatened with immediate death, bleeding, by cutting the tail, or opening a vein on the inſide of the fore-thigh, will ſometimes give inſtantaneous relief. In all the other caſes it is proper to take them home and feed them with ſtrengthening food; and if at this time they be attacked with a temporary ſcouring, they moſtly recover very faſt, and ſoon acquire their former vigour. It is ſaid that ſome few means of cure are occaſionally tried, but it is believed with little ſucceſs. Dipping in cold water is not unfrequently practiſed: whiſky and gunpowder are ſometimes poured down their throats; and balls of muſtard and other hot pungent medicines are often adminiſtered. Others recommend bringing them into the houſe, giving them a mixture of equal quantities of ſallad oil and ſpirits, with a little finely powdered ginger, and at the ſame time rubbing into the back a little black ſoap broken in warm water, and feeding them on hay, the produce of dry walks or other grounds.

The giving of the ſheep a decoction of the dewcup and healing leaf boiled in butter-milk, is ſaid to have been uniformly ſucceſsful in treating ſheep affected with this diſorder during the ſummer and autumn.

In the removal of the *ſecond* kind of the diſeaſe, as it ariſes from the brain being oppreſſed, by too much blood being ſent to it by the quickened circulation, the firſt thing to be attended to on its appearance is copious blood-letting, which

which will be more effectual if taken from the veins of the neck, or from a vein on the outside of the eye, mostly well known to shepherds. It may even be taken from the tail, or fore-leg; but opening of the veins of the head is generally considered as the most proper and beneficial in this species of the complaint. As there is too great a determination of blood to the head, it will be attended with advantage to make a determination to the bowels, by stimulating them by means of purgatives, such as those of common salts, one ounce or more: calomel, from ten grains to half a drachm; or, what is supposed more proper, as it also acts upon the kidneys and skin, a dose of half an ounce or more of nitre. These remedies are to be persevered in, until all marks of the disease disappear. But if the sheep be too far gone in the disorder, and has lost all motion, it should be killed for the sake of the carcase, which in this species of the disease is not affected, or at least but very slightly.

In the managing of the cure, much nice attention is necessary in both kinds of this disease.

THY, in *Geography*, a town of Prussia, in Pomerelia; 7 miles N. of Marienburg.

THYAMIA, in *Ancient Geography*, a town of the Peloponnesus, in Sicyonia. Xenophon.

THYAMIS, a town of Arachosia, founded by Semiramis.—Also, a promontory of Epirus, between Thesprotia and Cestrinia.

THYARIS, a river of Asia, in Phrygia Salutaris, which passed through the northern part of this province, and discharged itself into the Sangara.

THYATIRA, Akhisar, a town of Asia Minor, in Lydia. According to Steph. Byz. it was very ancient, and called Pelope, Pelopea, or Pelopia, and afterwards Semiramis. According to Pliny it was also denominated Evippa. It derived its name of Thyatira, from the Greek word signifying daughter, from Seleucus Nicanor, who received the news, as it is said, at this town of the birth of a daughter. From an inscription found in this city, it appears that Adrian had a temple in it; and medals have been found here that were struck in honour of Adrian. Strabo says that the town of Thyatira was considered by some authors as the last of the district of Mysia, and that it was a colony of Macedonians. After Scipio had defeated Antiochus near Magnesia of Sipyla, the town of Thyatira sent ambassadors to the Romans, to render them homage. Thyatira was taken by Aristonicus, in the year 130 B.C.; but this prince having been taken prisoner in the same year by the consul Perpenna, this town reverted to the dominion of the Romans. Thyatira was much distinguished by the benefactions of the emperor Caracalla; and it appears by a medal of this town, that under the reign of this prince it took the name of Neocorus. This place was one of the seven churches of Asia, mentioned in the book of Revelations; so that the Christian religion was introduced here by the apostles and their immediate disciples; but whether the church was founded by St. Paul or St. John, or by either of them, does not appear.

The inhabitants of Thyatira had a particular veneration for Diana. This appears from many inscriptions found in the town, on one of which this goddess bears the title of "Diana Montana." The town was situated at the southern foot of a chain of mountains, on the route from Pergamus to Sardis, and it was watered by a stream of the river Caicus. The town suffered much by an earthquake in the reign of Tiberius. See Akhisar.

THYIA, Θυια, in *Antiquity*, a festival in honour of Bacchus, celebrated by the Eleans.

THYITES Lapis, in the *Materia Medica of the Ancients*, the name of an indurated clay, approaching to the nature of a stone. It was found in Egypt, and used in distemperatures of the eyes.

This substance has been very much misunderstood by late writers, and by most of them supposed to be lost at this time; but this was wholly owing to their mistaking the class of bodies among which they were to look for it: some imagining it to have been a species of green marble; and others the turquoise-stone, that Dioscorides meant by this name. It is very plain, however, that it was no other than an indurated clay of the morochthus kind, and no more a stone than that substance, that being also frequently called *lapis morochthus*.

It is of a smooth, even, and regular texture, very heavy, of a shining surface, and of a pale green, without the admixture of any other colour. It does not at all adhere to the tongue, nor stain the fingers in handling; but drawn along a rough surface, leaves a slender white line. It melts slowly in the mouth, and is of a sharp, acrid, and disagreeable taste; and when rubbed down with water on a marble, it melts into a milky liquor of a pure white, not the least greenness being sensible in it. It is found at present in the great mine at Gosselar in Saxony, and seems to owe its colour to particles of copper, to which also it owes the virtues attributed to it by Dioscorides, acting as a weak kind of verdigris. Hill.

THYLACION, a word used by the ancient medical writers, to express the bag formed by the membranes of the fœtus at the orifice of the pudenda, before the birth.

THYLLA, Θυλλα, in *Antiquity*, a festival in honour of Venus.

THYMALLUS, in *Ichthyology*. See Grayling, and Salmo *Thymallus*.

THYMATERIUM, in *Ancient Geography*, a town of Africa, in Libya, two days' journey beyond the columns of Hercules, according to the Periplus of Hannon: it is the Thymateria of Steph. Byz.

THYMBRA, a town of Asia Minor, in the Troade, according to Steph. Byz. who says that it was founded by Dardanus, who gave it its name after that of his friend Thymbros. Apollo had a temple here under the appellation of Thymbrian. Strabo says that a stream called Tymbrius traversed its canton, and that this stream discharged itself into the Scamander, before the temple of Apollo. Servius says that Achilles was wounded here by Paris; and this circumstance gave occasion to the report that the wound was inflicted by Apollo.

Thymbra, or *Tymbra*, a mountain of Asia, in Phrygia.

Thymbra, in *Botany*, a name borrowed from Dioscorides, whose real θυμβρα, however, is a species of Satureia; see that article, n. 3. Linnæus therefore has adopted the above name for another Greek genus, nearly akin to the original plant.—Linn. Gen. 288. Schreb. 385. Willd. Sp. Pl. v. 3. 46. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 3. 375. Sm. Prod. Fl. Græc. Sibth. v. 1. 398. Juss. 115. Lamarck Illustr. t. 512.—Class and order, *Didynamia Gymnospermia*. Nat. Ord. *Verticillatæ*, Linn. *Labiatæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, nearly cylindrical, with a longitudinal hairy keel at each side, the orifice two-lipped; upper lip broadest, cut half way down into three equal converging segments; lower in two deep narrower segments. *Cor.* of one petal, ringent; tube nearly cylindrical; upper lip flat, erect, cloven, obtuse; lower in three, nearly equal, flat lobes. *Stam.* Filaments four, thread-shaped, approaching each other in pairs, two of them shorter than the rest; anthers of two divaricated lobes, under the upper lip of the corolla. *Pist.* Germen superior, four-cleft;

cleft; ftyle thread-fhaped, cloven a little way down; ftigmas two, acute. *Peric.* none, except the unaltered calyx. *Seeds* four.

Eff. Ch. Calyx nearly cylindrical, two-lipped, marked on each fide with a hairy prominent line. Style cloven.

1. Th. *fpicata.* Spike-flowered Thymbra. Linn. Sp. Pl. 795. Willd. n. 1. Ait. n. 1. Sm. Fl. Græc. Sibth. t. 546, unpublifhed. (Th. fpicata verior hifpanica; Barrel. Ic. t. 1230. Thymum majus longifolium, &c.; Pluk. Phyt. t. 116. f. 5.)—Flowers fpiked. Leaves lanceolate.—Native of the Levant, on dry hills. Dr. Sibthorp met with the plant in Crete, Afia Minor, and Greece, and conceived it to be the υσσωπος ορεινος, or Mountain Hyffop, of Diofcorides, which is extremely probable. The *ftem* is fhrubby, very bufhy, about a foot high, with numerous, upright, fimple, leafy, purplifh, quadrangular branches, whofe oppofite fides are often denfely downy, in an alternate manner between the different pairs of leaves, the pubefcence recurved. *Leaves* oppofite, feffile, crowded, fpreading, acute, entire, about an inch long, fmooth on each fide, befprinkled with refinous dots, and fringed at the margin with copious white hairs. They are accompanied by axillary tufts of fmaller and narrower leaves. *Flowers* of a fine reddifh purple, in folitary, terminal, denfe, leafy, whorled *fpikes*, from two to four inches long. *Calyx* reddifh, abounding in effential oil, fmooth and naked, without ribs, except the lateral line at each fide, which is fringed, as well as the teeth, with ftrong white hairs. *Bracteas* lanceolate, fringed, purplifh. Tube of the *corolla* twice the length of the calyx, fomewhat downy; lower lip deflexed, in three obtufe equal fegments, hairy about the throat. The whole herb has the warm pungent flavour of Thyme, and the afpect of Hyffop.

2. Th. *verticillata.* Whorl-flowered Thymbra. Linn. Sp. Pl. 796. Willd. n. 2. Ait. n. 2. (Hyffopus montana; Dalech. Hift. 934; not 394, as Willdenow, copying Linnæus's typographical error, has it.) — Flowers whorled. Leaves linear-lanceolate.—Native of the fouth of Europe. The *ftem* is fhrubby, but more flender than the laft, hairy in the fame manner, but more univerfally. *Leaves* much narrower, dotted and fringed in the fame manner. *Flowers* axillary, from top to bottom of each branch; thofe of the principal one fix in each whorl; thofe of the lateral branches only two. In ftructure, fize and colour they agree with the foregoing, only the *calyx* has fome appearance in the dried fpecimen of being more ribbed. Its lateral keels, as well as the teeth, are ftrongly fringed. Neverthelefs, the general hue and afpect of thefe two plants are fo much alike, that there feems great reafon for Linnæus's fufpicion of their being varieties of each other. At the back of the original fpecimen of this laft is the following fynonym. Tragoriganum creticum, majore craffiore afperiori folio; Profp. Alpin. Exot. 79. So confufed is this old author, that one can hardly tell which of his plates his loofe defcriptions refer to; but our plant certainly agrees better with his *Thymbra*, t. 80, than with his *Tragoriganum*, t. 78, though the above fynonym feems to indicate the latter.

3. Th. *ciliata.* Capitate-flowered Thymbra. Desfont. Atlant. v. 2. 10. t. 122. Willd. n. 3.—Flowers capitate. Leaves linear. Bracteas ovate.—Found by Desfontaines, on dry hills and uncultivated fpots, near Mafcar, in Algiers. A fmall bufhy *fhrub*, from eight to twelve inches high, agreeing much in habit with the two preceding fpecies; but the *leaves* are linear; while the *bracteas* are broader and more ovate, as well as the *fpikes* much fhorter, than in the *Th. fpicata.* The *leaves* are equally fringed in all. Nothing is faid, or expreffed in the figure, of any hairy lateral lines on the *calyx*, the moft important character of *Thymbra.* Having feen no fpecimen of this fpecies, we cannot judge with certainty refpecting its genus, nor whether it might not rather be referred to Satureia, fee that article; but we cannot fatisfactorily affent to the opinion of its learned difcoverer, that thefe genera are not fufficiently diftinct. The *calyx* in the natural order to which they belong affords, in many inftances, clear, though nice, generic differences. At the fame time we admit that Linnæus is incorrect in making a femibifid ftyle, by which muft be underftood a ftyle cloven half way down, one of the effential marks of a *Thymbra.*

Thymbra, in *Gardening*, furnifhes plants of the under fhrubby, exotic kind, among which the fpecies cultivated are the fpiked thymbra (T. fpicata); and the whorled thymbra (T. verticillata).

Method of Culture.—Thefe plants may be increafed by feeds, flips, and cuttings. The feeds fhould be fown in the early fpring in a warm border, and fheltered from bad weather by glaffes; or, which is better, in pots filled with light mould, and placed in a mild hot-bed: when the plants have attained fome growth, they fhould be fet out or removed into feparate pots.

The flips and cuttings fhould be planted out in the fpring and fummer, and when well rooted, removed where they are to grow: they alfo fometimes fucceed by bottom offsets, planted out as above.

They afford variety among other potted greenhoufe plants; and require the protection of fuch houfes during the winter feafon, in this climate, in almoft all fituations and places.

THYMBRÆUS Mons, in *Ancient Geography*, a mountain of Afia Minor, in the Troade; from which, according to Feftus, Apollo was denominated Thymbrian.

THYMBRIA, a place of Ionia, four ftadia E.S.E. of Myus. The cavern Charonium was near Tymbria, which was thought to be one of the mouths of Hell, becaufe from it iffued peftilential vapours.

THYMBRIUM, a town of Afia, in Phrygia, at the diftance of twelve parafangas from Cayftropedium. At this place was a fountain, called the fountain of Midas, king of Phrygia.

THYME, in *Botany.* See Thymus.

In the *Materia Medica*, the common garden thyme is a moderately warm pungent aromatic. To water it imparts by infufion its agreeable fmell, with a weak tafte and yellowifh or brown colour; in diftillation, it gives over an effential oil, in the quantity of about an ounce from thirty pounds of the herb in flower, of a gold yellow colour if diftilled by a gentle fire, of a deep brownifh-red if by a ftrong one, of a penetrating fmell like that of the thyme itfelf, but lefs grateful, and in tafte exceedingly hot and fiery: the remaining decoction, infpiffated, leaves a bitterifh, roughifh, fubfaline extract. The active matter, which by water is only partially diffolved, is by rectified fpirit diffolved completely, though the tincture difcovers lefs of the fmell of thyme than the watery infufion; and the fpirit brings over, in diftillation, a part of its flavour, leaving an extract of a weak fmell, and of a penetrating camphorated pungency. Murray has obferved, that this plant feems actually to contain a fpecies of camphor.

The virtues of thyme, according to Bergius, are refolvent, emmenagogue, diuretic, tonic, and ftomachic. As agreeing, fays Woodville, in common with the natural order of verticillatæ, its aromatic qualities may be found equally ufeful in fome of thofe complaints for which lavender, fage, rofemary, &c. are ufually employed.

The *ferpyllum*, or mother of thyme, is an elegant aromatic plant,

plant, fimilar to the preceding fpecies, but milder, and in flavour rather more grateful; its effential oil is both in fmaller quantity and lefs acrid, and its fpirituous extract comes greatly fhort of the penetrating warmth and pungency of that of the others, fo that it is lefs medicinal than the other fpecies. It is faid to afford an agreeable diftilled water, more durable, but lefs active and penetrating than peppermint. (Lewis.) This has been much extolled as a nervous fimple. An infufion of it has been faid to do wonders in tumours, lownefs of fpirits, and head-aches: and it has been much commended for the cure of the night-mare.

The *lemon-thyme*, which is a variety of the laft, is lefs pungent than the firft fort, but more fo than the fecond, and much more grateful than either. Diftilled with water, it yields a larger quantity than the other forts, of a yellowifh very fragrant oil of the lemon-flavour, containing nearly all the medicinal parts of the plant. It gives over alfo, with rectified fpirit, its finer odorous matter. Lewis.

Thyme, *Cat.* See Teucrium *Marum*.

Thyme, *Maftich.* See Thymus *Maftichina*.

THYMELÆA, in *Botany*, from θυμος, *thyme*, and ελαια, *an olive*, (the firft alluding to the leaf, and the latter to the fhape and oilinefs of the fruit,) is an ancient Greek name, found in Diofcorides, book 4. chap. 173. His θυμελαια, there defcribed, is thought to be the *Daphne Gnidium* of Linnæus; and muft be at leaft one of that natural order, and, probably, genus. Hence the name has been applied by many botanifts, amongft which were the Bauhins and Tournefort, to what Linnæus called Daphne; fee that article. This latter appellation was preferred by him and his fchool, becaufe a name compofed of another, already eftablifhed, is contrary to a very found law of the *Philofophia Botanica;* and in the prefent inftance the word is compounded of two other generic names, though one of them has been made Latin in *Olea*. The French however ftill hanker after *Thymelæa*, as appears by Juffieu's choofing it for the title of one of his Orders. See Thymelææ.

THYMELÆÆ, the twenty-fifth of Juffieu's Natural Orders, or the fecond of his fixth clafs, thus named from an ancient fynonym of the genus *Daphne*, which makes a principal figure herein. (See Daphne and Thymelæa.) This order is analogous to the *Veprecule* of Linnæus. For the detailed characters of Juffieu's fixth clafs, fee Lauri. The order of *Thymelææ* is defined as follows.

Calyx of one leaf, tubular, inferior. *Corolla* none; but in fome inftances there are petal-like fcales, originating from the mouth of the calyx, which have the appearance of a polypetalous corolla. *Stamens* definite, inferted into the calyx, and for the moft part double the number of its fegments, fome being oppofite, others alternate therewith. *Germen* fuperior, fimple; ftyle folitary; ftigma moftly undivided. *Seed* folitary, fuperior, either naked, or pulpy, or clothed with the calyx. *Embryo* deftitute of albumen; its radicle fuperior. *Stem* moftly fhrubby. *Leaves* generally alternate.

We may add to thefe characters of Juffieu the remarkable filky appearance of the inner bark, when a twig is broken. Mr. Brown, *Prodr. Nov. Holl.* v. 1. 358, obferves that the general number of *ftamens* is eight, fometimes four, rarely but two; in the latter cafes always oppofite to the fegments of the *calyx*, which are occafionally five, fometimes, not always, with ten *ftamens*. The fame writer informs us there is fometimes a flight portion of *albumen*. The *leaves* are entire, deftitute of *ftipulas*. *Flowers* capitate or fpiked, terminal or axillary, fometimes folitary.

The genera, as they ftand in Juffieu, are *Dirca; Lagetta*, Lamarck Illuftr. t. 289; *Canjera*, Juff. append. 448; *Daphne; Pafferina; Stellera; Struthiola; Lachnea; Dais; Gnidia; Nectandra* of Bergius, included under *Gnidia* by Linnæus; and *Quifqualis*. To thefe is to be added the great diandrous genus of *Pimelea*, of which Mr. Brown defines thirty-four New Holland fpecies.

The order under confideration is one of thofe which has moft excited the queftion of what is a *calyx?* and what a *corolla?* and is appealed to equally by thofe who maintain different theories on this intricate fubject. It feems to us that the *Thymelææ* combine both thofe parts in one, the coloured infide of their *calyx* having exactly the nature of a *corolla;* which is confirmed by the remark of Juffieu, that the tube of *Daphne Mezereum* is double, formed of two layers. The appendages, in the form of fcales, or glands, found in *Gnidia* and *Struthiola*, are more evidently *petals*, and would doubtlefs be univerfally taken for fuch, did not analogy and theory caft a doubt over the fubject. At any rate it is fafe to fay that *Daphne* has a coloured *calyx*, as well as moft of its allies; juft like *Polygonum*, in the generally colourlefs order of *Holeraceæ*, or *Atriplices*.

Thymelææ *Radix*, in the *Materia Medica*, the dried root of the *thymelæa foliis lini* of Tournefort and other authors.

It is a light root of different fizes, of a reddifh colour without, and greyifh within, woody, and full of fibres, and taftes fweet at firft, but is hot as fire when it has been held a little time in the mouth. It lofes however both this fiery tafte, and its acrid quality, in long keeping, and with them its virtues.

It is to be chofen new, well fed, and not worm-eaten. The fruit of this plant is the *granum cnidium* of the fhops. They are both of an acrid quality, and are not in ufe in the fhops at prefent.

THYMELE, in *Biography*, a celebrated female Grecian, who invented theatrical dances. It is fuppofed that the Greeks called their comedians *Thymelici* from her name.

Thymele, in the *Ancient Theatre*, a kind of pulpit, where the fingers, called *thymelici*, performed.

THYMELICI, among the Romans, were muficians, who fung in the interludes, or who danced and kept time with their geftures. The place where they performed was called thymele, whence Juvenal, vi. 66.

"Attendit thymele, thymele nunc ruftica difcat."

THYMIAMA, θυμιαμα, in *Antiquity*, an offering of incenfe to God.

Thymiama, in the *Materia Medica*, a name by which fome authors have called the *cafcarilla bark;* called by fome *cortex thuris*, or Indian bark. (See Thus *Judæorum*.) The *cortex thymiamatis* of the German fhops is a bark, in fmall brownifh-grey pieces, intermixed with bits of leaves, brought from Syria, Cilicia, &c. and fuppofed to be the produce of the liquid ftorax-tree. It has an agreeable balfamic fmell, approaching to that of liquid ftorax, and a fubacid bitterifh tafte accompanied with fome flight aftringency. Cartheufer and Hoffman report, that it affords an excellent fumigation for œdemas, rheumatifms, and catarrhs; and that the fpirituous tincture and extract, and the diftilled fpirit, are ufeful anodynes or antifpafmodics in convulfive coughs and other diforders. It is rarely met with in this country. Lewis.

THYMIAMATA, a kind of fumigations among the ancients, the ingredients of which were fo various, that it appears they always confulted utility as well as pleafure, in their compofition of them.

We find the gum ammoniacum of the ancients, which had the fmell of caftor, ufed in them: whence it is evident, that

that the ancients ufed falutiferous as well as fweet-fcented things in thefe fumigations. Galbanum has a worfe fmell than ammoniacum, and yet this alfo we find, together with the myrrh, and other gums, is made an ingredient in the oldeft prefcriptions of this kind.—And Pliny mentions the ammoniacum with the fchænanth, and other fweets, ufed for this purpofe.

THYMIATUM, in *Ancient Geography*, a country of Africa, in Libya, on the coaft of the Atlantic, according to the Periplus of Hannon.

THYMIC, in *Anatomy*, arteries, veins, &c. belonging to the *thymus;* fee that article.

THYMIUM, a wart or excrefcence on the fkin.

THYMNIAS, in *Ancient Geography*, a gulf placed by Pliny on the coaft of the Doride, a province of Afia Minor. Here was a promontory of the fame name.

THYMOXALME, in the *Materia Medica of the Ancients*, was a compofition ufed externally in the gout, and many diforders of the limbs, and was given inwardly in diftemperatures of the ftomach, a quarter of a pint for a dofe. It operated as a purge, and was prepared in the following manner: take two ounces of bruifed thyme, as much falt, a little meal, rue, and pennyroyal.—Thefe were to be put into a pot, and three pints of water and fourteen ounces of vinegar are to be poured upon them; after which they are to be covered with a coarfe cloth, and fet in the fun for fome time. Diofcorides, lib. v. cap. 24.

THYMUS, in *Anatomy*, a glandular body, occupying the upper and anterior part of the cheft, and neighbouring portion of the neck, very large in the fœtus, and diminifhed or nearly difappearing in the adult. The name is Greek, θυμος, which Pollux defines "caro fimilis tonfillæ, prope cordis caput;" p. 258. The gland confifts of two lobes, a right and left, which are elongated and conical, being broader below and narrow above: they are joined by cellular fubftance, which can eafily be deftroyed by diffection, in their inferior two-thirds, but above they are feparated by the intervention of the trachea. The thymus, indeed, may be defcribed as forming two elongated horns above, of which the right is fometimes longer than the left: it alfo forms two horns below; but they are fhorter, thicker, and more obtufe. The principal body of the gland occupies the cavity of the mediaftinum, or the interval between the right and left pleuræ, behind the upper part of the fternum. Here it is covered in front by that bone, on the fides by the pleuræ, and it refts behind on the front of the pericardium, of the aorta at its origin, and of the left fubclavian vein. The inferior cornua reach to about the middle of the pericardium; and fometimes nearly to the diaphragm: the fuperior run into the neck, on each fide of the trachea, between that tube and the carotid, and reach the thyroid gland, or nearly fo.

The thymus is large in the fœtus; nearly equal to the heart or one of the lungs. In a fœtus of fix months, this gland was to the kidney as 4 to 6. It not only does not increafe after birth, but it becomes lefs, contains lefs fluid, is harder, and is nearly loft in the furrounding fat. In the mature fœtus it weighed 160 and 180 grains; at twenty-eight years, 90 grains. In a calf it was 16 ounces; in a full-grown cow, 9 ounces.

In ftructure it refembles the conglomerate glands: that is, it is compofed of innumerable fmall portions, united by cellular fubftance. By maceration thefe may be feparated into fmaller and fmaller lobules. It is however fofter than the pancreas or falivary glands, and of a darker colour. When cut into, a copious whitifh fluid may be fqueezed out from all parts of its texture. If air be impelled into it, the whole is reduced into a fpongy kind of fubftance.

No excretory duct has been difcovered in the thymus; although anatomifts have fancied that they had difcovered paffages from it to the œfophagus, trachea, pericardium, &c.

It has feveral arteries and veins: the former principally from the thyroid and mammary. The veins join the left fubclavian, or the jugular, and the internal mammary.

The nerves, if it has any, are extremely fmall twigs from the phrenic. Its abforbing veffels, which no doubt exift, are not much known.

It is of confiderable fize, even in the adult, in fome animals, as the rat: the fame may be obferved of the Arctic bear. It is large in fetaceous animals.

We know nothing of its office, nor why it is fo large in the fœtus. There is not even a probable conjecture on the fubject.

Thymus, a warty excrefcence, efpecially about the anus or pudenda.

THYMUS, in *Botany*, *Thyme;* θύμος of the Greeks, whether fo called from θυμὸς, *courage*, in allufion to its cordial qualities; or from θυω, *to glow* or *burn;* or *to facrifice*, becaufe it may have been ufed in facrifick garlands; we muft leave to every one's opinion. The laft explanation appears the leaft fatisfactory.—Linn. Gen. 297. Schreb. 394. Willd. Sp. Pl. v. 3. 138. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 3. 413. Sm. Fl. Brit. 639. Prodr. Fl. Græc. Sibth. v. 1. 419. Purfh 413. Juff. 115. Tourn. t. 93. Lamarck Illuftr. t. 512.—Clafs and order, *Didynamia Gymnofpermia*. Nat. Ord. *Verticillatæ*, Linn. *Labiatæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, permanent, divided nearly half way down into two lips, the mouth clofed with converging hairs; upper lip broadeft, flat, erect, with three teeth; lower of two equal awl-fhaped fegments. *Cor.* of one petal, ringent; tube the length of the calyx, with a fmall throat; upper lip rather the fhorteft, flat, erect, emarginate, obtufe; lower longer and broader, fpreading, in three obtufe lobes, of which the middle one is the broadeft. *Stam.* Filaments four, incurved, two longer than the reft; anthers fmall, two-lobed. *Pift.* Germen fuperior, deeply four-cleft; ftyle thread-fhaped; ftigma divided, acute. *Peric.* none, the feeds being concealed in the calyx, whofe orifice is contracted and hairy. *Seeds* four, fmall, roundifh.

Eff. Ch. Calyx two-lipped, its mouth clofed with hair. Upper lip of the corolla flat, emarginate.

The trifling genera of old authors, made out of the prefent, though indicated by Linnæus, are not worth confidering. It is more defirable to define the limits of *Thymus* itfelf, which run very clofe upon thofe of Melissa; fee that article, at the end of which this fubject is difcuffed. The number of fpecies in Syft. Veg. ed. 14. are eleven; Willdenow has 22. We fhall find fome things among them to correct, and feveral new fpecies to add. The habit of the whole is more or lefs fhrubby, but their ftature humble, with fpreading or diffufe *branches*. *Root* woody, generally perennial. *Branches* fquare. *Leaves* oppofite, moftly entire. *Flowers* either whorled or capitate, purple or lilac, fometimes nearly white; never really blue, fcarlet or yellow. Whole plant abounding with pungent aromatic effential oil. This genus is almoft entirely European, and inhabits dry hilly fituations, in the warmer or more temperate climes.

1. Th. *Serpyllum.* Wild Thyme, or Mother of Thyme. Linn. Sp. Pl. 825. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 1514. Curt. Lond. fafc. 2. t. 47. Woodv. Med. Bot. t. 110. (Serpyllum; Rivin. Monop. Irr. t. 42. S. vulgare; Ger. Em. 570. Dod. Pempt. 277. Vaill. Parif. t. 32. f. 9, as well as the varieties 6, 7 and 8.)

β. Serβ. Serpyllum citratum; Ger. Em. 571. Rivin. Monop. Irr. t. 41. Lemon Thyme.

γ. Thymus lanuginofus; Willd. n. 2. (Th. Serpyllum δ; Linn. Sp. Pl. 825. Th. pannonicus; Allion. Pedem. v. 1. 20. Th. n. 236. Hall. Hift. v. 1. 103. Serpyllum montanum hirfutum; Rivin. Monop. Irr. t. 42.) Hoary Mother of Thyme.

Flowers capitate. Stems decumbent, creeping. Leaves flat, ovate, obtufe; fringed at the bafe.—Native of dry heaths and hillocks, as well as alpine paftures, throughout Europe, from Sweden to Greece, flowering all fummer long. Its entangled branches form an elaftic perennial turf, exhaling a warm aromatic odour when trodden upon, which varies in degree, and, in the well-known variety β, affumes the grateful flavour of lemon-peel. The hoary or woolly variety we believe to be no more fpecifically diftinct, notwithftanding Willdenow's remark, of its being unchanged by culture; for he does not mention having raifed it from feed. The *ftems* of *Th. Serpyllum* are wiry and flender, always wavy, never ftraight; their branches leafy and downy, afcending, each terminating in a little round head of numerous purple *flowers*, whofe palate is variegated with white and crimfon. *Leaves* dotted, ftrongly fringed at the bafe, as are their *footftalks* throughout. *Stipulas* none. Bees frequent the *flowers* in great numbers. Hairy fwellings, caufed by an infect, are common on the young fhoots. The *feeds* are rarely perfected.

2. Th. *lævigatus*. Smooth Arabian Thyme. Vahl. Symb. v. 2. 65. Willd. n. 3. (Th. Serpyllum; Forfk. Ægypt.-Arab. 107.)—"Flowers capitate. Stems procumbent. Leaves linear, obtufe, feffile; contracted at the bafe."—Found by Forfkall, on mount Chadra, in Arabia Felix. *Stems* fhrubby, thread-fhaped; fmooth in the lower part, villous above, grey, with jointed annulated *branches*. *Leaves* half as long as the nail, very fmooth, without ribs, dotted on both fides; fringed at the bafe. Head of *flowers* feffile, terminal, hemifpherical, furrounded with numerous larger leaves. *Calyx* marked with elevated hairy lines; its teeth awl-fhaped, fringed. *Corolla* rather hairy. *Vahl.*

3. Th. *montana*. Smooth Mountain Thyme. Waldft. et Kitaib. Hungar. v. 1. 72. t. 71. Willd. n. 13, excluding the reft of the fynonyms, which belong to our *Th. Serpyllum*, var. γ. Ait. n. 7.—Flowers in elongated heads. Stem erect, branched. Leaves ovate, obtufe, flat, fmooth and naked, entire.—Native of the Carpathian mountains. We received it from the Cambridge garden, in 1803. The *root* is perennial, with many long branching fibres. *Stem* a fpan high, bufhy; the angles downy, with fine recurved hairs. *Leaves* ftalked, broadly ovate, flightly revolute; very fmooth and even above; deftitute of fringe at the bafe. *Inflorefcence* like *Th. Serpyllum*, but rather more elongated, or fpiked, and the *flowers* fmaller, with a much lefs hairy, though not fmooth, *calyx*, the hairs of whofe orifice are fcarcely prominent at all, by no means fo confpicuous as in the *Serpyllum*.

4. Th. *nummularius*. Money-wort Thyme. Marfch. a Bieberft. Taur. v. 2. 58.—Flowers capitate. Stems decumbent, creeping, hairy. Leaves roundifh-ovate, flat, obtufe; fomewhat fringed at the bafe and midrib.—Native of mount Caucafus. We received wild fpecimens from Dr. Fifcher. This has a very different afpect from *Th. Serpyllum*, on account of its almoft orbicular *leaves*, and the hemifpherical leafy heads of *flowers*. Every part moreover is three or four times the fize of that common fpecies. The joints of the *ftem* are remarkably villous in their upper part, efpecially near the *flowers*. Sometimes, it is faid, the whole plant is denfely hairy.

5. Th. *Marfchallianus*. Bufhy Taurian Thyme. Willd. n. 8. Marfch. a Bieberft. Taur. v. 2. 59.—Flowers in elongated heads. Stem fhrubby; its flowering branches erect. Leaves linear-lanceolate, bluntifh, flat, fomewhat triple-ribbed; fringed at the bafe. Frequent in dry graffy hilly places, about mount Caucafus, flowering from May to Auguft. This feems by the defcription more akin to *Th. Serpyllum* than to *Th. Zygis*, for which latter it was taken by Pallas. The *ftem* is procumbent, fending up numerous fimple flowering-branches, fix inches high, downy in the upper part. *Leaves* eight lines long, one and a half broad, on very fhort ftalks. *Calyx* hairy, ftriated. It varies with *leaves* but half as broad.

6. Th. *vulgaris*. Common Garden Thyme. Linn. Sp. Pl. 825. Willd. n. 4. Ait. n. 2. Woodv. Med. Bot. t. 109. (Thymum durius; Ger. Em. 573.)—Stem fhrubby, much branched, erect. Leaves ovate, revolute. Whorls crowded into leafy fpikes.—Found on ftony hills in Spain, Portugal, the fouth of France, Greece, and the Archipelago. Common in gardens, flowering during fummer. The *ftem* is bufhy, woody and rigid. *Leaves* a quarter of an inch long, various in breadth, downy, of a greyifh hue, numerous, with little axillary tufts of fmaller ones. *Flowers* fmall, light purple, in hairy heads, or fhort fpikes, with two or three remote whorls beneath. *Calyx-teeth* ftrongly fringed. This has ufually a warm pungent flavour, like Winter Savory; but there is a fweet-fcented variety, called Frankincenfe-Thyme, differing in no other refpect from the common fort, which is commonly cultivated in Norfolk, and highly grateful to moft people. The θυμος of Diofcorides is not, as Bauhin fuppofed, this plant, but *Satureja capitata*.

7. Th. *lanceolatus*. Lanceolate Thyme. Desfont. Atlant. v. 2. 30. t. 128. Willd. n. 5. Prodr. Fl. Græc. n. 1396.—Stem fhrubby, erect. Leaves elliptic-lanceolate, obtufe, entire, downy, flat. Whorls crowded into a denfe fpike.—Found by profeffor Desfontaines, flowering in the early fpring, on mount Atlas, and by profeffor Sibthorp in hilly places in Greece. *Root* creeping, woody. *Stems* numerous, fimple or branched, about fix inches high, downy. *Leaves* near an inch long, and one-third as broad, rather crowded; veiny and dotted beneath. *Spikes* two inches long, interfperfed with lanceolate *bracteas*. *Calyx* downy. *Corolla* purple, glandular, about the fize of the laft.

8. Th. *numidicus*. Numidian Thyme. Desfont. Atlant. v. 2. 29. Willd. n. 6.—"Stem fomewhat fhrubby, erect. Leaves linear, fpreading, fmooth; ribbed beneath. Flowers capitate. Bracteas ovato-lanceolate, fringed. Calyx hairy."—Native of Barbary near La Calle. A little bufhy *fhrub*, four inches high, with flender upright branches, downy in the upper part. *Leaves* entire, with axillary tufts. *Flowers* in oblong heads. *Calyx* villous, ftriated. *Corolla* fmall, rofe-coloured. Allied to *Th. Zygis*, but the *leaves* are quite fmooth, not fringed; and the *bracteas* broader at the bafe. *Desfontaines*.

9. Th. *Zygis*. White Spanifh Thyme. Linn. Sp. Pl. 826. Mant. 413. Willd. n. 7. Ait. n. 3. Sm. Fl. Græc. Sibth. t. 574, unpublifhed. (Thymum angufto longioreque folio; Barrel. Ic. t. 777. Serpillum fylveftre, Zygis Diofcoridis; Cluf. Hift. v. 1. 358. S. creticum; Ger. Em. 571.)—Stem fhrubby, afcending. Leaves linear-lanceolate, obtufe, revolute; tapering and fringed at the bafe. Whorls crowded into leafy fpikes.—Native of Spain and the Levant. Dr. Sibthorp gathered it on hills about Athens and Conftantinople. Mr. Malcolm is faid in Hort. Kew. to have had the plant in his garden in 1771. Linnæus cultivated it at Upfal. The *root* is woody and perennial. *Stems* numerous, from four to fix inches long, leafy, round, finely downy,

downy, reddifh, flightly branched, fpreading on the ground before flowering, then afcending. *Leaves* three-quarters of an inch long, numerous, crowded, fpreading, very minutely and denfely downy, copioufly dotted; ribbed and rather paler beneath; tapering into a fhort, broad, downy *footftalk*, coarfely fringed like the bafe of the leaf itfelf. *Flowers* in leafy heads, often with an axillary whorl below. *Calyx* clothed with recurved hairs; all its teeth tapering and parallel, ftrongly fringed. *Corolla* white, with red dots on the palate. *Anthers* reddifh, prominent. Profeffor Sibthorp adopted the opinion of the old authors, that this might perhaps be the ερπυλλος ζυγις of Diofcorides. Its appellation in modern Greek is σμάρι, which, if we miftake not, means "the delight of bees."

10. Th. *Acinos*. Bafil Thyme. Linn. Sp. Pl. 826. Willd. n. 10. Fl. Brit. n. 2. Engl. Bot. t. 411. Curt. Lond. fafc. 1. t. 43. (Acinos; Rivin. Monop. Irr. t. 43. f. 2. Ocymum fylveftre; Ger. Em. 675.)—Flowers on fimple footftalks, about fix in a whorl. Stem herbaceous, afcending, branched. Leaves acute, ferrated. Calyx gibbous at the bafe. Native of dry gravelly or chalky paftures, fallow fields, &c. throughout Europe, nor rare in England, flowering from July to September. The *root* is annual, of a few flender fibres. *Stems* clothed with recurved hairs, reddifh, lax and fpreading, hardly a fpan long; their flowery ultimate branches erect. *Leaves* on fhort footftalks, fmall, ovate, varying to roundifh or oblong, but always acute, more or lefs deeply and copioufly ferrated, rarely quite entire, veiny, hairy; the upper ones tapering much at the bafe. *Flowers* light violet; their palate white, with dark purple fpots. *Stamens* fhort. *Calyx* deeply furrowed, hairy, fringed, fwelling underneath, as is the cafe, more or lefs, with all the fpecies to which this is allied. The herb is rather flightly aromatic, not pungently fo.

11. Th. *fuaveolens*. Penny-royal-fcented Thyme. Prodr. Fl. Græc. n. 1400. (Clinopodium minus anguftifolium, pulegii odore, romanum; Bocc. Muf. v. 1. 50—54. t. 45, A.)—Flowers whorled. Leaves lanceolate-elliptical, pointed, fomewhat ferrated, hairy. Stems fhrubby.—Native of Italy and Greece. The *ftem* is a foot high, bufhy; the branches leafy, rough, with recurved hairs. *Leaves* with their *ftalks* about an inch long, rigid, ribbed, briftly, often quite entire. *Flowers* fix or eight in a whorl, on fimple ftalks. *Calyx* like the laft, but longer and more flender. The whole plant fmells powerfully of Penny-royal, even after having been dried thirty years. On this fubject Boccone has treated us with a long difquifition, quite in the Italian ftyle, in which the facts are better than the philofophy, though fome of thofe want confirmation. He attributes the above fcent to particles of fulphur and bitumen communicated by the foil.

12. Th. *patavinus*. Marjoram-leaved Thyme. Jacq. Obf. fafc. 4. 7. t. 87. Willd. n. 11. Ait. n. 5. (Clinopodium perenne, pulegii odore, majoranæ folio, patavinum; Bocc. Muf. v. 1. 60. t. 45, B.)—Flowers whorled. Leaves ovate, with copious fhallow ferratures, flightly hairy. Stems fhrubby.—Native probably of the fouth of Europe, though no botanift who has defcribed this fpecies feems to have known it but from gardens. Hence even its name originated, which is therefore liable to great exception. Willdenow appears to have feen no fpecimen. The fpecific character taken by him from the firft edition of Hort. Kew. of "the inflated throat of the *corolla*, extending beyond the *calyx*," is not in the leaft degree peculiar. Neverthelefs, authentic fpecimens of the plant prove it diftinct from the foregoing and the following, in the broad-ovate, almoft heart-fhaped, figure of the rather flefhy *leaves*, their even furface, and numerous, minute, fhallow ferratures. They much refemble fome kinds of *Ocymum*, and like thofe are fometimes concave.

13. Th. *alpinus*. Alpine Thyme. Linn. Sp. Pl. 826. Willd. n. 12. Ait. n. 6. Jacq. Auftr. t. 97. (Clinopodium montanum; Bauh. Pin. 225. Bocc. Muf. v. 1. t. 45, C. C. auftriacum; Cluf. Pann. 622, 623. Hift. v. 1. 353. Ger. Em. 676.)—Flowers on fimple footftalks, about fix in a whorl. Stem herbaceous, afcending, branched at the bottom. Leaves ovate or roundifh, bluntifh, coarfely ferrated. Calyx gibbous at the bafe.—Native of the lofty mountains of Auftria, Switzerland, Italy, and Crete, as well as of the Bithynian Olympus. Nothing is more difficult than to define the difference between this and our *Th. Acinos*, except that the *alpinus* is in every part larger and more handfome, with a ftrong refinous fcent. The *root* is either biennial, or perennial, we are not certain which. The *leaves* are too entire in the cut of Clufius and Gerarde.

14. Th. *exiguus*. Small Cyprian Thyme. Sm. Prodr. Fl. Græc. Sibth. n. 1402. Fl. Græc. t. 575, unpublifhed.—Flowers very few in a whorl. Leaves rhomboid, pointed, oblique, nearly entire. Stems branched at the bafe. Tube of the corolla thread-fhaped.—Difcovered by Dr. Sibthorp in hilly fituations in the ifle of Cyprus. The *root* is annual, fimple, fibrous. *Stem* two or three inches high, erect, with fimple leafy hairy *branches* from the bottom. *Leaves* one-third of an inch long, fmoothifh, on long hairy ftalks. *Flowers* either two or four in each whorl, on thick ftalks. *Calyx* flender, furrowed, hairy. *Corolla* with a very flender white tube, enclofing the *ftamens*, and fhort, rounded, pale-purple fegments in the limb.

15. Th. *pulegioides*. Penny-royal-leaved Thyme. Linn. Sp. Pl. ed. 1. 592. Sm. Prodr. Fl. Græc. Sibth. n. 1397. (Cunila thymoides; Linn. Sp. Pl. ed. 2. 31. Willd. Sp. Pl. v. 1. 123. Acinos thymi folio annuus, floribus inexpanfis; Morif. fect. 11. t. 19. f. 6.)—Whorls many-flowered, crowded into long, denfe leafy fpikes. Leaves ovate, obtufe, entire. Stem herbaceous, branched, with four hairy angles.—Native of the fouth of France, and of hills in Greece.—*Root* fibrous, marked as annual by Linnæus, but the ftems have a fhrubby appearance. They are a fpan high, with oppofite branches, leafy, their angles denfely clothed with recurved hairs. *Leaves* ftalked, from a quarter to half an inch long, deflexed, dotted, fmooth, except a few occafional coarfe marginal hairs. *Flowers* on longifh, cylindrical, denfely downy ftalks, ten or twelve in each whorl. *Calyx* ftrongly furrowed, hairy, with a broad upper lip, and two long, narrow, fringed teeth in the lower one; the orifice denfely hairy. *Corolla* fmall; its limb feems to refemble the laft-defcribed. Sometimes the *ftem* is clothed with whorls of *flowers* almoft from the bottom to the top, and the upper *leaves* are larger than the lower. The odour of the plant is that of Thyme, not of Penny-royal.

16. Th. *graveolens*. Strong-fcented Greek Thyme. Sm. Prodr. Fl. Græc. Sibth. n. 1403. Fl. Græc. t. 576, unpublifhed.—Whorls barely fix-flowered. Leaves ovate, rhomboid, obtufe, revolute, fomewhat ferrated. Stems much branched, fhrubby.—Gathered on mount Parnaffus, by Dr. Sibthorp, who fufpected it might be the τραγοριγανος of Diofcorides, and from whofe manufcripts we have adopted the fpecific name. The ftrong, woody, branching *root* bears a tuft of numerous afcending, branched, leafy, reddifh, downy *ftems*, about fix inches high. *Leaves* dark green, paler beneath, fmooth, a quarter of an inch long, on *footftalks* of nearly their own length. *Flowers* on fimple ftalks, with a pair of fmall oval *bracteas* at the bafe of each ftalk, ufually

usually three or four in a whorl, sometimes five or six. *Calyx* with a shortish furrowed tube, very gibbous at the base beneath; its upper lip broad; lower of two awl-shaped fringed teeth; both tinged with red. *Corolla* of a purplish crimson, large and handsome, downy in the mouth, as well as at the back, which latter is the case with *Acinos*, *alpinus*, and all of the same tribe.

17. Th. *marginatus.* Thick-edged Thyme. Sm. in Dicks. Dr. Pl. n. 71. (Th. Piperella; Allion. Pedem. v. 1. 21. t. 37. f. 3, excluding the synonyms.) — Stalks many-flowered, lateral and terminal. Leaves ovate, nearly smooth, ribbed, entire, with a thick cartilaginous margin. Calyx-teeth nearly equal. Stems shrubby, ascending.—On the rocks of the maritime alps of Piedmont very abundantly. *Allioni.* Of more humble stature than the last, with many round, slender, downy, purplish, ascending *stems*, about a finger's length, branched at the base only. *Leaves* nearly sessile, inclining to heart-shaped, covered with resinous dots, sometimes slightly downy, remarkable for their thick, smooth, pale margin. *Flower-stalks* chiefly axillary, about as long as the leaves, somewhat corymbose, downy, bearing several small ovate *bracteas*, and three or four *flowers*. *Calyx* cylindrical, furrowed; all its segments awl-shaped, and not very unequal, none of them fringed. *Corolla* with a slender hairy tube, twice as long as the calyx, and a short rounded limb. The whole plant is warm and pungent, highly aromatic. It is very distinct from the following.

18. Th. *Piperella.* Pepper Thyme. Linn. Syst. Nat. ed. 12. v. 2. 400. Willd. n. 14, excluding the synonym of Allioni, and possibly those of Vahl and Forskall. (Marum hispanicum nigrum, flore purpureo, Piperella hisp; Barrel. Ic. t. 694. Bocc. Mus. 166. t. 117.) — Stalks many-flowered, lateral. Leaves ovate, somewhat heart-shaped, obtuse, entire, smooth, strongly ribbed, copiously dotted. Upper lip of the calyx very broad; lower fringed.—Native of Spain. The *root* is perennial. *Stems* apparently trailing, a span long, branched, bluntly quadrangular, finely downy. *Leaves* varying in size, but scarcely more than a quarter of an inch long at the most, thick, flat, without any cartilaginous edges, their ribs numerous, parallel and strong. *Footstalks* short, downy. *Flowers* in axillary, corymbose, downy, leafy tufts, with ovate *bracteas*. Upper lip of the *calyx* remarkably broad, and rather the longest, covered with resinous dots; lower strongly fringed. *Corolla* a little longer than the calyx, pale, dotted with resinous points. The odour of the plant is most like *Th. Serpyllum*. Vahl speaks of a border to the *leaves*, which induces a suspicion that he took our *marginatus* for *Piperella*.

19. Th. *Brownei.* Jamaica Thyme. Swartz. Prodr. 89. Ind. Occ. 1011. Willd. n. 15. (Th. n. 1; Browne Jam. 259.) — Stalks axillary, thread-shaped, single-flowered. Leaves orbicular-heart-shaped, crenate, smooth. Calyx-teeth ovato-lanceolate, nearly equal. Stem herbaceous, procumbent.—Native of moist grassy places, near rivulets, in Jamaica and Hispaniola, flowering all summer. The *root* is annual, fibrous. *Stems* a foot long, creeping, slender, quadrangular, smooth, often purple, with short leafy branches. *Leaves* about half an inch long, not unlike some of our annual *Veronicæ*, paler beneath, on slender stalks. *Flowers* purplish-white, small, on long, very slender, solitary stalks. *Calyx* cylindrical, smooth, strongly furrowed, with broad pointless teeth. Swartz says it has a very strong smell, like *Mentha arvensis*.

20. Th. *filiformis.* Minorca Thyme. Ait. n. 8. Willd. n. 16. — Stalks axillary, thread-shaped, single-flowered. Leaves heart-shaped, bluntly pointed, entire, with a thick cartilaginous margin. Stems thread-shaped, decumbent.—Native of the Balearic islands. Introduced into our greenhouses in 1770, by Mr. Malcolm. The *root* is perennial, woody. *Stems* from four to six inches long, trailing, purplish, slightly branched. *Leaves* stalked, agreeing with those of n. 17. in their tumid margin, but not half so large, and more pointed. *Flowers* very small. *Calyx* ovate, furrowed; its three upper teeth broadest and shortest; lower ones fringed.

21. Th. *incanus.* Hoary Calamint Thyme. Sm. Prodr. Fl. Græc. Sibth. n. 1405. Fl. Græc. t. 577, unpublished. (Calamintha orientalis annua, ocymi folio, flore minimo; Tour. Cor. 12, by the character.)—Whorls simply stalked, of about six flowers. Leaves roundish, entire, clothed with hoary down. Beard of the calyx concealed. Stems procumbent.—Common in the islands of the Archipelago, and about Athens. The *root* is woody, and but for Tournefort's synonym, we should judge it perennial. *Stems* herbaceous, numerous, diffuse, a foot long, with opposite leafy branches, clothed, like every part of the herbage, with fine, soft, grey pubescence. *Leaves* stalked, convex, ribbed, rounded and blunt, half an inch in diameter. *Flowers* scarcely projecting beyond the leaves, on simple hairy stalks. *Calyx* ovate, tumid, ribbed; with lips of equal length; the upper broad, abrupt, three-toothed: converging hairs of the throat concealed in the tube. Upper lip of the *corolla* pink, hairy; lower white; palate dotted with red.

22. Th. *grandiflorus.* Large-flowered Calamint Thyme. Sims in Curt. Mag. t. 997. (Th. carolinianus; Michaux Boreal-Amer. v. 2. 9. Calamintha grandiflora; Pursh 414.) —Whorls simply stalked, of about ten flowers. Leaves ovate, serrated, nearly smooth. Beard of the calyx concealed. Stems erect, shrubby.—On the banks of the river Savannah, in Georgia and Carolina, flowering in July and August. *Pursh.* Cultivated by John Walker, esq. at Southgate, about 1804. The *root* is perennial. *Stems* bushy, with opposite branches, a foot or more in height. *Leaves* stalked, deflexed, above an inch long, green, somewhat downy to the touch only. *Flowers* large, pale purple, with a vaulted upper lip, and a dotted palate. Upper lip of the *calyx* very broad.

23. Th. *Calamintha.* Common Calamint Thyme. Fl. Brit. n. 3. Engl. Bot. t. 1676. (Melissa Calamintha; Linn. Sp. Pl. 827. Willd. Sp. Pl. v. 3. 147. Calamintha; Rivin. Monop. Irr. t. 46. f. 2. Matth. Valgr. v. 2. 76. C. vulgaris officinarum; Ger. Em. 687.)—Whorls stalked, many-flowered, forked. Leaves hairy, with shallow serratures. Beard of the calyx concealed. Stem erect.—Native of dry banks, and the borders of fields, especially on a gravelly soil, in England and the more southern parts of Europe, flowering in July and August. The whole herb has a peculiarly sweet and grateful fragrance. The *root* is perennial. *Stem* twelve or eighteen inches high, hairy, with many opposite branches. *Leaves* broad, ovate, bluntish, on long stalks. *Flowers* copious, pale lilac, the whorls becoming leafless in the upper part of the branches. *Bracteas* bristle-shaped, fringed. *Calyx* ovate, furrowed, bristly; its broad upper lip deeply three-cleft; lower fringed.

24. Th. *Nepeta.* Lesser Calamint Thyme. Fl. Brit. n. 4. Engl. Bot. t. 1414. (Melissa Nepeta; Linn. Sp. Pl. 828. Willd. Sp. Pl. v. 3. 147. Curt. Lond. fasc. 6. t. 40. Calamintha odore pulegii; Ger. Em. 687. C. folio incano; Rivin. Monop. Irr. t. 47.)—Whorls stalked, many-flowered, forked, longer than the leaves. Leaves serrated. Beard of the calyx prominent. Stem erect.—Native of chalky banks, and the borders of fields, plentifully in England, and throughout the south of Europe; very common in Greece and the Archipelago, flowering in August.

August. The habit of this species is like the last, but with smaller *leaves*, more conspicuous longer-stalked *flowers*, and less upright *stems*. Its scent is different, and much stronger, resembling Penny-royal.

25. Th. *cephalotus*. Great-headed Portugal Thyme. Linn. Sp. Pl. 826. Willd. n. 17. Ait. n. 9. Vahl Symb. v. 3. 77. "Hoffm. et Link Lusit. v. 1. 127. t. 13." (Tragoriganum dictamni capite, hispanicum; Barrel. Ic. t. 788. Bocc. Mus. 50. t. 43.)—"Heads of flowers with loosely imbricated, large, coloured bracteas, destitute of dots. Leaves linear, entire.—Native of Spain and Portugal. A shrubby bushy plant, with purplish *stems*, and downy *branches*. *Leaves* fringed at the base. *Flowers* concealed by the large purplish *bracteas*, forming an ovate head. Upper lip of the *calyx* rather the largest; lower fringed. We have seen no specimen, either of this or the next.

26. Th. *striatus*. Striated Neapolitan Thyme. Vahl. Symb. v. 3. 78. Willd. n. 18.—"Heads of flowers with closely imbricated, ovate, striated, dotted bracteas. Leaves linear-lanceolate, serrated, dotted in the margin."—Found by Cyrillo, in the kingdom of Naples. The *stems* are shorter and more upright than the foregoing; not branched in their upper part. *Leaves* broader, erect; striated at the back. *Heads* smaller, with smaller green *bracteas*. *Vahl.*

27. Th. *villosus*. Hairy Thyme. Linn. Sp. Pl. 827. Willd. n. 19. Ait. n. 10. "Hoffm. et Link Lusit. v. 1. 128. t. 14." Sm. Fl. Græc. Sibth. t. 578, unpublished.—Heads of flowers with imbricated, fringed, lanceolate, ternate, keeled bracteas. Leaves lanceolate, hairy, acute. Stems trailing.—Native of Portugal, Cyprus, and the Archipelago. The strong woody *root* sends out numerous, decumbent, branched, shrubby *stems*, which compose ample tufts, taking root as they spread, with short, simple, ascending flowering branches. *Leaves* clustered, nearly awl-shaped, dark green, fringed with coarse white hairs. *Bracteas* and *calyx* tinged with a violet purple; the upper lip of the latter oval, with three sharp teeth. *Corolla* rose-coloured, with a slender hairy tube, twice the length of the calyx. *Stamens* prominent.

28. Th. *Mastichina*. Mastick Thyme. Linn. Sp. Pl. 827. Willd. n. 20. Ait. n. 11. (Marum; Rivin. Monop. Irr. t. 40. Ger. Em. 670.)—Whorls stalked, many-flowered, crowded into round heads. Leaves ovate, obtuse, entire. Calyx-teeth awl-shaped, taper-pointed, all fringed, nearly uniform.—Native of stony ground in Spain and Greece. Dr. Sibthorp gathered it on mount Hymettus, near Athens, so famous for honey. This plant has been treasured up in many a rustic garden, or cottage window, ever since the days of old Gerarde; but will scarcely bear our winters unprotected, for any length of time. It flowers throughout the latter part of summer. The figure of Rivinus is cited by mistake, in the usually accurate Hort. Kew. for *Teucrium Marum*. The *stem* of the present species is shrubby, twelve or eighteen inches high, erect and bushy, with many roundish, downy, leafy branches. *Leaves* numerous, stalked, about the size and shape of *Th. Serpyllum*, but thicker, finely downy, and not fringed at the base; most hoary beneath. *Flowers* white, small, conspicuous for the long slender teeth of the *calyx*, which are pectinated with abundance of long bristly hairs. The tube is closed with copious white hairs, nor can we see any foundation for Linnæus's doubts, whether this plant should be referred to *Thymus* or *Satureja*, except the calyx-teeth being nearly equal, which is the case, more or less, with some of the foregoing. The odour of *Th. Mastichina* is pleasantly aromatic, not very pungent.

29. Th. *Tragoriganum*. Goat's Thyme. Linn. Mant. 84. Willd. n. 21. Ait. n. 13. Turr. Farset. 11. (Tragoriganum majus; Alpin. Exot. 79. t. 78. T. secunda, altera species; Clus. Hist. v. 1. 355. T. cretense; Ger. Em. 668.)—"Stem somewhat shrubby, erect. Flowers whorled. Leaves hispid, pointed."—Native of hills in Crete; as well of Cyprus and Bœotia, according to Dr. Sibthorp's manuscripts, though his herbarium contains no specimen. Neither does that of Linnæus, whose specific character we are obliged to copy. He describes it as a sweet-scented plant, with hairy *stems*, a foot high; *leaves* rather rigid, pointed at each end. The *root* appears to be woody and perennial. Whorls numerous, dense, of many *flowers*.

For *Th. virginicus*, Willd. n. 22, see PYCNANTHEMUM, n. 5. The same author has a *Th. inodorus*, n. 9, adopted from Desfont. Atlant. v. 2. 30. t. 129. A specimen apparently answering to this, gathered by Thunberg at the Cape of Good Hope, is preserved in the Linnæan herbarium, with a note at the back adverting to the singularity of a plant of the *Didynamia Gymnospermia* having alternate leaves; and it is named *Satureja alternifolia*. We do not find that either Linnæus or Thunberg ever published this plant; possibly because of the uncertainty of its genus; or it may be among those which the latter has referred in his *Prodromus* to *Selago*, several of which we have no means of determining. Whether the plant of Desfontaines be the same or no, we dare not, without examination, consider it as a *Thymus*, though he describes the *calyx* as closed with hairs, which is certainly not the case with Thunberg's specimen.

THYMUS, in *Gardening*, contains plants of the low, aromatic, perennial kind; among which the species cultivated are, the wild thyme (T. serpillum); the garden thyme (T. vulgaris); the mastick thyme (T. mastichina); and the Virginian or savory thyme (T. virginicus).

In the first sort there are several varieties; as the broad-leaved, the narrow-leaved, the variegated-leaved, the silver-striped-leaved, the citron-scented or lemon thyme, and the great purple-flowered.

And in the common sort there are different varieties; as the broad-leaved, the narrow-leaved, and the variegated or striped-leaved thyme.

Method of Culture.—These plants may be easily raised from seed, by slipping the roots and branches, and by cuttings; but the seed method is seldom practised, except with the second sort, or garden thyme. The seed should be sown in the early spring on light, rich, dry ground, which should be properly dug over, and the surface be made moderately smooth with the spade. As the seed is small, it should not be sown too thick, or be covered too deep: the seed is best sown while the ground is fresh stirred, either broad-cast on the surface, raking it in lightly, or in flat shallow drills, earthed over thinly: the plants appear in two or three weeks. It is necessary to be careful to keep them well weeded, giving occasional light waterings in dry weather; and by June they will require thinning, especially if the plants are to grow stocky, and with bushy full heads; in which case they should be set out to six or eight inches distance; when those thinned out may be planted in another place, in rows six or eight inches asunder, giving water till fresh rooted, keeping the whole clean from weeds by occasional hoeing between them in dry days, which will also stir the surface of the earth, and much improve the growth of the plants: they will be in perfection for use in summer, or early in autumn.

Sometimes the market kitchen-gardeners raise large quantities in beds, for daily supply, leaving the whole thick:

when

when of proper [illegible] root and [illegible] together, from time to time, as wanted, and tie them in [illegible]

[illegible] quantity [illegible] for occasional [illegible]

[illegible] cultivated for kitchen [illegible] half a foot apart, [illegible] plants, [illegible] plants, each [illegible] proper [illegible] It may also often be [illegible] other compartments [illegible] the plants multiply exceedingly [illegible] furnishing the [illegible] increase. Some [illegible], however, [illegible] raised from seed in the above manner, as [illegible] a stronger aromatic quality than those [illegible]

When it is intended [illegible] particular varieties, [illegible] certainty, it can only be effected by slips and cuttings.

In respect to the offsets and slips, all the sorts multiply by [illegible] root and slips of the branches: the rooted [illegible] most expeditious method, as the old plants increase [illegible] many offset stems rising from the root, each furnished with fibres; and by taking up the old plants in the [illegible] &c. and slipping or dividing them into separate parts, not too small, with roots to each, and planting them in beds of good earth, in rows half a foot asunder, giving water directly, and repeating it occasionally in dry weather till they have taken root, and begin to shoot at top; they soon grow freely, and form good bushy plants in two or three months.

The strong slips of the branches without roots, succeed when planted any time in the early spring season in a shady border, in rows four or five inches distant, giving due waterings; and become good plants by autumn, when they may be planted out where they are to remain.

The cuttings of the young branches grow readily, the same as the slips, when planted at the same season in a shady place, and well watered.

The common thyme is in universal use as a pot-herb for various culinary purposes; it may also be employed in assemblage with other small plants, to embellish the fronts of flower-borders, shrubbery clumps, small and sloping banks, &c. placing the plants detached or singly, to form little bushy tufts, and in which the variegated sorts, and the silver thyme and lemon thyme particularly, form a very agreeable variety. The lemon thyme is also in much estimation for its peculiar odoriferous smell. Some of each of these sorts may also be potted, in order to be moved occasionally to any particular places as may be required, and under occasional shelter in severe weather, to preserve the plants more effectually in a lively state; likewise some of the mastick thyme. Spanish and Portugal thymes are also sometimes potted for the same purpose, and to place under the protection of a garden frame or green-house in winter, to continue them in a more fresh and lively growth; and sometimes some of the smaller thymes are [illegible] or planted for edgings to particular beds or borders for variety, such as the lemon thyme, silver-leaved and variegated sorts; also occasionally the common thyme; and all kept low, close and regular, by clipping them at the sides and top annually in the summer season.

All the several sorts and varieties possess an aromatic quality, which principally resides in the leaves, whence it is imparted and affords a fine agreeable fragrance. But the first three kinds are by much the most noted and valued in kitchen gardens, and more especially the common thyme, which is so very useful as a culinary herb.

In gathering this for use, in common gardens, it should in general only be cut or slipped as it is wanted, in small quantities at a time, and then not stumped off in too close a manner: but the mode pursued by market gardeners is quite different, as has been already seen.

THYNI, in *Ancient Geography*, a people of Thrace, according to Strabo. Among the Thraces of Asia. mentioned by Herodotus, we are to include the Bithynians and Thynians. These people were originally of Europe, and were driven from thence by the Teucrians and Mysians. They were also called Strymonians: and upon passing into Asia, they took the name of Bithynians. The Thynians were originally Thracians; inhabiting the environs of Salmydessus and Apollonia: and upon their removal to Asia, they occupied the sea-coast, and some part of the adjacent territory. These people had acquired the art of engraving precious stones: accordingly we find the following verse of Mecænas upon the death of Horace, preserved by Isidore in his Origines:

> "Nec percandida margarita quæro
> Nec quos Thynica lima perpolivit,
> Amellos, nec jaspios lapillos."

THYNIA, a country of Asia, in Bithynia. Pliny.

THYNIAS, an island of the Euxine sea, opposite to Bithynia, according to Pliny, but on the coast of Bithynia, according to Strabo.

THYNNIA, Θυννια, in *Antiquity*, a sacrifice offered to Neptune by the fishermen, after a plentiful draught.

The word comes from θυννος, *a tunny*, that being the sacrifice offered.

THYNNUS, in *Entomology*, a genus of the Hymenoptera order of insects: the characters of which are, that the mouth is horny; the mandible bent, with a short jaw, straight; the lip larger than the jaws, with the apex membranaceous; trifid; the intermediate fringes emarginate; the tongue very short or folded; the four palpi filiform and equal; the antennæ filiform. Gmelin enumerates three

Species.

Dentatus. With black abdomen; the second, third, and fourth segments marked with two white points. Found in New Holland.

Emarginatus. With black abdomen, the segments having a yellow interrupted band; the scutellum emarginate. Found in New Holland.

Integer. Black, with the segments of the abdomen villose-cinereous at the margin, and the anus entire. Found in New Holland.

Thynnus, in *Ichthyology*. See Tunny, and Scomber, of which it is species.

THYOS, Θυος, in *Antiquity*, an offering of fruits, leaves, or acorns, which were the only sacrifices at first in use.

THYRÆI, in *Ancient Geography*, a people of Italy, in Japygia, who inhabited the middle of the isthmus, between Tarentum and Brundusium, according to Strabo.

THYREA, a town of the Argolide, upon an eminence, in that part which adjoined Laconia, that is, on the western coast of the Argolic gulf. The country in which it was situated bore the name of Cynuria or Cynouria.—Also, a town of Greece, in the Phocide, where, according to Pausanias, Phocus, the son of Harmythion, placed a colony.—

Also,

Alfo, a place fituated on the coaft of the Peloponnefus. According to Herodotus, the inhabitants of Hermione gave it to thofe of Samos.

THYREUM, a fmall town of Arcadia, S. of Megalopolis. It was deferted in the time of Paufanias.

THYRIDES, a town of Laconia, S.E. of Meiffa. Near this place were the ruins of the town of Hippola, in the midft of which was feen, in the time of Paufanias, a chapel of Minerva Hippolaitis.—Alfo, the name of the fummit of Tænarus, in the Peloponnefus; 30 ftadia from the promontory Tænarum. Pliny gives the name of Thyrides to three iflands of the gulf Afinæus.

THYROID, in *Anatomy*, *thyroideus*, or more properly *thyreoideus*, from θυρεοειδης, compounded of θυρεος, *a fhield*, and ειδος, *form*; a name given to one of the cartilages of the larynx (fee LARYNX), to a gland fituated near that cartilage (fee LARYNX), and to the arteries and veins of the gland. See ARTERY and VEIN.

THYROID *Gland*, *Difeafed*. See BRONCHOCELE.

THYROID *Gland*, *Extirpation of*. It cannot be doubted that this operation is one of the moft difficult and dangerous in the practice of furgery; and it ought never to be undertaken, except under the moft urgent circumftances, and by operators of confummate fkill and judgment. Were a furgeon, fuperficially acquainted with anatomy, and little accuftomed to attempts of fo bold a kind, to undertake the operation of cutting away a difeafed thyroid gland, he would run the utmoft rifk of feeing the patient bleed to death under his hands.

The following is a memorable inftance of the fuccefsful performance of this operation. In the year 1784, J. Hyons, twenty years of age, experienced an acute pain at the middle and anterior part of the neck, in confequence of a violent extenfion of the head. This pain, which was only momentary, was followed by fome difficulty of motion. About three months afterwards, a fmall, hard, indolent tumour appeared on the right fide of the trachea. The fwelling was unattended with pain, or alteration in the colour of the integuments. The tumour feemed to be raifed by a pulfatory action, which tended to prove the exiftence of a large artery underneath, and, in fact, its bafe was fituated on the general courfe of the carotid artery. The patient feeling no inconvenience, neglected it until June 1788. At this time it was an inch in diameter. Its progrefs, which in the firft inftance was flow, now augmented with proportionable rapidity. Internal remedies and topical applications had no effect in preventing its increafe. A fluctuation in its centre was foon evident: an incifion was then made into this part, and a quantity of yellow ferofity difcharged. Three months after this operation, which was not of the leaft fervice, recourfe was had to cauftics, which were repeatedly applied without any advantage. On the 20th of March 1791, fhe prefented herfelf for admiffion at the Hôtel-Dieu. At this period the tumour was two inches in diameter, round, hard, and attached to the right and middle part of the trachea, and it pufhed outwards the fterno-maftoideus mufcle. Independently of its being fenfibly raifed by each pulfation of the arteries, it obeyed the motions of deglutition, and in a flight degree impeded the paffage of the folid aliment. The patient, [illegible]neftly defiring to get rid of fo inconvenient a deformit[illegible], [illegible]etermined to fubmit to its extirpation, which appeared her only refource. The danger, the length of time, and the pain neceffarily annexed to the operation, were not concealed from her. The operation, after a few days previous preparation, was performed in the amphitheatre by Default in the following manner: the patient being laid on her back, a little inclined on the left fide, with the head and neck more raifed than the reft of the body, the furgeon made a longitudinal incifion through the middle of the tumour, beginning one inch above, and finifhing one inch below, to allow room to finifh the operation with eafe: in the firft fection he cut down as far as the gland, dividing the integuments, the platyfma-myoides, and fome fibres of the fterno-hyoideii and fterno-thyroideii mufcles; an affiftant, with the view of fixing the tumour, drew towards the left the infide edge of the wound made by the incifion, whilft the furgeon detached it from the fterno-maftoideus mufcle. In diffecting the cellular fubftance which united the parts, two fmall arteries were divided, which were raifed by a pair of diffecting forceps and fecured by ligatures. The external furface of the tumour being thus difengaged, the internal part was detached in the fame way. The tumour was drawn outwards by means of a hook, that it might be feparated with more eafe from the anterior part and from the fide of the trachea. In the courfe of this diffection, the branches of the thyroid arteries were fucceffively tied, as faft as they were divided. The affiftant, to whom the hook was confided, directed the gland from within and forwards, whilft the furgeon finifhed the diffection outwards and from above downwards. This part of the operation was the moft minute and difficult: it was neceffary by means of a fponge continually to wipe away the blood, which neceffarily prevented the parts from being eafily diftinguifhed, and obliged the furgeon to divide but a little at a time, and previoufly to feel with his finger thofe parts he was about to incife. By this cautious diffection of parts, the fuperior and inferior thyroid arteries were laid bare, and afterwards fecured by ligature by means of a blunt crooked needle. They were afterwards tranfverfely divided, and the remaining part of the tumour detached from the trachea, to which it ftrongly adhered. The wound refulting from this operation was near three inches in depth: it was outwardly bounded by the fterno-maftoideus mufcle, and inwardly by the trachea and œfophagus; pofteriorly by the carotid artery, and by the nerves of the eighth pair, which were expofed at the bottom of the wound. After the wound was well wafhed with warm water, and cleared from the blood, it was filled with coarfe lint, powdered with colophony; fquare compreffes, fecured by a bandage moderately tight, formed the reft of the dreffing. The extirpated tumour was five inches in circumference; and on examination was found to differ in no particular from fchirrous glands, except that in the centre there was a cartilaginous nucleus. The patient fupported this long, difficult, and painful operation with uncommon firmnefs: fhe paffed the reft of the day without experiencing any other fymptom than a flight fhivering, generally confequent to large wounds. The following night fhe complained of a fenfe of heat in the neck, and fome difficulty in deglutition. The next day a little eafe was obtained by moiftening the dreffing with a decoction of marfhmallows. A weak drink of the herb dog's-tooth, acidulated with oxymel, was prefcribed. On the third day the fever was very moderate, but the difficulty in fwallowing had confiderably increafed at this period; the compreffes and the external lint were removed, and frefh applied. On the fourth, the fever ceafed, and deglutition became lefs painful. Suppuration now became eftablifhed. The next day all the lint was detached, and the whole of the dreffings renewed. The wound was in a good ftate: it was dreffed with foft lint and compreffes moiftened with an emollient decoction; a practice which was continued for the following days. No particular circumftance occurred during the cure. The wound followed the ordinary progrefs,

grefs, and was cicatrized at the end of a month. The patient left the hofpital, perfectly cured, the 34th day after the operation. See Default's Parifian Chirurgical Journal, vol. ii. p. 292—296.

To the preceding cafe, the editor of the above work has annexed the few following reflections.

The extirpation of the thyroid gland is an operation extremely difficult, and certainly highly dangerous, when performed by an operator but moderately exercifed in the practice of his profeffion. The number and fize of the arteries neceffary to divide, the proximity of the trachea, œfophagus, and carotid, near which the knife muft neceffarily pafs, are the principal dangers that the operator fhould avoid. Thefe are the circumftances which have deterred the majority of practitioners from performing it, particularly thofe who from long eftablifhed prejudice have been deterred from ufing ligatures in cafes of wounded arteries. Examples of this operation are very rare. The firft time that Gooch undertook to perform it, he was deterred from finifhing it by the hemorrhage, and his patient died on the eighth day. The fecond time he fucceeded better, but was incapable of fecuring the veffels, and fucceeded in ftopping the hemorrhage, which would otherwife have been mortal, by caufing the parts to be compreffed by the hand of an affiftant for the fpace of eight days. Gooch's Med. and Chir. Obf. p. 130. Bell's Syftem of Surgery, vol. v. p. 525. And La Bib. Chir. de Richter, l. 2. 4e partie, p. 128.

A. F. Vogel and Theden have practifed the fame operation with the moft complete fuccefs. All danger from the hemorrhage, or inconvenience arifing from the difcharge of blood, may be obviated by pinching up the fmall veffels, tying them as faft as they are divided, and by difcovering and tying the large veffels previous to their divifion; other parts that cannot be wounded without danger, are to be avoided by diffecting flowly and a little at a time, and feeling with the finger every part previous to its divifion with the biftoury.

THYRO-ARYTENOIDEUS, a mufcle of the larynx. See Larynx.

THYRO-EPIGLOTTICUS, a fuppofed mufcle of the larynx. See Larynx.

THYRO-HYOIDEUS, a mufcle paffing between the os hyoides and the thyroid cartilage. See Larynx.

THYRO-PHARYNGEUS, a portion of the inferior conftrictor of the pharynx. See Deglutition.

THYROIDEÆ *Glandulæ Mufculus*. See the defcription of the thyroid gland in the article Larynx.

THYRRÆUM Vinum, a fort of wine among the ancients, remarkable for its thicknefs and dark colour; it was fweet and lufcious, and not aftringent.

THYRREUS Lapis, in *Natural Hiftory*, the name of a foffil, which the writers of the middle ages have called *fyrus*.

It has many virtues afcribed to it; but all the accounts we have of its real properties are from Pliny, who obferves, that it fwam upon the water while whole; but when broken into fmall pieces, thefe funk to the bottom. It feems to have been a fort of bitumen of a fpongy ftructure.

THYRSINE, in *Botany*, probably from its denfe clufter-like appearance, a name given by Gleditfch to the Cytinus, (fee that article,) in a treatife publifhed in his Phyfic. Botan. Oecon. Abhandlungen, v. 1. 199. t. 2. He is cited in Schreb. Gen. 609, and Willd. Sp. Pl. v. 4. 589.

THYRSUS, Θυρσος, in *Antiquity*, the fceptre which the ancient poets put in the hands of Bacchus, and with which they furnifhed the Mænades in their Bacchanalia.

The thyrfus was originally a lance or fpear, wrapped up in vine leaves; with which Bacchus is faid to have armed himfelf and his foldiers in his Indian wars, to amufe and deceive the unpractifed Indians, and make them fufpect no hoftilities.

Hence it was afterwards borne in the feaft and facrifices of that god; and as the Satyrs, who were Bacchus's foldiers, were fuppofed to have fought with it, it became a cuftom to reprefent them therewith.

Thyrsus, *Oriftagni*, in *Ancient Geography*, a river of the ifle of Sardinia, which ran from N. to S. and difcharged itfelf towards the W. into the fea.

Thyrsus, in *Botany*, a Bunch, is a mode of inflorefcence, nearly allied to a *Racemus*, or Clufter, except in being compound, in which it agrees with a Panicle. Its form is more or lefs ovate, and the difpofition of the branches and fubdivifions is either oppofite or alternate; the ultimate one fometimes obfcurely umbellate. Examples are found in the Lilac, *Syringa vulgaris*, and a bunch of Grapes, *Vitis vinifera;* as well as in the herbaceous plants *Tuffilago hybrida* and *Petafites*. Hence it appears that a *Thyrfus* is nothing more than a denfe or clofe Panicle; and in the examples laft cited, this mode of inflorefcence actually becomes a loofe panicle, as the plant perfects feed. See Panicula and Inflorescence.

THYSANOTUS, θυσανωτος, *fringed*, a very defcriptive name of Mr. Brown's, which he complains of Mr. Salifbury for having knowingly fuppreffed.—Brown Prodr. Nov. Holl. v. 1. 282. (Chlamyfporum; Salif. Parad. 103.)—Clafs and order, *Hexandria Monogynia*. Nat. Ord. *Coronariæ*, Linn. *Afphodeli*, Juff.

Gen. Ch. *Cal.* none. *Cor.* inferior, of one petal, in fix deep, fpreading, permanent fegments; the three inner ones broadeft, fringed at the edges with jointed hairs; the three outermoft externally of the texture of a calyx. *Stam.* Filaments fix, awl-fhaped, fmooth, much fhorter than the calyx, inferted into its bafe; anthers linear, incumbent, attached by the finus at their bafe, a little unequal at the end, the three outer ones generally elongated and reclining. *Pift.* Germen fuperior, roundifh; ftyle thread-fhaped, declining, about the length of the ftamens; ftigma fimple. *Peric.* Capfule oval, of three cells and three valves, with a partition from the centre of each, enveloped in the withered corolla. *Seeds* two in each cell, one erect, the other pendulous, roundifh, fomewhat ftalked, inferted into a cup-fhaped white appendage; albumen denfe, flefhy.

Obf. A few fpecies have only three ftamens.

Eff. Ch. Corolla in fix deep fegments; the three innermoft broadeft, fringed; permanent. Stamens fmooth. Capfule fuperior, of three cells and three valves. Seeds in pairs, with cup-fhaped appendages.

A rather numerous genus of perennial herbaceous plants, natives of different parts of New Holland. The *root* is either fibrous, or confifts of cluftered flefhy bulbs. *Stem* generally branched and leafy. *Leaves* linear, narrow, often channelled, fometimes thread-fhaped, or fhortened. *Flowers* terminal, umbellate; rarely fcattered; their ftalks jointed in the middle. *Corolla* blue within; three, at leaft, of its fegments green at the back. *Anthers* purple; the outer ones fometimes whitifh, which in the triandrous fpecies are wanting. *Seeds* black. The permanent *corolla*, and fmooth *filaments*, principally diftinguifh this genus from Mr. Brown's *Arthropodium*, Prodr. Nov. Holl. v. 1. 276, by which it is related to the Linnæan *Anthericum*. The learned author whom we follow defines twenty-one fpecies, of which he feems doubtful whether any one has ever been introduced into the Englifh gardens, at leaft fo as to bear flowers; for he thinks the figure in Parad. Lond. was done from

from a dried ſpecimen. On this ſubject we have no particular information. Several drawings of this genus and its allies, made in New Holland, have paſſed under our inſpection, and diſplay a degree of elegance which renders the plants highly deſirable.

Of the twenty-one ſpecies, ſeventeen are hexandrous, four triandrous.

Sect. 1. *Stamens ſix.*

Th. *tuberoſus.* Tuberous Fringe-bloſſom. Br. n. 1.—"Bulbs faſciculated, ſtalked. Radical leaves channelled, lax, ſmooth, rather ſhorter than the round, ſmooth, panicled ſtem. Umbels of two or three flowers. Anthers unequal."—Gathered by Mr. Brown, near Port Jackſon, New South Wales.

Th. *junceus.* Ruſh-leaved Fringe-bloſſom. Br. n. 9. (Chlamyſporum juncifolium; Saliſ. Parad. t. 103.)—"Root fibrous. Stems branched, diffuſe, round, ſtriated; branches ſlightly angular. Radical leaves ſhort; thoſe of the ſtem ſtraight, ſlightly ſpreading. Umbels of few flowers. Anthers unequal."—Native likewiſe of Port Jackſon, from whence we have received ſpecimens by favour of Dr. White. The *ſtems* are about a foot long, diffuſe, according to Mr. Brown, ſmooth, ſlender, ruſhy, alternately branched.—*Flowers* about an inch in diameter, their inner ſegments obtuſe, delicately fringed. They are ſaid to be very tranſient.

Th. *dichotomus.* Forked Fringe-bloſſom. Br. n. 14. (Ornithogalum dichotomum; Labillard. Nov. Holl. v. 1. 83. t. 109.)—Root fibrous. Radical leaves hiſpid. Stem round, ſtriated, with numerous rather ſpreading branches; forked above. Flowers ſolitary. Anthers unequal.—Gathered in Lewin's land by M. Labillardiere, from whom we have a ſpecimen. The *ſtem* is 15 or 18 inches high, repeatedly divided from the bottom, ſo as to be almoſt corymboſe at the top, roughiſh to the touch, ſlightly leafy. *Radical leaves* numerous, about four inches long, erect, linear, obtuſe, entire, channelled, rough with ſhort, rigid, pale, prominent hairs; ſheathing at the baſe: thoſe of the ſtem ſolitary under each branch, ſhort, awl-ſhaped, ſtriated, claſping the ſtem with a dilated, membranous margin in the lower part. *Flowers* terminal, two or three to each branch, but it appears to us that the individual ones are ſolitary. Three inner ſegments purple on the inſide, with a fringe of the ſame colour; their outſide, like the whole of the outer ones, green. *Anthers* but ſlightly, if at all, unequal. Valves of the *capſule* beaked.

Sect. 2. *Stamens three.*

Th. *triandrus.* Triandrous Fringe-bloſſom. Br. n. 18. (Ornithogalum triandrum; Labill. Nov. Holl. v. 1. 84. t. 110.)—"Root fibrous. Leaves linear, fringed, the length of the ſmooth unbranched common flower-ſtalk. Umbel many-flowered. Lower joint of each partial ſtalk ſeveral times longer than the bracteas.—Gathered by Labillardiere, in Lewin's land. *Stalks* one or more, compreſſed, a ſpan high, as well as the numerous, all radical, *leaves.* *Umbel* of about nine *flowers;* its *ſtalks* jointed below the middle. *Stamens* but three, oppoſite to the three fringed ſegments of the *corolla*, which are purple on the inſide.

THYSANUS, from θυσανος, *a fringe*, becauſe of the fringed tunic of the ſeed.—Loureir. Cochinch. 284.—Claſs and order, *Decandria Tetragynia.* Nat. Ord. *Terebintaceæ*, Juſſ.?

Gen. Ch. *Cal.* Perianth inferior, of five coloured, permanent, lanceolate, concave, hairy, ſpreading leaves. *Cor.* bell-ſhaped, of five ſpreading oblong petals, the ſize of the calyx. *Stam.* Filaments ten, ſhort, reflexed; anthers roundiſh, erect, of two cells. *Piſt.* Germen ſuperior, quadrangular; ſtyles four, thread-ſhaped, inſerted laterally into the four angles of the germen; ſtigmas ſlightly cloven. *Peric.* Drupas four, oblong, gibbous, recurved at the point, with a woolly coat, burſting laterally. *Seeds.* Nuts ſolitary, oblong-ovate, ſmooth, naked at the top, enveloped in their lower part with a fleſhy, fringed, red tunic.

Eſſ. Ch. Petals five. Drupas four, gibbous. Nuts with a fringed tunic.

1. Th. *Palala.* Deei Khê of the Cochinchineſe.—Native of the woods of Cochinchina. A large, woody, nearly erect, branching *ſhrub*, without thorns. *Leaves* pinnate, of about ten pair of oblong, entire, ſmooth leaflets. *Stalks* axillary, many-flowered. *Calyx* red. *Corolla* white. Wing, or tunic, of the *nuts* red.

Such is the deſcription of Loureiro, who quotes, with a mark of doubt, *Palala ſecunda;* Rumph. Amboin. v. 2. 26. t. 6. But that is a *Myriſtica*, and has ſimple leaves. Yet hence the ſpecific name appears to be taken. He more juſtly indicates the affinity of his plant to *Sinaba;* Aubl. Guian. 400. t. 155, of which we propoſe to treat hereafter in its proper place, under Schreber's name of Zwingera.

We preſume Loureiro's *Thyſanus* to be very nearly related to Cnestis of Juſſieu and Willdenow; ſee that article. The number of germens may be very variable or uncertain. What the author terms a *drupa*, appears, from its burſting laterally, to be a true *follicle*, as is the ſeed-veſſel of *Cneſtis.* Whether the ſeed of the latter has any thing analogous to the fringed *tunic*, does not appear.

THYSDRUS, in *Ancient Geography*, a town of Africa Propria, and one of thoſe which, according to Ptolemy, lay to the S. of Adrumetum.

THYSIUS, (Thys,) Antony, in *Biography*, a philologiſt, was born at Leyden in 1603, and became profeſſor of eloquence and poetry in the univerſity of his native city, and public librarian. Beſides two or three works of his own, he was the editor of ſeveral editions of claſſics called "Variorum;" of which were "Valerius Paterculus," "Salluſt," "Valerius Maximus," "Seneca the Tragedian," "Lactantius," and "Aulus Gellius." He died in 1670.

THYSSAGETÆ, in *Ancient Geography*, a people who inhabited the territory near the Sarmatæ, where was the ſource of the river Tanais. Ammianus Marcellinus ſays that theſe people had their abode in large foreſts, and lived by the chace. Their wives and children they had, he ſays, in common. Herodotus ſays they were a numerous nation, and governed by their own laws. Hardouin, in his notes on Pliny, ſays that they inhabited the banks of the Tanais, towards that bend of the river, where it moſt nearly approaches the Wolga, and which is now the territory of Aſtrachan.

THYSSELINUM, in *Botany*, a name adopted by Lobel in his *Icones*, 711, for the *Selinum ſylveſtre* of Linnæus. Lobel cites Pliny, but the name in that author is *Thyſſelium.* The plant to which it belonged was "not unlike parſley, *Apium;* its *root* when chewed purged humours from the head." Rivinus, Pentap. Irr. t. 19 and 20, has the Linnæan *Selinum ſylveſtre* and *paluſtre* under the generic name of *Thyſſelinum*, as has Tournefort likewiſe, in his *Inſtitutiones*, 319. The latter diſtinguiſhes his genus from *Oreoſelinum* ſolely by its milky juice. As this juice is highly acrid, theſe authors ſhould ſeem to conſider the word as derived from θυω, *to burn*, and σελινον, *parſley.* Linnæus omitted the firſt ſyllable as, in his opinion, ſuperfluous,

fluous, and even Haller follows his example. See Selinum.

THYSSUS, in *Ancient Geography*, a town of Macedonia, on and about mount Athos. Pliny and Thucydides.

THYSTHUM, or Thytium, a town of Etolia. Suidas.

TIABA, a town of Asia Minor, in Caria. Strabo.

TIAGAR, a town in the interior of Arabia Felix, between [illegible] and Appa. Ptolemy.

Tiagar, in *Geography*, a town of Hindooftan, in the Carnatic; 5[illegible] miles W.S.W. of Pondicherry. N. lat. 11° 42′. E. long. 79° 12′.

TIAGNANUCO, a town of Peru, in the diocefe of La Paz. This is a town of great antiquity, and is faid to have received its name from one of the Incas. In it are fome ftatues, and a coloffal pyramid, with a variety of human figures cut out of ftone, which, though decayed by time, appear to have belonged to fome gigantic nation; 36 miles N.W. of La Paz.

TIAGURA, in *Ancient Geography*, a town of India, on this fide of the Ganges, and E. of the river Nomadus. Ptolemy.

TIANG-POTAO, in *Geography*, an ifland of Corea, about thirty miles in circumference, in the Hoang-hai. N. lat. 37° 2[illegible]′. E. long. 124° 52′.

TIANO. See Theano.

Tiano, a fmall ifland in the North fea, near the coaft of Lapland. N. lat. 68° 42′.

TIANTEGNIES, a town of France, in the department of Jemappe; 6 miles S.W. of Tournay.

TIANTONG, a town of Upper Siam, on the Mecon; 60 miles N.W. of Porfelouc.

TIAOYU-SU, a fmall ifland in the Chinefe fea, belonging to thofe called Lieou-kicou. N. lat. 25° 55′. E. long. 123° 37′.

TIARA, τιαρα, an ornament, or habit, with which the ancient Perfians covered their heads; and which the Armenians and kings of Pontus wear on medals: thefe laft, becaufe defcended from the Perfians.

Latin authors call it indifferently *tiara* and *cidaris*.

Strabo fays, the tiara was in form of a tower; and the fcholiaft on Ariftophanes's comedy, Ἀχαρνεῖς, act i. fcene 2. affirms that it was adorned with peacocks' feathers. Some moderns, however, fancy the fcholiaft is here fpeaking of the cafque which the ancient Perfians wore in war, rather than of the habit which they wore on the head in the city.

The kings of Perfia alone had the right of wearing the tiara ftraight and erect; the priefts and great lords wore it depreffed, or turned down on the fore-fide. Xenophon, in his Cyropædia, fays that the tiara was fometimes encompaffed with the diadem, at leaft in ceremonials; and had frequently the figure of a half-moon embroidered on it: others are of opinion, that the diadem was in figure of a moon; and that it was hence the *tiara* was called *lunata*. Laftly, others think that the tiara itfelf was made fometimes in form of a half-moon. From what we have faid, it appears that there were different forms of tiaras; and, in effect, Pafchalius, De Coronis, diftinguifhes no lefs than five different kinds. See Diadem.

The tiara was alfo an ornament belonging to the Jewifh priefts. Exod. xxviii. 40. xxxix. 26.

Tiara is alfo the name of the pope's triple crown; anciently called *regnum*.

The tiara and keys are the badges of the papal dignity; the tiara of his civil rank, and the keys of his jurifdiction: for as foon as the pope is dead, his arms are reprefented with the tiara alone, without the keys.

The ancient tiara of the popes was a round high cap. Boniface VIII. firft encompaffed it with a crown. Benedict XII. added a fecond crown; and John XXIII. a third.

TIARANTUS, in *Ancient Geography*, a river of Scythia, which ran into the Danube; now the *Alut*.

TIARE, a town of Afia Minor, in the Troade. Pliny.

TIARELLA, in *Botany*, the diminutive of τιαρα, a Perfian diadem, or ornament for the head. This name alludes to the form of the feed-veffel, and was contrived by Linnæus to preferve an analogy with Mitella, fee that article, to which the prefent genus is next akin.—Linn. Gen. 223. Schreb. 301. Willd. Sp. Pl. v. 2. 659. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 3. 72. Purfh 659. Juff. 309. Lamarck Illuftr. t. 373.—Clafs and order, *Decandria Digynia*. Nat. Ord. *Succulentæ*, Linn. *Saxifragæ*, Juff.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in five deep, ovate, acute, permanent fegments. *Cor.* Petals five, oblong, their claws inferted into the calyx. *Stam.* Filaments ten, capillary, longer than the corolla, inferted into the calyx; anthers incumbent, orbicular. *Pift.* Germen fuperior, cloven, terminating in two very fhort ftyles; ftigmas fimple. *Peric.* Capfule oblong, fomewhat compreffed, of one cell and two flattifh valves, one of them twice as long as the other. *Seeds* numerous, ovate, polifhed.

Eff. Ch. Calyx in five deep fegments. Petals five, undivided, inferted into the calyx. Capfule of one cell, with two unequal valves.

Obf. The undivided petals, and the inequality of length in the two valves of the capfule, diftinguifh this genus from *Mitella*.

1. T. *cordifolia*. Heart-leaved Tiarella. Linn. Sp. Pl. 580. Willd. n. 1. Ait. n. 1. Purfh n. 1. Lamarck as above. (Cortufa americana, flore fpicato, petalis integris; Herm. Parad. 129, without a figure.)—Leaves heart-fhaped, acutely lobed, with pointed teeth. Clufter fimple, ovate.—Native of the fhady woods of Canada, and the high mountains of New York and Pennfylvania, flowering in April and May. *Purfh.* It is hardy in our gardens, flowering at the fame feafon, but chiefly preferved in the more curious collections only. The *root* is tuberous, with many blackifh fibres, perennial. *Leaves* feveral, all radical, light green, hairy, elegantly lobed and veined, acute, about an inch and half in diameter, on erect, fimple, hairy *footftalks*, thrice as much in length. *Flower-ftalk* radical, moftly folitary, unbranched, hairy, taller than the leaves, bearing a fimple downy clufter, an inch long, of about twenty fmall, delicate, white *flowers*, which is fubfequently elongated as the *fruit* ripens. The *capfules* then become deflexed, two-lipped, ribbed, fmooth, and fhining. It is wonderful that every author fhould perfift in quoting, after Linnæus, the plate of Hermann's *Paradifus*, which is evidently *Heuchera americana*, and is mentioned under the name of *Cortufa americana*, *flore fquallidè purpureo*, in the text of the fame work, p. 131; where alfo this figure is referred to. The editor, having committed a double blunder, in the title of the plate and its reference, 130 inftead of 131, is in fome meafure refponfible for the miftake; which however the compound *panicle*, and clofed *calyx*, ought to have fooner corrected.

2. T. *Menziefii*. Slender-fpiked Tiarella. Purfh n. 2.—"Leaves ovate-heartfhaped, acute, toothed, with fhallow lobes; thofe of the ftem alternate, remote. Clufter threadfhaped, fomewhat fpiked. Calyx tubular."—Gathered by Mr. Menzies, on the north-weft coaft of America. Perennial. More than a foot high, with five or fix alternate *leaves* on the *ftem*. *Purfh.*

3. T. *trifoliata*. Three-leaved Tiarella. Linn. Sp. Pl. 580. Willd. n. 2. Purfh n. 3. (Mitella foliis ternatis; Linn. Am.

Am. Acad. v. 2. 351.)—Leaves ternate, lobed and toothed. Stem leafy. Cluster compound.—Gathered by Mr. Menzies on the north-west coast of America, where it is frequent in woods. Linnæus saw it only in the collection of plants from Kamschatka, submitted to his inspection by Demidoff, and described in the 2d volume of the *Amœnitates Academicæ*; for there is no specimen in his own herbarium. The *root* is tuberous, and somewhat creeping, perennial. *Stems* above a foot high, erect, simple, leafy, smooth and slender. *Leaves* all ternate, slightly hairy, paler beneath; the leaflets somewhat rhomboid, acute, more or less deeply lobed, and irregularly notched, an inch or an inch and half in length; the lateral ones often deeply divided; so that they much resemble some of the more delicate species of *Rubus*. The radical leaves have long slender *footstalks*; those on the stem short ones. *Cluster* many-flowered, from three to six inches long, alternately branched; the branches corymbose, each bearing from three to six or seven very small greenish-white *flowers*. The base of the *calyx* is concave, or slightly bell-shaped. *Capsule* half an inch long, each valve tipped with a permanent, elongated, capillary *style*.

4. T. *biternata*. Compound-leaved Tiarella. Venten. Malmaif. t. 54. Pursh n. 4.—Leaves twice ternate, lobed and toothed. Stem leafy. Panicle compound, divaricated; its branches somewhat spiked.—Found on the mountains of South Carolina, flowering in May. *Root* perennial. *Stem* a yard high. The appearance of the plant is justly compared by Ventenat to *Spiræa Aruncus*. The *leaves* consist of nine large ovate *leaflets*, slightly hairy, partly lobed, and all strongly toothed, or notched. *Flowers* very small, yellowish-white, almost sessile, disposed in numerous long *clusters*, forming a large, spreading, repeatedly branched *panicle*. The *petals* in Ventenat's figure are narrow, elliptic-lanceolate. Pursh says they are sometimes wanting. The appearance of the *capsule* in that figure is very different from the other species, and the valves are of equal length. This plant is said to have proved biennial in the garden of Malmaison; but it may still be perennial in its native country. We have seen no specimen, nor has this curious species, any more than the last, yet found its way into the English gardens.

TIARINI, Alessandro, in *Biography*, an historical painter, who was born at Bologna in 1577. He was first a disciple of Prospero Fontana, but on the death of that master, he received instructions from Bartolomio Cesi, from whom, being obliged to leave Bologna on account of a quarrel, he went to study under Passignano at Florence. After some time, about seven years, as the influence of the circumstance which had driven him from his native city subsided, he ventured to return there, and became a pupil of the Caracci; and he principally attached himself to Ludovico, more for the improvement of his style, than for practice.

He had, during his residence at Florence, acquired considerable fame, and painted several pictures for churches and convents in places within and round about that city. On his return to Bologna, his talents acquired him considerable employment there, and many of his principal works still adorn its public edifices. Ferdinand, duke of Mantua, invited him to take up his residence with him; sat to him for his portrait, as did all the princes of his family, and many of the nobles of his court.

The colouring adopted by Tiarini in his best time is clear and rich; his design tasteful and agreeable, though of a serious cast; and his expression just and natural: and there are not many artists who have have done more credit to the Bolognese school. He died in 1668, at the advanced age of 91.

TIARIULIA, in *Ancient Geography*, a town of Hispania Citerior, in the interior of the country of the Ilercaons. Ptol.

TIARP, in *Geography*, a town of Sweden, in Westmannland; 25 miles N. of Upsal.

TIASSE, in *Ancient Geography*, a river of the Peloponnesus, in Laconia, which ran between Sparta and Amycla. Pausanias.

TIASUM, a town of Dacia, in the vicinity of Nantidava and Zugma. Ptol.

TIAUSPA, a town of India, on this side of the Ganges, W. of this river and near it. Ptol.

TIB, in *Geography*, a town of Persia, in Chusistan, or Kuzistan; 60 miles N.W. of Shuster.

TIBAENS, a town of Portugal, in the province of Entre Duero e Minho; 4 miles W. of Braga.

TIBALDI, Pellegrino, in *Biography*, was born at Bologna in 1527. He was the pupil of Bagnacavallo, and copied with much attention the works of Vasari, in the refectory of S. Michele in Bosco. At the age of twenty he went to Rome, chiefly to study the works of Michael Angelo. The pictures he produced at Rome obtained for him the patronage of the cardinal Poggi, who employed him in ornamenting his Vigna, near the Porto del Popolo, with works in fresco, and then sent him back to Bologna, to assist in the completion of his palace there (now the Academical Institute), both as architect and painter; and in both characters it remains as the principal testimonial of his powers remaining in Italy. He also constructed and adorned a chapel for his patron in the church of S. Giacopo Maggiore. One of the paintings he executed there was the Preaching of St. John, and another, the Last Judgment; where, in the opinion of the Caracci, he almost equalled the majesty of Michael Angelo, and it was preferred by them to all the other works of Pellegrino, and served them and their scholars as a model of study.

From Bologna, the cardinal sent him to Loretto, to superintend the erection of a chapel in the church of La Madonna, which he also ornamented with stuccoes and paintings of the Nativity, the Presentation in the Temple, the Transfiguration, and the Decollation of St. John. From thence he went to Ancona, where he wrought in the churches of S. Agostino and Ciriaco; and in the great hall of the merchants he painted one of his most celebrated pictures, the subject of which is Hercules overthrowing monsters. He also superintended, as military architect, the fortifications of the place, about the year 1560; and two years afterwards visited Pavia, where he constructed the palace of the Sapienza; he then went to Milan, and there built the temple of S. Fidele, and before the year 1570 was elected architect of the cathedral.

Here he disencumbered the dome of numerous Gothic monuments, sepulchral urns and trophies, and embellished it in their stead with various chapels and a majestic choir. He soon after received a commission from Philip II. to prepare designs and plans for adorning the Escurial, both architectural and pictorial. He followed them to Spain himself in 1586. There he superintended the work for nine years, painting a great number of pictures, particularly some in fresco in the lower cloister, whence he expunged the unsuccessful productions of F. Zucchero. The subjects were from scripture, of the Purification; the Flight into Egypt; the Murder of the Innocents; Christ tempted in the Wilderness; the Election of the Apostles; the Resurrection of Lazarus; the Expulsion of the Money Changers from the Temple; and the Resurrection of our Saviour. Besides these, he painted during his residence in Spain several pictures ture, for other places, particularly for the great church at Madrid, where there are five pictures by him. But his moft renowned work, and which moft contributed to eftablifh his fame in Spain, was the cieling of the library of the Efcurial, where he appears to have rivalled the compofition of the fchool of Athens by Raphael; with beautiful groups of children and figures fupporting the cornices and feftoons in great varieties, and forefhortenings worthy of an imitator of the ftyle of Michael Angelo. For the extraordinary talents which he exhibited in thefe great works, Philip loaded him with riches and honours, and even gave him patents of nobility, creating him marquis of Valdelfa; a diftrict in which his father and his uncle had laboured in the humble capacity of mafons. He lived to an advanced age, but the exact year of his death is not known, though it is thought to have been about 1600.

Pellegrini Tibaldi is confidered, and with fufficient evidence from his works, as the greateft defigner of the Bolognefe and Lombard fchools. He approaches the line of Michael Angelo nearer than all the reft of his imitators; but as he had decidedly adopted the technic without always penetrating the moral principles of his model, the manner of the mafter frequently became the ftyle of the pupil; though it cannot be denied that he often united energy of attitude and grandeur of line, with fublimity of conception and dignity of motive. Of thefe he has given no where more fignal proofs than in the cielings and the compartments of the Academical Inftitute at Bologna. They reprefent various fcenes from the Odyffey; among them, Polypheme waking under the pangs of the fiery point, though painted with a fentiment of original expreffion, is evidently imitated from the newly created figure of Adam in the Siftina; but the fame Cyclops groping at the entrance of his cave to prevent the efcape of Ulyffes and his affociates, is in conception of the whole, and in the detail of the parts, an original invention; a form, than which Michael Angelo himfelf never conceived one of greater energy, with expreffion, attitude, and limbs more in unifon. With this may be placed that wonder of forefhortening, excentricity, and rotundity, the figure of Elpenor, on one of the architraves of the Salotto, reprefented in the moment when, yet dreaming, he leaves his hold, and is precipitated from the roof. The air of originality which this figure in every view prefents, and the elegance with which the imitator has reverfed the figure in the Laft Judgment of Michael Angelo, from which he borrowed the principal limbs of his own, place him on a level with the inventor.

It was, however, lefs for the powers exerted by Pellegrino, in the decorations of the Inftitute, than for the eclectic principle which they difcovered in his fubfequent works, that the Caracci gave him the epithet of *Michel Angelo riformato*, and commended

"Del Tibaldo il decoro e il fondamento."

The compofitions of the chapel Poggi, in St. Giacomo, where the imitation of Michael Angelo is blended with that of Raphael, Corregio, and D. da Volterra, contain the rudiments of their own fyftem.

Pellegrino Tibaldi is more known by his works in frefco than by his pictures in oil, which are extremely fcarce: one of the earlieft is the Nativity, already mentioned, in the Palace Borghefe, of which the cartoon ftill exifts in a private collection of drawings. It is painted in a fober unaffected tone, and confidered as the work of an artift jealous of his line, with great mellownefs of touch. The figures of this are confiderably lefs than the fize of life; but there are pictures of his to be met with of diminutive dimenfions, with all the finifh of miniatures, though rich in figures, touched with great fpirit and equal vivacity of colour: they are generally fet off by backgrounds drawn from his favourite branch of art, architecture. Fufeli's Pilkington.

TIBARANIA, or TIBARÆNIA, in *Ancient Geography*, a country of Afia, in Pontus, in the vicinity of Cappadocia, and adjoining the country of the Chalybes. Steph. Byz.

TIBERIA, a town of Thrace, founded by the emperor Tiberius, whence its name.

TIBERIACUM, a town of Italy, near Ravenna.—Alfo, a town of Lower Germany, upon the route from Colonia Trajana to Colonia Agrippina, between this latter place and Juliacum, according to the Itinerary of Antonine.

TIBERIADES WATER, the water of a hot fpring near Tiberiades in Egypt.

Dr. Perry, when on the fpot, tried fome experiments on this water, which give us a much better idea of its nature than we have from any other accounts of it. Half a drachm of oil of tartar being mixed with an ounce and half of the water, it becomes turbid and muddy; and after twelve hours, three parts of the whole appear like white wool, only leaving a fmall portion of clear water at the top. The white woolly matter dried, produced only a fmall quantity of yellow ochre.

Spirit of vitriol added to the water in the fame quantity, affords a large unctuous fediment of a white colour. A folution of fublimate being mixed in the fame quantity, it became turbid and yellowifh, and yielded an earthy fediment in fmall quantity; whence it feems evident, that it contains a fal murale. Saccharum faturni being added in the fame quantity, the water depofited a lateritious fediment in a fmall quantity. Mixt with fpirit of fal ammoniac, it turns to a blueifh-green turbid liquor, and finally yields a woolly fediment. Sugar of violets mixed with it, turned it to a yellow colour; and the fcrapings of galls mixed with it, turned it to a deep purple; and on fhaking, this became as black as ink.

It appears from thefe experiments, that the water contains a good deal of a grofs fixed vitriolic falt, fome alum, and a fal murale. It is too falt and naufeous for internal ufe; but it muft be of ufe as a bath in all cutaneous foulneffes, efpecially in fcorbutic and leprous cafes; for it will powerfully deterge, fcour, and cleanfe the excretory pores, and it may be, by its weight and ftimulus, reftore them to their natural ftate and tone, and reftore the true ftate of the vitiated folids in general. Phil. Tranf. N° 462. p. 52.

TIBERIANI CAMPI, in *Ancient Geography*, fields of Italy, in the vicinity of Rome, which took their name from the emperor Tiberius, who fixed them at 25 acres.

TIBERIAS, a town of Paleftine, the capital of Galilee, was fituated in a plain, near the lake of Gennefareth, which from this city was alfo called the lake or fea of Tiberias. This city is very famous, and often mentioned by Jewifh writers, becaufe, after the taking of Jerufalem, there was at Tiberias a fucceffion of Hebrew judges and doctors till the fourth century. It was a bifhop's fee in this century. Epiphanius fays that a Hebrew tranflation of St. John, and the Acts of the Apoftles, was kept in this city. It was diftant about 90 miles from Jerufalem. See TABARIA.

TIBERINA INSULA, the ifle of Tiber, fituated in the city of Rome; called by Suetonius the ifle of Æfculapius. Plutarch fays that this ifland was called at Rome the facred ifle and the ifle of two bridges, becaufe in confecrating to Mars a field which belonged to the Tarquins, they threw into the

the river the corn and alſo the trees which grew in this field. Theſe materials, united with the mud brought down by the river, formed an iſland, on which were built ſeveral temples and porticoes.

Tiberina *Regio*, a country of Aſia, in Cappadocia, where was a place named Ariarzus.

TIBERIOPOLIS, a town of Aſia, in Phrygia Major. Ptol.—Alſo, a town of Bulgaria, upon the coaſt of the Euxine ſea.

TIBERIS, or Tiber, a river of Italy, which had its ſource in the Apennines, towards a place called Tifernum Tibarinum. Its courſe was firſt towards the S. paſſing by Peruſia, as far as Tuder, where it turned towards the S.W. as far as the Volſinii. Having received the Clanis, it turned towards the S.E., received the Nar at Hortanum, and continued in this direction as far as a point that lies between Capena and Cures. Aſſuming a direction towards the S., it paſſed to Rome, and then proceeded towards the S.W. to the ſea before Oſtia, *i. e.* the mouths, of which it has many. This river was inconſiderable till it reached Hortanum; but afterwards it was augmented by the Nar, the Valinus, and the Anio, ſo that at Rome it was large and deep. The ancients, by way of enhancing its celebrity, repreſent it as receiving twenty other rivers; but under this general denomination they muſt comprehend ſeveral ſmall ſtreams. It was called by various names.

TIBERIUS Claudius Nero, in *Biography*, a Roman emperor, ſo called after his father, his mother's name being Livia Druſilla, was born in the year B.C. 42. He was at an early age ſo well inſtructed in Greek and Roman literature, as to be able, when nine years old, to pronounce a funeral oration for his father, which gained great applauſe. His temper was naturally reſerved and gloomy, and yet, with the advice of his mother Livia, who was married to Auguſtus, he conducted the uſual ſpectacles with a magnificence which gave ſatisfaction to the Roman people. His firſt appearance in a military character was as a tribune in the Cantabrian war; he next ſuſtained the office of commander-in-chief in placing Tigranes on the Armenian throne, and on his return was made prætor. He was afterwards ſent to join his brother Druſus, and gained a deciſive victory over the Rhetians and Vindelicians. He became conſul in the twenty-eighth year of his age, and thus rapidly advanced to the rank which, as the emperor's ſtep-ſon, he was likely to obtain, and his elevation was accelerated by the death of Agrippa, B.C. 22. Previouſly to his being admitted into a partnerſhip of the empire, Auguſtus obliged him to divorce his wife Viſpania, the daughter of Agrippa, and the object of his choice and affection, and to marry his own daughter Julia, of doubtful reputation.

The next object of his military career was the reduction of the Pannonians, in conſequence of which he was honoured with triumphal ornaments. From his ſucceſsful proſecution of the war in this part of the empire he was ſuddenly called to attend his brother Druſus in his laſt moments: and he afterwards accompanied his remains on foot in a funeral proceſſion to Italy. After his victories had been celebrated by an ovation, he was deputed to make peace in Germany, and being a ſecond time made conſul, B.C. 7, he triumphed on the day when he took poſſeſſion of his dignity. At the expiration of the year, Auguſtus conferred upon him the tribunitial power for five years. At this time Caius, one of the emperor's adoptive ſons, though under age, was raiſed to the pontificate, and introduced into the ſenate. Jealous of Caius as a rival, and diſguſted by the open gallantries of his wife Julia, he reſolved to aſk permiſſion to withdraw from public buſineſs, and to live in retirement at the iſland of Rhodes. Accordingly he ſailed for Rhodes. His wife's conduct became ſo notorious, that ſhe was baniſhed by her father to the iſle of Pandataria, and divorced from her huſband. Having obtained leave of the emperor, though reluctantly granted, to return from Rhodes to Rome, he lived privately till the death of the two Cæſars, Caius and Lucius, opened to him new proſpects. The emperor, whoſe declining age needed an aſſociate, adopted Tiberius A.D. 4, renewing his tribunitian power, and then placing him next to himſelf in the empire. Having brought the war againſt the Pannonians and Dalmatians, as much by policy as by force, to an honourable termination, he obtained a triumph, A.D. 9; and as a recompence of other ſervices, his tribunitian authority was prolonged: but the emperor terminating his life at Nola, Tiberius, without oppoſition, ſucceeded to the empire, in the fifty-fifth year of his age. Paſt experience had taught him the art of diſſimulation, and this art he practiſed during the progreſs of his reign. Although he was very jealous of his authority, he was moderate in the exerciſe of it, and always paid great deference to the ſenate, and reſpect to the conſuls. He was zealous in the adminiſtration of juſtice, and avoided oppreſſive impoſts even in the moſt diſtant provinces, for which he had the leſs occaſion, as he was not avaricious of money; a virtue which, as Tacitus ſays, he retained, when he had renounced all others. To which we may add, that he was munificent in his relief of public calamity and private diſtreſs. Theſe qualities, combined with his ſound ſenſe, rendered the earlier part of his reign as proſperous as perhaps any in the annals of the empire.

The popularity of Germanicus rendered Tiberius jealous, and vigilant of his conduct; and in order to reſtrain his authority, he employed Piſo, a man of ancient family and imperious ſpirit, as his ſubordinate agent for this purpoſe. Germanicus, however, died of a lingering diſeaſe, and Piſo was ſuſpected, if not accuſed, of having given him poiſon. Piſo was impeached in the ſenate for his conduct towards Germanicus. In the courſe of his trial, Tiberius acted with apparent impartiality; but the accuſed, deſpairing of an acquittal, put an end to his own life. Tiberius, in the ſeventh year of his reign, withdrew from Rome to Campania, in order to accuſtom Druſus, who was then conſul, to the exerciſe of the ſupreme power. Notwithſtanding ſeveral inſtances, in which he manifeſted a moderate exerciſe of power, a ſtern unfeeling tyranny was becoming the ſettled character of his reign, to which his growing confidence in the deteſtable Sejanus very much contributed. The death of Druſus, A.D. 23, occaſioned by poiſon, adminiſtered in conſequence of the ſeduction of his wife, was borne by his father Tiberius with a degree of ſelf-poſſeſſion, which was imputed to want of natural affection. After this event he appeared in the ſenate: and the two elder ſons of Germanicus were preſented to him. Taking them by the hand, and delivering a ſpeech which melted the whole aſſembly into tears, he recommended theſe orphans, who had loſt both their uncle and father, to the guardianſhip of the ſenate. Two years after the death of Druſus, Tiberius took an opportunity, which a propoſal for erecting a temple to him and his mother afforded him, of giving his ſentiments on that deification which diſgraced the reigns of the Roman emperors. Recognizing himſelf as a mere mortal, ſubject to all the infirmities of the human condition, and ſufficiently honoured in holding the firſt place among men, he was deſirous that poſterity ſhould know his ſentiments on the ſubject, and that he wiſhed for no other honours paid to his memory than to be thought to have worthily performed the duties of his ſtation. The whole ſpeech, replete with wiſdom and good fenfe, is reported by Tacitus. His defign of retiring from the capital, encouraged for felfifh purpofes by Sejanus, was put into execution A.D. 26. Accordingly he withdrew into the ifle of Capreæ, near the bay of Naples. Here he paffed his remaining years, immerfed in grofs and infamous debauchery, hating mankind, fcarcely known to exift but by his cruelties, and rendering himfelf, in direct oppofition to his own maxims, "let them hate, provided they efteem me," no lefs contemptible than odious. It ought to be mentioned, however, that in a conflagration which confumed a large quarter of Rome, he difplayed a very laudable and fpontaneous munificence. For an account of his connection with Sejanus, and of the effects and termination of that connection, we refer to the article SEJANUS. The latter part of Tiberius's reign was marked by fervility on one hand, and defpotic ferocity on the other; and it appears by one of his letters to the fenate, that he fuffered as much mifery from the anguifh of felf-reproach and tumult of mind as he inflicted: "What I fhall write to you, confcript fathers, or what I fhall not write, or why I fhould write at all at this time, may the gods and goddeffes plague me more than I feel daily that they are doing, if I can tell!" What mental torture it muft have been, fays Tacitus, that could have extorted fuch a confeffion. Some few occafional acts of wifdom and munificence brightened in a faint degree the black picture that was exhibited by his general conduct. Towards the clofe of life, and at an advanced age, the appointment of a fucceffor engaged his attention. He had two alternatives; the one was the nomination of Caius, his grandfon, the fon of Germanicus, who was his adopted fon; and the other, the appointment of Gemellus, the fon of Drufus, who was his fon by nature. The former was of mature age, being now twenty-five, and poffeffed of popular favour. The diffimulation of tbis afpirant to the empire had not eluded the penetration of Tiberius. See CALIGULA.

Tiberius, leaving Capreæ, frequently changed his abode, and at laft ftopped at a country-houfe, which had belonged to Lucullus, near the promontory of Mifenum. There, on March 16th, A.D. 37, he funk into a ftate, in which he appeared dead; upon which Caius, with indecorous precipitance, proceeded with a numerous efcort to feize poffeffion of the empire: but his revival threw them all into confufion. At this inftant Macro, the pretorian prefect, caufed him to be fuffocated with pillows. He died in the feventy-eighth year of his age, and twenty-third of his reign, univerfally execrated; and his predominant vices were fuch, that they have almoft effaced the records of his laudable qualities. Tacitus. Suetonius. Crevier.

TIBERIUS CONSTANTINE, emperor of the Eaft, was a Thracian by birth, and by office captain of the guards to Juftin II. By the recommendation of the emprefs Sophia, he was raifed to the rank of Cæfar A.D. 574, and in 578, when Juftin died, fucceeded to the imperial throne. Sophia, attached to his perfon, had flattered herfelf with the hope of his being her fecond hufband; but on his acceffion to the empire, it appeared that he had been previoufly married to Anaftafia, who was proclaimed Augufta. Sophia, thus difappointed, concurred in a confpiracy for raifing to the purple Juftinian, commander of the eaftern army; but the plot being difcovered, Sophia was punifhed by lofing the greateft part of her allowance. The government of Tiberius has been favourably reprefented. He was temperate, juft, and humane; economical in the difburfement of the revenue, yet liberal and beneficent, and ready to remit the dues of taxation to fufferers under public calamity. The principal events of his reign were two victories over the Perfians. Soon after the fecond victory, Tiberius fell into a difeafe, during which he declared Maurice, who had married his daughter Conftantia, and who had been nominated Cæfar, his fucceffor: and after a reign of four years, he clofed his life in 582, with the general regret of his fubjects. Anc. Un. Hift. Gibbon's Rom. Emp.

TIBESTI, in *Geography*, a town of Africa, on the route from Fezzan to Bornou, inhabited by the people called *Tibbo* (which fee); 150 miles S.E. of Mourzouk. The vales of Tibefti are fertile in corn, and pafturage for cattle, of which they have numerous herds; and they are particularly celebrated for their breed of camels, which are efteemed the beft in Africa. For this fertility they are indebted to the water of the innumerable fprings, that amply compenfate for the want of rain, which feldom, if ever, falls within the limits of Tibefti. Among the natives of Tibefti, different religions are profeffed; for fome of them are Mahometans, and others continue attached to their ancient fyftem of idolatry. From the plain, which lies to the W. of the defert of Tibefti, a part of the mountains of Tibefti take their rife. Thefe vaft hills, the range of which is very extenfive, are varioufly peopled: but fuch of them as are croffed on the route from Fezzan to the city of Bornou, are inhabited by a mixture of Muffulmen and idolaters, who employ themfelves in breeding camels and affes, and other cattle, particularly horfes of a fmall fize.

TIBET. See THIBET.

TIBI, a town of Arabia, in the country of Oman; 8 miles N. of Kalhat.

TIBIA, in *Anatomy*, the large bone of the leg. See EXTREMITIES.

TIBIA, *Fractures of the*. See FRACTURE.

TIBIA *Biceps*. See BICEPS.

TIBIA, in *Mufic*, was originally a flute, made of the fhank or fhin-bone of an animal; and when the art of boring flutes was difcovered, they were made of box-tree, laurel, brafs, filver, and even of gold. See FLUTE.

TIBIA *Articularis*. See BAGPIPE.

Dr. Burney (Hift. Muf. vol. i. p. 521.) apprehends that the union of this inftrument with the fyrinx fuggefted the firft idea of an organ.

TIBIÆ *Pares et Impares*, in the *Dramatic Mufic of the Ancients*. It has been long doubted, whether *pares* and *impares* meant double and fingle flutes, or equal and unequal in point of length and fize. But though in preferring either of thefe acceptations, fome fenfe and meaning is acquired, yet we fhould incline to the latter. For in none of the reprefentations in ancient painting or fculpture, which we have yet feen, does it appear that the tibicen, either at facrifices or in the theatre, plays on a fingle flute, though we as often fee double flutes of different lengths in his hands, as of the fame length; and as harmony, or mufic in different parts, does not appear to have been practifed by the ancients, the flutes of *equal* length may naturally be fuppofed to imply unifons; and *unequal*, fuch as are octaves to each other.

TIBIALIA, among the Romans, a kind of fwaths with which they ufed to cover their legs.

TIBIALIS, in *Anatomy*, a name applied to various organs fituated in the neighbourhood of the tibia. There is an anterior and a pofterior tibial artery, an anterior and pofterior tibial nerve (fee ARTERY and NERVE), and the two following mufcles.

TIBIALIS *Anticus*, jambier antérieur, tibio-fus-tarfien; an elongated mufcle, flattened at the fides, placed on the front of the leg, and extending from the upper end of the tibia to the firft cuneiform bone. It is covered in front by the

the aponeurofis of the leg, to which it adheres clofely at the upper part: the anterior furface of the mufcle forms the convexity on the outfide of the tibia, which is more confiderable in ftrong mufcular fubjects. The inner flat furface correfponds to the outer or concave furface of the tibia, and is attached to its upper half: the outer furface correfponds above to the extenfor longus digitorum pedis, below, to the extenfor longus pollicis pedis: the anterior tibial veffels and nerve being interpofed. The pofterior edge of the mufcle is attached to the upper three-fourths of the interoffeous ligament, then it lies on the front of the tibia, on the ankle joints, and on the upper and inner part of the tarfus. The upper extremity of the mufcle is fixed to the front of the external tuberofity of the tibia; thence it defcends parallel to the tibia, firft increafing in fize, then diminifhing again, and ending about the lower third of the leg in a thick and flat tendon, which defcends over the front of the tibia, and of the ankle, confined by the fuperior annular ligament of the tarfus. (See Fascia.) Having paffed this ligament, the tendon paffes forwards on the foot, then turns obliquely inwards, becoming a little broader, over the convexity of the firft cuneiform bone, and divides into two portions. The pofterior, which is the largeft, is fixed to the inner and front part of the bafis of that bone; the anterior and fmaller is attached to the pofterior extremity of the firft metatarfal bone.

The lower part of the tibialis anticus confifts of a ftrong tendon, which enters the fubftance of the mufcle, and expands into an aponeurofis reaching nearly to the upper end of the mufcle. The flefhy fibres arife from the fafcia of the leg, from the external furface of the tibia, from the interoffeous ligament, and from an aponeurotic feptum between it and the extenfor longus digitorum. They pafs obliquely to both furfaces of the tendon, like the barbs on the fhaft of a feather, and are continued much lower on its pofterior than on the anterior furface.

It bends the foot on the leg, and turns the point inwards: it elevates at the fame time the whole internal edge of the foot. It brings the leg forwards on the foot, and maintains it in that pofition.

Tibialis *Pofticus*, jambier poftérieur, tibio-fous-tarfien, is a long narrow mufcle, thicker above than below, placed at the back of the leg, under the calf, and extending from the upper part of the tibia and fibula to the os naviculare. It is covered behind by the foleus, by the flexor longus digitorum and pollicis pedis. In front it is attached to nearly the whole pofterior furface of the interoffeous ligament, and above, to the pofterior furface of the tibia. On the outfide it is fixed to the fibula. Its upper extremity is divided into two portions, an external and fmaller attached to the fibula, an internal larger to the tibia and interoffeous ligament; they are feparated by an interval, through which the anterior tibial artery paffes. The mufcle defcends parallel to the bones of the leg, and arcuated between them, becoming larger to its middle, from which it again diminifhes; towards the lower part of the leg it forms a ftrong tendon, which runs in a groove hollowed in the external malleolus, and furrounded by a fibrous fheath, which feparates it from the flexor longus digitorum. In this groove the tendon becomes broader: it paffes below the head of the aftragalus, fwelling into a hard and nearly bony fubftance, and is attached to the lower and inner part of the os naviculare, and to the bafis of the firft cuneiform bone. The inferior tendon afcends into the mufcle, expanding into an aponeurofis, in which the flefhy fibres are inferted obliquely on all fides from the fibula, the tibia, the interoffeous ligament, and the aponeurofis, which covers it from the flexor longus digitorum. It extends the foot on the leg, turning the fole and point a little inwards. It will carry the leg backwards on the foot, when that is fixed.

TIBICEN, in *Ancient Mufic*, a flute-player.

Tibicen, in *Ichthyology*, a fifh of the *trigla* kind, called by many authors *lyra*, or the *harp-fifh*; and in fome parts of England, the *piper*.

The head of this fifh runs out into two broad horns, which are ferrated, or befet with a fort of teeth, or fmall fpines, all along their edges, which is its principal diftinction from the hirundo or fwallow-fifh. Above the gill-fins it has on each fide a long and fharp fpine. The forehead is elevated into a fort of eye-brows over the eyes: and at the angles of thefe there are fmall and fhort fpines, which are long and crooked. The fide lines feel but very little rough to the touch, and the forehead between the eyes is not hollowed. The whole head is covered with a bony cruft, which runs into two horns or fpines behind. It has three fingers or filaments on each fide, from the roots of the gill-fins; and its jaws are rough like files, but have no diftinct teeth. The tail-fin, and the middle of the back, in this fifh, are red. It is caught in the Mediterranean, and in fome other feas. In our county of Cornwall it is not unfrequently caught about the fhores, and from the noife it makes, when taken out of the water, is called the *piper*. Ray and Willughby.

TIBIGENSE Oppidum, in *Ancient Geography*, a town of Africa Propria, according to Pliny; called Thigiba by Ptolemy.

TIBIGI, in *Geography*, one of the rivers of the Brazils, which flow into the Parana, rich in diamonds, as the few families that live in its vicinity have reafon to remember with gratitude. Weft of this river and of Corritiva, it is dangerous to land, fince in that direction are found the Anthropophagi, who were driven from thefe boundaries at a very recent period. The country to the N. abounds with wood.

TIBILIS, in *Ancient Geography*, a place of Africa, diftant 10 leagues S.W. from Hippo Regius, and 16 miles E. of Cirta; where are many ruins.

TIBISCA, a town of Lower Mœfia. Ptol.

TIBISCUM, one of the moft confiderable towns of Dacia. Ptol.

TIBISCUS, a river of Dacia, which ran into the Danube.

TIBISIS, a large river, which rofe in mount Hæmus, and purfuing a north courfe, difcharged itfelf into the Ifter.

TIBIUM, a mountain of Afia, in Phrygia.

TIBOELALE, in *Geography*, a town on the S. coaft of the ifland of Ceram. S. lat. 3° 19′. E. long. 128° 45′.

TIBOUCHINA, in *Botany*, an unexplained barbarous name, Aubl. Guian. 445. t. 177. Juff. 329. The fhrub which bears it is fufpected by Schreber to be a fpecies of Melastoma. (See that article.) We fee no reafon to queftion this, though Aublet defcribes the fruit as a dry capfule; for the known *Melaftomæ* differ greatly in the degree of pulp in their berries, efpecially according to the period at which they are examined.

TIBOULEN, in *Geography*, a fmall ifland in the Mediterranean, near the coaft of France. N. lat. 43° 15′. E. long. 6° 24′.

TIBOURBOU, in *Botany*, the Caribbean name of a fine tree of Guiana and Cayenne, called *Apeiba Tibourbou* in Aubl. Guian. 538. t. 213. See Aubletia and Sloanea.

TIBRACANA, in *Ancient Geography*, a town of Aſia, in the interior of Media. Ptol.

TIBULA, or TIBULÆ, a town ſituated on the northern coaſt of the iſland of Sardinia. Ptol. Iter. Anton.

TIBULLUS, ALBIUS, in *Biography*, a Roman poet of the Auguſtan age, of the equeſtrian rank, whoſe native place and time of birth are not aſcertained. His patrimony was much impaired, either by his own prodigality, or by the devaſtation of ſeveral wars; but yet he does not ſeem to have been diſtinguiſhed by any tokens of the liberality of Auguſtus and Mæcenas, the munificent patrons of literature at the period in which he lived; nor does he mention their names in any of his poems. M. Valerius Meſſala Corvinus, upon whom he compoſed a panegyric, was his particular friend and patron, whom he accompanied in his expeditions to Aſia; but he preferred peace and retirement in the ſociety of one of thoſe objects of his affection whom he has celebrated in his elegies. Horace, with whom he was intimate, has addreſſed to him an ode and an epiſtle, complimenting him as a candid judge of his writings, and deſcribing him as poſſeſſed of every worldly advantage. It has been inferred, from an epigram of Domitius Marſus, that he died about the ſame time with Virgil, B.C. 19, in the flower of his age. Ovid lamented his death in a beautiful elegy, repreſenting his mother and ſiſter as mourners at his funeral, and ſpeaking of him as a poet of the higheſt reputation.

The poems of Tibullus are elegies compriſed in three books, and a panegyric of Meſſala. His fame is founded on his elegies, which are deſcribed by one of his biographers as occupying, by the teſtimony of ancient and modern critics, the firſt claſs of ſuch compoſitions with regard to "the appropriate qualities of elegance, tenderneſs, and that beautiful ſimplicity, which is the character of real feeling." Their principal ſubjects are "love and rural life." With his deſcription of a paſſion which is illicit, he has blended "more touches of a pure, and what may be termed a conjugal affection, than almoſt any other Roman poet. His language is a true example of what the Latins call *terſe*, or neat and poliſhed. He is eaſy and natural, with ſcarcely any mixture of learned alluſion or figure." His works are uſually printed with thoſe of Catullus and Propertius; but of the ſeparate editions, the moſt eſteemed are thoſe of Brookhuſius, Amſt. 1708, 4to.; of Vulpius, Patav. 1749, 4to.; and of Heyne, Lipſ. 1755, 1777, 8vo. Gen. Biog.

TIBUR, TIVOLI, in *Ancient Geography*, a town of Italy, near the Anio, N.E. of Rome, in the country of the Sabines. Pliny refers its origin to the age which preceded the ſiege of Troy, and ſays that its founder was Tiburnus, one of the ſons of Amphiariis, aſſiſted by his two brothers, Catille and Corax. This Tiburnus was regarded after his death as a god; and was worſhipped in a wood conſecrated to him, and where a temple was erected to his honour. But Dionyſius Halicarnaſſenſis pretends that it was built by the Siculi, before this epocha. For its ſituation, and ſome other circumſtances attending it, we refer to the article TIVOLI.

Horace has deſcribed in a few lines the beauties which he admired in contemplating this ancient city, Od. 7. lib. i. "Nothing," ſays the poet, "ſtruck me ſo much as the houſe of the reſounding Albunea, the lofty caſcade of the Anio, the ſacred wood of Tiburnus, and the gardens irrigated by unintermitting ſupplies of water." The "domus Albuneæ reſonantis" of the poet was the ſolfatara or ſulphureous abyſs of the place, probably the crater of ſome ancient volcano, which perpetually diſcharged a kind of gas or mephitic vapour, that was thought to poſſeſs a ſanative quality, and to be a remedy for many diſorders. Many perſons reſorted hither for relief; and Suetonius informs us, that Auguſtus alſo came for the benefit of the baths which the place afforded. Theſe benefits were aſcribed to imaginary deities, who were thought to preſide over this privileged ſpot. Accordingly, a monument has been diſcovered, which indicated that Hygeia, the goddeſs of health, was worſhipped here. The vapour poſſeſſed alſo a kind of inſpiring quality, ſo that here was a temple of the Muſes; and alſo, beſides various other monuments, a temple in which was an oracle. Virgil informs us how this oracle was conſulted. The "præceps Anio" of Horace refers to the caſcade of this river. The gardens and vineyards have to this day retained their celebrity; the wine of this canton being held in high eſtimation.

Tibur was alſo famous for its temple of Hercules, which had its college of prieſts and curators; a beautiful portico, where, according to Suetonius, Auguſtus adminiſtered juſtice when he reſided here; and an excellent library of which Aulus Gellius ſpeaks in his "Noctes Atticæ." Tibur had alſo a temple of the Sibyl, much admired for its elegance. This place was alſo famous for other monuments, now in ruins. Towards the end of the Roman republic, the adjoining territory was ſelected for ſuperb buildings and houſes of various kinds, all diſtinguiſhed by their magnificence and beauty. Of theſe, the Tiburnus of Adrian was the moſt celebrated.

TIBURO, in *Ichthyology*, a fiſh very badly and falſely deſcribed by ſeveral authors, and proving, on a ſtrict inquiry, to be no other than the lamia or white ſhark.

The tiburo of Linnæus is a ſpecies of ſqualus, with a very broad and heart-ſhaped head, found in the American ſeas. Linnæus queries, whether it is not a variety of the *zygæna*, or hammer-headed ſhark.

TIBURON, in *Geography*, a town and bay on the S.W. coaſt of Hiſpaniola, near Cape Tiburon.—Alſo, a ſmall iſland in the Pacific ocean, diſcovered by Magellan in 1520. It is variouſly laid down in maps. S. lat. 9°, 13°, 14°, 15°, and 17°.

TIBURONES, or *Main Cape Reef*, two ſmall iſlands, ſurrounded with rocks, near the coaſt of Honduras. N. lat. 15° 10′. W. long. 82° 8′.

TICADEE, a town of Hindooſtan, in the circar of Ruttunpour; 15 miles N. of Dumdah.

TICAL, in *Commerce*, a weight for gold and ſilver, and alſo a money of account in certain parts of the Eaſt Indies, particularly at Pegu and Siam. At Pegu, the weight of ſilver, under this denomination, is divided into 16 toques or touch. Gold and ſilver are here weighed by the tical, and their fineneſs is expreſſed by the parts called touch. The tical weighs $4\frac{1}{2}$ pagodas, or $237\frac{1}{3}$ Engliſh grains. The commercial weights are the vis of 100 ticals or tuals, and the candy of 100 vis. From the above weight of the tical, the candy ſhould weigh $508\frac{1}{2}$ lbs.; nevertheleſs the Engliſh reckon it at 6 maunds 28 ſeers of the Bengal factory, or 500 lbs. avoirdupois.

At Siam, the accounts are kept in catties, tales, ticals or tuals, miams, fouangs, and cowries. The catty is = 20 tales, the tale = 4 ticals = 16 miams = 32 fouangs; and the fouang is = 800 cowries. The coins are gold ticals, which paſs for ten ſilver ticals; ſilver ticals, miams, fouangs, and ſompeias, the latter being the fourth part of a fouang. The ſilver tical weighs $225\frac{1}{2}$ Engliſh grains, and being from 11 oz. 4 dwt. to 11 oz. 12 dwt. fine, is worth from 29*d.* to 30*d.* ſterling; but theſe coins are often adulterated; 2 ticals paſs commonly for 1 Spaniſh dollar, and $2\frac{1}{2}$ ticals for 1 Dutch

1 Dutch ducatoon. The finenefs of gold and filver is expreffed by toques or touch, the weight being divided into 100 parts. The pecul, or weight for heavy goods, is = 50 catties, and the catty = 20 tales = 80 ticals. The Siam pecul weighs 129 lbs. avoirdupois, and the catty, 41 oz. 4½ dwt. avoirdupois.

TICANONA, Tacona, *Jeanona* or *Jeatona*, in *Ancient Geography*, a town of Egypt, between Cene and Oxyrynchon. Itin. Anton.

TICAO, in *Geography*, one of the Philippine iflands, about 25 miles long, and from 3 to 8 broad. N. lat. 12° 39′. E. long. 123° 34′.

TICENA, in *Ancient Geography*, a town of Africa Propria, S. of Carthage, between the rivers Bagradas and Triton. Ptol.

TICENGO, in *Geography*, a town of Italy, in the department of the Upper Po; 6 miles E. of Crema.

TICHASA, Te-Gewse, in *Ancient Geography*, a town of Africa Propria, S. of Carthage, between the rivers Bagradas and Triton, 12 leagues S.W. of Capfa: in which are fome veftiges of the Romans. Ptol.

TICHENBRAY, in *Geography*. See Tinchebray.

TICHFIELD, a village of England, in the county of Hants, fituated on a river which runs into the Southampton Water. Here Charles I. concealed himfelf, when he fled from Hampton-Court, in the year 1674, at a feat of the earl of Southampton. This feat had been an abbey, and is faid to be the place where the marriage of Henry VI. with Margaret of Anjou was folemnized; 8 miles N.W. of Gofport.—Alfo, a town of Jamaica, on the N. coaft; 22 miles N.E. of Kingfton. N. lat. 18° 12′. W. long. 76° 10′.

TICHIS, in *Ancient Geography*, a river which flowed from the Pyrenees, now *Tech*, in the department of the Eaftern Pyrenees.

TICHIUM, a town of Greece, in Etolia. Thucydides.

TICHOS, or Tichus, a fortrefs of Achaia, in the eaftern part to the S. of the promontory Araxum.

TICINDLO, or *Naviglio Grande*, in *Geography*, a canal made from the river Tefino to the city of Milan, by order of Francis I. king of France.

TICINUM, Pavia, in *Ancient Geography*, a town of Tranfpadane Gaul to the S.W. upon the river Ticinus, or near it. After the fecond Punic war, it attained the rank of municipal. Odoacer, king of the Heruli, deftroyed it, and it was rebuilt under the name of Papia, whence the name Pavia.

TICINUS, Tesin, a river of Tranfpadane Gaul, which commenced in the country of the Lepontii, traverfed the lake Verbanus, and difcharged itfelf into the Po, near Ticinum. It is celebrated for a battle of the fame name, between the Romans, conducted by Cornelius Scipio, the father of Scipio Africanus, and the Carthaginians, conducted by Hannibal, in the year of Rome 535, in which the Romans were defeated.

TICK, in *Natural Hiftory*, a nafty little animal of a livid colour, with a blunt and roundifh tail, elevated antennæ, a globofe-ovate form, and full of blood; which infefts cows, fwine, goats, fheep, and dogs. The tick or ricinus is, in the Linnæan fyftem, a fpecies of *acarus* in the *aptera* order of infects.

In order to deftroy and remove thefe noxious vermin, which fpread very rapidly in fheep, it has been recommended to feparate the wool, and to wafh the difeafed fpots two or three times, or oftener, if neceffary, with a liquid preparation, confifting of one ounce of cream of tartar, and a quarter of a pound of bay-falt, each finely powdered and fifted, and one ounce of corrofive fublimate, reduced into the fame ftate; the whole being well diffolved and mixed together in two quarts of foft water: or four pounds of foft foap, and two pounds of arfenic, may be fteeped and diffolved in thirty gallons of water, and the animals be immerfed in the infufion or folution, the heads of them being carefully kept above water, and the fheep being fheltered from rain for one or two days afterwards. The wool muft be clofely preffed, and the liquor that runs off be caught in a tub, or other veffel, for future ufe. The proportion above fpecified, is fufficient to bathe or wafh forty lambs, or the fame number of fmall fheep; and fometimes many more.

But the preparation which is in ufe at Holkham-Hall, in the county of Norfolk, for this purpofe, confifts of two pounds of tobacco, two pounds and a half of foft foap, and one pound of the white calx of mercury, well reduced into powder; the whole being boiled in eight gallons of water for an hour. This is a quantity fufficient for dreffing fixty fheep, being applied by parting the wool down the fhoulders and breaft, and twice on each of the fides of the fheep, then pouring it in very carefully fo as to prevent its being wafted. It is faid to be very effectual not only in deftroying the vermin, but in removing the fcabby fores that are produced.

It is ftated in a paper in the third volume of the "Tranfactions of the Highland Society of Scotland," that the tick, or *acarus reduvius*, is a diftinct fpecies or fort of vermin of this kind from that of the kid, or *hippobofca ovina*, the former of which haraffes the lambs and trembling fheep in the fpring feafon, while the latter molefts all forts and ages, but particularly hogs or young fheep, and chiefly fuch as are in a lean ftate. The former always adheres clofe to the bare fpots of the fhoulders, thighs, or ears, draining and drawing away the blood from them; and for the moft part drops off about midfummer: but the latter harbours in the wool, bites the fheep, and fucks their blood. Smearing with tar, it is faid, expels it from the fkin, and it foon afterwards drops from the wool. Tobacco-juice is fatal to it almoft inftantaneoufly, and mercurial ointment deftroys it. The former, or tick, is removed by the fame remedies as the kid, and it is wholly prevented by having the young fheep in good condition. This diftinction, in fome cafes, may be of confiderable ufe to the fheep-farmer in the deftruction and removal of fuch hurtful vermin.

Tick, in the *Manege*, a habit that fome horfes take of preffing their teeth againft the manger, or all along the halter or collar, as if they would bite it.

Tick-*Bean*, or *Ticks*, in *Agriculture*, a term commonly applied to the fmall bean employed in the feeding of horfes and other animals; of which there are feveral kinds, as the common ticks, the large flat ticks, the fmall or Effex ticks, and the French ticks. The firft is a fort which is fmall and very commonly cultivated, but moft generally by the farmers of Kent, where they are ufed for the fattening of hogs, and as food for horfes, efpecially thofe of the team kind. The fecond is a larger fort than the common, and ripens fomewhat more early. They are very productive in fome cafes; but from being larger in fize, they of courfe are lefs heavy, and confequently of rather lefs value the quarter or any other meafure. They are fometimes called May beans. The Effex ticks are a much fmaller fort than the common, and of a rounder fhape or form. They ripen a few days later, and are not fo productive, but are more valuable, as being heavier in proportion. The laft fort, or fmall French ticks, are a ftill lefs kind, being only about as large as a middling-fized pea, and nearly circular. They ripen later than

than any of the other forts, but are the moft valuable when dry, on account of their great weight.

Ticks are an important article of cultivation in moft places, where the land is fuited to their growth; and though they have been for a long time, and are at prefent, almoft wholly confined to the counties of Effex and Kent, they may be raifed in many other diftricts with equal fuccefs and advantage.

TICKARRY, in *Geography*, a town of Hindooftan, in Bahar; 15 miles N.W. of Gaya. N. lat. 24° 58′. E. long. 85°.

TICKELL, Thomas, in *Biography*, an Englifh poet, was the fon of a clergyman in Cumberland, and born at Bridekirk, near Carlifle, in the year 1686. He was admitted at Queen's college, Oxford, in 1701; and in 1707 he publifhed a poem, entitled "Oxford," and infcribed it to lord Lonfdale, expreffing his gratitude to that univerfity. In 1708 he took his degree of M.A., and two years after was elected a fellow of his college, under a difpenfation from the crown againft the ftatute which required him to be in orders. With a view of advancement by the exercife of his literary talents, he came to the metropolis, and ingratiated himfelf with Addifon by an elegant copy of verfes in praife of his opera of Rofamond. He contributed to the periodical publications of the "Spectator" and "Guardian," in the latter of which, all the papers on paftoral poetry, except one by Pope, are afcribed to him. During the negotiations which terminated in the peace of Utrecht, he publifhed a very popular poem, entitled "The Profpect of Peace," which was highly commended by Addifon, in return for which commendation he wrote his lines on the "Cato" of that author. On the acceffion of the Hanover family, to which he was attached, he prefented George I. on his arrival with a piece called "The Royal Progrefs;" and he ferved the caufe ftill more effectually by two fatirical poems on the Jacobite party, *viz.* "An Imitation of the Prophecy of Nereus," and "An Epiftle from a Lady in England to a Gentleman at Avignon." Tickell accompanied Addifon to Ireland, and was there initiated in public bufinefs with a view to future preferment. On occafion of Pope's publication of the firft volume of his tranflation of Homer's Iliad, Tickell publifhed a tranflation of the firft book of that poem, which was patronifed by Addifon, fo as to occafion an interruption of his friendfhip with Pope. When Addifon was made fecretary of ftate, Tickell was underfecretary, and continued in office under his fucceffor Craggs. On the death of Addifon, Tickell was entrufted with the charge of publifhing his works, to which he prefixed a valuable life of the author. In 1725 he was appointed to the lucrative poft of fecretary to the lords-juftices of Ireland, and retained it till his death, which happened at Bath in 1740. Tickell had been married and left a family.

Tickell is ranked by his biographers among Englifh poets of the fecond order; equalled by few of his contemporaries in eloquence of diction and harmony of verfification, and without lofty flights maintaining a decent elevation by a cultured ftyle, and by juft and ingenious thoughts. His funeral poem on Addifon is pronounced by Dr. Johnfon to be more fublime and elegant than any that is to be found in the whole compafs of Englifh literature. His "Ode to the Earl of Sunderland," and his "Colin and Lucy," are highly commended.

Richard Tickell, efq. a grandfon of this poet, who was a commiffioner of the ftamp-office, has been known to the literary world by his "Wreath of Fafhion," and efpecially by an effufion of political art and fatire, entitled "Anticipations of the Debates of the Houfe of Commons," 1778. He died at Hampton Court in 1793. Johnfon and Anderfon's Lives of the Poets. Gen. Biog.

TICKELY, in *Geography*, a town of Hindooftan, in the circar of Cicacole; 30 miles N.E. of Cicacole. N. lat. 18° 36′. E. long. 84° 34′.

TICKERA, a pafte which is prepared in Fezzan from dates and the meal of Indian corn, and which, whenever they travel, is in great requeft among the people of Fezzan.

TICKEREE, in *Geography*, a town of Hindooftan, in Oude; 48 miles N.E. of Manickpour.

TICKHILL, a market-town in the lower divifion of the wapentake of Strafford-and-Tickhill, in the Weft Riding of the county of York, England; is 4 miles W. from Bawtry, 7 miles S. from Doncafter, and 154 miles N. by W. from London. The houfes are placed in a valley, and cover a large fpace of ground. Some of them are of brick, and others of ftone: a few of them are refpectable, but the more numerous have only a mean appearance. A market is held on Fridays, but is nearly fallen into difufe. A fair is kept annually for horfes, horned cattle, and fheep. The population return of the year 1811, ftates that Tickhill contained 1508 inhabitants, who occupied 279 houfes. The objects moft worthy of attention are the church, and the remains of an ancient caftle. The former is a fpacious edifice, with a lofty and beautiful tower, and from its architecture feems to have been built in the reign of Henry III. The caftle, of which nothing now remains but the lofty mound on which the keep formerly ftood, with a ditch and part of the walls furrounding the fortrefs, is fituated on the fouth fide of the town. An ancient gateway, forming the entrance on the weftern fide, is the moft curious part of the ruins. Part of thefe, with modern repairs and additions, is the feat of the honourable Frederick Lumley. A great part of the ground within the walls is converted into gardens and fhrubberies. The fteep declivity of the mound is formed into winding walks, leading by a gentle afcent to the fummit.

The hiftory of Tickhill prior to the Norman conqueft is wholly unknown. It appears to have been one of the forty-nine manors given by the Conqueror to Roger de Bufli, who probably erected and refided in the caftle. It was afterwards fucceffively held by feveral noblemen, till Richard II. gave it to his uncle, John of Gaunt, duke of Lancafter, from whom it paffed to the crown by the fucceffion of Henry IV. In the year 1644 the caftle was regarded as a very ftrong fortrefs, and was garrifoned for Charles I.; but being furrendered to the parliament, an order was iffued that it fhould be difmantled and rendered untenable. The circular keep was in confequence demolifhed, but the foundations may ftill be traced by opening the ground. A royal free chapel or collegiate church was founded in the caftle by queen Eleanor, wife of Henry II. It was given by king John to the prebends of the cathedral church of Rouen in Normandy. It was afterwards granted to the prior and convent of Lenton, Nottinghamfhire; and in 1504 to the abbot and convent of St. Peter, Weftminfter. After the diffolution it was given by Edward VI. to Francis, earl of Shrewfbury.

About two miles and a half from Tickhill is Sandbeck, the feat of the earl of Scarborough. The manfion, built by the late earl, is a large and commodious edifice, feated in a fpacious park, which abounds with foreft trees; and is adorned with an extenfive lake. Near the weftern verge of the park, are the venerable and picturefque ruins of Roche abbey, which was founded in the year 1147, for monks of the Ciftercian order. Here is a famous quarry, from which the

the ſtone for building the abbey, and for many other public edifices, was obtained.

About five miles nearly S. from Tickhill is Walding Well, the ſeat of ſir Thomas White, bart. The houſe is a modern edifice, ſituated in a well-wooded park of conſiderable extent, and ſtands partly in Yorkſhire and partly in Nottinghamſhire; a ſmall rivulet, which runs under a part of the out-buildings, forming the boundary between the two counties. In the park was formerly a priory of nuns, called St. Mary in the Park, founded by Ralph de Cheurolcourt. This religious houſe appears to have ſtood within the limits of Nottinghamſhire.—Beauties of England and Wales, vol. xvi. Yorkſhire; by J. Bigland.

TICKING, or Tiching, in *Huſbandry*, denotes the act of ſetting up turfs in ſuch a manner as that they may be dried by the ſun, and fit for being burnt into aſhes on the land.

TICKLE Harbour, in *Geography*, a harbour on the E. coaſt of Newfoundland.

Tickle *me Quickly*, a bay on the coaſt of Darien, near the Samballas.

TICKLISH, in the *Manege*. A horſe is ſaid to be ticklish that is too tender upon the ſpur, and too ſenſible, that does not freely fly the ſpurs, but in ſome meaſure reſiſts them, throwing himſelf up when they come near and prick his ſkin. A ticklish horſe has ſomewhat of the ramingues, *i. e.* the kickers againſt the ſpurs; but with this difference, that the latter put back, leap, and kick, and yerk out behind, in diſobeying the ſpurs; whereas a ticklish horſe only reſiſts for ſome time, and afterwards obeys, and goes much better, through the fear of a vigorous ham, when he finds the horſeman ſtretch his leg, than he does upon being actually pricked.

TICKSAH, in *Geography*, a river of America, in the Miſſiſſippi territory, which riſes 10 miles N.E. of the forks of the Amite, and when it enters Weſt Florida, is a creek of trivial ſize; it then becomes gradually augmented by ſeveral creeks, and after a S. courſe of 50 miles, falls into lake Maurepas, 4 miles N.E. of the mouth of Amite. Three miles above its mouth the Tickſah receives from the E. the united ſtreams of the Notalbany and Pontchatoola, upon the latter of which ſtands Springfield, on the road from Madiſonville to Natchez. Springfield is one of the landing places of travellers, who paſs in ſchooners from New Orleans to Natchez. The above-mentioned Amite riſes within the Miſſiſſipi territory, about 20 miles N. of the town of Liberty, in Amite county. The two ſtreams that conſtitute the Amite, remain ſeparate in their courſe through the Miſſiſſipi territory, but unite immediately on entering Weſt Florida, and then it joins the Iberville, and falls after a whole courſe of 100 miles into the lake Maurepas. Below the junction of Amite and Iberville, the united ſtreams form a fine navigable river, admitting veſſels of ſix feet draught.

TICKSEED Sun-flower. See Coreopsis, and Sun-flower.

TICOLEA, in *Geography*, a town of Hindooſtan, in Bahar; 7 miles N. of Bettiah. N. lat. 26° 55′. E. long. 84° 38′.

TICOLOOSA, a town of the United States of America, in Tenneſſee; 38 miles S. of Knoxville.

TICONDEROGA, a townſhip of Eſſex county, in the ſtate of New York, erected in 1804. It is bounded N. by Crown Point, E. on lake Champlain, S. by Waſhington county, W. by Scroon, and includes the N. end of lake George. Mount Defiance is in the S. part of this townſhip. In 1810 it had about two hundred families, and thirty-five ſenatorial electors: ſeven ſaw-mills, three grain-mills, three forges, three carding-engines, and ſome other machines, and three ſchool-houſes. Here is alſo a broom machine, in which, by means of machinery moved with water, one man makes a hundred brooms a day. The inhabitants are moſtly farmers.

In this townſhip ſtands the fortreſs of Ticonderoga, now a heap of ruins. It was built by the French in 1756, on a point of land formed by the junction of lake George creek with lake Champlain, in N. lat. 43° 50′, and 34′ E. long. from New York. It was, both by nature and art, a place of great ſtrength. On three ſides it is ſurrounded by water, and about half the other ſide is occupied by a deep ſwamp, and the line of defence was completed by the French with the erection of a breaſt-work nine feet high, on the only aſſailable ground. In 1758, general Abercrombie with the Britiſh army unſucceſsfully aſſailed this fortreſs, and with the loſs, as it is ſaid, of 1941 men; but in July of the following year it was ſurrendered to general Amherſt. It was the firſt fortreſs carried by the arms of America, in their conteſt for independence; being taken by ſurpriſe by general Allen, May 10, 1775, and retained till July 1777, when it was evacuated at the approach of general Burgoyne with the Britiſh army. This fort is never likely to be rebuilt; for the ſituation is very inſecure, being commanded by the lofty hill called Mount Defiance. Mount Independence lies on the E. ſide of the lake, about two miles S.E. of the fort, between which two places there is a well-regulated ferry. The population of the townſhip, in 1810, conſiſted of 985 perſons.

TICOO, a town on the W. coaſt of Sumatra, near the Line. E. long. 99° 21′.

Ticoo *Iſlands*, a cluſter of ſmall iſlands near the W. coaſt of Sumatra. S. lat. 0° 6′. E. long. 99° 13′.

TICORANTE, a town of the iſland of Teneriffe.

TICOREA, in *Botany*, a name of Aublet's. See Ozophyllum.

TICOS, in *Geography*, a ſmall iſland in the Pacific ocean, near the E. coaſt of the iſland of Luçon. N. lat. 14° 10′. E. long. 124°.

TICOUL Hotun, a town of Corea; 450 miles E.N.E. of Peking.

TICOUR, a town of France, in the department of the Moſelle; 6 miles N.W. of Morhange.

TICSAN, a town of Peru, in the juriſdiction of Cuença.

TICUARIN, the name of the iſland of Goa, before the city was built.

TICUNAS, *Poiſon of*, is an active poiſon prepared by the native Indians, on the borders of the river of the Amazons, in three or four degrees of ſouth latitude, which, together with that of Lamas, Pevas, and Yameos, is extracted by fire from plants, called by the French lianes, and uſed in poiſoning their arrows. See an account of the nature and effects of theſe poiſons by M. Heriſſant, in Phil. Tranſ. vol. xlvii. art. 12. and by M. Fontana, in Phil. Tranſ. vol. lxx. part i. Append. art. 2.; and alſo Fontana ſur les Poiſons, &c. Florence, 4to. See alſo Poison.

TIDE, or Tidi, in *Geography*, a river of England, which paſſes by St. Germains, and runs into the Hamoaze below Saltaſh.

Tide, the ſame with time, or ſeaſon. The word is originally Saxon, *tid;* which ſignifies the ſame.

Tide, among *Miners*, denotes the ſpace of twelve hours.

Tide, *Shrove*. See Shrove.

Tide, *Twelfth*. See Twelfth.

Tide, *Whitfun.* See Whitsun-*Tide*.

TIDES, two periodical motions of the waters of the fea; called alfo the *flux* and *reflux*, or the *ebb* and *flow*.

When the motion of the water is againft the wind, it is called a *windward-tide:* when wind and tide go in the fame direction, *leeward-tide:* when it runs very ftrong, it is called a *tide-gate.*

To tide it over or up into any place, is to go in with the tide, either ebb or flood, as long as that lafts; then to ftay at anchor all the time of contrary tide; and thus to fet in again with the return of the next tide.

It is faid to *flow-tide* and *half-tide*, allowing fix hours to a tide, when the tide runs three hours in the offing longer than it does by the fhore; but, by *longer*, they do not mean its running more hours; but that, if it be high water a-fhore at twelve, it will not be fo in the offing till three. An hour and a half longer make tide and quarter-tide, three-fourths of an hour longer make tide and half-quarter tide, &c.

When the moon is in the firft and third quarter, *i. e.* when fhe is new and full, the tides are high and fwift, and are called *fpring-tides:* when fhe is in the fecond and laft quarter, the tides are lower and flower, and called *neap-tides.*

Tides, *Phenomena of the.* The fea is obferved to flow, for certain hours, from fouth towards north; in which motion, or flux, which lafts about fix hours, the fea gradually fwells: fo that, entering the mouths of rivers, it drives back the river-waters toward their heads, or fprings.

After a continual flux of fix hours, the fea feems to reft for about a quarter of an hour; after which it begins to ebb or retire back again from north to fouth, for fix hours more; in which time, the water finking, the rivers refume their natural courfe. Then, after a feeming paufe of a quarter of an hour, the fea again begins to flow, as before; and thus alternately.

Thus does the fea ebb twice a day, and flow as often; but not in the fame hours. The period of a flux and reflux is 12 hours $50\frac{1}{2}$ minutes; fo that the tides return later and later each day by $50\frac{1}{2}$ minutes, which is the excefs of a lunar day above a folar one, fince $28\frac{1}{2}$ lunar days are nearly equal $29\frac{1}{2}$ folar ones. So that the fea flows as often as the moon paffes the meridian, both the arc above, and that below the horizon; and ebbs as often as fhe paffes the horizon, both the eaftern and weftern point of it.

This farther agreement we obferve between the moon and the fea, that the tides, though conftant, are not equal; but are greateft, when the moon is in conjunction or oppofition to the fun, or at the time of new and full moon; and leaft, when in quadrature to it. This increafe and diminution conftitute the *fpring* and *neap* tides: the augmentation becomes alfo ftill more obfervable when the moon is in its perigee, or neareft the earth. The loweft as well as the higheft water is at the time of the fpring-tides: the neap-tides neither rife fo high nor fall fo low.

Laftly, thofe tides are the greateft, which happen in the new and full moon, and the time of the equinoxes, while the moon is in its perigee. Thefe tides are often ftill more increafed by the equinoctial winds, which are fometimes fo powerful as to produce a greater tide before or after the equinox than that which happens in the ufual courfe, at the time of the equinox itfelf.

Add, that the fame things are obferved throughout moft of the coafts of Europe; only that the tides are fo much the lefs, and happen the later, as the coafts are the more northerly.

Thefe phenomena of the tides are admirably accounted for, from the principle of gravitation. All we require to their folution is, that the earth and moon, and every particle of them, mutually gravitate towards each other: the reafonablenefs of which affumption, fee under the article Gravity.

Indeed the fagacious Kepler, long ago, conjectured this to be the caufe of the tides: "If," fays he, "the earth ceafed to attract its waters towards itfelf, all the water in the ocean would rife and flow into the moon: the fphere of the moon's attraction extends to our earth, and draws up the water." Thus thought Kepler, in his Introd. ad Theor. Mart. This furmife, for it was then no more, is now abundantly verified in the following theory, firft amply deduced by Dr. Halley from the Newtonian principles.

However, we may obferve with M. de la Lande (Aftronomie, vol. iv. Paris, 1781.) that feveral of the ancients, and among others, Pliny, Ptolemy, and Macrobius, were acquainted with the influence of the fun and moon upon the tides. And Pliny fays exprefsly, that the caufe of the ebb and flow is in the fun, which attracts the waters of the ocean; and adds, that the waters rife in proportion to the proximity of the moon to the earth.

Tides, *Theory of the.*—1. It is obvious, that if the earth were entirely fluid, and quiefcent, its particles, by their mutual gravity towards each other, would form themfelves into the figure of an exact fphere.

Suppofe, then, that fome power acts on all the particles of this earth with an equal force, and in parallel directions, the whole mafs will be moved by fuch a power, but its figure will fuffer no alteration by it; becaufe all the particles, being equally moved by this power in parallel lines, they will ftill keep the fame fituation with refpect to each other, and ftill form a fphere, whofe centre will have the fame motion as each particle. Upon this fuppofition, if the motion of the earth round the common centre of gravity of the earth and moon were deftroyed, and the earth were left to the influence of its gravitation toward the moon, the earth falling toward the moon would ftill retain its fpherical figure; all the parts being equally carried on, and retaining therefore the fame fituation with refpect to each other. But the effects of the moon's action, as well as the action itfelf, on different parts of the earth, are unequal, at all places within the angular diftance of $79\frac{1}{2}°$ from the line paffing through the attracting body, either in the nearer or in the remoter hemifphere: thofe parts, by the general law of gravity, being moft attracted which are neareft the moon, and thofe being leaft attracted which are fartheft from the moon; while the parts that are at a middle diftance, are attracted by a mean degree of force; befides, all the parts are not acted on in parallel lines, but in lines directed towards the centre of the moon; and on thefe accounts the fpherical figure of the earth muft fuffer fome change from the moon's action.

Suppofing the earth to fall towards the moon, and abftracting from the mutual gravitation of its parts towards each other, and alfo from their cohefion; it will eafily appear, that the parts neareft the moon would fall with the fwifteft motion, being moft attracted, and that they would leave the centre or greater bulk of the earth behind them in their fall, while the more remote parts would fall with the floweft motion, being lefs attracted than the reft, and be left a little behind the bulk of the earth, fo as to be found at a greater diftance from the centre of the earth than at the beginning of the motion. Whence it is manifeft, that the earth would foon lofe its fpherical figure, and form itfelf into an oblong elliptic fpheroid, whofe longeft diameter would point at the centre of the moon.

If the particles of the earth did not gravitate toward each other, but toward the moon only, the diſtances betwixt the parts of the earth that are ſuppoſed to be neareſt the moon, and the central parts, would continually increaſe, becauſe of their greater celerity in falling; and the diſtance betwixt the central parts, and the parts that are fartheſt from the moon, would increaſe continually at the ſame time; theſe being left behind by the central parts, which they would follow, but with a leſs velocity. Thus the figure of the earth would become more and more oblong, that diameter of it which pointed toward the moon continually increaſing.

But there is another reaſon why the earth would ſoon aſſume an oblong ſpheroidal form, if its parts were allowed to fall freely by their gravity towards the moon's centre; for the lateral parts of the earth, or thoſe which are at the diſtance of a quarter of a circle from the point which is directly below the moon, and the central parts deſcending with equal velocities toward the ſame point, *viz.* the centre of the moon, in approaching to it, would manifeſtly approach, at the ſame time, to each other; and their diſtance becoming leſs, the diameters of the earth paſſing through them would be diminiſhed, ſo that the diameters of the earth that point toward the moon would increaſe, and thoſe diameters of the earth that are perpendicular to the line joining the centres of the earth and moon, would decreaſe at the ſame time, and render the figure of the earth ſtill more oblong for this reaſon.

Let us now allow the parts of the earth to gravitate towards its centre; and, as this gravitation far exceeds the action of the moon, and much more exceeds the differences of her actions on different parts of the earth, the effect reſulting from the inequalities of theſe actions of the moon, will be only a ſmall diminution of the gravity of thoſe parts of the earth which it endeavoured in the former ſuppoſition to ſeparate from its centre, and a ſmall addition to the gravity of thoſe parts which it endeavoured to bring nearer to its centre; that is, thoſe parts of the earth which are neareſt to the moon, and thoſe which are fartheſt from her, will have their gravity toward the earth ſomewhat abated; whereas the lateral parts will have their gravity increaſed; ſo that if the earth be ſuppoſed fluid, the columns from the centre to the neareſt, and to the fartheſt parts muſt riſe, till, by their greater height, they be able to balance the other columns, whoſe gravity is either not ſo much diminiſhed, or is increaſed by the inequalities of the action of the moon. And thus the figure of the earth muſt ſtill be an oblong ſpheroid.

Let us now conſider the earth, inſtead of falling toward the moon by its gravity, as projected in any direction, ſo as to move round the centre of gravity of the earth and moon; it is manifeſt, that the gravity of each particle toward the moon will endeavour to bring it as far from the tangent, in any ſmall moment of time, as if the earth were allowed to fall freely toward the moon; in the ſame manner as any projectile, at our earth, falls from the line of projection as far as it would fall by its gravity in the perpendicular in the ſame time. Conſequently the parts of the earth neareſt to the moon will endeavour to fall fartheſt from the tangent, and thoſe fartheſt from the moon will endeavour to fall leaſt from the tangent, of all parts of the earth; and the figure of the earth, therefore, will be the ſame as if the earth fell freely toward the moon; that is, the earth will ſtill affect a ſpheroidal form, having its longeſt diameter directed toward the moon.

In order to underſtand this theory, it muſt be carefully conſidered, that it is not the action of the moon, but the inequalities in that action, that produce any variation from the ſpherical figure; and that if this action were the ſame in all the particles as in the central parts, and operating in the ſame direction, no ſuch change would enſue.

For the farther illuſtration of the preceding obſervations, we muſt perceive that the waters at Z (*Plate* I. *Geography*, *fig.* 10.) on the ſide of the earth A B C D E F G H, next to the moon M, are more attracted than the central parts of the earth, O, by the moon, and the central parts are more attracted by her than the waters on the oppoſite ſide of the earth at *n*; and therefore the diſtance between the earth's centre and the waters on its ſurface, under and oppoſite to the moon, will be increaſed. For let H, O, and D be three bodies, all equally attracted by the body M, and they will all move equally faſt toward it, their mutual diſtances from each other continuing the ſame. If the attraction of M is unequal, then that body which is moſt ſtrongly attracted will move faſteſt, and this will increaſe its diſtance from the other body. Conſequently, by the law of gravitation, M will attract H more ſtrongly than it does O, by which the diſtance between H and O will be increaſed; and a ſpectator in O will perceive H riſing higher toward Z. In like manner O, being more ſtrongly attracted than D, will move farther toward M than D does; and therefore the diſtance between O and D will be increaſed; and a ſpectator in O, not perceiving his own motion, will ſee D receding farther from him towards *n*; all effects and appearances being the ſame, whether D recedes from O, or O from D.

Suppoſe now there is a number of bodies, as A, B, C, D, E, F, G, H, placed round O, ſo as to form a flexible or fluid ring; then, as the whole is attracted toward M, the parts at H and D will have their diſtance from O increaſed; whilſt the parts at B and F, being nearly at the ſame diſtance from M as O is, will not recede from one another; but rather, by the oblique attraction of M, they will approach nearer to O. Hence the fluid ring will form itſelf into an ellipſe Z I B L *n* K F N Z, whoſe longer axis *n* O Z produced, will paſs through M, and its ſhorter axis, B O F, will terminate in B and F. Let the ring be filled with fluid particles, ſo as to form a ſphere round O; then, as the whole moves toward M, the fluid ſphere, being lengthened at Z and *n*, will aſſume an oblong or oval form. If M is the moon, O the earth's centre, A B C D E F G H the ſea covering the earth's ſurface, it is evident that, whilſt the earth by its gravity falls towards the moon, the water directly below her at H will ſwell, and gradually riſe toward her; and alſo the water at D will recede from the centre, (or, ſtrictly ſpeaking, the centre recedes from D,) and riſe on the oppoſite ſide of the earth; whilſt the water at B and F is depreſſed, and falls below the former level. Hence, as the earth turns round its axis from the moon to the moon again in about $24\frac{3}{4}$ hours, this oval of water muſt ſhift with it; and thus there will be two tides of flood and two of ebb in that time.

Some perſons have found a difficulty in conceiving how, agreeably to the principles above ſtated, the earth can fall towards the moon by the power of gravity, when the moon is full, or in oppoſition to the ſun; ſince the earth revolves about the ſun, and muſt continually fall towards it; and if the earth is conſtantly falling towards the moon, they muſt at laſt come together. In order to obviate this difficulty, it has been ſuggeſted, that it is not the centre of the earth that deſcribes the annual orbit round the ſun, but the common centre of gravity of the earth and moon, the diſtance of which from the earth's centre, dividing 240,000 miles, the moon's diſtance from the earth, by 40, the exceſs of the earth's weight above that of the moon, is 6000 miles; and that whilſt the earth is moving round the ſun, it alſo deſcribes a circle round that centre of gravity, going as many times round it in one revolution about the ſun as there are lunations or courſes of the moon round the ſun in a year; and therefore the earth is conſtantly falling towards the moon from a tangent to the circle which it deſcribes round the ſaid common centre of gravity. Let M (*fig.* 11.) be the moon, T W part of the moon's orbit, and C the centre of gravity of the earth and moon: whilſt the moon goes round her orbit, the centre of the earth deſcribes the circle *d g e* round C, to which circle *g a k* is a tangent; and, therefore, when the moon has gone from M a little beyond W, the earth has moved from *g* to *e*, and in that time has fallen towards the moon, from the tangent at *a* to *e*, and ſo on round the whole circle.

From the above reaſoning it appears, that the parts of the earth directly under the moon, or that have the moon in their zenith, and alſo thoſe in the nadir, or places diametrically oppoſite to each other, will have the flood, or high water at the ſame time.

Moreover, thoſe parts of the earth, where the moon appears in the horizon, or 90° diſtant from the zenith and nadir, will have the ebbs, or loweſt waters.

It is evident that, by the motion of the earth on its axis, the moſt elevated part of the water is carried beyond the moon in the direction of the rotation. The water continues to riſe after it has paſſed directly under the moon, though the immediate action of the moon there begins to decreaſe, and comes not to its greateſt elevation till it has got half a quadrant farther. It continues alſo to deſcend after it has paſſed at 90° diſtance from the point below the moon, though the force which the moon adds to its gravity begins to decreaſe there. For ſtill the action of the moon adds to its gravity, and makes it deſcend till it has got half a quadrant farther; the greateſt elevation, therefore, is not in the points which are in a line with the centres of the earth and moon, but about half a quadrant to the eaſt of theſe points in the direction of the motion of rotation. Thus in open ſeas, where the water flows freely, the moon, M, (*fig.* 10.) is generally paſt the north and ſouth meridian, as at *p*, when the high water is at Z and at *n*: the reaſon of which is plain, becauſe the moon acts with ſome force after ſhe has paſt the meridian, and thereby adds to the libratory or waving motion, which the water acquired when ſhe was in the meridian; and, therefore, the time of high water is not preciſely at the time of her coming to the meridian, but ſome time after.

Beſides, the tides anſwer not always to the ſame diſtance of the moon from the meridian at the ſame places; but are variouſly affected by the action of the ſun, which brings them on ſooner when the moon is in her firſt and third quarters, and keeps them back later when ſhe is in her ſecond and fourth; becauſe, in the former caſe, the tide raiſed by the ſun alone, would be earlier than the tide raiſed by the moon, and in the latter caſe later.

For the further illuſtration of the principle upon which lunar tides depend, we ſhall ſuppoſe, with Dr. Young, that the earth were wholly fluid, and the ſame part of its ſurface were always turned towards the moon; in which caſe, the pole of the ſpheroid being immediately under the moon, the lunar tide would remain ſtationary; the greateſt elevation being at the points neareſt to the moon and fartheſt from her, and the greateſt depreſſion in the circle equally diſtant from theſe points; the elevation, however, being twice as great as the depreſſion, on account of the ſmaller ſurface to which it is confined. The actual height of this elevation would probably be about 40 inches, and the depreſſion 20, making together a tide of five feet. If alſo the waters were capable of aſſuming inſtantly ſuch a form as the equilibrium would require, the ſummit of a ſpheroid equally elevated would ſtill be directed towards the moon, notwithſtanding the earth's rotation. This may be called the primitive tide of the ocean: but on account of the perpetual change of place which is required for the accommodation of the ſurface to a ſimilar poſition with reſpect to the moon, as the earth revolves, the form muſt be materially different from that of ſuch a ſpheroid of equilibrium. The force employed in producing this accommodation, may be eſtimated by conſidering the actual ſurface of the ſea as that of a wave moving on the ſpheroid of equilibrium, and producing in the water a ſufficient velocity to preſerve the actual form. We may deduce, ſays Dr. Young, from this mode of conſidering the ſubject, a theory of the tides which appears to be more ſimple and ſatisfactory than any which has yet been publiſhed: and by comparing the tides of narrower ſeas and lakes with the motions of pendulums ſuſpended on vibrating centres, we may extend the theory to all poſſible caſes.

If the centre of a pendulum be made to vibrate, the vibrations of the pendulum itſelf, when they have arrived at a ſtate of permanence, will be performed in the ſame time with thoſe of the centre; but the motion of the pendulum will be either in the ſame direction with that of the centre, or in a contrary direction, accordingly as the time of this forced vibration is longer or ſhorter than that of the natural vibration of the pendulum; and in the ſame manner it may be ſhewn that the tides, either of an open ocean or of a confined lake, may be either direct or inverted with reſpect to the primitive tide, which would be produced, if the waters always aſſumed the form of the ſpheroid of equilibrium, according to the depth of the ocean, and to the breadth as well as the depth of the lake. In the caſe of a direct tide, the time of the paſſage of the luminary over the meridian muſt coincide with that of high water, and in the caſe of an inverted tide with that of low water.

In order that the lunar tides of an open ocean may be direct, or ſynchronous, its depth muſt be greater than 13 miles, and for the ſolar tides than 14. The leſs the depth exceeded theſe limits, the greater the tides would be, and in all caſes they would be greater than the primitive tides. But in fact the height of the tides in the open ocean is always far ſhort of that which would be produced in this manner; it is therefore improbable that the tides are ever direct in the open ocean, and that the depth of the ſea is ſo great as 13 miles.

In order that the height of the inverted or remote lunar tides may be five feet, or equal to that of the primitive tides, the depth of the open ſea muſt be $6\frac{1}{2}$ miles; and if the height is only two feet, which is perhaps not far from the truth, the depth muſt be $3\frac{1}{2}$ miles.

The tides of a lake or narrow ſea differ materially from thoſe of the open ocean, ſince the height of the water ſcarcely undergoes any variation in the middle of the lake; it muſt always be high water at the eaſtern extremity when it is low water at the weſtern: and this muſt happen at the time when the places of high and low water, with reſpect to the primitive tides, are equally diſtant from the middle of the lake.

The tides may be direct in a lake 100 fathoms deep and leſs than 8° wide; but if it be much wider, they muſt be inverted. Suppoſing the depth a mile, they will be direct when the breadth is leſs than 25°; but if a ſea, like the Atlantic, were 50 or 60 degrees wide, it muſt be at leaſt four miles deep, in order that the time of high water might coincide with that of the moon's ſouthing.

Hitherto we have conſidered the motion of the water as free

free from all refiftance ; but where the tides are direct, they muft be retarded by the effect of a refiftance of any kind ; and where they are inverted, they muft be accelerated ; a fmall refiftance producing, in both cafes, a confiderable difference in the time of high water.

Where a confiderable tide is obferved in the middle of a limited portion of the fea, it muft be derived from the effect of the elevation or depreffion of the ocean in its neighbourhood ; and fuch derivative tides are probably combined in almoft all cafes with the ofcillations belonging to each particular branch of the fea.

Lunar tides, the rife and progrefs of which are fcientifically traced by Dr. Young, are fubject, independently of the influence of the fun, to a variety of modifications, fome of which we fhall fpecify in the fequel of this article.

2. We have hitherto taken notice only of the action of the moon in producing tides ; but it is manifeft that, for the fame reafons, the inequality of the fun's action on different parts of the earth would produce a like effect, and that this alone would caufe a like variation from the exact fpherical figure of a fluid earth. So that, in reality, there are two tides every natural day from the action of the fun, as there are in the lunar day from that of the moon, fubject to the fame laws ; and the lunar tide, as we have obferved, is fomewhat changed by the action of the fun, and the change varies every day on account of the inequality between the natural and the lunar day. Indeed, the effect of the fun in producing tides, becaufe of his immenfe diftance, muft be confiderably lefs than that of the moon, though the gravity toward the fun be much greater, the folar tide being, as Dr. Young ftates it, only about two-fifths of the lunar. For it is not the action of the fun or that of the moon, but the inequalities in the actions of each, which have any effect. The fun's diftance is fo great, that the diameter of the earth is as a point compared to it, and the difference between the action of the fun on the neareft, and that on the fartheft parts, becomes, on this account, vaftly lefs than it would be if the fun were as near as the moon.

However, the immenfe bulk of the fun makes the effect ftill fenfible, even at fo great a diftance ; and, therefore, though the action of the moon has the greateft fhare in producing the tides, the action of the fun adds fenfibly to it when they confpire together, as in the change and full of the moon, when they are nearly in the fame line with the centre of the earth, and therefore unite their forces. Thus, in conjunction, or when the fun and moon are on the fame fide of the earth, they both confpire to raife the water in the zenith, and confequently in the nadir ; and when they are in oppofition, that is, when the earth is between them, whilft one makes high water in the zenith and nadir, the other does the fame in the nadir and zenith. Confequently, in the fyzygies, or at new and full moon, the tides are the greateft, and are what we call the *fpring-tides*. Moreover, the action of the fun diminifhes the effect of the moon's action in the firft and laft quarters, becaufe the one raifes the water in that cafe where the other depreffes it ; and therefore, in the quadratures the tides are the leaft, and are called *neap-tides*.

As the lunar tide is much larger than the folar tide, the former muft always determine the time of high and low water, which, in the fpring and neap-tides, remains unaltered by the effect of the fun ; fo that in the neap-tides the actual time of low water is that of the folar high water ; but at the intermediate times, the lunar high water is more or lefs accelerated or retarded. The progrefs of this alteration may eafily be traced by means of a fimple conftruction. If we make a triangle, of which two of the fides are two feet and five feet in length, the external angle which they form being equal to twice the diftance of the luminaries, the third fide will fhew precifely the magnitude of the compound tide, and the halves of the two angles oppofite to the firft two fides the acceleration, or retardation, of the times of high water belonging to the feparate tides refpectively. Hence it appears that the greateft deviation of the joint tide from the lunar tide amounts to $11^{\circ}\ 48'$ in longitude, and the time correfponding to 47 minutes, fuppofing the proportion of the forces to remain always the fame ; but in fact the forces increafe in proportion as the cubes of the diftances of their refpective luminaries diminifh, as well as from other caufes ; and in order to determine their joint effects, the lengths of the fides of the triangle muft be varied accordingly. In fome ports, from a combination of circumftances in the channel, by which the tides reach them, or in the feas, in which they originate, the influence of the fun and moon may acquire a proportion fomewhat different from that which naturally belongs to them : thus at Breft, the influence of the moon appears to be three times as great as that of the fun ; when it is ufually only twice and a half as great.

Sir Ifaac Newton has calculated the effects of the fun and moon refpectively upon the tides from their attractive powers. The augmentation of the gravity of the lateral parts of the earth, produced by the action of the fun, is a fimilar effect to an augmentation, eftimated by him on another occafion, that is made to the gravity of the moon toward the earth by the fame action, when the moon is in the quarters ; only the addition made to the gravity of the lateral parts is about $60\frac{1}{2}$ times lefs, becaufe their diftance from the earth's centre is fo many times lefs than the diftance of the moon from it. The gravity of thofe parts of the earth that are directly beneath the fun, and of thofe oppofite to it, is diminifhed by a double quantity of what is added to the lateral parts ; and as the diminution of gravity of the one, and augmentation of gravity of the other, confpire together in raifing the water under the fun, and the parts oppofite to it, above its height in the lateral parts ; the whole force that produces this effect is to be confidered as triple of what is added to the gravity of the lateral parts ; and is thence found to be to the gravity of the particles as 1 to 12868200, and to the centrifugal force at the equator as 1 to 44527. The elevation of the waters by this force is confidered by Newton as an effect fimilar to the elevation of the equatorial parts above the polar parts of the earth, arifing from the centrifugal force at the equator ; and, being 44527 times lefs, is found to be 1 foot and $11\frac{1}{30}$ inches, Paris meafure. This is the elevation arifing from the action of the fun upon the water.

Mr. Maclaurin makes this elevation to be 1 foot $10\frac{8656}{10000}$ inches, of the fame meafure, which differs from the above eftimate by the $\frac{1}{6}$th part of an inch ; and the greateft elevation, when the fun is in the equinoctial, 1 foot $11\frac{1}{20}$ inches.

In order to find the force of the moon upon the water, Newton compares the fpring-tides, at the mouth of the river Avon, below Briftol, with the neap-tides there, and finds their proportion to be that of 9 to 5 ; whence, after feveral neceffary corrections, he concludes, that the force of the moon is to that of the fun, in raifing the waters of the ocean, as 4.4815 to 1 ; fo that the force of the moon is able, of itfelf, to produce an elevation of 8 feet and $7\frac{5}{22}$ inches, and the fun and moon together may produce an elevation of about $10\frac{1}{2}$ feet, in their mean diftances from the earth, and an elevation of about 12 feet, when the moon

... nearest the earth. The height to which the water is found to rise, upon coasts of the open and deep ocean, is agreeable enough to this computation.

Dr. Horsley estimates the force of the moon to that of the sun as 5.0469 to 1. Newton Princip. lib. iii. sect. iii. prop. 36, 37, apud Newt. Op. Ed. Horsley, vol. iii. p. 104. &c. and Maclaurin's Diss. de Causa Physica Fluxus & Refluxus Maris, apud Phil. Nat. Princ. Math. Comment. le Seur & Jacquier, tom. iii. p. 272.

3. It must be observed that the spring-tides do not happen precisely at new and full moon, nor the neap-tides at the quarters, but a day or two after, (at least two, and commonly three tides after,) because, as in other cases, so in this, the effect is not greatest or least when the immediate influence of the cause is greatest or least. As, *e. g.* the greatest heat is not on the solstitial day, when the immediate action of the sun is greatest, but some time after.

That this may be more clearly understood, let it be considered, that though the actions of the sun and moon were to cease this moment, yet the tides would continue to have their course for some time; for the water, where it is now highest, would subside, and flow down on the parts that are lower, till, by the motion of descent, being there accumulated to too great a height, it would necessarily return again to its first place, though in a less measure, being retarded by the resistance arising from the attraction of its parts. Thus it would for some time continue in an agitation like to that in which it is at present. The waves of the sea, that continue after a storm ceases, and every motion almost of a fluid, may illustrate this.

The resistance of fluids, in general, says Dr. Young, is as the square of the velocity, consequently it must be much greater for the lunar than for the solar tide, in proportion to the magnitude of the force; and the acceleration of the lunar tide produced by this cause must be greater than that of the solar: hence it may happen, that when the lunar tide occurs two or three hours after the transit of the moon, the solar tide may be three or four hours after that of the sun, so as to be about an hour later, at the times of conjunction and opposition, and the tides will be highest when the moon passes the meridian about an hour after the sun; while at the precise time of the new and full moon, the lunar tide will be retarded about a quarter of an hour by the effect of the solar tide.

4. The different distances of the moon from the earth produce a sensible variation in the tides. When the moon approaches the earth, her action on every part increases, and the differences of that action on which the tides depend, increase. For her action increases as the squares of the distances decrease; and though the differences of the distances themselves be equal, yet there is a greater disproportion betwixt the squares of less, than the squares of greater quantities; *e. g.* 3 exceeds 2, as much as 2 exceeds 1; but the square of 2 is quadruple of the square of 1, whilst the square of 3 (*viz.* 9) is little more than double the square of 2 (*viz.* 4).

Thus it appears, that by the moon's approach, her action on the nearest parts increases more quickly than her action on the remote parts; and the tides, therefore, increase in a higher proportion as the distances of the moon decrease. Sir Isaac Newton shews, that the tides increase in proportion as the cubes of the distances decrease, so that the moon, at half her present distance, would produce a tide eight times greater.

The moon describes an ellipse about the earth, and in her nearest distance produces a tide sensibly greater than at her greatest distance from the earth: and hence it is, that two great spring-tides never succeed each other immediately; for if the moon be at her nearest distance from the earth at the change, she must be at her greatest distance at the full, having, in the intervening time, finished half a revolution; and, therefore, the spring-tide then will be much less than the tide at the change was: and for the same reason, if a great spring-tide happens at the time of full moon, the tide at the ensuing change will be less.

5. The spring-tides are greatest about the time of the equinoxes, *i. e.* about the latter end of March and September, and least about the time of the solstices, *i. e.* toward the end of June and December; and the neap-tides are least at the equinoxes and greatest at the solstices; so that the difference betwixt the spring and the neap-tides is much less considerable at the solstitial than at the equinoctial seasons. In order to illustrate and evince the truth of this observation, it is manifest, that if either the sun or moon were in the pole, they could have no effect on the tides, for their action would raise all the water at the equator to the same height, and any place of the earth, in describing its parallel to the equator, would not meet, in its course, with any part of the water more elevated than another, so that there could be no tide in any place.

The effect of the sun or moon is greatest when in the equinoctial; for then the axis of the spheroidal figure, arising from their action, moves in the greatest circle, and the water is put into the greatest agitation; and hence it is that the spring-tides produced, when the sun and moon are both in the equinoctial, are the greatest of any, and the neap-tides are the least of any, about that time.

But the tides produced when the sun is in either of the tropics, and the moon in either of her quarters, are greater than those produced when the sun is in the equinoctial, and the moon in her quarters, because, in the first case, the moon is in the equinoctial, and in the latter case, the moon is in one of the tropics; and the tide depends more on the action of the moon than that of the sun, and is, therefore, greatest when the moon's action is greatest.

However, it is necessary to observe, 6. That, because the sun is nearer the earth in winter than in summer, *i. e.* in February and October than in March and September, the greatest spring-tides are after the autumnal, and before the vernal equinox.

7. Since the greatest of the two tides happening in every diurnal revolution of the moon, or lunar day, *i. e.* about $24^h\ 50^m$, is that in which the moon is nearest the zenith, or nadir; for this reason, while the sun is in the northern signs, the greater of the two diurnal tides in our climates, is that arising from the moon above the horizon: when the sun is in the southern signs, the greatest is that arising from the moon below the horizon.

In proof of this observation, let it be considered, that when the moon declines from the equator toward either pole, one of the greatest elevations of the water follows the moon, and describes nearly the parallel on the earth's surface which is under that which the moon, on account of the diurnal motion, seems to describe; and the opposite greatest elevation, being antipodal to that, must describe a parallel as far on the other side of the equator; so that while the one moves on the north side of the equator, the other moves on the south side of it, at the same distance. Now the greatest elevation which moves on the same side of the equator, with any place, will come nearer to it than the opposite elevation, which moves in a parallel on the other side of the equator; and, therefore, if a place is on the same side fide of the equator with the moon, the day-tide, or that which is produced while the moon is above the horizon of the place, will exceed the night-tide, or that which is produced while the moon is under the horizon of the place. It is the contrary if the moon is on one fide, and the place on the other fide of the equator; for then the elevation which is oppofite to the moon, moves on the fame fide of the equator with the place, and, therefore, will come nearer to it than the other elevation. The difference will be greateft when the fun and moon both defcribe the tropics; becaufe the two elevations in that cafe defcribe the oppofite tropics, which are the fartheft from each other of any two parallel circles they can defcribe. Thus it is found, by obfervation, that the evening tides in the fummer exceed the morning tides, and the morning tides in winter exceed the evening tides. The difference is found at Briftol to amount to fifteen inches, and at Plymouth to one foot. It would be ftill greater, but that a fluid always retains an impreffed motion for fome time; fo that the preceding tides affect always thofe that follow them. Upon the whole, while the moon has north declination, the greateft tides in the northern hemifphere are when fhe is above the horizon, and the reverfe while her declination is fouth.

To illuftrate this matter by figures; let N E S Q (*fig.* 12, 13, 14.) be the earth, N C S its axis, E Q the equator, T ♋ the tropic of Cancer, *t* ♑ the tropic of Capricorn, *a b* the arctic circle, *c d* the antarctic, N the north pole, S the fouth pole, M the moon, F and G the two eminences of water, whofe loweft parts are at *a* and *d* (*fig.* 12.), at N and S (*fig.* 13.), and at *b* and *c* (*fig.* 14.), always 90° from the higheft.

Now, when the moon is in her greateft north declination at M (*fig.* 12.), the higheft elevation, G, under her is on the tropic of Cancer, T ♋, and the oppofite elevation, F, on the tropic of Capricorn, *t* ♑; and thefe two elevations defcribe the tropics by the earth's diurnal rotation. All places in the northern hemifphere, E N Q, have the higheft tides when they come into the pofition *b* ♋ Q, under the moon; and the loweft tides when the earth's diurnal rotation carries them into the pofition *a* T E, on the fide oppofite to the moon: the reverfe happens at the fame time in the fouthern hemifphere E S Q, as is evident to fight. The axis of the tides *a* C *d* has now its poles *a* and *d* (being always 90° from the higheft elevations) in the arctic and antarctic circles; and, therefore, it is plain, that at thefe circles there is but one tide of flood, and one of ebb, in the lunar day. For when the point *a* revolves half round to *b* in twelve lunar hours, it has a tide of flood; but when it comes to the fame point *a* again in twelve hours more, it has the loweft ebb. In feven days afterward, the moon M (*fig.* 13.) comes to the equinoctial circle, and is over the equator E Q, when both elevations defcribe the equator; and in both hemifpheres, at equal diftances from the equator, the tides are equally high in both parts of the lunar day. All the phenomena being reverfed, when the moon has fouth declination, to what they were when her declination was north, require no farther defcription, *fig.* 14.

From what has been faid it appears, that as the tides are governed by the moon, they muft turn on the axis of the moon's orbit, which is inclined $23\frac{1}{2}$ degrees to the earth's axis at a mean ftate; and, therefore, the poles of the tides muft be fo many degrees from the poles of the earth, or in oppofite points of the polar circles, going round thefe circles in every lunar day. It is true that, according to *fig.* 14, when the moon is vertical to the equator E C Q, the poles of the tides feem to fall in with the poles of the world N and S; but when we confider that F G H is under the moon's orbit, it will appear that when the moon is over H, in the tropic of Capricorn, the north pole of the tides (which can be no more than 90° from under the moon) muft be at C in the arctic circle, not at P, the north pole of the earth; and as the moon afcends from H to G in her orbit, the north pole of the tides muft fhift from *c* to *a* in the arctic circle, and the fouth pole as much in the antarctic.

It is not to be doubted, but that the earth's quick rotation brings the poles of the tides nearer to the poles of the world than they would be if the earth were at reft, and the moon revolved about it only once a month; for, otherwife, the tides would be more unequal in their heights, and times of their returns, than we find they are. But how near the earth's rotation may bring the poles of its axis and thofe of the tides together, or how far the preceding tides may affect thofe which follow, fo as to make them keep up nearly to the fame heights, and times of ebbing and flowing, is a problem more fit to be folved by obfervation than by theory.

Thofe who have opportunity to make obfervations, and choofe to fatisfy themfelves whether the tides are really affected in the above manner by the different pofitions of the moon, efpecially as to the unequal times of their returns, may take this general rule for knowing when they ought to be fo affected. When the earth's axis inclines to the moon, the northern tides, if not retarded in their paffage through fhoals and channels, nor affected by the winds, ought to be greateft when the moon is above the horizon, leaft when fhe is below it; and quite the reverfe when the earth's axis declines from her; but in both cafes at equal intervals of time. When the earth's axis inclines fideways to the moon, both tides are equally high, but they happen at unequal intervals of time. In every lunation the earth's axis inclines once to the moon, once from her, and twice fideways to her, as it does to the fun every year; becaufe the moon goes round the ecliptic every month, and the fun but once in a year. In fummer, the earth's axis inclines towards the moon when new; and, therefore, the day-tides in the north ought to be higheft, and night-tides loweft about the change: at the full the reverfe. At the quarters they ought to be equally high, but unequal in their returns; becaufe the earth's axis then inclines fidewife to the moon. In winter the phenomena are the fame at full moon as in fummer at new. In autumn the earth's axis inclines fidewife to the moon when new and full; therefore the tides ought to be equally high and unequal in their returns at thefe times. At the firft quarter the tides of flood fhould be leaft when the moon is above the horizon, greateft when fhe is below it, and the reverfe at her third quarter. In fpring, the phenomena of the firft quarter anfwer to thofe of the third quarter in autumn, and *vice verfâ*. The nearer any time is to either of thefe feafons, the more the tides partake of the phenomena of thefe feafons; and in the middle between any two of them, the tides are at a mean ftate between thofe of both.

8. Such would the tides regularly be, if the earth were all over covered with fea very deep, fo that the water might follow the influence of the fun and moon; but, by reafon of the fhoalnefs of fome places, and the narrownefs of the ftreights in others, by which the tides are propagated, there arifes a great diverfity in the effect, not to be accounted for, without an exact knowledge of all the circumftances of the places; fuch as the pofition of the land, and the breadth and depth of the channels, direction of the winds, &c. For a very flow and unperceptible motion of the whole body of water,

water, where it is (for example) two miles deep, will fuffice to raife its furface ten or twelve feet in a tide's time; whereas, if the fame quantity of water were to be conveyed through a channel forty fathoms deep, it would require a very great ftream to effect it in fo large inlets as are the channel of England and the German ocean; whence the tide is found to fet ftrongeft in thofe places where the fea grows narroweft, the fame quantity of water being, in that cafe, to pafs through a fmaller paffage.

This is moft evident in the ftreights between Portland and Cape la Hogue in Normandy, where the tide runs like a fluice; and would be yet more between Dover and Calais, if the tide, coming round the ifland, did not check it.

This force, being once impreffed upon the water, continues to carry it above the level of the ordinary height of the ocean, particularly where the water meets a direct obftacle, as it does in St. Maloes; and where it enters into a long channel, which running far into the land, grows very ftraight at its extremity, as it does into the Severn fea at Chepftow, where the tide rifes to 40 feet, and Briftol, where its height is 30 feet. At Breft, the height of the tides is about 20 feet; at St. Maloes, 50; at Annapolis, in the bay of Fundy, as much fometimes as 100 feet. In the Mediterranean, the tides are generally inconfiderable; neverthelefs they are perceptible: at Naples, they fometimes rife to a foot; at Venice, to more than two feet; and in the Euripus, for a certain number of days in each lunation, they are very diftinctly obfervable from the currents which they occafion. In the Weft Indies, and alfo in the gulf of Mexico, the tides are lefs obfervable than in the neighbouring feas, perhaps on account of fome combinations derived from the variations of the depth of the rivers, and from the different channels by which they are propagated.

The fhoalnefs of the fea, and the intercurrent continents, are the reafons that in the open ocean the tides rife but to very fmall heights in proportion to what they do in wide-mouthed rivers, opening in the direction of the ftream of the tide; and that high-water is not at the time of the moon's appulfe to the meridian, but always fome hours after it, as it is obferved upon all the weftern coafts of Europe and Africa, from Ireland to the Cape of Good Hope; in all which a fouth-weft moon makes high water; and the fame is reported to hold in the weft of America.

So that tides happen to different places at all diftances of the moon from the meridian, and confequently at all hours of the lunar day.

It is to be confidered that, in order to allow the tides their full motion, the ocean, in which they are produced, ought to be extended from eaft to weft 90° at leaft. Becaufe the places, where the moon rifes moft, and moft depreffes the water, are at that diftance from each other. Hence it appears, that it is only in the great oceans that fuch tides can be produced, and why in the larger Pacific ocean they exceed thofe in the Atlantic ocean. Hence alfo it is obvious, why the tides are not fo great in the torrid zone, between Africa and America, where the ocean is narrower, as in the temperate zones on either fide; and we may hence alfo underftand, why the tides are fo fmall in iflands that are very far diftant from the fhores. It is manifeft, that, in the Atlantic ocean, the water cannot rife on one fhore but by defcending on the other; fo that, at the intermediate diftant iflands, it muft continue at a mean height betwixt its elevation on one and on the other fhore. But when tides pafs over fhoals, and through ftreights into bays of the fea, their motion becomes more various, and their height depends on many circumftances.

The tide entering the Atlantic appears, fays Dr. Young, to advance northwards at the rate of about 500 miles an hour, correfponding to a depth of about three miles, fo as to reach Sierra Leone at the eighth hour after the moon's fouthing; this part of Africa being not very remote from the meridian of the middle of the South Atlantic ocean, and having little fhare in the primitive tides of that ocean. The fouthern tide feems then to pafs by Cape Blanco and Cape Bojador, to arrive at Gibraltar at the thirteenth hour, and to unite its effects with thofe of other tides at various parts of the coafts of Europe.

We may therefore confider the Atlantic as a detached fea, about 3500 miles broad, and three miles deep; and a fea of thefe dimenfions is fufceptible of tides confiderably larger than thofe of the ocean, but how much larger we cannot determine without more accurate meafures. Thefe tides would happen on the European coafts, if there were no refiftance, a little lefs than five hours after the moon's fouthing, and on the coaft of America, a little more than feven hours after; but the refiftance oppofed to the motion of the fea may eafily accelerate the time of high-water in both cafes about two hours, fo that it may be a little before the third hour on the weftern coafts of Europe and of Africa, and before the fifth on the moft expofed parts of the eaftern coaft of America; and in the whole of the Atlantic, this tide may be combined more or lefs both with the general fouthern tide, and with the partial effects of local elevations or depreffions of the bottom of the fea, which may caufe irregularities of various kinds. The fouthern tide is, however, probably lefs confiderable than has fometimes been fuppofed, for, in the latitudes in which it muft originate, the extent of the elevation can only be half as great as at the equator; and the iflands of Kerguelen's land and South Georgia, in the latitudes of about 50° and 55°, have their tides delayed till the tenth and eleventh hours, apparently becaufe they received them principally from diftant parts of the ocean, which are nearer to the equator.

On the weftern coafts of Europe, from Ireland to Cadiz; on thofe of Africa, from Cape Coaft to the Cape of Good Hope; and on the coaft of America, from California to the ftreights of Magellan, as well as in the neighbouring iflands; it is ufually high-water at fome time between two and four hours after the moon's fouthing; on the eaftern coaft of South America, between four and fix; on that of North America, between feven and eleven; and on the eaftern coafts of Afia and New Holland, between four and eight. The Society Iflands are perhaps too near the middle of the Pacific ocean to partake of the effects of its primitive tide, and their tide, being fecondary, is probably for this reafon a few hours later. At the Almirantes, near the eaftern coaft of Africa, the tide is at the fixth hour; but there feem to be fome irregularities in the tides of the neighbouring iflands.

The progrefs of a tide may be very diftinctly traced from its fource in the ocean into the narrow and fhallow branches of the fea which conftitute our channels. Thus the tide is an hour or two later at the Scilly Iflands than in the Atlantic, at Plymouth three, at Cork, Briftol, and Weymouth four, at Caen and Havre fix, at Dublin and Brighthelmftone feven, at Boulogne and Liverpool eight, at Dover near nine, at the Nore eleven, and at London-bridge twelve and a half. Another portion appears to proceed round Ireland and Scotland into the North fea; it arrives from the Atlantic at Londonderry in about three hours, at the Orkneys in fix, at Aberdeen in eleven, at Leith in fourteen, at Loeftoffe in twenty, and at the Nore in about twenty-four, fo as to meet there the fubfequent tide coming from the fouth. From the time occupied by the tide in travelling from the mouth of the Englifh

Channel

Channel to Boulogne, at the rate of about fifty miles an hour, we may calculate that the mean depth of the channel is about twenty-eight fathoms, independently of the magnitude of the refiſtances of various kinds to be overcome, which require us to ſuppoſe the depth from thirty to forty fathoms. In the great river of Amazons, the effects of the tides are ſtill ſenſible at the ſtreights of Pauxis, 500 miles from the ſea, after an interval of ſeveral days ſpent in their paſſage up: for the ſlower progreſſive motion of the water no more impedes the progreſs of a wave againſt the ſtream, than the velocity of the wind prevents the tranſmiſſion of ſound in a contrary direction.

Dr. Young obſerves, that ſcarcely a ſingle inſtance occurs that favours the ſuppoſition of high water in the open ſea being within an hour of the moon's ſouthing, as it muſt be if the depth were very great; ſo that neither the height of the tide, nor the time of high-water, will allow us to ſuppoſe the ſea any where quite ſo deep as four miles.

The tide that is produced on the weſtern coaſts of Europe, in the Atlantic, correſponds to the ſituation of the moon already deſcribed. Thus it is high-water on the coaſts of Spain, Portugal, and the weſt of Ireland, about the third hour after the moon has paſſed the meridian; from thence it flows into the adjacent channels, as it finds the eaſieſt paſſage. One current from it, *e. g.* runs up by the ſouth of England, another comes in by the north of Scotland; they take a conſiderable time to move all this way, and it is high-water ſooner in the places to which they firſt come, and it begins to fall at thoſe places, while they are ſtill going on to others that are farther in their courſe. As they return, they are not able to raiſe the tide, becauſe the water runs faſter off than it returns, till, by a new tide propagated from the open ocean, the return of the current is ſtopped, and the water begins to riſe again. The tide, propagated by the moon in the German ocean, when ſhe is three hours paſt the meridian, takes about twelve hours to come from thence to London-bridge; ſo that when it is high-water there, a new tide is already come to its height in the ocean; and, in ſome intermediate place, it muſt be low water at the ſame time.

Conſequently, when the moon has north declination, and we ſhould expect the tide at London to be the greateſt when the moon is above the horizon, we find it is leaſt; and the contrary when ſhe has ſouth declination.

At ſeveral places it is high-water three hours before the moon comes to the meridian; but that tide which the moon puſhes, as it were, before her, is only the tide oppoſite to that which was raiſed by her when ſhe was nine hours paſt the oppoſite meridian.

It would be endleſs to recount all the particular ſolutions which are eaſy corollaries from this doctrine: as why the lakes and ſeas, ſuch as the Caſpian ſea and the Mediterranean ſea, the Black ſea and Baltic, have either ſmall or no very ſenſible tides: for lakes are generally ſo ſmall, that when the moon is vertical ſhe attracts every part of them alike, and therefore no part of the water can be raiſed higher than another: and having no communication with the ocean, it can neither increaſe nor diminiſh their water, in order to riſe and fall; and ſeas that communicate by ſuch narrow inlets, and are of ſo immenſe an extent, cannot, in a few hours time, receive and empty water enough to raiſe or ſink their ſurface any thing ſenſibly.

To demonſtrate the excellency of this doctrine, the example of the tides in the port of Batſha, in the kingdom of Tonquin, in the Eaſt Indies, 20° 50′ N. lat. which are ſo extraordinary and different from all others we have yet heard of, may ſuffice.

The day in which the moon paſſes the equinoctial, the water ſtagnates there without any motion; as the moon removes from the equinoctial, the water begins to riſe and fall once a day; and it is high-water at the ſetting of the moon, and low-water at her riſing. This daily tide increaſes for about ſeven or eight days, and then decreaſes for as many days by the ſame degrees, till this motion ceaſes, when the moon has returned to the equinoctial. When ſhe has paſſed the equinoctial, and declines toward the ſouth pole, the water riſes and falls again as before; but it is high-water now at the riſing, and low-water at the ſetting of the moon.

Sir Iſaac Newton, in order to account for this extraordinary tide, conſiders that there are two inlets to this port of Batſha, one from the Chineſe ocean, betwixt the continent and the Manillas, the other from the Indian ocean, betwixt the continent and Borneo. This leads him to propoſe, as a ſolution of this phenomenon, that a tide may arrive at Batſha, through one of theſe inlets, at the third hour of the moon, and another through the other inlet ſix hours after, at the ninth hour of the moon. For, while theſe tides are equal, the one flowing in as the other ebbs out, the water muſt ſtagnate; now they are equal when the moon is in the equinoctial; but as ſoon as the moon begins to decline on the ſame ſide of the equator with Batſha, it has been ſhewn that the diurnal tide muſt exceed the nocturnal, ſo that two greater and two leſſer tides muſt arrive at Batſha by turns. The difference of theſe will produce an agitation of the water, which will riſe to its greateſt height at the mean time betwixt the two greateſt tides, and fall loweſt at a mean time betwixt the two leaſt tides; ſo that it will be high-water about the ſixth hour at the ſetting of the moon, and low-water at her riſing. When the moon has got to the other ſide of the equinoctial, the nocturnal tide will exceed the diurnal; and, therefore, the high-water will be at the riſing, and low-water at the ſetting of the moon.

The ſame principles will ſerve to account for other extraordinary tides, which, we are told, are obſerved in places whoſe ſituation expoſes them to ſuch irregularities: and, as ſome think, for particular currents and winds. See Current and Winds.

When the time of high-water at any place is, in general, mentioned, it is to be underſtood on the days of the ſyzygies, or days of new and full moon; when the ſun and moon paſs the meridian of the place at the ſame time. Among pilots, it is cuſtomary to reckon the time of flood, or high-water, by the point of the compaſs the moon bears on, allowing three quarters of an hour for each point, at that time; thus, on the full and change days, in places where it is flood at noon, the tide is ſaid to flow N. and S., or at 12 o'clock; in other places, on the ſame days, where the moon bears 1, 2, 3, 4, or more points to the E. or W. of the meridian, when it is high-water, the tide is ſaid to flow on ſuch point; thus, if the moon bears S.E. at flood, it is ſaid to flow S.E. and N.W. or three hours before the meridian, that is, at 9 o'clock; if it bears S.W. it flows S.W. and N.E. or at three hours after the meridian; and in like manner for other points of the moon's bearing.

The times of high-water in any place fall about the ſame hours after a period of about fifteen days, or between one ſpring-tide and another; but during that period, the times of high-water fall each day later by about forty-eight minutes.

From the obſervations of many perſons there have been collected the times when it is high-water on the days of the new and full moon, on moſt of the ſea-coaſts of Europe, and many other places; which are uſually put in a table againſt the names of the places; a ſpecimen of which is ſubjoined.

A Table of the Times of High-Water on the Days of the New and Full Moon, on moſt of the Sea-Coaſts of Europe.

Names of Places.	Countries.	Coaſt.	High-Water. H.	M.
Abbrevrak - - - - -	France - -	Engliſh Channel - -	4	30
Aberdeen - - - - -	Scotland - -	German Ocean - -	0	45
Aldborough - - - -	England - -	Ditto - - - - -	9	45
Alderney, Iſle of - -	Ditto - -	Engliſh Channel - -	12	0
Amazons, River (Mouth) -	Amazon - -	Atlantic Ocean - -	6	0
Ameyland, Iſle of - -	Dutchland - -	German Ocean - - -	7	30
Amſterdam - - -	Ditto - -	Ditto - - - - -	3	0
Andrews, St. - - - -	Scotland -	Ditto - - - - -	2	15
Anholt, Iſle of - - - -	Denmark -	Sound - - - - -	0	0
Antwerp - - - - -	Flanders -	River Schelde - - -	6	0
Archangel - - - - -	Ruſſia - -	White Sea - - -	6	0
Arran, Iſle of - - - -	Ireland -	St. George's Channel -	11	0
Aſhley, River - - - -	Carolina -	Atlantic Ocean - -	0	45
Auguſtine, St. - - - -	Florida	Ditto - - - - -	4	30
Baltimore - - - - -	Ireland	Weſtern Ocean - -	4	30
Barfleur, Cape - - - -	France	Engliſh Channel - -	7	30
Bas, Iſle de - - - -	Ditto - -	Ditto - - - - -	3	45
Bayonne - - - - -	Ditto - -	Bay of Biſcay - - -	3	30
Beachy-Head - - - -	England - -	Engliſh Channel - -	0	0
Bear, North } Bear, South } - - -	Labrador - -	Hudſon's Bay - - -	12	0
Belfaſt - - - - -	Ireland - -	Iriſh Sea - - - - -	10	0
Belleiſle - - - - -	France - -	Bay of Biſcay - - -	3	30
Bermudas, Iſland of - -	Bahama Iſles -	Atlantic Ocean - -	7	0
Berwick - - - - -	England - -	German Ocean - - -	2	30
Bic, Iſle du - - - -	Acadia - -	River St. Lawrence - -	2	0
Blackney - - - - -	England - -	German Ocean - -	6	0
Blanchart-Race - - - -	France - -	Engliſh Channel - -	9	45
Blanco, Cape - - - -	Negroland - -	Atlantic Ocean - -	0	0
Bojador, Cape - - - -	Ditto - - -	Ditto - - - - -	0	0
Boulogne - - - - -	France - -	Engliſh Channel - -	10	30
Bourdeaux - - - - -	Ditto - -	Bay of Biſcay - - -	3	0
Breefound - - - - -	Dutchland - -	German Ocean - - -	4	30
Bremen - - - - -	Germany - -	River Weſer - - -	6	0
Breſt - - - - - -	France - -	Bay of Biſcay - - -	3	45
Bridlington Bay - - - -	England - -	German Ocean - - -	3	45
Brill - - - - - -	Dutchland - -	Ditto - - - - -	1	30
Briſtol - - - - -	England - -	St. George's Channel -	6	45
Buchanneſs - - - - -	Scotland - -	German Ocean - - -	3	0
Button's Iſles - - - -	North Britain -	Hudſon's Straits - -	6	50
Cadiz - - - - - -	Spain - -	Atlantic Ocean - -	4	30
Caen - - - - - -	France - -	Engliſh Channel - -	9	0
Caithneſs Point - - - -	Scotland - -	Weſtern Ocean - -	0	0
Calais - - - - - -	France - -	Engliſh Channel - -	11	30
Caldy, Iſle of - - - -	England - -	St. George's Channel -	5	15
Camfer - - - - -	Dutchland - -	German Ocean - - -	1	30
Canaria, Iſle of - - - -	Canaries - -	Atlantic Ocean - -	3	0
Cantin, Cape - - - -	Barbary - -	Ditto - - - - -	0	0
Caſkets - - - - -	Guernſey - -	Engliſh Channel - -	8	15
Charles, Iſle of - - - -	Labrador - -	Hudſon's Straits - -	10	15
Charles-Town - - - -	Carolina - -	Aſhley River - - -	3	0
Chignectow - - - -	Nova Scotia -	Bay of Fundy - - -	0	45
Cherbourg - - - - -	France - -	Engliſh Channel - -	7	30
Churchill, Cape and River -	North Wales -	Hudſon's Bay - - -	7	20
Clear, Cape - - - -	Ireland - -	Weſtern Ocean - -	4	30
Concarneau - - - - -	France - -	Bay of Biſcay - - -	3	0.

Names of Places.	Countries.	Coast.	High-Water. H.	M.
Conquet	France	Englifh Channel	2	15
Coquet, Ifle of	England	German Ocean	3	0
Corke	Ireland	St. George's Channel	6	30
Corfe, Cape	Guinea	Ethiopian Sea	3	30
Cromer	England	German Ocean	7	0
Dartmouth	Ditto	Englifh Channel	6	30
David's Head, St.	Wales	St. George's Channel	6	0
Dieppe	France	Englifh Channel	10	30
Dort	Dutchland	German Ocean	3	0
Dover	England	Englifh Channel	11	30
Downs	Ditto	German Ocean	1	15
Dublin	Ireland	Irifh Sea	9	15
Dunbar	Scotland	German Ocean	2	30
Dundee	Ditto	Ditto	2	15
Dungarvan	Ireland	Atlantic Ocean	4	30
Dungenefs	England	Englifh Channel	9	45
Dunkirk	France	German Ocean	0	0
Dunnofe	Ifle of Wight	Englifh Channel	9	45
Edinburgh	Scotland	German Ocean	4	30
Edyftone	England	Englifh Channel	5	30
Elbe, River (Mouth)	Germany	German Ocean	0	0
Embden	Ditto	Ditto	0	0
Enchuyfen	Dutchland	Zuyder Sea	0	0
Eftaples	France	Englifh Channel	11	0
Falmouth	England	Ditto	5	30
Flamborough-Head	Ditto	German Ocean	4	0
Florida, Cape	Florida	Gulf of Mexico	7	30
Flufhing	Dutchland	German Ocean	0	45
Fly, Ifle of	Ditto	Ditto	7	30
Foreland, North	England	Ditto	9	45
Foreland, South	Ditto	Englifh Channel	9	45
Foulnefs	Ditto	German Ocean	6	45
Foye	Ditto	Englifh Channel	5	15
Garonne, River	France	Bay of Bifcay	3	0
Gafpey Bay	Acadia	Gulf of St. Lawrence	1	30
Gibraltar	Spain	Mediterranean Sea	0	0
Good Hope, Cape of	Cafiers	Indian Ocean	3	0
Granville	France	Englifh Channel	7	0
Graveline	Ditto	Ditto	0	0
Gravefend	England	River Thames	1	30
Groine, or Cape Corunna	Spain	Bay of Bifcay	3	0
Guernfey, Ifland of	England	Englifh Channel	1	30
Haarlem	Dutchland	German Ocean	9	0
Halifax	Nova Scotia	Weftern Ocean	7	30
Hamburgh	Germany	River Elbe	6	0
Hartlepool	England	Ditto	3	0
Harwich	Ditto	Ditto	11	15
Havre de Grace	France	Englifh Channel	9	0
Henry, Cape	Virginia	Atlantic Ocean	11	15
Holyhead	Wales	Irifh Sea	1	30
Honfleur	France	River Seine	9	0
Hull	England	River Humber	6	0
Humber, River (Entrance)	Ditto	German Ocean	5	13
Ice Cove	North Main	Hudfon's Straits	10	0
John's, Fort St.	Newfoundland	Atlantic Ocean	6	0
John de Luz, St.	France	Bay of Bifcay	3	30
Julian, Port St.	Patagonia	South Atlantic Ocean	4	45
Kentifh Knock,	England	German Ocean	0	0
Kilduin, Ifle of	Lapland	Northern Ocean	7	30
Kinfale	Ireland	Atlantic Ocean	5	15
Land's-End	England	St. George's Channel	7	30
Leith	Scotland	German Ocean	4	30

Names of Places	Countries.	Coast.	High-Water. H.	M.
Leostoffe - - - - -	England - -	German Ocean - -	9	45
Lewes, Isle of, North Port -	Scotland - -	Western Ocean - -	6	30
Lime - - - - - -	England - -	English Channel - -	7	0
Lisbon - - - - -	Portugal - -	River Tagus - - -	2	15
Liverpool - - - - -	England - -	Irish Sea - - - -	11	15
Lizard - - - - -	Ditto - -	English Channel - -	7	30
London - - - - -	Ditto - -	River Thames - - -	3	0
London, New - - - -	New England -	Western Ocean - -	1	30
Long Island - - - -	Ditto - -	Ditto - - - - -	3	0
Longsand-Head - - - -	England - -	German Ocean - -	10	30
Louis, Port - - - -	France - -	Bay of Biscay - - -	3	0
Lundy, Isle of - - - -	England - -	St. George's Channel -	5	15
Lynn - - - - - -	Ditto - -	German Ocean - -	6	0
Madeira, Island of - -	Canaries - -	Atlantic Ocean - -	12	4
Maes, River (Mouth) - -	Dutchland - -	German Ocean - -	1	30
Maloes, St. - - -	France - -	English Channel - -	6	0
Man, Isle of (west end) -	England - -	Irish Sea - - - -	9	0
Margate - - - - -	Ditto - -	English Channel - -	11	15
Milford - - - - -	Wales - -	St. George's Channel -	5	15
Mount's Bay - - - -	England - -	English Channel - -	4	30
Nantes - - - - -	France - -	Bay of Biscay - - -	3	0
Naze - - - - - -	Norway - -	Western Ocean - -	11	15
Needles - - - - -	England - -	English Channel - -	10	15
Newcastle - - - - -	Ditto - -	German Ocean - - -	3	15
Nieuport - - - - -	Flanders - -	Ditto - - - - -	12	0
Nore - - - - - -	England - -	River Thames - - -	0	0
North Cape - - - -	Lapland - -	Northern Ocean - -	3	0
Orfordness - - - - -	England - -	German Ocean - -	9	45
Orkney Isles, (limits) - -	Scotland - -	Western Ocean - -	3	0
Ostend - - - - -	Flanders - -	German Ocean - -	12	0
Placentia - - - - -	Newfoundland -	Atlantic Ocean - -	9	0
Plymouth - - - - -	England - -	English Channel - -	6	0
Portland - - - - -	Ditto - -	Ditto - - - - -	8	15
Portsmouth - - - - -	Ditto - -	Ditto - - - - -	11	15
Quebec - - - - -	Canada - -	River St. Lawrence - -	7	30
Rhee, Isle of - - - -	France - -	Bay of Biscay - - -	3	0
Rochefort - - - - -	Ditto - -	Ditto - - - - -	4	15
Rochelle - - - - -	Ditto - -	Ditto - - - - -	3	45
Rochester - - - - -	England - -	River Medway - - -	0	45
Rotterdam - - - - -	Dutchland - -	German Ocean - -	3	0
Rouen - - - - -	France - -	River Seine - - -	1	15
Rye - - - - - -	England - -	English Channel - -	11	15
Sandwich - - - - -	Ditto - -	Downs - - - - -	11	30
Scarborough-Head - - -	Ditto - -	German Ocean - -	3	45
Scilly Isles - - - - -	Ditto - -	St. George's Channel -	3	45
Seine, River - - - -	France - -	English Channel - -	9	0
Senegal, River - - - -	Negroland - -	Atlantic Ocean - -	10	30
Severn, River - - - -	England - -	St. George's Channel -	6	0
Sheerness - - - - -	Ditto - -	River Thames - - -	9	0
Shetland Island (limits) -	Scotland - -	Western Ocean - -	3	0
Shoreham - - - - -	England - -	English Channel - -	10	30
Sierra Leona - - - -	Guinea - -	Atlantic Ocean - -	8	15
Sky, Isle of - - - -	Ditto - -	Ditto - - - - -	5	30
Southampton - - - -	England - -	English Channel - -	0	0
Spurn - - - - -	Ditto - -	German Ocean - -	5	15
Start-Point - - - - -	Ditto - -	English Channel - -	6	45
Stockton - - - - -	Ditto - -	German Ocean - -	5	15
Strongford Bay - - - -	Ireland - -	Irish Sea - - - -	10	30
Sunderland - - - - -	England - -	German Ocean - -	3	30
Swin - - - - - -	Ditto - -	Entrance of the Thames -	12	0
Tamarin-Town - - - -	Socotora - -	Indian Ocean - - -	9	0
Tees, River (Mouth) - -	England - -	German Ocean - -	3	0

Names of Places.	Countries.	Coaſt.	High-Water. H. M.
Teneriffe, Iſland of - -	Canaries - -	Atlantic Ocean - -	3 0
Texel, Iſland of - - -	Dutchland - -	German Ocean - -	7 30
Thames, River (Mouth) -	England - -	Ditto - - - - -	1 30
Tinmouth - - - - -	Ditto - -	Ditto - - - - -	3 0
Topſham - - - - -	Ditto - -	Engliſh Channel - -	6 0
Torbay - - - - -	Ditto - -	Ditto - - - - -	5 15
Tory, Iſland of - - -	Ireland - -	Weſtern Ocean - -	5 30
Valery, St. - - - - -	France - -	Engliſh Channel - -	10 30
Vannes - - - - -	Ditto - -	Bay of Biſcay - - -	3 45
Uſhant, Iſle of - - -	Ditto - -	Engliſh Channel - -	4 30
Waterford - - - -	Ireland - -	St. George's Channel -	6 30
Weymouth - - - -	England - -	Engliſh Channel - -	7 0
Whitby - - - - -	Ditto - -	German Ocean - -	3 0
Wight, Iſle of, North, South, Eaſt, and Weſt End -	Ditto - -	Engliſh Channel - -	0 0
Winchelſea - - - -	Ditto - -	Ditto - - - - -	0 45
Wintertonneſs - - -	Ditto - -	German Ocean - -	9 0
Yarmouth - - - -	Ditto - -	Ditto - - - - -	9 45
York Fort - - - -	New Wales -	Hudſon's Bay - - -	9 10
York, New - - - -	United States -	Atlantic Ocean - -	3 0
Youghall - - - -	Ireland - -	St. George's Channel -	4 30

The following times ſerve for coaſts of conſiderable extent, and nearly for the places on thoſe coaſts; *viz.* Finmark, or N.N.W. coaſt of Lapland, $1^h\ 30^m$; Jutland iſles, $0^h\ 0^m$; Frieſland coaſt, $7^h\ 30^m$; Zealand coaſt, $1^h\ 30^m$; Flanders coaſt, $0^h\ 0^m$; Picardy and Normandy coaſts, $10^h\ 30^m$; Biſcay, Gallician, and Portugal coaſts, $3^h\ 0^m$; Iriſh weſt coaſt, $3^h\ 0^m$; Iriſh ſouth coaſt, $5^h\ 15^m$; Africa weſt coaſt, $3^h\ 0^m$; America weſt coaſt, $3^h\ 0^m$; America eaſt coaſt, $4^h\ 30^m$.

The uſe of the preceding table is to find the time of high-water at any of the places contained in it: for this purpoſe, find the time of the moon's ſouthing on a given day (ſee MOON); and then add the time which the moon has paſſed the meridian on the full and change days, to make high-water at that place; and the ſum ſhews the time of high-water on the given day.

See on the ſubject of this article, Newton Princ. Math. lib. iii. prop. 24. and De Syſtem. Mundi, ſect. 38–54. Apud Opera Ed. Horſley, tom. iii. p. 25, &c. p. 203, &c. Maclaurin's Account of ſir I. Newton's Diſcoveries, book iv. ch 7. Ferguſon's Aſtron. ch. xvii. Robertſon's Navig. book vi. ſect. vii. viii. ix. Young's Lectures.

TIDE-*Dial*, the name of an inſtrument contrived by Mr. Ferguſon, for exhibiting and determining the ſtate of the tides. It is repreſented in *Plate* IV. *Dialling*, *fig.* 36. and the external parts of it conſiſt of 1. An eight-ſided box, on the top of which, at the corners, are ſhewn the phaſes of the moon at the octants, quarters, and full. Within theſe is a circle of 29½ equal parts, which are the days of the moon's age reckoned from the ſun at new moon, round to the ſun again. Within this circle is one of twenty-four hours, divided into their halves and quarters. 2. A moving elliptical plate, painted blue, to ſhew the riſing of the tides under and oppoſite to the moon, with the words *high-water*, *tide-falling*, *low-water*, *tide-riſing*, marked upon it. To one end of this plate is fixed the moon M by the wire W, which goes along with it. 3. Above this elliptical plate is a round one, with the points of the compaſs upon it, and alſo the names of above two hundred places in the large machine (but only thirty-two in the figure, to avoid confuſion) ſet over thoſe points on which the moon bears when ſhe raiſes the tides to the greateſt heights at theſe places, twice in every lunar day; and to the north and ſouth points of this plate are fixed two indices I and K, which ſhew the times of high-water, in the hour-circle, at all theſe places. 4. Below the elliptical plate are four ſmall plates, two of which project out from below its ends at new and full moon; and ſo, by lengthening the ellipſe, ſhew the ſpring-tides: the other two of theſe ſmall plates appear at low-water when the moon is in her quadratures, or at the ſides of the elliptic plate, to ſhew the neap-tides. When any two of theſe ſmall plates appear, the other two are hid; and when the moon is in her octants, they all diſappear. Within the box are a few wheels for performing theſe motions by the handle H. Turn the handle till the moon, M, comes to any given day of her age in the circle of 29½ equal parts, and the moon's wire W will interſect the time of her coming to the meridian on that day, in the hour-circle: the XII under the ſun being mid-day, and the oppoſite XII mid-night: then looking for the name of any given place on the round plate (which makes 29½ rotations, whilſt the moon M makes only one revolution from the ſun to the ſun again) turn the handle till that place comes to the word *high-water* under the moon, and the index which falls among the forenoon hours will ſhew the time of high-water at that place in the forenoon of the given day: then turn the plate half round, till the ſame place comes to the oppoſite high-water mark, and the index will ſhew the time of high-water in the afternoon at that place. And thus, as all the different places come ſucceſſively under and oppoſite to the moon, the indices ſhew the times of high-water at them in both parts of the day; and when the ſame places come to the low-water marks, the indices ſhew the times of low-water. For about three days before and after the times of new and full moon, the two ſmall plates come out a little way from below the high-water marks on the elliptical plate, to ſhew that the tides riſe ſtill higher about theſe times: about the quarters, the other two plates come out a little from under the low-

water

water marks toward the fun, and on the oppofite fide, fhewing that the tides of flood rife not then fo high, nor do the tides of ebb fall fo low, as at other times. For the defcription of the infide work of this machine, and the method of conftructing it, fee Ferguson's Aftron. p. 297.

Tide-*Gage*. See Gage.

Tide-*Gates* are the lower gates of a lock open to a tide-way: thefe are alfo placed at the mouths of drains.

Tide-*Mill*, in *Rural Economy* and *Agriculture*, an ufeful fort of mill, the moving power of which is formed by running a dam acrofs an inlet where tide-water comes in, fo as to leave a narrow paffage open for placing it in on one fide. It alfo fignifies a mill for raifing and clearing lands from tide-water in fen fituations, and where injury is done by the overflowing of the tides. See Watering *of Land*.

Tide-mills may moftly be formed without producing any obftruction or hindrance to agriculture.

Tide-*Waiters*, or *Tide-Men*, certain officers belonging to the cuftom-houfe, appointed to watch or attend on fhips coming from abroad, to fee that nothing be landed till the cuftoms be paid.

They are thus called, becaufe they go aboard the fhips at their arrival in the mouth of the Thames, and come up with the tide.

TIDENSDORF, in *Geography*, a town of Pruffia, in the province of Ermeland; 4 miles S. of Frauenburg.

TIDER, or Ner, a fmall ifland in the Atlantic, near the coaft of Africa. N. lat. 19° 30′.

TIDESWELL, a fmall market-town in the hundred of High Peak, and county of Derby, England; is fituated in a valley among bleak hills, 32 miles N.N.W. from the county-town, and 160 miles N.W. by N. from London. The town is reported to have received its name from an ebbing and flowing well, now hardly remembered, as it has long ceafed to flow. The church, which was erected in the fourteenth century, is a handfome edifice of the conventual form, with a neat tower at the weft end, terminated by eight pinnacles; thofe at the angles rifing from octagonal bafes, and being much higher than the intermediate ones. In the chancel is a fmall ftone commemorative of John Foljambe, who died in 1358, and is faid to have contributed much towards the building of the church. A raifed tomb perpetuates the name of Sampfon Meurill, who died in 1462, and who, in the courfe of two years, was engaged in eleven battles in France. Among other monuments of ancient date, is one to the memory of a native of this town, Robert Purfglove, prior of Gifburn priory, who obtained a penfion from Henry VIII. for his obfequious compliance with that monarch's wifhes, in not only furrendering his own houfe, but alfo acting as a commiffioner to procure the furrender of others. In queen Mary's reign he was appointed archdeacon of Nottingham, and fuffragan bifhop of Hull; but on the acceffion of Elizabeth, he was deprived of all his fpiritualities, and retired to Tidefwell, where, having founded a grammar-fchool, and an hofpital for twelve poor people, he died in 1579. By the population return of the year 1811, the inhabitants of this parifh are ftated to be 1219, who are chiefly fupported by the mining bufinefs; the number of houfes, which are moftly fcattered on the oppofite banks of a rivulet, was eftimated at 283. A weekly market is held on Wednefdays; and here are three annual fairs.

In the vicinity of Tidefwell is the fequeftered retreat of Monfal-Dale, peculiarly eminent for picturefque beauty. Near the head of the Dale, the rocks jut out on the fouth fide, like the immenfe towers of a ftrong fortrefs. Lower down, the crags foften into verdure, the dale expands, and the eye dwells enraptured on the rich profpect that prefents itfelf. The back-ground is formed by a fteep precipice, variegated by fhort herbage and brufhwood, with occafionally a ftarting rock breaking its continuity of furface. On the fummit of an eminence called the Great Finn, was a large barrow, about 160 feet in circumference, chiefly compofed of broken maffes of limeftone, to obtain which the barrow was deftroyed about the year 1795. Within this tumulus various fkeletons were difcovered, two of them of gigantic fize, with feveral urns, and other ancient memorials; among which were two arrow-heads of flint, whence the barrow is fuppofed to have been of very remote antiquity; for, as the learned author of "Nenia Britannica" obferves, "flint arrow-heads are evidences of a people not in the ufe of malleable metal; and it therefore implies, wherever thefe arms are found in barrows, they are inconteftibly the relics of a primitive barbarous people, and preceding the era of thofe barrows in which brafs or iron arms are found." It is worthy of note, that, excepting on the fide next the precipice, the fummit of the Great Finn is furrounded by a double ditch, with a vallum to each: the diftance between the banks is 160 yards.

Near the hamlet of Wormhill, in this parifh, is a romantic and deep glen or dale, where the river Wye flows beneath a ftupendous mafs of rock, called *Chee-Tor*. This mafs of freeftone rifes about 300 feet above the level of the river, and conftitutes a moft impofing and fingular feature. At a fmall hamlet called Tunfted, in the liberty of Wormhill, was born James Brindley, juftly famed for his fuccefsful efforts in planning and executing canals. See Brindley.—Beauties of England and Wales, vol. iii. Derbyfhire; by J. Britton and E. W. Brayley. Davies's Hiftorical and Defcriptive Account of Derbyfhire, 8vo. 1811.

TIDEWA, a town of Sweden, in Weft Gothland; 62 miles N.E. of Uddevalla.

TIDLA, a river of Sweden, which runs into the Wenner lake, near Marieftadt, in the province of Weft Gothland.

TIDON, a town on the eaft coaft of the ifland of Celebes, in the bay of Gunong Tellu. N. lat. 0° 3′. E. long. 120° 38′.

TIDOR, or Tidore, an ifland in the Eaft Indian fea, and one of thofe called Moluccas, fituated near the weft coaft of the ifland of Gilolo, between Ternate and Timor; about ten leagues in circumference, and fo called from its capital, though named Tadura, or Daco, by the natives. It abounds in fpices, efpecially cloves. The Dutch have feveral forts, but the ifland is governed by a king, who poffeffes likewife fome territory on the ifland of Gilolo; 15 miles S.E. of Ternate. N. lat. 0° 42′. E. long. 127° 19′.

TIDSI, a river of Morocco, which difcharges itfelf into the ocean a few miles S. of the Tegrewelt, or Cape Offam.

TIEBAS, a town of Spain, in the province of Navarre; 5 miles S.E. of Pamplona.

TIEDEMAN, Dieterich, in *Biography*, a philofophical writer, was born April 1748, at Bremervorde, in the duchy of Bremen, and educated in the fchool of his native place in the Greek and Latin languages, in which he made very confiderable proficiency. Devoting himfelf to the church, he removed to the fchool of Verden, and from thence to the Athenæum at Bremen, where he formed an intimate friendfhip with Meiners, afterwards profeffor at Gottingen.

Gottingen. In 1767 he fettled at Gottingen, and here he renounced the ftudy of theology, becaufe he difapproved the fyftem there taught, and applied to mathematics, claffical literature, and philofophy. In the winter of 1769 he fixed his refidence in Livonia, as tutor to a nobleman of that country; and whilft he was there, he publifhed at Riga, in 1772, his "Effay on the Origin of Language." After vifiting his native place in the following year, he went to Gottingen, and formed an acquaintance with the celebrated Heyne, who wrote a preface to his "Syftem of the Stoic Philofophy," and perfuaded him to publifh it. By the recommendation of this learned friend, he was appointed profeffor of ancient literature in the Caroline college at Caffel, of which office he took poffeffion in 1766. His intervals of leifure were employed in the ftudy of philofophy and its hiftory; and alfo in preparing for the prefs his "Inveftigation of Man," "The Firft Philofophers of Greece, &c." and his "Spirit of Speculative Philofophy." Upon the diffolution of the Caroline college in 1786, he occupied the chair of philofophy at Marpurg, and his lectures were very popular. He was an oppofer of Kant's philofophy: and he indulged himfelf in ridiculing the extravagant pretenfions or pious arrogance of the founders of fects. Although his conftitution was robuft, he was carried off by a fever and inflammation of the lungs, in May 1803, at the age of 55. As a literary character, he was intimately converfant with the literature of Greece and Rome, and with all the fyftems of ancient and modern philofophy, as well as the manners and cuftoms of ancient and modern times. His extenfive erudition appears in his "Argumenta Platonis," annexed to the edition of Plato, printed at Deux-Ponts; in his prize effay, entitled "Difputatio de Quæftione quæ fuerit magicarum artium origo," and in various other differtations. In philofophy he was in early life a dogmatift, and in the latter period of his life inclined to fcepticifm. His works, which, befides thofe already mentioned, were numerous, and relate chiefly to the hiftory of philofophy, and its different fyftems, afford ample evidence of his affiduity and labour. Monthly Magazine. Gen. Biog.

TIEFENSEE, in *Geography*, a town of Pruffia, on a lake of the fame name; 20 miles S. of Brandenburg.

TIEFF, a town of Pruffia, in the province of Bartenland; 7 miles S.E. of Angerburg.

TIEFFENAW, a town of Pruffian Pomerelia; 15 miles S. of Marienburg.

TIELLEN-HEAD, a cape of the county of Donegal, on the weft coaft of Ireland. N. lat. 54° 41'. W. long. 8° 40'.

TIEM, a town of Afia, in the kingdom of Laos, on the Mecom; 90 miles S.S.E. of Lantchan.

TIEN, or Lien, a city of China, of the fecond rank, in Quang-tong; 960 miles S. of Peking. N. lat. 24° 50'. E. long. 111° 49'.—Alfo, a town of Corea; 25 miles N.N.E. of King-ki-tao.—Alfo, a city of China, of the fecond rank, in Quang-fi, on the north fide of the Pofoi: 1120 miles S.S.W. of Peking. N. lat. 23° 46'. E. long. 106° 19'.

TIEN-CHAN, a town of Corea; 53 miles W.N.W. of Han-tcheou.

TIENEN. See Tirlemont.

TIENGEN, or Thiengen, or *Thungen*, a town of Germany, in the principality of Klettgau, on the Wutach, formerly, with its diftrict, conftituting a lordfhip; 29 miles E. of Balo. N. lat. 47° 42'. E. long. 8° 17'.

TIENHOVEN, a town of Holland, on the Leck; 6 miles S. of Schoonhoven.—Alfo, a town of Utrecht; 7 miles N. of Utrecht.

TIEN-SING, a great port of China, on the river Pei-ho. Its Chinefe name literally fignifies "heavenly fpot;" and in the time of Marco Paolo, when it is fuppofed to have been much larger than at prefent, it was called "Citta Celefte:" and it is faid to have a claim on this appellation from its fituation in a genial climate, fertile foil, dry air, and ferene fky. It is the general emporium for the northern provinces of China, and is built at the confluence of two rivers, from which it rifes in a gentle flope. The palace of the governor ftands on a projecting point, commanding a broad bafon, or expanfe of water, produced by the union of the rivers, and almoft covered with veffels of different fizes. Thefe two rivers are the Pei-ho and the Yun-leang-ho, or grain-bearing river, from the quantities of wheat conveyed upon it from the province of Shan-fee, and fent up by the Pei-ho to the neighbourhood of Peking. Over thefe rivers, where they unite, is a bridge of boats: and along the quays were fome temples and other handfome edifices, but the reft confifted chiefly of fhops for the retail of goods, and alfo warehoufes, together with yards, and magazines for maritime ftores. The houfes at Tien-fing are chiefly built of brick, of a leaden-blue colour. Few are red: the pooreft are pale brown. Many of the houfes are two ftories high.

TIEN-TCHA, or *New Gibraltar*, a mountain of Cochin-china, which forms the harbour of *Turon;* which fee.

TIENTONG, a town of Siam; 350 miles N.N.W. of Juthia.

TIEN-TSANG, a town of Thibet; 268 miles E.S.E. of Hami.

TIEPOLO, Giovanni Batista, in *Biography*, was one of the laft of the eminent Venetian painters. He was born at Venice in 1697, and was a fcholar of G. Lazzarini; but he afterwards ftudied the works of P. Veronefe. He poffeffed a quick invention, and great freedom of hand, and was admirably qualified for the execution of large frefco works upon ceilings, &c.; where great facility of handling, and richnefs of colouring, will often apologize for the want of higher qualities, particularly in allegoric or grotefque fubjects. Tiepolo was employed in many of the palaces in Italy, but moft honoured by the employment he received from the king of Spain, who engaged him to adorn his palace at Madrid. He died at Madrid in 1770, at the age of 73. He etched many of his own defigns with great neatnefs and tafte.

TIER, in *Sea Language*, the name of the feveral ranges of guns mounted on one fide of a fhip's deck; which, according as they are placed on the lower, middle, or upper decks, are called the lower, middle, or upper tier.

Tier *of the Cable*, denotes a range of the fakes or windings of the cable, which are laid within one another in an horizontal pofition, fo as that the laft becomes the innermoft.

Tier *Cable*, is the hollow fpace in the middle of a cable, when it is coiled.

Tier, in *Organ-Building*, is ufed to diftinguifh the different ranks or ranges of pipes (as a tier of guns in men of war) in the front of the inftrument, and even in the interior of the cafe, when the compound ftops have feveral ranks of pipes, as the fefquialter, furniture, and cornet.

TIERBY, in *Geography*, a town of Sweden, in the province of Halland; 6 miles S.E. of Helmftadt.

TIERCE', a town of France, in the department of the Mayne and Loire; 3 miles S. of Chateauneuf.

Tierce, or *Teirce*, in *Commerce*, a meafure of liquid things,

things, as wine, oil, &c. containing the third part of a pipe, or forty-two gallons. See Measure.

The tierce is alſo a weight by which proviſions are ſold in Ireland. The tierces, barrels, and firkins are not tared, but the pieces in each caſk muſt be of the following weight and number:

		lbs.				lbs.	
Beef. —	Navy	304	*per* tierce,	being	38 pieces of	8	each.
	India	336	ditto	-	42 -	8	
	Meſs	304	ditto	-	38 -	8	
	Ditto	200	*per* barrel	-	25 -	8	
	Ditto	100	*per* firkin	-	25 -	4	
Pork. —	India	318	*per* tierce	-	53 -	6	
	Navy	320	ditto	-	80 -	4	
	Army	208	*per* barrel	-	52 -	4	
	Meſs	200	ditto	-	50 -	4	
	Ditto	100	*per* firkin	-	25 -	4	

Tierce, in *Muſic*, a 3d. The higheſt ſtop in an organ, called the tierce, is a major 3d above the 15th, every ſound being a 17th above the diapaſon. See Third.

Tierce *de Picardie*, in *French Muſic*, and indeed all choral muſic of old maſters in a minor key, is terminated with a ſharp 3d, which the French now call *tierce de Picardie*, on account of the great number of cathedrals in that province, where it continues ſtill in uſe.

Padre Martini (Saggio di Contrap. parte prima, 23.) recommends the terminating minor movements with a ſharp 3d; a practice which Rouſſeau (Dict. de Muſ.) cenſures as Gothic, and a proof of bad taſte. If the firſt of theſe excellent writers wiſhed only to preſerve its uſe in the church, and the ſecond to baniſh it elſewhere, they were both right, however their opinions may ſeem to claſh. The learned author of the Saggio di Contrappunto, who was ſo perfectly acquainted with all the beauties and effects of choral muſic, is certainly more to be relied on in whatever concerns it, than the animated author of the Dictionnaire de Muſique; who, with the moſt refined taſte and exalted views with reſpect to dramatic compoſitions, had neither time nor opportunity ſufficiently to explore the myſteries of canto fermo, or to become a very profound contrapuntiſt. For our own part, though we never wiſh to hear a ſong or glee in a minor key, and with a ſharp 3d; yet there is ſomething ſo ſolemn and grateful in theſe terminations of eccleſiaſtical compoſitions, that we ſhould be very ſorry if the practice were not continued. And if we conſider the relation and compoſition of the ſeveral ſtops in an organ, we ſhall find, that as every ſingle key in the chorus of that inſtrument has a complete chord with a ſharp 3d to it, when we dwell on a chord with a flat 3d, while the tierce, cornet, ſeſquialter, and ſometimes the furniture, are ſounding the ſharp 3d, it affords an additional reaſon for the origin and continuance of the practice, beſides the peculiar properties of tonal modulation.

Tierce, in *Gaming*, a ſequence of three cards of the ſame colour.

Tierce, in *Fencing*. See Guard and Thrust.

Tierce *Order*. See Third *Order*.

Tierce *Point*. See Third *Point*.

TIERCED, Tierce, in *Heraldry*, denotes the ſhield to be divided by any of the partition lines, party, coupy, tranchy, or tailly, into three equal parts, of different colours or metals.

If the chief and baſe be of the ſame colour when divided by a feſſe, they blazon it by expreſſing the colour, and mentioning the feſſe; otherwiſe, they ſay, it is *tierce in feſſe*, and mention each of the colours, or *tierce in pale*, if ſo divided in pale.

TIERCEL, in *Falconry*, a name given to a male hawk, as being a third part leſs in ſize than the female.

TIERCELET. See Tassel.

TIERDILL, in *Geography*, a town of Hindooſtan, in Viſiapour; 20 miles W. of Galgala.

TIERPIED, a town of France, in the department of the Channel; 3 miles E. of Avranches.

TIERRA. See Terra.

Tierra *Bomba*, a ſmall iſland near the coaſt of South America, at the entrance of the harbour of Carthagena; where, in 1741, the Engliſh erected a battery.

TIERY, a town of Sweden, in the province of Upland; 30 miles N. of Upſal.

TIES, aboard a ſhip, are thoſe ropes by which the yards hang; and when the haliards are ſtrained to hoiſe the yards, theſe ties carry them up.

TIESSERBACH, in *Geography*, a river of Wurtemberg, which runs into the Neckar, near Nurtingen.

TIETAR, a river of Spain, which runs into the Tagus, near Talavan, in Eſtremadura.

TIE-TCHEOU, a town of Chineſe Tartary, in the country of Kokonor: 688 miles S.E. of Hami. N. lat. 33° 56′. E. long. 102° 54′.

TIETE, or Anhembi, a river of Braſil, which runs into the Parana.

TIFACOUM, a word uſed by ſome of the chemical writers to expreſs quickſilver.

TIFATA Mons, in *Ancient Geography*, a mountain of Italy, in Campania, near Capua. The table of Peutinger has placed here two temples, one deſignated by the words "Ad Dianam," the other by thoſe of "Jovis Tifationus."

Tifata, a town of Italy, in Latium. Pliny.

TIFATUM, a word uſed by ſome of the chemical writers to expreſs ſulphur.

TIFER, in *Geography*, a town of the duchy of Stiria; 3 miles S. of Cilley.

TIFERNUM, or Tifernus, in *Ancient Geography*, a river of Italy, in Samnium.

Tifernum *Metaurum*, a town of Italy, in Samnium. Livy.

Tifernum *Tiberinum*, or *Tifernum of the Tiber*, *Citta di Caſtello*, a town of Italy, in Umbria, to the N.W. towards the banks of the river Tiber. It was municipal.

TIFESELT, in *Geography*, a town of Fez; 12 miles N.E. of Sallee.

TIFFAUGES, a town of France, in the department of the Vendée; 9 miles E. of Montaigu.

TIFFE *de Mer*, in *Natural Hiſtory*, a name given by count Marſigli to a ſpecies of ſea-plant, as he ſuppoſes it to be, commonly but erroneouſly reckoned among the ſpunges, and called by authors a *branched ſpunge*. This author has called it by this name from its reſemblance to the heads of the *typha paluſtris*, or cat's tail, when ripe in the month of September.

The ſpunges muſt be of a lax and cavernous texture; but this ſubſtance is ſmooth and firm, and has no inequalities on its ſurface, excepting a few ſhort hairs, which give it a velvety look, when firſt taken out of the water. It is a very elegant and beautiful ſubſtance; it grows to two feet in height, and is very elegantly branched; it grows on rocks and ſtones, and, when firſt taken out of the ſea, is full of a viſcous water, as yellow as the yolk of an egg; but when this water is preſſed out, and the ſubſtance dries, it loſes its yellow, and becomes of a duſky-brown colour: it is very tough and firm while in the water, but when dry it uſually

uſually breaks of itſelf into little pieces, and may be crumbled to powder between the fingers. This is a very ſtrong proof, among others, of its not being of the nature of the ſpunge.

When viewed by the microſcope, the whole ſurface is found to be covered with extremely fine and ſlender hairs; and, among theſe, there is an infinity of little apertures, through which the ſea-water makes its way.

When a branch of it is cut tranſverſely, there are ſeen a number of long and fine canals, by means of which the water, received at theſe ſuperficial apertures, is conveyed to its whole ſubſtance. Marſig. Hiſt. de la Mer, p. 82.

Subſtances of this kind are now known to be of animal and not of vegetable origin. See Coral.

TIFFENETH, in *Geography*, a town of Pruſſia, in the province of Natangen; 10 miles S. of Brandenburg.

TIFFESCH, or Tifas, anciently *Theveſte*, a town of Algiers; 40 miles S. of Bona. N. lat. 36° 20′. E. long. 7° 40′.

TIFLISBERG, a mountain of Switzerland, between the cantons of Uri and Unterwalden.

TIGA, in *Ancient Geography*, a town of Africa, in Mauritania Cæſariana, near the coaſt of the Atlantic. Strabo.

Tiga, in *Geography*, a ſmall iſland in the Eaſt Indian ſea, near the north-weſt coaſt of the iſland of Borneo. N. lat. 6° 25′. E. long. 112° 14′.

TIGAON, an iſland in the Indian ſea, near the north-weſt coaſt of the iſland of Borneo. N. lat. 6° 10′. E. long. 128° 48′.

TIGARA, in *Ancient Geography*, a town of Africa, in the interior of Mauritania Cæſariana. Ptol.

TIGAREA, in *Botany*, a barbarous or arbitrary name, of which its publiſher Aublet has given no explanation.—Aubl. Guian. 917. Juſſ. 339. Lamarck Illuſtr. t. 826.—Schreber admitted the genus, under the name of *Rhinium*, in his Gen. 701, but in his *Addenda* to that work, 833, reduced it to Tetracera; ſee that article. Mr. Purſh, however, has reſtored the genus and the name, in his *Flora Americæ Septentrionalis*, 333, where he has, not without ſome doubt, referred hither a very curious new ſhrub, found in the meadows of the Rocky-mountains, and on the Columbia river, by the name of *T. tridentata*, t. 15. This has crowded, wedge-ſhaped, hoary, three-toothed *leaves*, and ſolitary, terminal, yellow *flowers*, the ſize of hawthorn-bloſſoms. That it is very diſtinct in genus from Aublet's *Tigarea* we have no doubt, being very nearly akin to the *Rubus japonicus* of Linnæus, *Corchorus japonicus* of Thunberg, as has lately been pointed out by M. De Candolle, in a paper read before the Linnæan Society. But it ſeems to us that the genus of neither of theſe ſhrubs can as yet be determined, for want of perfect fruit.

TIGAUDA, in *Ancient Geography*, a municipal town of Africa, in Mauritania Cæſariana, upon the route from Ruſucurrum to Cala, between Caſtellum Tingitanum and Oppidum Novum. Anton. Itin.

TIGE, in *Architecture*, a French term for the ſhaft or fuſt of a column, comprehended between the aſtragal and the capital.

TIGEGUACU, in *Ornithology*, the name of a ſmall Braſilian bird, of the ſize of a ſparrow, and with a ridged and triangular bill, in which it reſembles the mouche-rolle; its eyes are of a fine blue, and its legs and feet yellow; it is all over of a deep black, but that it has a large blood-red ſpot on the top of its head; its tail is ſhort and black.

TIGELLIUS, in *Biography*, a muſician, born in Sardinia, grandſon of Phamea, a muſician in great favour at Rome in the time of Julius Cæſar. Horace has handed him down to poſterity as a mercileſs ſpendthrift, and an egregious coxcomb.

> "Ambubajarum collegia Pharmacopolæ
> Mendici, Mimæ, Balatrones, hoc genus omne
> Mæſtum, ac ſolicitum eſt cantoris morte Tigelli:
> Quippe benignus erat."—Sat. lib. i. 2.

Tigellius was not only much in favour with Julius Cæſar, but afterwards with Cleopatra and Auguſtus: he was an able muſician, an ingenious buffoon, and ſubtle courtier. What Horace has ſaid of his caprice, has often been applied, and we fear will ever continue to be applied, to muſicians of a ſimilar diſpoſition.

> "Omnibus hoc vitium ut cantoribus, inter amicos
> Ut nunquam inducant animum cantare rogati;
> Injuſſi nunquam deſiſtant."—Sat. lib. i. 3.

TIGENHAGEN, in *Geography*, a town of Pruſſian Pomerelia; 12 miles N. of Marienburg.

TIGENWIT, a town of Africa, in Negroland; 45 miles N. of Arguin.

TIGER, a ſmall iſland in the Spaniſh Main, near the coaſt of Darien. N. lat. 8° 35′. W. long. 77° 30′.

Tiger, *Tigris*, in the Linnæan ſyſtem of *Zoology*, is a ſpecies of cat, or Felis *Tigris*; which ſee.

The tiger (formed of גיר, *ſagitta, a dart*, whence תגיר) has its name from its ſuppoſed ſwiftneſs. See the article Felis *Tigris*.

Tiger, *American*. See Felis *Onca*.

Tiger-*Cat*. See Felis *Capenſis*.

Tiger, *Hunting*, or *Leopard*. See Felis *Leopardus*.

Tiger, *Man*. See Mantegar.

Tiger-*Shell*, a name given to the red voluta, with large white ſpots.

In the Linnæan ſyſtem, the tiger-ſhell is a ſpecies of the cypræa. See Shells.

TIGGREE, in *Geography*, a town of Hindooſtan, in the circar of Sumbul; 17 miles S. of Nidjibabad.

TIGH, in our *Old Writers*, a cloſe or incloſure mentioned in ancient charters, and is ſtill uſed in Kent in the ſame ſenſe.

TIGHMAN's Island, in *Geography*, a ſmall iſland in the Cheſapeak. N. lat. 38° 48′. E. long. 76° 21′.

TIGHT, in *Sea Language*, expreſſes the quality by which a veſſel reſiſts the penetration of any fluid, whether compreſſing its ſurface, or contained within it. Hence a ſhip is ſaid to be tight, when her planks are ſo compact and ſolid, as to prevent the entrance of the water in which ſhe is immerſed; and a caſk is called tight, when the ſtaves are ſo cloſe, that none of the liquid contained in it can iſſue through or between them. In both ſenſes, tight is oppoſed to leaky. Falconer.

TIGILLUM, a word uſed by ſome chemiſts to expreſs the tile with which they cover the mouth of their crucibles; and, by others, for the crucible itſelf.

TIGILSKOI, in *Geography*, a town of Kamtſchatka; 80 miles W. of Ukinſkoi. N. lat. 57° 20′. E. long. 157° 44′.

TIGINE. See Bender.

TIGIS Herba, in *Ancient Geography*, a town of Africa, in the interior of Mauritania Cæſariana, near a river, and S. of Icoſium. In the Itin. of Anton. it is marked on the route from Ruſucurrum to Scaldæ.

TIGLIUM, in *Botany*. See Pinei *Nuclei*, &c.

TIGNALE, in *Geography*, a town of the iſland of Corſica; 30 miles S.E. of Corte.

TIGNARES, a town of Brafil, and chief place in the captainfhip of Rio Grande.

TIGNES, a town of France, in the department of Mont Blanc; 3 miles S.E. of St. Maurice.

TIGRA, in *Ancient Geography*, a town of Lower Mœfia, on the route from Viminiacum to Nicomedia, between Exantaprillis and Appiaria. Anton. Itin.

TIGRAH, in *Geography*, a town of Hindooftan, in Bahar; 40 miles E.S.E. of Hajypour. N. lat. 25° 28′. E. long. 86° 7′.

TIGRANA, in *Ancient Geography*, a town of Afia, in the interior of Media. Ptol.

TIGRANAAMA, a town of Afia, in the Greater Armenia, and one of thofe which were fituated to the E. of the fources of the Tigris. Ptol.

TIGRANES, *the Great*, in *Biography*, king of Armenia, after having been delivered by his father as a hoftage to the Parthians, was liberated and affumed the crown about the year B.C. 93. Having formed an alliance with Mithridates, king of Pontus, againft the Romans, he married Cleopatra, daughter of that prince; and, agreeably to the terms of his alliance, he reduced Cappadocia, and caufed Ariarathes, the fon of Mithridates, to occupy the throne inftead of Ariobarzanes, who was fupported by the Romans. Soon after this event, Tigranes was offered the crown of Syria, and accepted it B.C. 83; and when he had taken poffeffion of the kingdom, governed it for many years by a lieutenant. He then invaded Leffer Armenia, and completely ruined it in the courfe of one campaign. Having made various other conquefts, he founded the city of Tigranocerta, on the fpot in Armenia where he had received the crown. He afterwards joined Mithridates, his father-in-law, in a war againft the Romans; but when Mithridates, after having been defeated by Lucullus, took refuge in Armenia, he was coldly received by Tigranes, who granted him a caftle for his refidence, with a royal allowance. By a feries of fubfequent adventures, which proved fuccefsful, Tigranes was fo elated, that he affumed the title of king of kings, and exacted from all who approached him tokens of the moft humiliating reverence. A change however in his fituation was rapidly approaching; for Lucullus, the Roman general, having reduced the kingdom of Pontus, availed himfelf of a preconcerted circumftance for marching in a hoftile manner into Armenia, and laid fiege to Tigranocerta. Tigranes advanced to its relief; but meeting with Lucullus at the head of a fmall army, an engagement enfued, the refult of which was the pufillanimous flight of Tigranes, and the difperfion of his numerous army; and though he received confiderable fuccour from Mithridates, and levied frefh troops, he could not prevent the furrender of Tigranocerta to Lucullus; and this furrender was followed by a fignal defeat of the united forces of Mithridates and Tigranes; upon which the latter prince withdrew to the remoteft part of his dominions. When Pompey fucceeded Lucullus in the command of the Roman army, Mithridates and Tigranes, availing themfelves of an interval of inaction, recovered Armenia and a great part of Pontus; but their fuccefs was interrupted by the rebellion of the fon of Tigranes, who took up arms againft his father; but being defeated, he fought refuge in Parthia, and perfuaded Phraates, the fovereign of that country, to declare war againft the Armenians. Phraates, with a numerous army under his command, compelled Tigranes to withdraw to the mountains, and befieged his capital Artaxata. The younger Tigranes being left in command of the Parthian army, was defeated by his father, who raifed the fiege of Artaxata. Tigranes afterwards joined the Romans, and conducted Pompey into Armenia againft his father. Unable to refift this invafion, he determined to furrender himfelf to Pompey, and to confide in his generofity. Upon being introduced to the prefence of the Roman general, he took off his diadem, and proftrated himfelf at Pompey's feet. Pompey raifed him, and replaced the royal diadem; and in compromifing the difpute between the father and fon, reftored to the former the kingdom of Armenia, and the greateft part of Mefopotamia, but impofed upon him a fine of 6000 talents for making war upon the Roman people. He was alfo obliged to refign the crown of Syria, which he had held for eighteen years, and likewife the provinces of Cappadocia and Cilicia. From this time Tigranes was received as a friend and ally of the Roman people, and by maintaining their friendfhip, he was enabled to retain his dominions in peace to the end of his life, which terminated in the eighty-fifth year of his age. Anc. Un. Hift.

TIGRANOCERTA, Sered, in *Ancient Geography*, a town of Afia, in Greater Armenia, at fome diftance to the left of the Tigris, on the river Nicephorius, and N.W. of its mouth in the Tigris. This town was built by Tigranes, in the time of the Mithridatic war. According to Plutarch, it was large, handfome, populous, powerful, and rich. Tacitus reports that Tigranocerta was fituated on an eminence, nearly furrounded by the Nicephorius, and that it was well fortified and garrifoned.

TIGRE, in *Geography*, a fmall ifland in the Pacific ocean, at the entrance into Amapalla bay. N. lat. 13° 10′. W. long. 88° 44′.

Tigré, a province of Abyffinia, about 200 miles in length, and 120 in breadth. What in a fpecial manner makes the riches of Tigré, is, that it lies neareft the market, which is Arabia; and all the merchandize deftined to crofs the Red fea muft pafs through this province, fo that the governor has the choice of all commodities wherewith to make his market. The ftrongeft male, the moft beautiful female, the pureft gold, the largeft teeth of ivory, all muft pafs through his hand.

TIGRIDIA, in *Botany*, the *Flos Tigridis* of old authors, fo called from its beautifully fpotted corolla, refembling the fkin of a tiger, or rather of a leopard or lynx. This fine Mexican plant, being known to fyftematic botanifts from early engravings only, did not find a place in their arrangements, till Mutis fent a drawing of it to Linnæus, under the name of *Pavonia*, in honour of one of his ableft pupils, Pavon, as appears by his letters; and not, as fome have fuppofed, becaufe of any refemblance in the fpots of the flower to a peacock's tail. Being judged a *Ferraria*, it was referred to that genus in the *Supplementum;* but Juffieu, and after him Mr. Gawler, has reftored the genus of Mutis, under the above name, there being another Pavonia, which the reader may fee in its proper place.—Juff. Gen. 57. Gawler, (now Ker Bellenden,) in Sims and Kon. Ann. of Bot. v. 1. 246. Ait. Hort. Kew. v. 4. 137. (Ferraria; Lamarck Illuftr. t. 569.)—Clafs and order, *Monadelphia Triandria.* Nat. Ord. *Enfatæ*, Linn. Gawler. *Irides*, Juff.

Gen. Ch. *Common Sheath* two-edged, of two compreffed pointed valves; *partial* ones fmaller, two-ranked, alternate, fingle-flowered. Perianth none. *Cor.* fuperior, regular, of fix petals; the three outermoft ovate-oblong, acute, concave at the bafe; flightly contracted towards the middle: three innermoft much fmaller, oblong-fiddle-fhaped, pointed, convex, recurved, haftate at the bafe. *Stam.* Filaments three, firmly united into a triangular, abrupt, erect column, longer than the inner petals; anthers feffile at the top of the column,

column, erect, linear-oblong, acute, converging at the points, bursting externally. *Pist.* Germen oblong, abrupt, with three rounded angles; style thread-shaped, rather longer than the column of the stamens; stigmas three, slender, acute, deeply divided. *Peric.* Capsule oblong, bluntly triangular, abrupt and scarred at the top, of three cells and three valves, the partitions from the centre of each valve. *Seeds* numerous, nearly globose, ranged in a double row in each cell, somewhat angular from mutual pressure.

Eff. Ch. Common Sheath of two leaves. Calyx none. Petals six; the three inner ones smallest, fiddle-shaped, pointed. Stigmas linear, deeply cloven. Capsule of three cells, inferior.

1. T. *Pavonia.* Mexican Tiger-flower. Redout. Liliac. t. 5. Gawler n. 1. Ait. n. 1. (Ferraria pavonia; Linn. Suppl. 407. Willd. Sp. Pl. v. 3. 581. Cavan. Diss. 342. t. 189. f. 1. Andr. Repos. t. 178. F. Tigridia; Curt. Mag. t. 532. Ocoloxochitl, seu Flore Tigris; Hernand. Mex. 276. Tigridis flos; Dodon. Pempt. 693. Ger. Em. 122.)—Native of Mexico and Peru. Said to have been first introduced into the gardens of this country, about the year 1796, by Ellis Hodgson, esq. of Everton, near Liverpool, who liberally communicated it to the nurserymen about London, so that now few ornamental flowers are more easily obtainable. If treated as a greenhouse plant, like the Cape bulbs, the *Tigridia* flowers in spring, ripening abundance of seeds. If planted in the open ground in March or April, the more dry or sandy the soil the better, it will blossom in succession through the autumn, at the end of which the bulbs should be taken up, carefully dried, freed from their very succulent fibres, and preserved from frost till the following spring. Though each flower lasts but one day, as every plant bears several, a plentiful succession may readily be had. The *root* is an ovate bulb, which is eatable when roasted, tasting like a chesnut; from its base are sent down several long, perpendicular, tapering, very juicy, downy fibres. *Stem* two or three feet high, erect, round, leafy, somewhat branched. *Leaves* several, erect, sword-shaped, many-ribbed, plaited, smooth, a foot long. *Flower* inodorous, three or four inches broad, so splendidly variegated with scarlet, crimson, purple and yellow, that no description can do it justice. The ends of the larger *petals* are scarlet; their middle yellow; their base, like the whole surface of the smaller ones, richly spotted. *Stamens* and *pistil* red. It increases by bulbous offsets, as well as by seeds.

TIGRINI, Orazio, in *Biography*, a canon of Arezzo, who published at Venice, in 1588, a Musical Compendium; "Compendio della Musica," which he dedicated to Zarlino, from whom he received a letter of thanks for the laurel-crown with which he had bound his brows; which letter is prefixed to the work, with complimentary verses innumerable from other friends. This Compendium is not only well digested by the author, but rendered more clear and pleasant in the perusal, by the printer, who has made use of large Roman types, instead of Italic, in which most of the books that were published in Italy, before the present century, were printed. This author is the first, in our recollection, who has censured the impropriety and absurdity of composing music for the church upon the subject of old and vulgar ballad tunes. The cadences which he has given in three, four, five, and six parts, and which are good examples of ecclesiastical counterpoint, have been almost all used by Morley, without once mentioning Tigrini's name, either in the text or catalogue of authors whom he has cited. Zarlino, who had adopted the four new ecclesiastical tones proposed by Glareanus, was followed by Tigrini, with whom they seem to have stopped: as no more than the eight ancient tones appear afterwards to have been acknowledged by orthodox ecclesiastical composers; and Zarlino himself, in the last editions of his works, relinquished the idea of twelve modes: as no new harmony or modulation was furnished by the additional four to the contrapuntist, without violating the ancient rules of canto-fermo, which confine all its melody to the different species of octave. It appears from this Compendium, that *contrapunto alla mente*, or extemporary discant upon a plain-song, was still practised in the churches of Italy.

TIGRIS, in *Ancient* and *Modern Geography*, a large river of Asia, which has its source in the mountains of Greater Armenia, about 15 miles S. of the sources of the Euphrates, and pursues nearly a regular course S.E., until its junction with that river at Korna, 50 miles above Bassora. Formerly these rivers discharged themselves separately into the Persian gulf; but they now fall into the sea by a common canal, about 70 miles S. of Bassora. In the time of Pliny their separate beds might be seen. According to the same author, it was named "Deglito," from its source to mount Taurus, which it traversed; and from the place of its discharge on the other side of the mountain, to the sea or Persian gulf, it was called Tigris. This author says that it passed through the lake of Arethusa, without mixing its waters with those of the lake. Strabo and Arrian denominated the mouth of the Tigris "Pasitigris," and Pliny gives this name to that part of the river which separated into two arms, that, after enclosing an island, joined again, and fell into the same bed. Moses (Gen. ii. 14.) calls this river, as it has been supposed, Hiddekel. The cavern of mount Taurus, through which it is said to have passed, was called "Zoroanda;" and as a proof that it was the same river which entered the cavern and passed out of it, any substance thrown into the river on one side of the mountain was discharged by it on the other.

The ancient Persians called this river "Teer," *the arrow*, from the rapidity of its current; and it is now called "Degila," and "Shat-Bagdad," the river of Bagdad. The united rivers of the Tigris and Euphrates are denominated "*Shat-ul-Arab*;" which see.

The Tigris, though a far less noble stream than the Euphrates, is one of the most celebrated rivers in history; and many famous cities have, at different periods, decorated its banks; among which we may reckon, in ancient times, those of Nineveh, Seleucia, Ctesiphon; and in subsequent periods, those of Bagdad, Mosul, Diarbekir, &c.

This river is navigable for boats of twenty or thirty tons burthen as far as the mouth of the Odorneh, but no farther; and the commerce of Mosul is consequently carried on by rafts, supported by inflated sheep-skins. The rafts are floated down the river, and when arrived at Bagdad, the wood of which they are composed is sold without a loss, and the skins conveyed back to Mosul by camels. The Tigris is, on an average, between Bagdad and Korna, about 200 yards wide. The banks are steep, and, for the most part, overgrown with brush-wood, the haunt of lions and other wild beasts. The Tigris rises twice in the year; the first and great rise is in April, and is caused by the melting of the snows in the mountains of Armenia; and the other is in November, produced by the periodical rains. A boat, with a fair wind, will sometimes pass from Bagdad to Bassora in six days, but the common passage is from eight to ten.

The banks of the Tigris, from Tauka-Kesra to Korna, cannot boast of a single village, or even habitation, with the exception of Koot, a miserable place, containing 40 or 50 mud-huts. The city of Wasith, repeatedly mentioned in the Arabian histories, is no longer a place of any consequence; it stands on the banks of the Hye, or great canal. From Korna to the neighbourhood of Bassora, Bassara or Basra, Bafra, there is little or no cultivation; but from thence the country bordering on the banks of the river is covered with plantations of date-trees, which continue, without interruption, almoft to the mouth of the Shat-ul-Arab.

Tigris *Fons*, a fountain of Afia, in the mountains S. of Maxo ne, which formed a ftream that ran towards the S.E. and difcharged itfelf into the lake Arethufa.

Tigris, in *Geography*, a river of China, between Canton and the fea, fo called by Europeans.

Tigris, in *Zoology*. See Felis *Tigris*.

TIGUAZALPA, in *Geography*, a town of Mexico, in the province of Nicaragua, on a river which runs into Amapalla bay; 80 miles N. of Leon. N. lat. 13° 50′. W. long. 87° 36′.

TIGUILLACA, a town of Peru, in the diocefe of La Paz; 10 miles N. of Puno.

TIGURINI, in *Ancient Geography*, a people of Gaul, who eftablifhed themfelves in a canton of the Helvetians, and who joined the Cimbri when they made an attempt to pafs into Italy.

TIGURINUS Pagus, one of the four cantons which compofed the Helvetic confederacy; fuppofed to be Zurich.

TIGUTIA, a place of Italy, in Liguria, N.E. of Monilia.

TIGY, in *Geography*, a town of France, in the department of the Loiret; 12 miles S.E. of Orleans.

TIHAN, a town of Hungary; 20 miles S.W. of Stulweifenburg.

TIHOE, a bay on the S. coaft of the ifland of Bouro. S. lat. 3° 44′. E. long. 126° 27′.

TIHOL, in *Natural Hiftory*, a name given by the people of the Philippine iflands to a fpecies of crane very frequent among them, and remarkable for its fize, being taller than a man when it ftands erect, and holds up its neck. They call it alfo fometimes *tipul*.

TIIB, El, in *Geography*, a town of Perfia, in the province of Chufiftan, on the Ahuaz river; 70 miles N.W. of Toftar.

TIJEGUACU-PAROARA, in *Ornithology*, the name of a Brafilian bird, of the fize of a lark; it has a fhort and thick beak, brown above and whitifh below; its head, throat, fides, and the lower part of its neck, are of a fine yellow, variegated with red in the female, and all over of a perfect blood-red in the male; the upper part of the neck, and the whole back, are grey, with a mixture of brown; the wings are brown, tipped with white; the tail is of the fame colour; and the fides of the neck, the breaft, belly, and thighs, are white. Marggrave's Hift. Brafil.

TIJEPIRANGA, the name of a Brafilian bird of the fparrow kind. It is a little larger than the lark; its whole body, neck, and head, are of a very fine red or blood colour, and its wings and tail black.

There is another fpecies alfo of this bird, which is of the fize of a fparrow, and is of a blueifh-grey on the back, white on the belly, and of a fea-green on the wings; the legs of this are of a pale grey. Marggrave's Hift. Brafil.

TIJOLA, in *Geography*, a town of Spain, in the province of Grenada; 5 miles S.W. of Purchena.

TIJOUCA, a cultivated valley of the Brazils, in the vicinity of Rio de Janeiro, fituated, as it were, in the bottom of a funnel, being furrounded on all fides by mountains, excepting to the fouthward, where a fmall opening admits an arm of the fea. The valley is watered by a clear ftream, precipitated down a fteep and broad rock of granite, forming a magnificent cafcade. The foil requires little labour of cultivation: indigo, manioc, coffee, cacao or chocolate trees, fugar-canes, plantains, and orange and lime-trees growing promifcuoufly, and fome fpontaneoufly, in the fpace of twenty fquare yards. Coffee and indigo claim the chief attention. The temperature of the valley is very hot, on account of its confined fituation and the reflection of the mountains. Fahrenheit's thermometer in the fhade about four in the afternoon ftood at 88°. Staunton's Emb. to China, vol. i.

TIIZ, or Tiz, a town of Perfia, in the province of Mecran, at the mouth of the Kurene; 75 miles S. of Kidge. N. lat. 25° 25′. E. long. 60° 24′.

TIKAX, a town of Mexico, in Yucatan; 68 miles S. of Merida.

TIKE, the Zetland name for an otter, of which there are many to be found about that ifland. Phil. Tranf. N° 473. fect. 8.

Tike is alfo ufed for a fmall bullock or heifer, for a particular fort of worm, and in Scotland for a dog.

TIKIOB, in *Geography*, a town of Denmark, in the ifland of Zealand; 4 miles S.W. of Helfingoer.

TIKITHOCKTHOCK, a fettlement on the E. coaft of Labrador. N. lat. 56° 15′. W. long. 60° 5′.

TIKOO, a town of Bengal; 30 miles S.W. of Ramgur. N. lat. 23° 29′. W. long. 84° 55′.

TIKOTSCHIN, a town of the duchy of Warfaw; 24 miles N. of Bilefk.

TIL, a town of Perfia, in the province of Adirbeitzan; 60 miles N.W. of Tauris.

TILA Navi, one of the Lipari iflands; 6 miles S.S.W. of Stromboli.

TILAMUNGALUM, a town of Hindooftan, in Myfore; 5 miles S. of Ouffoor.

TILBORG, a town of Brabant, celebrated for its manufacture of cloth; 10 miles S. of Bois-le-Duc.

TILBURREAH, a town of Bengal; 30 miles N.N.E. of Doefa.

TILBURY, a townfhip of Upper Canada, near lake St. Clair.

Tilbury, *Weft*, a village and parifh in the hundred of Barftable, and county of Effex, England; is fituated 24 miles S. by W. from Chelmsford, and 27 E. by S. from London. It appears to have been an epifcopal feat of Cedda, bifhop of the Eaft Saxons, who in the 7th century propagated the Chriftian religion in this county, and built churches in feveral places, but "efpecially," as Bede reports, "in the city, which, in the language of the Saxons, is called Ythanceftre; and alfo in that which is named Tillaburgh (the firft of which places is on the banks of the river Pant, the other on the banks of the Thames), where gathering a flock of fervants of Chrift, he taught them to obferve the difcipline of a regular life, as far as thofe rude people were then capable." Ythanceftre is fuppofed to have ftood at the mouth of the river Pant, or Blackwater, but has been entirely engulphed by the fea. Tilbury is now only a fmall village, containing, as the return of the year 1811 ftates, 44 houfes and 117 inhabitants. A medicinal fpring was difcovered here in the year 1727, of great efficacy in cafes of hæmorrhage, fcurvy, and fome other diforders. (See Tilbury-*Water*.) The marfhes in this, and the contiguous parifhes, are chiefly rented by the grazing butchers of London, who generally ftock them with Lincolnfhire and Leicefterfhire wethers, which are fent hither about Michaelmas, and feed till Chriftmas, when they are conveyed to the metropolis for fale.

On the banks of the Thames, in this parifh, is Tilbury-Fort, originally built as a kind of block-houfe by Henry VIII., but enlarged into a regular fortification by Charles II., after the Dutch had failed up the river in the year

year 1667, and burnt three Engliſh men of war at Chatham. Various additions have been ſince made; and it is now ſtrongly garriſoned, and defended by a great number of guns. Some traces of the camp formed here to oppoſe the threatened invaſion of the Spaniſh armada, in the time of Elizabeth, are yet viſible.—Beauties of England and Wales, vol. v. Eſſex; by J. Britton and E. W. Brayley.

Tilbury-*Water*, in *Medicine*, is an acidulous or ſaline water, iſſuing from a ſpring ſituated near a farm-houſe at Weſt Tilbury, near Tilbury-Fort, in Eſſex. This water is of a ſtraw-colour, ſoft and ſmooth to the taſte, but leaving, after agitation in the mouth, a ſmall degree of roughneſs on the tongue; it throws up a ſcum variegated with ſeveral colours, which feels greaſy; and effervesces with ſpirit of vitriol; it mixes ſmooth with milk, but curdles with ſoap; when boiled, it turns milky, but is fined by a fourth part of mountain-wine, and by acids; it operates chiefly by urine, though it is ſomewhat purgative, and increaſes perſpiration. This water is eſteemed for removing glandular obſtructions, and hence is alſo recommended in ſcurvies and cutaneous diſeaſes; it is good in bloody fluxes, purgings, and the like: in diſorders of the ſtomach ariſing from acidity, in the gravel, fluor albus, and immoderate flux of the menſes. As a diuretic, it is beneficial in dropſical complaints. It gently warms the ſtomach, ſtrengthens the appetite, and promotes digeſtion. The uſual doſe is a quart a-day. This water is ſuppoſed to owe its virtue to a native alkaline ſalt, which may be obtained from it by evaporation, and to its fixed air, which, however, being very volatile, ſoon exhales when the water is heated or ſtands for ſome time expoſed. Elliot's Account of Mineral Waters, &c. p. 220.

TILCARA, in *Geography*, a town of South America, in the province of Tucuman; 32 miles N.N.W. of St. Salvador de Jugui.

TILDIZ Dagh, a mountain of Aſiatic Turkey; 10 miles S. of Tocat.

TILE. See Tyle.

Tiles, *Draining*, in *Agriculture*, ſuch as are made of particular forms and dimenſions, for the purpoſe of draining and taking away the water that ſtagnates in or upon land. They are ſaid to conſtitute a very neat and convenient, as well as cheap and beneficial material for this uſe in a great many caſes, eſpecially as they are exempt from the common duties on ordinary tiles and bricks. They have the advantage too of being capable of being laid with much facility and diſpatch, and of requiring leſs cutting than in the methods uſually had recourſe to in the common practice of freeing land from wetneſs. They are made and employed in ſome diſtricts, as Cheſhire, &c. with complete ſucceſs and much utility.

Tile-*Earth*, that ſort of earthy material of the ſtrong clayey kind which is uſed in the making of tiles. It is alſo a term in farming which is ſometimes employed to ſignify a ſtrong, ſtiff, ſtubborn ſort of land or ſoil that cannot be brought into cultivation, and be managed without very great labour, trouble, and expence, but which, when once reduced and got into order, is, in ſome caſes, very productive and laſting in its returns.

Vaſt ſtrength of men and teams is often requiſite in working ſuch lands as farms, as they cannot be effectually improved and got into a proper ſtate, except by the application and incorporation of large quantities of different proper rich earthy and other ſuitable ſubſtances.

The farmer ſhould always calculate well before engaging farms conſiſting greatly of this ſort of land or ſoil.

The general opinion among the moſt attentive and diligent farmers in the county of Eſſex is, that even the paſture lands upon the wet, cold, tile-earth bottoms, ſhould be kept under the plough two or three years in twenty, in order to render them in the moſt ſuitable and productive ſtate.

Tile, or *Tyle*, in *Aſſaying*, a ſmall flat piece of dried earth, uſed to cover the veſſels in which metals are in fuſion.

Theſe are made of a mixture of clay and ſand, or powder of flints, or broken crucibles, made into a paſte, and ſpread thin with a rolling-pin, on a table or flat ſtone. From theſe cakes or plates, pieces are to be cut with a knife, to the ſhape and ſize of the mouths of the veſſels to be cloſed. It is beſt then to pare away the borders of the under ſurface of the piece thus cut off, that this ſurface may immediately touch all the way the edge of the mouth of the veſſel, leaving a prominent rim, by which means the tile fits cloſe upon the veſſel, and is not ſo eaſily diſplaced by accidents, as a touch of the poker, or of the coals put on to mend the fire, as it otherwiſe would be. Finally, put on the middle of the outer ſurface a ſmall bit of the ſame matter, which ſerves as a kind of handle, by means of which it may be conveniently managed by the tongs, and eaſily taken off and put on again at pleaſure. Cramer, Art. Aſſ. p. 66.

TILENUS, Daniel, in *Biography*, a doctor and profeſſor of theology at Sedan, in France, was born in Sileſia, in 1563, and was the firſt foreigner who wrote againſt Arminius, though he afterwards changed his opinion and ſupported the doctrine of that theologian. He alſo took part in a violent controverſy with Du Moulin. A reconciliation was attempted between the diſputants, in which the elector palatine, the duke de Bouillac, and king James I. of England, interpoſed; and a national ſynod of the French churches was held for this purpoſe at Tonneins in 1614. The attempt to produce a pacification failed; and Tilenus was deprived of his profeſſorſhip in 1619 or 1620. He then removed to Paris, and afterwards maintained for five days, at Orleans, a diſputation with John Cameron on grace and free-will. In a letter addreſſed to the people of Scotland, he accuſed the Preſbyterians of introducing too many changes in the form of their religion, and praiſed the people of England for admiring epiſcopacy. King James I. cauſed this letter to be printed, and invited the author to England, with an offer of a penſion. Tilenus accepted the offer; but returning to France in order to arrange his affairs, an outcry was in the meanwhile raiſed againſt him in England, and he therefore determined to remain at Paris, where he died in 1633. He was the author of many works in Latin and French, which it is needleſs to recite. Gen. Biog.

TILGUN, in *Geography*, a town of Aſiatic Turkey, in Caramania; 36 miles E.N.E. of Akſhehr.

TILHARA, a town of Hindooſtan, in Rohilcund; 30 miles S.S.E. of Bereilly.

TILIA, in *Botany*, the Lime-tree, or Linden-tree, an ancient Latin name, whoſe origin may perhaps be found in the Greek πτελεα, *the Elm*; but on this ſubject nothing certain, nor indeed very plauſible, has been made out by etymologiſts.—Linn. Gen. 267. Schreb. 355. Willd. Sp. Pl. v. 2. 1161. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 3. 299. Venten. in Sims and Kon. Ann. of Bot. v. 1. 207. Sm. Fl. Brit. 571. Prodr. Fl. Græc. Sibth. v. 1. 362. Purſh 362. Juſſ. 292. Tourn. t. 381. Lamarck Illuſtr. t. 467. Gærtn. t. 113.—Claſs and order, *Polyandria Monogynia*. Nat. Ord. *Columniferæ*, Linn. *Tiliaceæ*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in five deep, concave, coloured, deciduous ſegments, about as large as the corolla. *Cor.* Petals five, alternate with the calyx, oblong, obtuſe, crenate at the ſummit. Nectary a ſcale at the baſe of each petal, not univerſal. *Stam.* Filaments numerous,

merous, thread-ſhaped, the length of the corolla; anthers of two nearly orbicular divaricated lobes, burſting outwards. *Piſt.* Germen ſuperior, roundiſh; ſtyle thread-ſhaped, the length of the ſtamens; ſtigma obtuſe, with five angles. *Peric.* Capſule globoſe, angular, coriaceous or membranous, burſting tardily at the baſe, of five valves and five cells. *Seeds* ſolitary, roundiſh.

Obſ. Two or three of the cells are generally abortive and obliterated. The nectary ſeems confined to the American ſpecies.

Eſſ. Ch. Calyx in five deep ſegments, deciduous. Petals five. Capſule ſuperior, roundiſh, angular, of five cells, and five valves.

An important genus, of uſeful, as well as ornamental, hardy deciduous trees. The bark ſerves for cordage, and for thoſe very ſerviceable mats, manufactured in Ruſſia, ſo well known to our gardeners, and ſo uſeful for packing. The ſmooth, ſoft, white, cloſe-grained wood is eſteemed by carvers, and was preferred by the inimitable Gibbons, for thoſe feſtoons of flowers, fruit, dead game, &c. with which his free and expeditious hand adorned moſt of the great houſes in England. The leaves are ſometimes given to cattle in ſeaſons of ſcarcity in the North. The whole plant abounds with mucilage, and the ſap is reported to afford ſome ſugar. Nothing is more delicioufly fragrant than the flowers of the whole genus, which bees frequent in great numbers, as they yield plenty of honey.

Section 1. *Flowers without the ſcaly nectaries.* European ſpecies.

1. T. *europæa.* Common Smooth Lime-tree. Linn. Sp. Pl. 733. Willd. n. 1. Ait. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 610. Fl. Dan. t. 553. (T. platyphyllos; Scop. Carn. v. 1. 373? Venten. n. 2. T. vulgaris platyphyllos; Bauh. Hiſt. v. 1. p. 2. 133. Raii Syn. ed. 2. 316. T. fœmina; Ger. Em. 1483.)—Nectaries none. Capſule coriaceous. Leaves heart-ſhaped, undivided; ſmooth and ſomewhat glaucous beneath, with the branching of their veins woolly. Branches and footſtalks ſmooth.—Native of woods and the borders of meadows, or the ſlopes of hills, in various parts of Europe, from Sweden to Greece, flowering early in July. A tall upright *tree*, with ſmooth, ſpreading, round *branches*, green when tender, afterwards brown. *Leaves* alternate, on longiſh ſtalks, pointed, ſharply ſerrated, almoſt orbicular, about three inches in diameter, entire at the baſe, and their ſides rather unequal or oblique in that part: their upper ſurface of a full bright green, quite ſmooth: under paler, ſomewhat glaucous, with a yellowiſh prominent midrib, and ſeveral other ribs, either oppoſite from the central one, or radiating from the baſe, ſubdivided, connected by parallel tranſverſe veins, all ſmooth as well as the ſurface of the leaf, except at the baſe of each ſide-rib, where is a ſmall, depreſſed, axillary, fringe-like tuft of hairs. *Stipulas* none. *Flower-ſtalks* axillary, ſolitary, ſhorter than the leaves, ſmooth, ſlender, each bearing an irregular umbel or cyme of yellowiſh *flowers*, and very remarkable for a large, ſolitary, oblong, obtuſe, entire, veiny *bractea*, of a pale greeniſh hue, and ſmooth ſurface, united firmly to the ſtalk, and falling off with it. The *germen* is very woolly. *Capſule* obovate, or angular, eſpecially when it ripens more than one *ſeed*, which is not often the caſe. The *flowers* are delightfully fragrant, eſpecially at night. This is the kind of Lime moſt uſually planted for avenues, nor can any thing be more deſirable for that purpoſe. It appears to have taken place of our more ancient elms in king William's time, when alſo it was equally popular in France. The branches naturally feather down to the ground, but will bear clipping without injury. The *leaves* fall perhaps the firſt of all our native trees, eſpecially in the ſquares of London, where the Lime nevertheleſs bears the ſmoky atmoſphere tolerably well. Whether the *T. ulmifolia, ſemine hexagono* of Merrett, mentioned by Dillenius in his edition of Ray's *Synopſis*, 473, be a variety of this, with more perfect fruit, or of any other ſpecies, we have no means of determining.

2. T. *corallina.* Red-twigged Downy Lime-tree. (T. europæa β; Ait. Hort. Kew. ed. 1. v. 2. 229. ed. 2. n. 1. γ; Fl. Brit. n. 1. T. grandifolia; Ehrh. Arb. n. 8. T. foliis molliter hirſutis, viminibus rubris, fructu tetragono; Raii Syn. ed. 2. 316.)—Nectaries none. Capſule coriaceous. Leaves heart-ſhaped, undivided; downy beneath, with the branching of their veins woolly. Branches and footſtalks downy.—Native of various parts of Europe. Plentiful in Stoken-church woods, Oxfordſhire, where it was firſt noticed by Bobart, and where its ſhining red twigs are very conſpicuous. This character, however, is not invariable. We have the ſame ſpecies in Norfolk with brown twigs, and it ſeems to be often planted indifferently with the former. They have not yet been ſeparated as ſpecies, nor did Ehrhart, in publiſhing the preſent under the appellation of *grandifolia*, mean any thing further than to diſtinguiſh it, in common with the foregoing, from his *parvifolia*, hereafter deſcribed. We therefore prefer an older and leſs ambiguous name. Profeſſor Mertens, who has ſtudied theſe trees in Germany, obſerves that *corallina* flowers a fortnight earlier than *europæa.* As to their ſpecific difference, it appears chiefly to depend on the fine ſoft hairs, which clothe the backs of the *leaves*, and eſpecially cover their ribs, fringing their minuteſt veins in a delicate and regular manner. Theſe hairs are condenſed into little axillary tufts, at the origin of each principal vein. In the *infloreſcence* or *flowers* we perceive no material difference. The *capſule* has four or five angles. The famous old Lime in the church-yard of Zedlitz near Guttenberg, in Bohemia, which is ſaid to have borne hooded *leaves*, ſince a parcel of monks were hanged upon it, proves, by an authentic ſpecimen ſent us by profeſſor Jacquin, to be this ſpecies, not the foregoing.

3. T. *parvifolia.* Small-leaved Lime-tree. Ehrh. Arb. n. 36. Pl. Off. n. 125. Sm. Engl. Bot. t. 1705. Ait. n. 2. "Schkuhr Handb. v. 2. 72. t. 141." (T. microphylla; Venten. n. 1. Sav. Etruſc. v. 1. 152. T. europæa β; Fl. Brit. n. 1. T. ulmifolia; Scop. Carn. v. 1. 374. T. ſylveſtris; Trag. Hiſt. 1111. T. folio minore; Bauh. Hiſt. v. 1. p. 2. 137. Raii Syn. ed. 2. 316. T. bohemica, &c.; Till. Piſ. 165. t. 49. f. 3.)—Nectaries none. Capſule roundiſh, very thin. Leaves heart-ſhaped, ſharply ſerrated, ſomewhat lobed; ſmooth and glaucous beneath, with denſe, axillary or ſcattered, tufts of hair.—Native of Germany, Carniola, Switzerland, Italy, France, and England. Ray ſays it frequently occurs in Eſſex and Suſſex, as well as Lincolnſhire and elſewhere. It flowers a month later than even the firſt ſpecies, not being in full perfection before Auguſt. The *leaves* are but about half the ſize of either of the foregoing, their ſerratures ſharper, tufts of axillary hair larger, and often accompanied by large hairy blotches. *Footſtalks* ſlender, and often of a longer proportion, quite ſmooth. *Flowers* ſmaller, ſmelling like a Honeyſuckle. *Capſule* ſmall, roundiſh, ſcarcely angular, rarely perfecting more than one ſeed, its coat thin and tender compared with either of the former ſpecies, on which circumſtance M. Ventenat chiefly founded its diſtinctive character. We do not find that part ſo unlike them in firmneſs, as in thickneſs; but we have no doubt of the ſpecies being perfectly diſtinct. By planting this intermixed with the others about houſes, in avenues, &c. a longer

longer fucceffion of fragrance from their bloffoms might be obtained.

Sect. 2. *Flowers with fcaly nectaries.* American fpecies.

4. T. *americana.* Broad-leaved Lime-tree. Linn. Sp. Pl. 733. Willd. n. 2. Ait. n. 3. (T. glabra; Venten. n. 3. " Mem. de l'Inftit. v. 4. 9. t. 2." Purfh n. 1. T. canadenfis; Michaux Boreal.-Amer. v. 1. 306.)—Nectaries prefent. Leaves orbicular-heartfhaped, abrupt with a point, fharply ferrated; their veins minutely hairy beneath. Petals abrupt, crenate. Capfule ovate, fomewhat ribbed. In the woods of Canada and the northern United States, and on the mountains, as far as South Carolina, flowering in May and June. It is known by the name of Lime-tree or Line-tree, Bafs-wood, or Spoon-wood, and is both ufeful and ornamental. *Purfh.* Kalm firft made the plant known to Linnæus, and it was fuppofed by them to be the only American fpecies of *Tilia.* The *ftem* is faid to be eighty feet high. The *branches* are brown, fmooth. *Leaves* larger than any of our European fpecies, and of a more orbicular or rather elliptical form, abrupt rather than heart-fhaped at their bafe; of a fine green above, turning red in autumn; much paler beneath; finely veined and fmooth on both fides, except that all their veins are minutely hairy (not fringed like *T. corallina*) beneath, and even the fmaller ones, as well as the larger, are furnifhed with little axillary hairy tufts. *Flowers* corymbofe; their common ftalk about twice the length of the footftalks. *Petals,* according to Ventenat, abrupt, and toothed towards the end. We have not examined the flowers.

5. T. *laxiflora.* Panicled Lime-tree. Michaux Boreal.-Amer. v. 1. 306. Purfh n. 2.—" Leaves heart-fhaped, taper-pointed, fparingly toothed, membranous, fmooth. Panicles loofe. Petals emarginate, fhorter than the ftyle. Capfule globofe."—Near the fea-coaft, from Maryland to Georgia, flowering in May and June. A very diftinct fpecies, though generally confounded with the foregoing one. *Purfh.*

6. T. *pubefcens.* Hoary Lime-tree. Ait. n. 4. Willd. n. 3. Venten. n. 4. " Mem. de l'Inft. v. 4. 10. t. 3." Purfh n. 3.—Nectaries prefent. Leaves heart-fhaped, pointed, coarfely ferrated; abrupt and unequal at the bafe; downy beneath. Panicles forked, compound. Petals acute.—In clofe copfes, and on the banks of rivers, from Virginia to Georgia, flowering from May to July. *Purfh.* Its thinner-leaved variety was long ago brought from Louifiana to the Paris gardens, and Juffieu gave it the name of *multiflora,* which is very apt, but has never been publifhed till lately. Catefby is reported to have introduced this fpecies into England before the year 1726. If our memory does not deceive us, it is to be met with at Bulftrode, and in other old plantations, and the flowers are more highly fragrant than any others of the genus. Its growth is faid not to be fo lofty as that of *T. americana.* The *leaves* are fmaller, obliquely heart-fhaped, with very broad and pointed ferratures; their under fide extremely foft to the touch, but not white, though paler than the upper, and fomewhat hoary. There are fcarcely any axillary tufts of hair to the veins, except on the older denudated leaves. *Flower-ftalks* twice as long as the *footftalks,* branched at the top into a forked, fpreading, downy *panicle* of numerous *flowers.* The *petals* are rather pointed, as Ventenat defcribes them; and not emarginate, as in his and Purfh's fpecific definition. We readily concur with thefe authors, that the Louifiana tree, called *multiflora,* is a mere variety, and but a flight one. Our defcription of the *inflorefcence* and *flowers* is taken from this variety. It is hardly neceffary to mention that all thefe American Lime-trees bear the fame peculiar fort of *bractea* as thofe of Europe.

7. T. *alba.* White Lime-tree. Ait. n. 5. Willd. n. 4. " Waldft. et Kitaib. Hung. t. 3." Jacq. Hort. Schoenbr. v. 3. 18. t. 283. (T. rotundifolia; Venten. n. 5. " Mem. de l'Inft. v. 4. 12. t. 4.")—Nectaries prefent. Leaves deeply heart-fhaped, obfcurely lobed, fharply ferrated; downy and white beneath.—Native of woods in Hungary. *Willdenow.* Found by Bruguière and Olivier near Conftantinople. *Ventenat.* It was erroneoufly reported by our gardeners to come from America, as every new plant, at one period, was fuppofed to do. More recently, every novelty has been attributed to Botany Bay.—This is a hardy tree in England, but does not flourifh fo well as any of the preceding. The deep, and more even, heart-fhaped figure of the *leaves,* and their fnow-white under furface, readily characterize this fpecies. Its light-yellow, cymofe or panicled *flowers* are faid to have the fcent of a jonquill.

8. T. *heterophylla.* Various-leaved Lime-tree. Venten. n. 6. " Mem. de l'Inft. v. 4. 16. t. 5." Purfh n. 4. (T. alba; Sm. Inf. of Georgia, v. 1. 21. t. 11?)—" Leaves ovate, fharply ferrated; white and downy beneath; either heart-fhaped, or obliquely, or equally, abrupt, at the bafe. Capfule globofe, obfcurely ribbed."—On the banks of the Ohio and Miffiffippi, flowering in June. A very handfome and defirable ornamental tree. *Purfh.* Ventenat fays it is diftinguifhed from the laft by many characters. The young *branches,* and *buds,* are fmooth, of a purple colour inclining to black. *Leaves* delicately ferrated, pointed, with tufts of reddifh axillary hairs to the veins. *Flower-ftalks* almoft as long as the leaves, being thrice the length of *T. alba.* We have feen no fpecimen of this fpecies, but it has probably been introduced into the gardens by fome of our collectors from America. It is extremely likely to be the Warhew of Mr. Abbot, in our Infects of Georgia, t. 11.; which from the above-mentioned error of the gardeners refpecting *T. alba,* we fuppofed could be no other than that fpecies, now known not to grow in America. The Warhew is faid to be very like the European Lime-tree, except being always a low bufh or fhrub. Mr. Abbot's figure anfwers fo well to Ventenat's and Purfh's definitions, as to leave fcarcely a doubt on the fubject, except only that the latter fpeaks of *T. heterophylla* as an *ornamental tree.* It may attain a greater fize in one part of the country than in another.

We feel much regret in rejecting our late efteemed correfpondent M. Ventenat's fuppofed improvements in the nomenclature of the fpecies of *Tilia.* But befides their appearing to us uniformly for the worfe, as ufual in all fuch alterations that ever came in our way, we greatly prefer eftablifhed names; which though occafionally erroneous or ambiguous, have generally acquired affociations that compenfate for any defects.

Tilia, in *Gardening,* contains plants of the ornamental tree kind, among which the fpecies moftly cultivated are, the European lime-tree (T. europæa); the broad-leaved American lime-tree (T. americana); the pubefcent Carolina lime-tree (T. pubefcens); and the white lime-tree (T. alba).

The firft fort, though little ufed, is a handfome tree, having a fmooth taper ftraight trunk, and the branches forming a beautiful cone. The foliage alfo is fmooth and elegant: it grows to a very large fize, and affords good fhade: it makes a fine detached object in parks and open lawns, planted fingly: the branches are fo tough as feldom to be broken by the winds, and the flowers have a delightful fragrance: the wood is foft, but capable of being turned into light

light bowls and dishes, &c. There are several varieties of it, as the narrow-leaved, the broad-leaved, the elm-leaved, the red-twigged, the smooth small-leaved, the smooth large-leaved, the soft hairy-leaved, the wrinkled-leaved, and the striped-leaved.

Culture.—These trees may be increased by seeds, layers, and cuttings. The seed, when ripe in the autumn, should be beaten down, keeping the green-twigged and red-twigged sorts separate; and be sown soon after, or preserved dry and sound till spring; sowing it in a bed or border of common earth; previously digging the ground, and dividing it into four-feet wide beds; drawing the earth off the surface evenly, about an inch deep, into the alleys; then sowing the seeds thinly, touching them lightly down into the earth with the back of the spade, directly earthing them over to the above depth.

When they come up in the spring, the beds should be kept clean from weeds, giving moderate waterings in dry weather, to forward the plants in growth as much as possible, in order to be fit for planting out in nursery-rows by the autumn or spring following; though, if they have shot rather weakly, they should stand another year, then be planted out in rows two feet and a half asunder, by eighteen inches distance in the lines, to remain three or four years or more to acquire a proper size for the purposes intended, trimming off the large side-branches from the lower part of the stem occasionally, to encourage their aspiring more expeditiously at top, which should be suffered to remain entire: these trees, when raised from seed, generally assume a more handsome and expeditious growth than such as are raised from layers and cuttings. When they are from about five or six to eight or ten feet high, they are of proper size for final planting out; though, when designed as forest-trees for timber, it is advisable to plant them finally while they are young, as not more than from three or four to five or six feet high.

They are all raised readily by the layer method; and for this purpose proper stools must be prepared, and the young shoots of a year or two old are the proper parts for being laid down, which should be performed in autumn or winter, by slit-laying, shortening the tops of each layer within a little of the ground: they are mostly rooted by the autumn following, and fit to plant out in nursery-rows, being then managed as the seedlings.

When cuttings are employed, the strong young shoots of the year should be chosen in autumn or spring, and planted in a moist good soil; or any scarce sorts may be planted several together in pots, and plunged in a hot-bed, as they more readily strike root in that way.

These two last methods are the proper ones for raising the varieties with certainty.

These trees are of a quick handsome growth, and succeed in almost any soil and exposure. They are some of them employed for their fine appearance, others for the exquisitely sweet smell of their flowers, and most of them for the use of their wood. The plants of them are also occasionally made use of in forming hedges in particular situations, but they are not by any means well calculated for this purpose.

As timber trees, their wood is found highly valuable on account of its softness, lightness, and toughness, for the making of various sorts of household utensils, as bowls, basons, &c. as well as for different purposes in the business of carving, gilding, turning, spinning, &c.

All these trees afford ornament and variety among other deciduous trees in the shrubbery, plantations, &c.

TILIACEÆ, in *Botany*, a natural order of plants, the seventy-ninth in Jussieu's system, or the nineteenth of his thirteenth class, of which *Tilia*, the Lime-tree, is an example. See GERANIA for the full characters of this thirteenth class. Those of the order in question are thus given.

Calyx either of many leaves, or in many deep segments. *Petals* definite, distinct, (wanting in *Sloanea*,) alternate with the segments or leaves of the calyx, and for the most part agreeing with them in number. *Stamens* generally indefinite in number, and distinct. *Germen* simple. *Style* frequently solitary, rarely either multiplied, or wanting. *Stigma* either simple or divided. *Fruit* in some instances pulpy, in others capsular, mostly with several cells, having one or many seeds in each, the partitions from the centre of each valve. *Corculum* of the seed flat, surrounded by a fleshy albumen. *Stem* arboreous or shrubby; rarely herbaceous. *Leaves* alternate, simple, accompanied by stipulas.

Section 1. *Stamens definite in number, more or less combined in their lower part, or at the very base.* These are termed by Jussieu "doubtful *Tiliaceæ*." They consist of *Waltheria*, *Hermannia*, and *Mahernia*.

Sect. 2. *Stamens distinct, mostly indefinite. Fruit of many cells.* Genuine *Tiliaceæ*.

Antichorus; Corchorus; Heliocarpus; Triumfetta; Sparmannia; Sloanea; Apeiba of Aublet, which is *Aubletia* of Schreber; *Muntingia; Flacourtia* of L'Heritier; *Oncoba* of Forskall, Lamarck Illustr. t. 471; *Stuartia; Grewia;* and *Tilia.*

Sect. 3. *Stamens distinct, indefinite. Fruit of one cell.* Genera allied to *Tiliaceæ*.

Bixa; Laetia; and *Banara* of Aublet and Schreber.

The author hints that this order might possibly, with propriety, receive a reinforcement of several polypetalous polyandrous genera, at present not well understood, and therefore annexed to other orders, among subjects that remain in doubt. He names *Soramia* of Aublet (see MAPPIA); *Calinea* of the same (see DOLIOCARPUS); *Cleyera* of Thunberg (see TERNSTROEMIA); *Vallea* of Linnæus; *Dicera* of Forster (see ELÆOCARPUS); *Caraipa*, *Mahurea* (see BONNETIA), *Houmiria* (see MYRODENDRUM), *Vantanea* (see LEMNISCIA), all of Aublet; and *Trilix* of Linnæus. The reader will be able to form his own opinion on these matters, by turning to these articles in their proper places, many of the genera and their affinities having become better known since the publication of Jussieu's work.

The characters of his *Tiliaceæ* are hardly to be distinguished from those of his next order *Cisti*, the principal difference consisting in the straight *corculum*, and more copious *albumen*, of the former.

TILLABARUM, in *Ancient Geography*, a town of Africa Propria, upon the route from Tacapæ to the Greater Leptis, between Thebelamum and Adaugmagdum. Anton. Itin.

TILLÆA, in *Botany*, was dedicated by Micheli (followed by Linnæus) to the honour of his friend and fellow-labourer Michael Angelo Tilli, who published a splendid and rich catalogue of the garden of Pisa, of which he had the care, in 1723. He was a member of the Royal Society of London, as well as of the Botanical Society of Florence, and corresponded with the chief botanists of his time, in England, Holland, and elsewhere. He travelled to Constantinople and Tunis.—Linn. Gen. 68. Schreb. 93. Willd. Sp. Pl. v. 1. 720. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 1. 282. Sm. Fl. Brit. 201. Mich. Nov. Gen. 22. t. 20. Juss. 307. Lamarck Illustr. t. 90. Gærtn. t. 112.—Class and order, *Tetrandria Tetragynia*. Nat. Ord. *Succulentæ*, Linn. *Sempervivæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, in four deep, flat, ovate, large segments. *Cor.* Petals four, ovate, acute, flat, rather fmaller than the calyx. *Stam.* Filaments four, fimple, fhorter than the corolla; anthers fmall, roundifh. *Pift.* Germens four; ftyle fimple; ftigmas obtufe. *Peric.* Capfules four, oblong, pointed, reflexed, the length of the calyx, burfting longitudinally along the upper edge into two valves, with one cell. *Seeds* two, or many more, in each cell, ovate.

Obf. *T. mufcofa* has the parts of fructification ufually in threes, not fours. Gærtner difcovered its flowers to be fometimes even five-cleft. He juftly remarks, that fuch differences of number are in this natural order of little importance, and that *Tillæa* differs from *Craffula* in nothing but the want of nectariferous fcales below the germens.

Eff. Ch. Calyx in three, four, or five fegments. Petals as many. Nectaries none. Capfules three, four, or five, burfting inwards. Seeds feveral in each capfule.

1. T. *aquatica.* Water Swedifh Tillæa. Linn. Sp. Pl. 186. Fl. Suec. 54. Willd. n. 1. Ehrh. Phytoph. n. 14. Schkuhr in Uft. Annal. fafc. 12. 6. t. 1.—Stem erect. Leaves linear, acute. Flowers nearly feffile.—Native of watery places in Lulean Lapland; as well as near Upfal, where water has ftagnated, in hilly fpots. *Linnæus.* A delicate, fmooth, annual plant, two or three inches high, fomewhat like *Montia fontana*, but much more flender, growing in denfe tufts, fimple or branched. *Leaves* oppofite, ftalked, narrow, acute, entire, a third of an inch long. *Flowers* either axillary and lateral, or in the forks of the ftem, folitary, fmall, white, on very fhort ftalks. The whole *herb* is fucculent and pellucid.

2. T. *proftrata.* Proftrate German Tillæa. Schkuhr in Uft. Annal. fafc. 12. 6. Willd. n. 2. (T. aquatica; Schkuhr in Uft. Annal. fafc. 2. 21. t. 3.)—Stem proftrate. Leaves lanceolate. Flowers on fhort ftalks.—Native of moift ground in Germany. Annual, differing from the foregoing in having many proftrate *ftems* from one *root*, broader *leaves*, which are nearly cylindrical, and rather longer *flower-ftalks*. *Seeds* eight in each *capfule*. *Schkuhr.*

3. T. *Vaillantii.* Stalked French Tillæa. Willd. n. 3. (Sedum minimum annuum, flore rofeo tetrapetalo; Vaill. Parif. 182. t. 10. f. 2.)—Stem erect, much branched. Leaves ovate, clafping the ftem, fhorter than the flower-ftalks.—Native of France. Obferved by Vaillant, in the foreft of Fontainebleau, where water has ftagnated in winter, flowering from May to Auguft. *Root* annual, of a few fmall tufted white fibres. *Stem* an inch or two high, repeatedly branched, fcarcely forked, purplifh. *Leaves* in pairs croffing each other, very thick, pointed, gibbous underneath, dark green, about two lines long. *Petals* four, rofe-coloured, with a dark-coloured mid-rib. *Seeds* numerous, black, very minute.—The broader thicker *leaves*, and the much longer *flower-ftalks*, render this very diftinct, as Willdenow obferves, from *T. aquatica*.

4. T. *peduncularis.* Long-ftalked Brazil Tillæa.—Stem erect. Leaves lanceolate, acute. Flower-ftalks often twice the length of the leaves. Capfules abrupt.—Gathered by Commerfon, in marfhy fpots that had been overflowed, at Monte Video. This grows in tufts, and has very much the habit of *T. aquatica*, for which poffibly it may have been taken. There appears neverthelefs much difference between them. The whole *herb*, in the prefent inftance is red, and the *flowers* rofe-coloured, growing on long *ftalks*, which, though indeed variable, are never lefs than half the length of the leaves, and often twice their length. The fhape of the *leaves* agrees with *aquatica*; but the *capfules* when expanded are more abrupt, and even inverfely heart-fhaped.

5. T. *mufcofa.* Moffy Tillæa. Linn. Sp. Pl. 186. Willd. n. 8. Fl. Brit. n. 1. Engl. Bot. t. 116. Rofe's Elem. append. 448. t. 2. f. 2. (T. mufcofa annua perfoliata, flore albo; Mich. Gen. 22. t. 20. Sempervivum omnium minimum repens mufcofum, polygoni facie; Bocc. Muf. 36. t. 22. Polygonum mufcofum minimum; Bocc. Sic. 56. t. 29.)

β. Craffula mufcofa; Linn. Sp. Pl. 405. Am. Acad. v. 6. 86. Willd. Sp. Pl. v. 1. 1557. Thunb. Prodr. 54. See Crassula, n. 40. (Ficoides africana annua minima mufcofa; Herm. Parad. 170.)

Stems procumbent, branched. Leaves obtufe. Flowers moftly three-cleft. Calyx and petals taper-pointed.—Native of fandy barren ground in the more temperate parts of Europe, flowering in fummer. Abundant on fandy heaths near Norwich, Bury, Brandon, &c. The variety β is brought from Africa, from Lima, and even from New South Wales. We can find no difference in the dried fpecimens, except their being larger than our's, with fomewhat of a glaucous hue, and the *flowers* partly ftalked, more numerous, and all, as far as can be examined, five-cleft and pentandrous, juft like Gærtner's plate of *T. mufcofa*. The Britifh fpecimens of the *mufcofa* are from one to two inches high, ftrongly tinged with a blood-red, afcending, branched, with a fibrous annual *root*. *Leaves* elliptical, thick, obtufe, fomewhat channelled above; clafping their ftem at their bafe. *Flowers* moftly three-cleft, feffile; their *petals* white, with a taper red point, lefs than the *calyx*. *Seeds* only two in each capfule.

We fcruple to retain in this genus four other fpecies admitted by Willdenow. The firft is *T. capenfis*, Linn. Suppl. 129. Willd. n. 4; evidently, as Thunberg calls it, a *Craffula*, by its purple triangular nectaries, though, on account of its four-cleft *flowers*, made a *Tillæa* by Linnæus and Willdenow.

T. perfoliata, Linn. Suppl. 129. Willd. n. 5; *T. umbellata*, Willd. n. 6; and *T. decumbens*, Willd. n. 7; all referred to *Craffula* by Thunberg, have none of them fallen under our infpection; but as Willdenow avows having been guided by number, we have no fcruple in removing them hence.

So alfo *Craffula mofchata*, Forft. Magell. 16; gathered by that author, as well as by Commerfon, Menzies, Banks, and Solander, at Staten land, is moft certainly a *Craffula*, becaufe of its nectaries; though, on account of its four-cleft *flowers*, it has been taken by fome great botanifts for a *Tillæa*.

TILLAGE, in *Agriculture*, the practice of tilling or cultivating land, efpecially of the arable kind, or the means of bringing it into a ftate of preparation for the growth of different forts of arable crops.

Of all the arts, fays Vattel, tillage, or agriculture, is the moft ufeful and neceffary. It is the nurfing-father of the ftate. It forms the fureft refource and the moft folid funds of riches and commerce, for people who enjoy a happy climate. This object, therefore, deferves the utmoft attention of government: and it ought carefully to avoid every thing capable of difcouraging the hufbandman, or of diverting him from the labours of agriculture. Thofe taxes, thofe exceffive and ill-proportioned impofitions, the burthen of which falls almoft entirely on the cultivators; and the vexations they fuffer from the commiffioners who levy them, take from the unhappy peafant the means of cultivating the earth, and depopulate the country. Spain is the moft fertile and the worft cultivated country in Europe. The church poffeffes too much land, and the undertakers of the royal magazines, who are authorized to purchafe, at a low price, all the corn they find in the poffeffion of a peafant, above what is neceffary for the fubfiftence of himfelf and his [illegible], ſo greatly diſcourage the huſbandman, that he ſows no more corn than is neceſſary for the ſupport of his own houſehold. Whence frequently ariſes the greateſt ſcarcity in a country capable of feeding its neighbours.

Another abuſe injurious to agriculture is, the contempt caſt upon the huſbandman. The inhabitants of cities, even the moſt ſervile artiſts, and the moſt lazy citizens, conſider him that cultivates the earth with a diſdainful eye; they humble and diſcourage him. They dare to deſpiſe a profeſſion that feeds the human race; the natural employment of man. A little inſignificant mechanic places far beneath him the beloved employment of the firſt conſuls and dictators of Rome. China has wiſely prevented this abuſe; agriculture is there held in honour, and to preſerve this happy manner of thinking, every year, on a ſolemn day, the emperor himſelf, followed by his whole court, ſets his hand to the plough, and ſows a ſmall piece of land. Hence China is the beſt cultivated country in the world: it nouriſhes an innumerable multitude of people, that at firſt appears to the traveller too great for the ſpace they poſſeſs. Beſides, the cultivation of the ſoil is an obligation impoſed by nature on mankind.

The moſt proper ſorts of ſoils for the purpoſes of tillage-cultivation, are all thoſe of the more dry and friable kinds, whether the depth of earth or mould, or what is often termed ſtaple in them, be only ſlight or conſiderable; as under different circumſtances theſe differences fit them for the production of different ſorts of crops, the methods of cultivation in which are fully explained under their different proper heads.

In this view, all the various denominations of light ſoils, ſuch, for inſtance, as gravels, ſands, light chalks, and thin loamy lands, are well adapted, in moſt caſes, to the purpoſes of tillage, from their being, in general, pretty well ſuited to the various ſorts of grain, as well as to the raiſing of ſuch green and root-crops as are neceſſary in the ſupport and management of different kinds of live-ſtock. The more deep, loamy, chalky, and gravelly ſorts of land, where they can be kept ſufficiently dry, and in a proper ſtate, during the winter ſeaſon, may likewiſe, in many caſes, be well employed in tillage-cultivation, and eſpecially when they do not produce and afford an abundant and uſeful ſort of herbage for the keeping of animals, or other uſes. All the lands of the ſward-kind, or in the ſtate of graſs, which are liable to be infeſted with the moſs-plant, or to become over-run with a moſſy covering, may, in common too, be managed under the tillage-ſyſtem with much advantage, and better than in ſuch a ſtate of graſs.

In ſome caſes, lands may be ſuited to convertible tillage, or alternately that of grain and graſs, with vaſt benefit to the farmer. It has been remarked on this ſort of tillage by a late writer, that land may in this way often be turned to better account by ploughing and tilling it eight or ten years, and then laying it down to graſs, in order to take up another part or portion, than by the common method, but eſpecially where the land is ſubject to ant-hills; as the paring and burning deſtroys all ſuch hills, and ſuch land is ſure to bring abundant crops of corn. And that there are very few ſituations that have dry land and ſoil fit for the plough, but what would bring more profit under tillage than by lying in the ſtate of old graſs; for when ſuch good land as this is well laid down to graſs, with plenty of good proper ſeeds, after a courſe of tillage, an acre of it will keep as much ſtock as four acres would which were produced in the natural way, and this is what makes its great value. Such tillage-land as this, it is ſaid, is worth more money than the fineſt graſs-land in the kingdom; as, on the fine marſhes ſo much boaſted of, the earlieſt of the ſummer-ſtock comes to market at the very time when all ſorts of vegetables are in plenty, ſuch as peas, beans, and many others, and when meat conſequently is ſure to fall in price; and great numbers of graſs-fed beaſts, or cattle and ſheep, come together. Beſides, the very beſt graſs-lands ſend only two ſheep in the two early months of April and May from an acre; but the beſt tillage-land will ſend ten from an acre, and have them ready any time in the winter, when meat is the deareſt. Thus, it is contended that ten acres of turnips will ſend one hundred ſheep in the deareſt time to the market, but that it will take fifty acres of the beſt land in graſs, to ſend the ſame number to the market.

It is therefore concluded that, in this way, the tillage-farmer ſends three hundred acres of corn to market, and as many fat ſheep beſides, acre for acre, as the beſt grazing-land; and that by ſtill other improved methods of management, as that of the culture of flax for the uſe of the ſeed in fattening live-ſtock, and ſome others of a ſimilar deſcription, the tillage-farmer may derive greater profit than by the turnip practice, from the large quantity of winter-fattened animals, and the vaſt ſupply of dung or manure which is thus raiſed and provided.

Although the neceſſity of good tillage in the preparation of land for cropping be now pretty well underſtood by the practical farmer, and has been inculcated occaſionally under different heads in the preſent work, it requires to be well explained in ſome of its proceſſes. It has indeed been obſerved in the Agricultural Survey of the County of Hereford, after noticing that the Romans were convinced of the good effects of this ſort of preparation, as Pliny has remarked the advantages of frequent ploughing and turning over the ſoil in Tuſcany; and that, in this country, Evelyn ſuggeſted its power of ſo altering a ſoil from its former nature, as to render the hardeſt and harſheſt as well as moſt uncivil clay obſequious to the huſbandman; that tillage alſo deſtroys weeds, and reduces the earth to ſmall particles, rendering it ſufficiently looſe and porous to admit of the eaſy growth and extenſion of the roots and fibres of the grain to be cultivated in or upon it. And that the ſpade is well adapted to theſe purpoſes, becauſe it moves the ground eight or ten inches deep, turns it upſide down, and covers the weeds with a quantity of earth, under which they rot, and contribute towards its fertilization and improvement; and that this mode is founded on the juſt idea or notion of the Flemings, that a farm ſhould reſemble a garden as nearly as poſſible. But that as the ſpade method is much too tedious and laborious, as well as too expenſive, to be practiſed on the larger ſcale of a farm, the plough is therefore ſubſtituted, as cheaper and more expeditious, but that, in general, it does not ſtir the earth ſo deeply, and often moves it in large bodies or maſſes, without ſufficiently breaking it into pieces. In order to remedy this inconvenience, the celebrated Mr. Tull, it is ſaid, recommended a plough of his own invention, which had four coulters inſtead of one, and thus divided the earth raiſed by the ſhares into ſeveral narrow ſlips; but the reſiſtance occaſioned by the additional coulters was found to require a greater ſtrength in horſes than the profits of the experiment and work would warrant. It was, however, afterwards aſcertained by a diſtinguiſhed foreigner, M. de Chateauvieux, that the breadth of the furrow ſhould be proportioned to the ſtiffneſs of the ſoil or land; and that thus the reſiſtance may be regulated on all kinds of land or ſoil. But the operation of repeated croſs-ploughing, and the uſe of other tools, as now generally practiſed, aided as they are by full expoſure

expoſure to froſt, rain, &c. ſo effectually break down the hardeſt ſoils, that other meaſures are, it is thought, rendered leſs neceſſary. Since the above was written, however, many uſeful inſtruments have been formed, by which tillage-cultivation is not only rendered more effective, but more eaſy and expeditious, as may be ſeen by the deſcriptions which have been given of them under their different proper heads. See DRAG, SCARIFIER, SCUFFLER, SPIKE-*Roller*, &c.

M. Duhamel has ſince too obſerved in his "Elements of Agriculture," that ſome believe it is more advantageous to increaſe the fertility of land by frequent ploughing and other means than by manure; becauſe, in general, only a certain quantity of manure can be procured; as twenty acres of land will, in common caſes, ſcarcely produce as much manure as is neceſſary for five; whereas the particles of the earth may be divided and ſubdivided almoſt to infinity. The aids, therefore, which are derived from manure, muſt, it is ſuppoſed, be limited, whilſt no bounds can be ſet to the benefits that may accrue from ploughing or breaking down and reducing the parts of the ſoil. This appears, the writer thinks, to be over-rating the advantages of breaking the ſoil down in other ways; but, it is certain, that when the particles of land or ſoil adhere ſo cloſely together as to impede the extenſion of the roots of plants, in ſearch of the food and nouriſhment they require, the plants themſelves cannot grow with proper vigour, or yield a proper produce. This is therefore to be corrected by frequent ploughings, &c. And that, laſtly, repeated ploughings and other ſuch means enable the land to receive and retain all the benefits to be derived from the floating vapours and dews of the atmoſphere, which falling on hard ground, where it cannot readily penetrate, is quickly exhaled by the next day's ſun and wind.

Notwithſtanding theſe remarks, it may, however, be noticed, that no tillage or breaking down of the parts of the ſoil, though ever ſo complete and effectual, can wholly ſupply the place of manure, although it may greatly contribute, in different inſtances, to aſſiſt its fertility.

Theſe are ſome of the more general and particular ways in which tillage becomes ſo eſſential and effectual in promoting the fertility and improvement of land; but there are a few others, the proceſſes of which may be ſeen under their proper heads.

In the tillage-cultivation for moſt ſorts of crops of the grain or corn kinds, as well as ſome others, it becomes eſſentially neceſſary that the ſoil ſhould be reduced to a very conſiderable degree of fineneſs, or what is frequently termed *tilth* by writers on huſbandry; as, where this is not the caſe, they can neither be ſo well provided with food or nouriſhment, nor be kept ſo perfectly and ſo ſufficiently clean and free from weedy matters. There are other reaſons too that require, at leaſt, the more ſuperficial parts of the ſoils to be in a fine condition of tillage for the receiving of ſuch crops, which are thoſe of the young tender roots of the new riſing plants being thereby rendered more capable of fixing themſelves perfectly in the mould which is produced, and of their drawing from it a more regular ſupply of food, in conſequence of the more equal diffuſion of moiſture and other ſubſtances through it, which muſt neceſſarily take place. Beſides, it is favourable in other ways, as by ſuch tillage the ſeed-corn is not only more capable of being perfectly but equally covered, in conſequence of which the vegetation and growth of the young plants of it are more equal and expeditious.

But beſides the ſtate and condition of the ſoil or land in regard to tilth, it ſhould be in a ſuitable ſituation in reſpect to dryneſs; as where there is too great a degree of moiſture in it, the tillage can neither be performed in a proper manner, nor the ſeed-corn be put in without the danger of ſuſtaining injury by becoming rotten before the vegetative proceſs takes place, as not unfrequently happens to pea and other garden crops, when put into the ſoil during the moiſt winter months: and where, on the contrary, the land is in too dry a ſtate, the tillage is improper to be effected, as cauſing too much exhalation, by which the ſeed-corn, when put in at ſuch periods, may be much injured by the want of that moiſture which is neceſſary for perfect vegetation. Under the laſt circumſtance too, it may be more liable to be deſtroyed by worms, grubs, and other inſects. On theſe accounts the arable farmer ſhould, of courſe, be equally attentive to the tillage preparation of the ſoil, and the condition in which it may be cropped to the greateſt advantage, and with the greateſt chance of ſucceſs.

The writer of the "Elements of Agricultural Chemiſtry" ſtates, that in all caſes of tillage, the ſeeds ſhould be put in ſo as to be fully expoſed to the influence of the air. And that one cauſe of the unproductiveneſs of cold clayey adheſive ſoils is, that the ſeed becomes coated with matter impermeable to air. All immediate tillage, for putting in crops, ſhould conſequently be performed as much as poſſible in ſuitably dry weather on ſuch ſorts of land.

In ſandy ſoils, he ſays, the earth is always ſufficiently penetrable by the atmoſphere; but in clayey ſoils there can ſcarcely be too great a mechanical diviſion of the parts in the proceſs of tillage.

In general, the beſt and moſt effectual method of breaking down and bringing land into the ſtate of proper tillage, is by the uſe of the plough and different other implements of the harrow kind, ſuch as thoſe which have been noticed above, ſuited to the intention of the cultivator, and the peculiar nature of the land or ſoil. The tillage with the plough ſhould conſtantly be performed according to the nature of the ſoil, and that of the crop which is to be ſown or ſet, and the operations which are afterwards to be executed upon it. But to whatever depth this may be proper to be done, it is of much conſequence to have it performed in an exact and effectual manner; as on this not unfrequently depends the difference between a good and bad crop, as well as that between the animals employed in the labour moving with eaſe and with difficulty. The repetitions in the tillage of this ſort muſt be conſtantly regulated by the quality and circumſtances of the land and the deſigns of the farmer, as ſome ſorts and caſes of land require much more tillage than others. This point is moſt decidedly evinced in the Agricultural Survey of the County of Glouceſter. On the Cotſwolds, it is the practice, the writer remarks, to ſow their crops on one ploughing, experience having proved that frequent ploughings or tillage on theſe light ſoils, weaken the ſtaple of the land, and are productive of injury.

On the ſtrong lands or ſoils of the county of Eſſex, the moſt intelligent and ſucceſsful practical farmers, it is ſaid, are thoſe who are the moſt careful in the repetition of tillage of the plough kind, to which they conſtantly attribute great powers and effects. The ſtrong heavy lands have it eight or more times in many caſes, even for barley or oats; and on thoſe which are leſs ſo, the general ſyſtem of tillage is moſtly four or five times for the different fallow crops. In this laſt intention, it is not unuſual to commence the firſt tillage ploughing towards November, continuing it nearly or quite to the end of March, after barley ſowing; and if at the firſt period of ſuch tillage the ridges be laid a little round, ſo as to be water-ſhot, and after that well water-furrowed, the tillage is greatly promoted. The land is moſtly first broken up into ridges of eight or twelve nine-inch furrows; then crossed, and the tillage given in different ways very often during the summer season, carefully turning up and exposing every time a different surface, as much as possible, to the sun and air: before harvest it is got up on four-furrow ridges, when, after that season is over, it has again immediately another tillage ploughing; and if the weather be suitable, it is done twice, leaving it upon the ridge for the ensuing winter: the later the last tillage furrow is given the better, in this district, for preventing the black grass-weed getting up; after which the whole is well water-furrowed for taking off any water that may be upon it: by these means the land is much earlier got upon in the spring season than could otherwise be done, and in consequence, when the tillage for barley is performed, such stiff tenacious lands break down into the finest tilth it is almost possible to conceive.

In executing the work of tillage on ridges for wheat, or any other sort of crop, great attention is here bestowed on turning the furrows well, drawing them straight, making them alike in size, and lapping them with such regularity on to each other, that the harrow tools cannot fail to lay hold of them all with facility; the shutting-up furrow more especially is drawn with perfect straightness, exactly turned, swept out with cleanness, and at the same time the space between the ridges not left in too wide a state.

But notwithstanding this great and frequent tillage, in some places they do not venture in the seed on the autumnal furrow, but give a spring plough tillage, though perhaps some other tool of the tillage kind might answer better in many cases, and be far more expeditious.

The most proper and suitable depths of tillage for different sorts of soils, have probably not yet been well ascertained; but such as have a good strong staple, require much more deep tillage than those of the light kind. Whether flat-work tillage, as practised in Norfolk, or that of feather-edged, as employed in Essex, has the advantage, is not properly decided, but probably each may have a superiority on different sorts of land: the great point of importance is that of allowing the covering of the seed well.

The plan of tillage given below has been advised in the Corrected Agricultural Survey of the County of Salop, for the lighter sorts of friable lands, on a farm of four hundred acres: first, the wheat stubble is to be harrowed by drawing the harrows one way, which lays the stubble; and by returning back along the same stroke, they draw the greater part of that which was gathered by the harrows; and a proper person following them with a fork, unloads them, and lays the stubble in heaps, to be disposed of as directed below.

This stubble ground has the tillage of ploughing from the middle of November to the end of the following month; about the beginning of March it has that of cross-ploughing given it, and when dry, well harrowed; and when the weather is suitable, much of the couch-grass is got out of it and burnt; but when not so, it is, in this way, checked in its growth during the seed-time, and the business is more easily performed; which is to be done in the month of May and the two succeeding ones, in which the fallow lands have the tillage of three ploughings and sufficient harrowings to prepare them for turnips, for which eight cubic yards of reduced dung, or seventy-two bushels of clod-lime, are laid upon the acre; which are ploughed in at the last tillage-furrow, though sooner, it is thought, would be better, if the dung be reduced enough by that time, or the land be so clean as not to require much harrowing. Turnip-seed, one pound to the acre, is then sown from the 7th of June to the 14th of the following month, the plant being twice hoed; the average produce is from 2*l.* to 2*l.* 15*s.*

As the same land becomes cleared of its crop of turnips, it has the tillage of ploughing and harrowing, preparatively for a crop of barley: and being again tilled, by being ploughed up in butts or lands five yards in width, from the latter end of March to the latter end of the following month, is sowed with three and a half statute bushels of barley, fourteen pounds of common red clover-seed, and one peck of fine rye-grass-seed to each acre: the average produce is about forty bushels, of the statute kind, of barley to the acre.

The young clover which is not eaten between December and May, in the part which is mowed, on an average produces about two waggon-loads, or a ton and a half to the acre. In the succeeding month of October, it is ploughed in the tillage of nine-inch furrows and six inches deep, and sowed with two and a half bushels of wheat: the produce about seventeen bushels the acre.

The turnip-crop is generally disposed of somewhat in this manner: first, by drawing home those under the hedges, at the beginning of November, and some of the largest over the rest of the field, taking all up where the horses and carts are to pass. When the tops and small roots are cut off, they carry them home, and place them in heaps of about twelve cart-loads each, in the form of the cone of a wheat-rick, covering them a foot thick with straw and thatch. These serve as a resource in time of frost and snow, for the beasts that are stall-fed, of which there are generally twenty yearly; and a man and boy, with one horse and cart, supply them; leaving ultimately in the fields as many turnips to be eaten off upon the land by sheep, as to ensure fertility enough for the crops of barley, &c. as the barley, being too rank, commonly spoils the young clover growing with it. Another advantage in this plan of tillage, which is obtained by stall-feeding with turnips, is the making a large quantity of straw into manure at home; which is the best use that can be made of it, as straw-food is not an improver of cattle-stock.

This method of tillage or cultivation for dry lands, is recommended to those who have been in the practice or custom of long tillages, and without the use of general turniping, to be continued for so long as two courses of tillage, that is, eight years; by which time their land will be clean, and more fit for what is conceived to be a more beneficial mode of husbandry, and which mode is now, it is said, pursued; namely, first turnips, managed and manured for as above; second, barley; third, pease, in rows one foot asunder, hand-hoed and weeded; fourth, barley, with ten pounds of common clover, four pounds of white Dutch clover-seed, two pounds of trefoil-seed, and one peck of fine rye-grass-seed, eight cubic yards of rotten dung, or seventy-two bushels of stone-lime laid upon the young clover in November; fifth year, mow or graze the land; the sixth, graze until October; and the seventh, give a plough tillage, and sow with wheat as before; the land mucked for turnips, and lime or compost of lime, and earth or mud, &c. laid on the young clover in the autumn. This is believed to be a more profitable course of tillage, after land has been got into order, than that which was previously practised, affording a greater change, and thereby obviating the failure both of turnips and clover, and occasioning more grass-land, which for many years has there exceeded the tillage in point of profit.

As an improvement of wheat-lands, or mixed soils upon clay, the mode of tillage directed below is advised to be practised.

The

The turf or other land being well ploughed or tilled, and laid dry before Chriſtmas, in the following month of April ſow the land with four and a half ſtatute buſhels of oats, plough and lay it dry in the autumn, and in the month of May and the two following ones, give it three good tillage ploughings and harrowings, with ſome rollings, &c. ſo as to reduce it well; being thus drawn up and laid dry, it may continue in that ſtate to the middle of September; though made both fine and clean, it ſometimes gets an adheſive and binding quality, and conſequently works lumpy, and therefore has the texture and quality which the farmer, by miſtake, is afraid of loſing by making his land clean. It is, however, it is ſaid, in the three above months, when the ſun is powerful, that land is to be cleaned by tillage: a ploughing in Auguſt is ſeldom of much worth.

If manured with lime, lay eighty buſhels upon the acre; if with dung, ten cubical yards to each acre, either ploughed under at the July tillage ploughing, or before. From the 20th of September to the 10th of the ſucceeding month, ſow wheat nine ſtatute pecks to the acre, after having ſoaked the ſame not more than eight hours in mild brine, and dried it with lime, to prevent the ſmut. The next autumn plough the corn ſtubble, and at the end of March plant beans or peaſe in rows one foot aſunder, hand-hoe and weed them. Plough in the autumn, and ſow oats in the ſpring, and lay down with ten pounds of red clover-ſeed, four pounds of white Dutch clover-ſeed, and one peck of rye-graſs-ſeed to each acre. Manure the land in ſeeds in the autumn, and let it lie in ſward two or three years, as it may be required. At the next breaking up, plant the land with beans, hand-hoe and weed them; the enſuing autumn ſow it with wheat, then with beans in rows, hand-hoe and weed that crop; then put in oats and lay down with ſeeds, as before. In lieu of one of the hoeing crops, if the land be not too wet, potatoes may be planted, which would be found very profitable to the wheat-land farmer; being very uſeful food for feeding or milking cows in the winter ſeaſon. The farmer ſhould fallow for the firſt crop in one tillage, and hoe the next, and ſo proceed alternately; the ſummer ſun to wheat-lands being certainly uſeful, and alſo the manuring with dung or lime in an alternate manner. Where marle is to be procured at convenient diſtances, nothing turns to more profit; upon open ſoils, with either clay or dry bottoms, marle laid upon the ſward in the autumn, and to lie one year, is commonly the beſt practice, eſpecially if the marle be not perfectly good. Lime is ſure to pay well the next tillage courſe.

On this mode of tillage it is, however, remarked, that good farmers, on light ſoils, will entertain the plan here preſcribed with ſome caution, and that their apprehenſions of a crop of couch will often outweigh their hopes of a crop of clover. That peaſe are precarious; one week's hot weather whilſt in blow is often fatal to the crop.

It is added too, on the authority of Mr. Harries, after noticing the inſufficiency of ſome fallow tillage lands, that there are many active farmers who begin the tillage on their fallows in January, and by repeated ploughings, harrowings, and rollings, bring them into very good order for wheat. Others graze the ſecond year's clover until about the middle of the ſummer, and ſometimes mow it at that time: if the ſoil be dry and the ſummer favourable, they bring it into very good tillage order by ſeed-time. It would, however, it is thought, be better tillage huſbandry to raiſe a crop of turnips on ſuch lands, after wheat or barley. If this was done, at leaſt in every courſe of tillage, a good crop of wheat would be grown upon clover lays, upon one tillage ploughing, at a light expence. It is frequently his cuſtom to break up his clover lays of the firſt or ſecond year, if they are tolerably clean, upon one ploughing, putting upon the plough a cutting tool or inſtrument, which is there termed a *ſay* or *ſlay*, that cuts or pares off the ſurface turf, and lays it in the bottom of the furrow. Lately, a clover lay was worked with this inſtrument upon the plough, and after the ſeed was harrowed in, ſcarcely any of the ſurface turfy matter came upon the ploughed ſurface, the field looking as well, and appearing as clean, as though it had been ſown upon fallow tillage.

Some, however, on hollow lands, do not approve of this ſkimming or paring tillage; as ſlicing the ſurface of ſuch ſoils they conſider much worſe than turning it over in the ordinary manner, and letting the ſurface vegetable matters be laid into the furrows in a ſort of diagonal poſition, though ſome of them ſhould even appear out in the ſeams. The notion is notwithſtanding probably erroneous, as ſuch ſurface produce is always, in ſome way or other, to be rotted and got rid of, as in every mode of tillage it is ploughed in or under, and the main point is how to get the moſt ſpeedily and completely quit of it, and to render it the moſt uſeful to the crop which is to be put in. Theſe are certainly the beſt and moſt fully accompliſhed by taking it wholly off by ſuch a cutting apparatus, and placing it at the bottoms of the furrows, which muſt alſo leſſen the hollowneſs of the land at the ſame time.

In the breaking-up tillage of old graſs-lands, it muſt be executed in a manner ſuitable to the nature, ſtate, and quality of the ſoil, whatever that may be, reducing and breaking the turfy ſward well and carefully down, and clearing it effectually from inſects and vermin of all ſorts by proper crops, ſuch as thoſe of the pea, bean, teaſel, and other ſimilar kinds, before the introduction of thoſe of the grain ſort. In this way, the lands will not only be the beſt wrought into a proper ſtate of tillage, but the corn-crops the moſt effectually ſecured from the danger of worms, grubs, and other noxious vermin.

It has been remarked by the writer of the Corrected Agricultural Survey of the County of Norfolk, that for the laſt four or five-and-thirty years that he has examined Weſt Norfolk with the eye of a farmer, the change in the tillage ſyſtem, which has taken place in that vaſt arable diſtrict, has not been great. At the early part of that period, the tillage courſe was, it is ſaid, firſt, turnips; ſecond, barley; third, graſſes for two, or, in a few caſes, three years; fourth, white corn: on the better ſoils, wheat; on others rye, &c. The only material change that has occurred, has been, it is thought, in the graſſes: the variation, which, it is believed, firſt took place from forty to fifty years ago, was ſhortening the duration from three years to two; in both caſes giving what may be called a ſort of baſtard fallow the laſt year, by means of a half-ploughing, ſoon after the middle of the ſummer. Above thirty years ago, the writer, it is ſaid, contended, both in print and in converſation, againſt it, but was held cheap for entertaining any doubts of the propriety of the practice. He has lived, however, it is obſerved, to ſee this change alſo in a great meaſure take place amongſt the beſt farmers, who now give only one ploughing for the winter corn, whether wheat or tares; or in the ſpring for peaſe. That it is an improvement cannot be queſtioned, it is thought. The argument for it, founded on the invention of the drill-roller, and on the introduction of the drill-plough, is good, it is ſaid, but not ſingular, as the practice of dibbling is likewiſe far more adapted to a whole than to a broken furrow; and for broad-caſt common ſowing, if we are able to cover the ſeed by harrowing on ſtiff ſoils, once ploughed, aſſuredly the ſame practice might be better followed on ſand. The other reafon for the former fyftem, fpear-grafs getting a-head in a layer, is quite inadmiffible, it is thought; as he muft entirely agree with Mr. Overman, a large tillage cultivator in that diftrict, that no weeds, the feeds of which are not carried by the wind, will be *found* in a layer, if they were not *bred* there.

It is contended likewife, that the variations which have taken place in the tillage crops put in upon layers, are neither great, nor are they peculiar to the above county; the principal one is that of taking peafe on the flag, and then the wheat, and others, an admirable fyftem, which, it is faid, has long been practifed by good farmers in Suffolk, and, it is believed, ftill earlier in Kent. That Mr. Purdis's mode of fubftituting tares holds on the fame principle. Confidering the very great ufe and value of white pea-ftraw, well got, as fheep food, which is no where better underftood than in Kent, it is thought there is no tillage hufbandry better adapted to a fheep-farm, than this of peafe or tares preceding the wheat crop.

But it is thought that a very great and important change has taken place in the application of tillage crops to fheep inftead of bullocks and cows. Formerly the farmers confumed much of their ftraw by cattle; now the beft of them have it all trod into manure. Sheep are the main grazing ftock, and no more cattle kept than for treading, not eating ftraw while feeding on oil-cake and other fuch food. This is, it is contended, a very important change, which has had confiderable effect, and which has depended not a little on the introduction of South Down fheep. Yet ftill, it is conceived, that the grand object in the whole tillage fyftem, is the fingular fteadinefs with which the farmers of Weft Norfolk have adhered to the well-grounded antipathy to the taking of two crops of white corn in fucceffion: this is talked of elfewhere, it is faid, but no where fo fteadily adhered to as in this diftrict. It is this maxim, it is faid, which has preferved the effect of their marle on thin-fkinned lands of the wheat kind in fuch a manner, that the diftrict continues highly productive, under an almoft regularly increafing rent for more than fixty years, or three leafes of twenty-one years each; and by means of which great tracts have been marled a fecond, and even a third time with much advantage. This tillage fyftem, it is fuppofed, has been that to which the title of Norfolk hufbandry has been long, and is now peculiarly appropriated; and by no means that of the management of the very rich diftrict of Eaft Norfolk, where the foil is naturally among the fineft in the kingdom, and confequently where the merit of the farmer muft be of an inferior ftamp; barley there, it is faid, very generally follows wheat; an incorrect tillage hufbandry, deferving no praife, but condemnation. The celebrity of the county in general was not heard of, it is faid, until the vaft improvements of heaths, waftes, fheep-walks, and warrens, by enclofure, and marling took place in confequence of the exertions of Mr. Allen, of Lyng-Houfe, lord Townfhend, and Mr. Morley, who were in the firft thirty years of the preceding century. They were happily, it is faid, imitated by many others; an excellent fyftem of tillage management introduced, and fuch improvements wrought, that eftates and lands which were heretofore too infignificant to be known, became objects of public attention in the capital. The fame of Norfolk, it is remarked, gradually expanded, and the hufbandry of the county was celebrated before Eaft Norfolk was heard of beyond the converfation of Norwich and Yarmouth. It is, however, afferted, that without a continuance of careful tillage management and perfevering exertions, Weft Norfolk would even again become the refidence of poverty and rabbits. But let the meadows be improved; irrigation be practifed wherever it is applicable; the remaining waftes cultivated; and this diftrict will, it is maintained, become a garden. Such are the utility and importance of good tillage and other fyftems in the cultivation and improvement of land.

In concluding, it may be ftated from the Corrected Agricultural Report of the County of Hereford, that the importance of the tillage farmer cannot be difputed; and yet that perhaps no branch of the art of hufbandry is clogged with fo many obftacles and impediments to its improvement and fuccefs. The advantages of the grazing fyftem over that of tillage-cultivation, hold out a great inducement to the farmer to convert his tillage land into pafture, the immediate effect of which muft be felt in the reduced quantity and increafed price of grain of every defcription. And unfortunately, this is not the only obftacle or hindrance to the tillage farmer; the tax on horfes ufed in agriculture operates alfo againft the proper tillage culture of the ground. It was probably fuppofed, it is faid, by the framers of this duty, that the number of horfes would thus be diminifhed, and that of oxen increafed; but it fhould be recollected that oxen, valuable as they fometimes are as *auxiliaries*, can never be made the *fubftitute* of horfes for tillage; their conftitution and habits will not admit of it; and the fhoe with which they are occafionally furnifhed, affords but an imperfect protection to the foot on hard lands or ftony roads. See TEAM.

No check, but every encouragement, fhould certainly be given to tillage, or the means of raifing and providing the bread-corn for the increafing population of the country. See SUPPLY *and Confumption*.

TILLAGE *Farm*, that fort of farm which is, for the moft part, cultivated under the arable or tillage fyftem, or that by means of the plough. See FARM.

TILLANDSIA, in *Botany*, was fo named by Linnæus, in memory of an early Swedifh botanift, Dr. Elias Til-lands, profeffor of phyfic at Abo, who died in 1692, aged 52, after having publifhed in 1683 an octavo alphabetical catalogue, in Latin and Swedifh, of the wild, as well as cultivated, plants of the neighbourhood of his refidence. This little volume was accompanied, or foon followed, by another, confifting of rude, but often expreffive, wooden cuts, of 158 plants, mentioned in the foregoing catalogue. It is a defect in thefe cuts that they are not always original; an inftance of which occurred to the writer of the prefent article, while preparing a critical differtation on fome Britifh fpecies of *Hieracium*, fee Tr. of Linn. Soc. v. 9. 232. The *Pilofella*, t. 14. of Tillands proving a copy of Tabernæmontanus, rendered his work of no authority in an important point; though fuch a defect was not previoufly known, even to his learned countryman the late Mr. Dryander; and the book funk immediately in his eftimation, except as a rarity.—A curious reafon for the name of *Tillandfia*, as applied to the genus of which we are about to fpeak, is given by Linnæus himfelf, in his *Prælectiones in Ordines Naturales Plantarum*, publifhed by Gifeke, p. 291. "*Tillandfiæ* cannot bear water, and therefore I have given this name to the genus, from a profeffor at Abo, who in his youth having an unpropitious paffage from Stockholm to that place, no fooner fet his foot on fhore, than he vowed never again to venture himfelf upon the fea. He changed his original name to Tillands, which means *on*, or *by*, *land;* and when he had fubfequently occafion to return to Sweden, he preferred a circuitous journey of 200 Swedifh miles through Lapland, to avoid going eight miles by fea." This circumftance is alfo alluded to in the Tour in Lapland, publifhed from the journal of Linnæus in 1811, v. 1. 43. One of the moft invidious cenfors censors of this great botanist has declared that he would "excuse a thousand of his faults for the sake of the above name alone."—Linn. Gen. 158. Schreb. 212. Willd. Sp. Pl. v. 2. 11. Mart. Mill. Dict. v. 4. Ait. Hort. Kew. v. 2. 202. Pursh 217. Juss. 50. Lamarck Dict. v. 1. 616. v. 7. 666. Illustr. t. 224. (Caraguata; Plum. Gen. 10. t. 33. Renalmia; ibid. 37. t. 38.)—Class and order, *Hexandria Monogynia*. Nat. Ord. *Coronariæ*, Linn. *Bromeliæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, oblong, erect, permanent, in three oblong-lanceolate, pointed segments. *Cor.* of one petal, tubular; tube long, inflated; limb small, erect, in three obtuse segments. *Stam.* Filaments six, linear, inserted into the tube of the corolla, and of the same length; anthers acute, incumbent, in the throat of the tube. *Pist.* Germen superior, oblong, tapering at each end; style thread-shaped, the length of the stamens; stigma three-cleft, obtuse. *Peric.* Capsule elongated, bluntly triangular, pointed, scarcely separated into more than one cell, of three valves. *Seeds* several, cylindrical, each supported on a long stalk of aggregate fibres, becoming a feathery wing.

Eff. Ch. Calyx inferior, three-cleft, permanent. Corolla tubular, three-cleft. Capsule with three valves. Seeds on a feathery wing.

1. T. *utriculata*. Bottle Tillandsia. Linn. Sp. Pl. 409. Willd. n. 1. Ait. n. 1. (Viscum caryophylloides maximum, flore tripetalo pallidè luteo, semine filamentoso; Sloane Jam. v. 1. 188.)—Leaves linear, channelled, recurved; dilated and inflated at the base. Stem closely panicled.—Found on the branches of large trees in Jamaica, where it is known by the name of Wild Pine. Sloane observes that the long, tough, smooth fibres of the *root*, which is perennial, do not insinuate themselves into the bark or wood, to draw nourishment from thence, but merely grasp the branch, fixing themselves firmly to the bark for support. *Stem* solitary, round, smooth, leafy, three or four feet high. *Leaves* numerous, often a yard long, channelled, entire, tapering to a very slender point, recurved, striated; paler beneath, and clothed with extremely minute chaffy scales like powder; the radical ones greatly enlarged and tumid at the base, where they form a sort of oval hollow vessel, which holds a quantity of water, collected during the wet season, from the rain trickling down the channels of the leaves. In this it is said that small aquatic animals sometimes take refuge, while birds, and even men, are reported to have hence derived a welcome supply of drink. The water seems destined to support the plant during drought, when it could otherwise obtain nothing by its roots; but this slender stock is enough to preserve life, and indeed a considerable degree of luxuriance. The *flowers* are of a pale greenish-yellow, with purple *anthers*, and compose a close branched panicle. The long branching down which accompanies each *seed*, and is inserted into its base, carries it to a distance, and readily clings to the rough barks of trees, where the *seed* speedily vegetates. When the *stem* is wounded, a clear white mucilaginous gum exudes. *Sloane.*

2. T. *serrata*. Serrated Tillandsia. Linn. Sp. Pl. 409. Willd. n. 2. Ait. n. 2. (Caraguata clavata et spicata, foliis serratis; Plum. Ic. 63. t. 75. f. 1.)—Leaves flat, smooth, with strong spinous serratures; entire towards the base. Spike compound. Bracteas with spinous teeth.—Native of Jamaica. Brought to Kew, with the foregoing, by captain Bligh, in 1793. This is a large stout perennial plant, with the aspect of an *Aloe*, but not so succulent. The *leaves* are two or three feet long, and two inches broad, their upper part especially bordered with hooked spines; their under side curiously and minutely dotted between the numerous fine ribs. *Stem* and *compound spike* beset with broad, ovate, pointed *bracteas*, wh[illegible] spines are more direct and tooth-like; the under side ribbed and dotted in the manner of the leaves.

3. T. *lingulata*. Tongue-leaved Tillandsia. Linn. Sp. Pl. 409. Willd. n. 3. Ait. n. 3. Jacq. Amer. 92. t. 62. (Caraguata latifolia clavata; Plum. Ic. 63. t. 74. Viscum caryophylloides maximum, capitulis in summitate conglomeratis; Sloane Jam. v. 1. 189. t. 120.)—Leaves flat, somewhat tongue-shaped, smooth, entire, as well as the crowded bracteas.—Native of old trees in the vast forests of Martinico, as well as of Jamaica, where it is said to collect water, like the first species. In size it agrees with the second, but the entire *leaves*, and the close leafy head or spike of *flowers*, abundantly distinguish that before us. Jacquin says the *flowers* are yellow, inodorous, three inches long.

4. T. *tenuifolia*. Slender-leaved Tillandsia. Linn. Sp. Pl. 410. Willd. n. 4. Swartz Ind. Occ. v. 1. 591. (Renalmia spicâ multiplici, angustifolia, flore cæruleo; Plum. Ic. 234. t. 238. f. 2. Viscum caryophylloides minus, foliorum imis viridibus apicibus subrubicundis, flore tripetalo purpureo, semine filamentoso; Sloane Jam. v. 1. 190. t. 122. f. 1.)—Leaves linear-thread-shaped, channelled, erect, taper-pointed. Spikes alternate, imbricated. Flowers two-ranked.—Parasitical, like all the foregoing, on the branches of trees in the West Indies. The *stem* is a foot high, simple, entirely concealed by the broad sheaths of the *leaves* which clothe it. The radical *leaves* are very numerous, above a span long, very slender, resembling those of some long-leaved kinds of *Pinus*, but more tapering and channelled; moderately dilated, sheathing, downy and rusty, at the base. Those of the stem are much shorter, and almost setaceous, though their base is still broader. *Spikes* three or four, alternate, sessile, imperfectly two-ranked, lanceolate, an inch long, proceeding from broad sheathing *bracteas*. *Flowers* imbricated in two rows, blue. Linnæus quotes by mistake a synonym of Jacquin, belonging to the following.

5. T. *flexuosa*. Zigzag Tillandsia. Swartz Ind. Occ. 590. Willd. n. 5. Ait. n. 4. (T. tenuifolia; Jacq. Amer. 92. t. 63.)—Leaves linear-lanceolate, channelled, recurved. Spikes lax, zigzag. Flowers two-ranked, distant. —On trees near the sea in Jamaica, as well as near Carthagena in South America. Extremely unlike the last. The *leaves* are very broad and concave in their lower part, convoluted about the base of the stem, green, elegantly marked with broad, whitish, minutely scaly, transverse stripes; their points recurved in all directions. *Stem* twice as tall as the leaves, being two or three feet high, mostly subdivided in the upper part, invested with close red sheaths, and terminating in two or three long, lax, zigzag *spikes*, with triangular stalks. *Flowers* about an inch or more asunder. *Calyx* coloured, near an inch long. *Corolla* still longer, with reflexed segments, at first blue, then red, as we presume from Dr. Swartz's description and the analogy of *T. stricta* hereafter described. *Capsule* long, of three cells, the valves black and shining on the inside.

6. T. *setacea*. Setaceous Tillandsia. Swartz Ind. Occ. 593. Willd. n. 6.—Leaves linear-thread-shaped, recurved, nearly smooth. Spike simple, with two-ranked imbricated sheaths.—Found on trees in Jamaica. *Stem* a foot or more in height, round, nearly upright, clothed with alternate, broad, bristle-pointed sheaths. Radical *leaves* nearly equal in length to the stem, numerous, sheathing at the base, greyish, rigid, somewhat mealy as it were, with very minute scales.

fcales. *Spike* terminal, folitary, ovato-lanceolate. *Flowers* alternate. Moft like *T. tenuifolia*, n. 4, but differing in its recurved *leaves*, and fimple folitary *fpike*.

7. T. *paniculata*. Panicled Tillandfia. Linn. Sp. Pl. 410. Willd. n. 7. Lamarck v. 1. n. 6. (Renalmia ramofiffima, floribus variegatis et circinatis; Plum. Ic. 233. t. 237.)—Radical leaves very fhort, lanceolate. Stem panicled, twice compound. Spikes erect. Segments of the corolla linear, fpiral.—Native of South America. We know nothing of this fpecies but from Plumier, whofe figure reprefents numerous, crowded, erect, concave radical *leaves*, and a *ftem* alternately branched from the very bottom, with two-ranked reclining *branches*, laden with afcending *fpikes*. A copy, in our poffeffion, of his original drawing fhews the *flowers* to be four inches long.—We have no good authority for Browne's fynonym, cited by authors, nor does it, if correct, throw any light upon this very obfcure fpecies. Lamarck informs us, from Plumier's manufcripts, that the *ftem* is fometimes taller than a man; that the *calyx* is fpotted with green and purple; *corolla* of a violet blue, dotted with purple, its long narrow fegments becoming fpiral as they expand. This is the circumftance to which Plumier's definition alludes. His greatly reduced plate is not fufficiently exact to explain it, and Linnæus inaccurately copied *foliis* for *floribus*, in which Willdenow, of courfe, follows him without the leaft enquiry.

8. T. *fafciculata*. Fafciculated Tillandfia. Swartz Ind. Occ. 586. Willd. n. 8.—" Leaves lanceolate-awlfhaped, erect, ftraight. Spikes lateral, two-ranked, imbricated." —Found on trees in Jamaica, in thickets near the fea-fhore. *Stem* one or two feet high, leafy, fimple. Radical *leaves* broad, concave, and fheathing, at the bafe; lanceolate and tapering upward, very flightly recurved; downy externally; thofe of the ftem fhorter, fomewhat imbricated, ovate, with long awl-fhaped points. *Spikes* alternate, lateral and terminal, two-edged, an inch broad, with imbricated ovate *bracteas*, membranous at the margin. *Flowers* folitary. *Capfule* an inch long. *Swartz*. Lamarck's *T. clavata*, cited by Willdenow with a mark of doubt, belongs to *T. monoftachya*, n. 11, as evidently appears from Plumier's fynonym, the figure belonging to which thefe writers overlooked.

9. T. *nutans*. Nodding Tillandfia. Swartz Ind. Occ. 588. Willd. n. 9. Ait. n. 5.—" Leaves ovato-lanceolate, membranous. Stem nearly naked. Spikes fubdivided, drooping. Flowers feparate, ovate."—Native of branches of trees on hills in Jamaica. *Plant* from one to two feet high. *Leaves* all radical, tumid at the bafe, ftriated lengthwife, fmooth, much fhorter than the *ftem*, which is round, clothed with membranous ftriated fheathing fcales. *Spikes* alternate, rather diftant, drooping, with angular *ftalks*. *Flowers* diftinct, near each other, but not imbricated. *Corolla* white. *Capfule* roundifh-ovate. *Swartz*.

10. T. *polyftachya*. Many-fpiked Tillandfia. Linn. Sp. Pl. 410. Willd. n. 10. (Renalmia fpicâ multiplici, flore albo; Plum. Gen. 37; alfo as Linnæus fuppofed, R. alia, fpicâ multiplici, anguftifolia; ibid. 37. Vifcum caryophylloides anguftifolium, floribus cæruleis; Catefb. Carol. v. 2. 89. t. 89?)—" Stalk bearing imbricated lateral fpikes." —Native of South America. We can make out nothing further of this fpecies, nor how Linnæus came to a knowledge of it, there being no fpecimen in his herbarium. Swartz however appears to be acquainted with the plant; fee his remarks under n. 13. and 14.

11. T. *monoftachya*. Single-fpiked Tillandfia. Linn. Sp. Pl. 410. Willd. n. 11. (T. clavata; Lamarck Dict. v. 1. n. 4. Renalmia clavata, floribus niveis; Plum. Ic. 233. t. 238. f. 1. R. non ramofa fquamata, et floribus niveis; Plum. Gen. 37.)—Leaves radical, linear, channelled, recurved; broad and fheathing at the bafe. Stem fimple, clothed with imbricated fcales. Spike fimple. Bracteas ovate, concave.—Native of the Weft Indies. Plumier gathered it on old trees in Hifpaniola. The numerous radical *leaves* fpread widely in every direction, being about a foot long, and two inches broad, fo much recurved that their points touch the branch on which the plant is fixed. *Stem* from fifteen to eighteen inches high, erect, round, firm, quite fimple, as well as its fpike. *Bracteas* white, ftreaked or dotted with red. *Corolla* fnow-white; its limb in three deep ovate fegments.

12. T. *pruinofa*. Frofted Broad-leaved Tillandfia. Swartz Ind. Occ. 594. Willd. n. 12.—Leaves lanceolate, taper-pointed, recurved, clothed with fhaggy fcales. Spike fimple, with imbricated, pointlefs, downy bracteas.—Found on the arms and ftems of aged trees in Jamaica, as well as in Brafil. *Stem* a foot or more in height, fimple, leafy. *Radical leaves* a foot long, fpreading varioufly, near an inch broad at the bottom, but foon contracted into a long taper point, flat, denfely clothed all over with fhaggy, torn, peltate, fhining fcales, the marginal ones flat, inbricated, and much dilated; *ftem-leaves* much fhorter and narrower. *Spike* terminal, folitary, fimple, an inch long, ovate. *Bracteas* ovate, bluntifh, concave. *Corolla* blue, longer than the bracteas. *Capfule* oblong, triangular, fmooth.

13. T. *canefcens*. Hoary Tillandfia. Swartz Ind. Occ. 595. Willd. n. 13.—" Radical leaves linear, erect, hoary, as tall as the ftem. Spikes about three, terminal."—Native of Jamaica, on trees near the fea-fhore. Perennial, about a foot high, with fhort, fimple, curling, fibrous *roots*. *Stem* fimple, leafy. *Radical leaves* imbricated, linear, rigid, whitifh or hoary; with very broad, ovate, concave, tumid, membranous, fheathing bafes; *ftem-leaves* tapering, acute, with more lax fheaths. *Spikes* ufually three, crowded at the top of the ftem, feffile, ovate, acute, flattifh. *Bracteas* two-ranked, imbricated, ovato-lanceolate, fmooth. *Corolla* red, with long fegments. Nearly related to *T. polyftachya*, but that fpecies is taller, with recurved, zigzag, fmooth *leaves*, and numerous, fcattered, lanceolate *fpikes*. *Swartz*.

14. T. *anguftifolia*. Narrow and long-leaved Tillandfia. Swartz Ind. Occ. 596. Willd. n. 14.—" Leaves linear-lanceolate, nearly erect, fmooth, taller than the ftem. Spikes fomewhat cluftered."—Found on the trunks and branches of trees, in Jamaica and Hifpaniola. Perennial. *Stem* two feet high, nearly upright, fimple, leafy. *Leaves* all imbricated, broad and fheathing at the bafe, lanceolate, narrow towards the end, ftraight, ftriated; the fheaths of the radical ones broadeft, and rather inflated. *Spikes* numerous, fcattered, fomewhat cluftered, alternate, feparated by leafy fheaths, imperfectly imbricated, compreffed, lanceolate, many-flowered, an inch and half long. *Flowers* two-ranked. *Bracteas* imbricated, equitant, ovate, pointed, keeled, ftriated, fmooth. *Capfules* elongated, pointed, triangular, fmooth, extending beyond the *bracteas*. This likewife is cautioufly to be diftinguifhed from *T. polyftachya*, by having more upright *leaves*, longer than the *ftem*, and the *fpikes* feparated by leafy *fheaths*. *Swartz*. Nothing is mentioned refpecting the colour of the *flowers*.

15. T. *ftricta*. Frofted Stiff-leaved Tillandfia. Gawler in Curt. Mag. t. 1529. Ait. Epit. 375. Banks Ic. Ined. —Leaves chiefly radical, linear-lanceolate, channelled, recurved, minutely fcaly at the back. Stem fimple. Spike folitary. Bracteas ovate, concave, imbricated, glaucous, fmooth.—Found by Dr. Solander, on trees near Rio Janeiro, in Brafil. Said to have been introduced into the European ftoves,

ftoves, by lady Neale, about the year 1799. The *root* is fomewhat tuberous, with many tough fmooth fibres. *Stem* about fix inches high, furrounded, and almoft concealed, by the denfe tuft of very numerous radical *leaves*, which are fometimes all curved to one fide, five or fix inches long, pale green, frofted, as it were, with hoary fcaly pubefcence, thickeft towards the bafe. *Spike* three inches long, fimple, many-flowered, with beautiful large white *bracteas*, tinged and tipped with rofe-colour; the lower ones ending in leafy points. *Calyx* of the colour of the *bracteas*, but hardly fo long. *Corolla* with obtufe, emarginate, convolute fegments, at firft of a rich deep blue, but finally changing to a deep red. *Capfule* dark brown, an inch long. This is, no doubt, very different from *T. monoftachya*, though Linnæus's account of that fpecies may be, as juftly hinted in the Bot. Mag., incomplete. *T. ftricta* flowers in November. It is faid to live and bloffom when fufpended by a thread in a warm room. Few plants are more elegant or fingular.

16. T. *recurvata*. Recurved-leaved Tillandfia. Linn. Sp. Pl. 410. Willd. n. 15. Ait. n. 6. Purfh n. 1. Swartz Obf. 121. (Vifcum caryophylloides minus, foliis pruinæ inftar candicantibus, flore tripetalo purpureo, femine filamentofo; Sloane Jam. v. 1. 190. t. 121. f. 1.)—Leaves radical, awl-fhaped, fcaly, recurved. Stalks naked, two-flowered.—Native of the trunks of old rotten trees, in Jamaica and the Brafils, as well as in Florida and Georgia, growing in denfe tufts. The *ftems* are very fhort, clothed with crowded, fpreading, recurved, fheathing *leaves*, two or three inches long, downy with minute hoary fcales. *Stalks* terminal, folitary, four inches high, flender, round, naked and fmooth, each bearing at the top two upright *flowers*, enveloped in a pair of fheathing, furrowed, dotted *bracteas*. Segments of the *corolla* blue, obtufe, fcarcely extending beyond the *calyx*. *Anthers* yellow. *Capfule* an inch long, flender, brown and fhining, enveloped in the pale fegments of the permanent *calyx*, which are as long, and nearly as broad, as the valves.—Sloane fays it draws its nourifhment from rain water, falling into the cavity made by the leaves.

17. T. *ufneoides*. Long-mofs Tillandfia. Linn. Sp. Pl. 411. Willd. n. 16. Purfh n. 2. (Vifcum caryophylloides tenuiffimum, e ramulis arborum mufci in modum dependens, foliis pruinæ inftar candicantibus, flore tripetalo, femine filamentofo; Sloane Jam. v. 1. 191. t. 122. f. 2, 3. Cufcuta ramis arborum innafcens, &c.; Pluk. Phyt. t. 26. f. 5; alfo f. 6.)—Stem much branched, thread-fhaped, twifted, minutely fcaly, as well as the awl-fhaped channelled leaves.—Native of fhady woods from Virginia to Florida, as alfo of the Weft Indies and the Brafils, flowering in July. The long wiry contorted *ftems* creep over the ftems and branches of old trees, and even along a rope or hair line, if put in their way, the *roots* fcarcely fixing themfelves, or deriving any fuftenance, from either. The *flowers* are, according to Mr. Purfh, of a yellowifh-green. When the hoary fhaggy coat of the plant is feparated by beating or rubbing, the remains of the ftems look like a mafs of curling black horfe-hair, and ferve, like that, to ftuff mattreffes, &c. In this denudated ftate the ftems are reprefented, along with the perfect plant, by Sloane as well as Plukenet.

M. Poiret, in Lamarck Dict. v. 7. 666—673, has greatly enriched this genus, not only with all the fpecies publifhed by Dr. Swartz, and which we likewife have adopted, but alfo with ten befides, adopted from the *Flora Peruviana* of Ruiz and Pavon. That our work may not be incomplete, we fhall briefly mention thefe in the order in which M. Poiret has arranged them, trufting to him for the references, which we have not the means of confulting. He introduces them all, except the laft, between the *anguftifolia*, our n. 14, and *recurvata*, n. 16.

18. T. *tetrantha*. Four-flowered Tillandfia. Poiret n. 9. Fl. Peruv. v. 3. 39. t. 265.—Leaves radical, lanceolate, imbricated; recurved at the point. Stem erect. Stalks reflexed, four-flowered.—Grows on trees and rocks in the forefts of the Andes, flowering in July and Auguft. —*Root* of many fibres. *Leaves* radical, large, fpotted with red. *Stems* folitary, rather longer than the leaves, zigzag, clothed with oval, pointed, clofe, fcaly *bracteas*, of a purplifh rofe-colour; the upper ones fpreading almoft horizontally, each of the latter bearing an axillary *ftalk*, fupporting four, nearly feffile, *flowers*. *Calyx* yellow, coriaceous. *Corolla* violet.

19. T. *maculata*. Spotted-leaved Tillandfia. Poiret n. 10. Fl. Peruv. v. 3. 40. t. 267.—Leaves radical, lanceolate-fword-fhaped, fhining; revolute at the point. Panicle alternately branched. Spikes nearly fimple, many-flowered.—Native of rocks and trees, in the middle of the great forefts of the Andes, flowering from July to September. The *leaves* are channelled, polifhed on both fides, covered with red or purplifh fpots. Every part of the plant is often red. *Stems* three feet high, fimple, jointed, with an oval fcale, or *bractea*, at each joint. *Panicle* terminal, eighteen inches long, red, compofed of alternate, nearly fimple, *fpikes*, furnifhed with numerous, oval-lanceolate, pointed *bracteas*, reddifh as well as the *calyx*. *Corolla* violet, fmall.

20. T. *rubra*. Red Tillandfia. Poiret n. 11. Fl. Peruv. v. 3. 40. t. 266.—Leaves radical, fword-fhaped, fomewhat pointed. Panicle fimple, fpikes undivided.—Native of rocks in Peru, flowering in March and April. The *leaves* are about two feet long, fpreading or recurved; of a fhining green above; filvery white beneath. *Stems* folitary, erect, two or three feet high; clothed with fheathing fcales below; terminating in a ftraight reddifh *panicle*, compofed of many fimple, alternate, oblong, lanceolate, divaricating *fpikes*. *Bracteas* red, pointed, keeled, an inch in length. *Flowers* imbricated, feffile. *Calyx* yellowifh-red. *Corolla* fmall, violet, with reflexed fegments.

21. T. *parviflora*. Small-flowered Tillandfia. Poiret n. 12. Fl. Peruv. v. 3. 41. t. 269.—Leaves radical, awl-fhaped, greatly dilated at the bafe. Panicle fimple. Spikes from three to feven. Flowers two-ranked.—On rocks in the forefts of the Andes, flowering from Auguft to October. *Leaves* very numerous, from fix to nine inches long, channelled, fpreading, whitifh, clothed with a multitude of mealy fcales. *Stems* a foot high, flender, fimple, purplifh, with diftant, awl-fhaped, channelled, whitifh, fhort *ftem-leaves*, and oval whitifh *bracteas*. *Flowers* fmall, white, alternate, on zigzag partial ftalks. *Capfule* almoft eight times as long as the *calyx*.

22. T. *biflora*. Two-flowered Tillandfia. Poiret n. 13. Fl. Peruv. v. 3. 41. t. 268.—Leaves fword-fhaped, acute. Stem racemofe. Flowers in pairs.—Found on the Andes, flowering in Auguft and September. This fpecies is often proliferous. *Leaves* nearly equal, ftraight, fpreading, ftriated. *Stems* folitary, fimple, eighteen inches high, covered with lanceolate fcaly *fheaths*, or *ftem-leaves*, and terminating in a fimple *clufter*, fix inches long. *Flowers* on fhort ftalks, in alternate pairs, furnifhed with elongated, lanceolate, ftriated *bracteas*, recurved and pale green at their extremity. *Capfules* yellowifh, an inch long.

23. T. *purpurea*. Rofe-coloured Tillandfia. Poiret n. 14. Fl. Peruv. v. 3. 41. t. 270.—Leaves fword-fhaped, tapering, channelled, recurved, clothed with mealy fcales. Panicle of many fpikes. Flowers two-ranked.—Found on little

little hills about Lima, and in other sandy or stony situations in Peru, flowering in June and July. The perennial *root* throws out many prostrate trailing *shoots*. *Leaves* spreading, six to nine inches long, whitish. *Stem* solitary, a foot high, simple, clothed with long awl-shaped *sheaths*. *Panicle* rose-coloured, of from five to nine alternate *spikes*, with oval, concave, whitish *bracteas*. *Flowers* sessile, with rose-coloured *bracteas* and *calyx*. *Corolla* dark purple, with a white tube. *Capsule* [illegible]; deep purple within.

24. T. *heptantha*. Seven-flowered Tillandsia. Fl. Peruv. v. 3. 21. (T. heptandra; Poiret. n. 15.)—Leaves radical, sword-shaped, tapering, very acute. Spike solitary, simple, of about seven flowers.—Native of rocks and trees, among precipices, in Peru, flowering from June to August. *Leaves* whitish, and rather downy. *Stem* near a foot high, quite simple, scaly. *Flowers* sessile, in two ranks, with lanceolate violet-coloured *bracteas*. *Corolla* white, tipped with violet. We presume that M. Poiret has erred in his specific name.

25. T. *sessiliflora*. Sessile-flowered Tillandsia. Poiret n. 16. Fl. Peruv. v. 3. 42. t. 271.—Leaves radical, tongue-shaped, flat, obtuse. Spike solitary, simple.—Native of Peru, flowering in November and December. *Root* biennial. *Plant* smooth. *Leaves* eight or nine inches long, and an inch broad; the outer ones gradually smaller. *Stems* slender, a foot high, jointed, clothed with obtuse *sheaths*. *Spike* six inches in length. *Flowers* alternate, solitary, each with an oval, concave, acute *bractea*. *Corolla* of a violet purple on the inside.

26. T. *capillaris*. Capillary Tillandsia. Poiret n. 17. Fl. Peruv. v. 3. 42. t. 271. f. C.—Leaves linear-awlshaped. Stem forked. Stalks axillary, mostly single-flowered, capillary, smooth, thrice as long as the leaves.—On rocks, walls, and trees, in Peru, flowering in November and December. This species is said to be related in many respects to the *T. recurvata*, n. 16, but differs in having forked *stems*; more numerous and broader *leaves*, contracted at their base, and not recurved; capillary *flower-stalks*; and solitary *bracteas* to each *flower*. (We would observe that the last character is found in the *recurvata*.) The plant forms dense, leafy, whitish, tufts, the *leaves* being clothed with very minute mealy scales. *Stems* about six inches high, forked several times, furnished with two-ranked, crowded, imbricated, reflexed, linear-awlshaped *leaves*, striated at their base, and half clasping the stem. *Stalks* straight, bearing one or two *flowers*, with a solitary, ribbed, smooth *bractea*, and a leaf at their base. *Calyx* scariose, deep violet. *Corolla* white, hardly longer than the calyx. *Anthers* yellow. *Capsules* linear, twice the length of the calyx, dark violet within.

27. T. *virescens*. Greenish Tillandsia. Poiret n. 20. Fl. Peruv. v. 3. 43. t. 270. f. B.—Leaves linear-awlshaped. Stalks axillary, single-flowered, the length of the leaves, with a solitary convoluted bractea.—Native of rocks in Peru, flowering in December and January.—A small species, forming dense, proliferous, whitish, warty tufts. *Leaves* imbricated in two rows, reflexed at the point, striated at the base. *Flowers* pale yellow. *Capsule* green, twice the length of the calyx; internally dark-purple.

TILLANJONG, in *Geography*, one of the Nicobar islands, in the Indian sea. N. lat. 8° 40′. E. long. 94° 9′.

TILLE, La, a river of France, which runs into the Saône, about 3 miles below Auxonne.

Tillé, a town of France, in the department of the Oise; 3 miles N. of Beauvais.

TILLEE, a town of Bengal; 28 miles N.W. of Dacca.

TILLEMANS, Peter, in *Biography*, was born at Antwerp in 1684, and visited England in 1708, where he attracted attention by his excellent copies from the pictures of Bourgognone and Teniers, of whose works he preserved the freedom and spirit. He also painted landscapes with small figures, views of gentlemen's seats, sea-ports, &c. and met with very considerable employment. The duke of Devonshire favoured him, and for him he painted a picture of Chatsworth, which gained him considerable eclat. He died here in 1734.

TILLEMONT, Louis Sebastian le Nain de, a French ecclesiastical writer, was born at Paris in 1637; and in the school of the Port-Royal, into which he was admitted at the age of ten, he discovered promising talents and a pious disposition. From early life he devoted himself to the study of ecclesiastical antiquity, and made collections, principally relating to the first six centuries, with a view of composing a history of the church. Modest and diffident, as well as learned, he deferred taking priests' orders till his 40th year; and having done this, he declined all preferment, and retired first to Port-Royal-des-Champs, and then to Tillemont, near Vincennes, prosecuting his literary labours, and keeping in view his main object: he subjected himself at the same time to very rigid penitentiary discipline. His austerities and intense application debilitated his constitution to such a degree, that he died in 1698, at the age of 61 years.

The plan of his great work comprehended two parts, *viz.* the secular and the ecclesiastical history of the period of which he proposed to treat. Accordingly the first part, entitled "Memoires pour servir a l'Histoire Ecclesiastique des six premiers Siècles," was comprised in 16 vols. 4to. of which four volumes were published in his life-time, and twelve more after his death. The other part, entitled "L'Histoire des Empéreurs et des autres Princes qui ont regné durant les six premiers Siècles de l'Eglise," consists of 6 vols. 4to. the last being left in MS. and not published till 1738, finishing with the emperor Anastasius. Dupin, though he disapproves the method of Tillemont, observes, that great instruction may be derived from his history, especially with respect to critical and chronological matters. His style merits no commendation. Gibbon, who often quotes his History of the Emperors, and praises his scrupulous accuracy, finds frequent occasion to censure his bigotry, and remarks, that "he never dismisses a virtuous emperor without pronouncing his damnation." Moreri. Gen. Biog.

TILLENENSEE, in *Geography*, a lake of Prussia, 8 miles W. of Lick.

TILLER, or Tillar, in *Husbandry*, a little young tree, left to grow till it be fellable.

Tiller is also a term used by farmers to signify, that the produce of the grain branches out into several stalks; in which sense it denotes the same thing with the Latin word *fruticare*.

It has been suggested by the writer of the "Elements of Agricultural Chemistry," that in the tillering of corn, that is, the production of new stalks round the original plume, there is every reason to believe that oxygen must be absorbed; for the stalk at which the tillering takes place, always contains sugar, and the shoots arise from a part which is deprived of light. The drill-husbandry is therefore supposed to favour this process; as loose earth is thrown by the hoeing round the stalks; and they are preserved from light, and yet supplied with oxygen. The writer has counted from forty to one hundred and twenty stalks produced from a grain of wheat, in a moderately good crop of the drilled kind. And we are informed, it is said, by sir Kenelm Digby, in 1660, that there was in in the poſſeſſion of the fathers of the Chriſtian doctrine at Paris, a plant of barley, which they, at that time, kept by them as a curioſity, and which conſiſted of two hundred and forty-nine ſtalks ſpringing from one root, or grain; and in which they counted above eighteen thouſand grains, or ſeeds of barley.

It is noticed, too, that the great increaſe which takes place in the tranſplantation of wheat, depends upon the circumſtance, that each layer thrown out in tillering may be removed, and treated as a diſtinct plant.

The following ſtatement is given in the fifty-eighth volume of the Philoſophical Tranſactions, at p. 203: Mr. C. Miller of Cambridge ſowed ſome wheat on the 2d of June, 1766; and on the 8th of Auguſt, a plant was taken and ſeparated into eighteen parts, and replanted; theſe plants were again taken up, and divided in the months of September and October, and planted out ſeparately to ſtand the winter, which diviſion produced ſixty-ſeven plants. They were again taken up in March and April, and produced five hundred plants: the number of ears thus formed from one grain of wheat was twenty-one thouſand one hundred and nine, which gave three pecks and three-quarters of corn, that weighed 47lbs. 7 oz.; and that were eſtimated at five hundred and ſeventy-ſix thouſand eight hundred and forty grains.

There is a number of facts and caſes of the vaſt increaſe of grain crops by tillering, ſcattered through the writings on agriculture and huſbandry, which clearly ſhew the great utility and importance of it in the raiſing of ſuch crops.

Tiller *of a Ship*, a long piece of timber (which ſhould be ſtraight-grained and free from knots) fitted into the head of the rudder as a lever, to turn it from one ſide to the other, in order to ſteer the ſhip. This term, or *hich*, is uſed for the handle of a boat's rudder.

Tiller-*Rope*, a kind of tackle, communicating with the ſhip's ſide, and uſually compoſed of untarred rope-yarn for the purpoſe of traverſing more readily through the blocks or pullies: this tackle ſerves to guide and aſſiſt the operations of the tiller, and in all large veſſels is wound about a wheel, which acts upon it with the powers of a crane or windlaſs.

TILLERING, in *Agriculture*. See Tiller.

TILLEWALL, in *Geography*, a town of Pruſſia, in Oberland; 5 miles N.E. of Eylau.

TILLIE'RES, a town of France, in the department of the Eure; 6 miles N.E. of Verneuil.

TILLING, a town of Sweden, in the province of Upland; 23 miles S.E. of Upſal.

TILLIUM, or Tilium, in *Ancient Geography*, a town on the weſtern coaſt of the iſle of Sardinia, between the promontory Gorditanum and port Nymphæus. Ptol.

TILLONGCHOOL, or Katchal, in *Geography*, one of the Nicobar iſlands, of a triangular form, about 36 miles in circumference. N. lat. 7° 58′. E. long. 93° 50′.

TILLOT, Le, a town of France, in the department of the Voſges; 12 miles S.E. of Plombieres.

TILLOTSON, John, in *Biography*, a celebrated Engliſh prelate, deſcended from an ancient family in Cheſhire, was the ſon of Robert Tillotſon, a clothier at Sowerby, in the pariſh of Halifax, Yorkſhire, where he was born in the year 1630. Having been brought up in the principles of his father, who was a Calviniſtic puritan, and diſcovering an inclination to literature, he was entered in his 17th year a penſioner of Clare-Hall, Cambridge. In 1651 he was elected fellow of his college, and took pupils, to whoſe moral and religious inſtruction he was duly attentive. At this time, he was in his ſentiments Calviniſtic, heard ſuch preachers, and uſed extemporaneous prayer. His views of theology were enlarged ſoon after he left college in 1656, by the peruſal of Chillingworth's "Religion of Proteſtants." But retaining his attachment to the Preſbyterian form of church government, he was received into the family of Edmund Prideaux, attorney-general to the Protector, as chaplain and tutor to his ſon. He attended the Savoy conference in July 1661, and preached a ſermon (the firſt which he preached) at their morning exerciſe in Cripplegate, in the month of September. Under the Act of Uniformity in 1662, to which he ſubmitted, he became curate at Cheſhunt, in Hertfordſhire. In London he was much admired as a preacher, and was choſen miniſter by one of the pariſhes, but declined accepting the office, becauſe the vacancy had been occaſioned by the refuſal of Mr. Edm. Calamy to comply with the Bartholomew Act. From a rectory in Suffolk, to which he was preſented, he removed to the office of preacher to the ſociety at Lincoln's Inn. In 1664 he married the daughter of Dr. French, canon of Chriſtchurch, by a ſiſter of Oliver Cromwell; and in 1665 he was appointed lecturer to the pariſh of St. Laurence Jewry. His reputation as a preacher was very conſiderably increaſed at this time by his printed ſermon, "On the Wiſdom of being religious." His controverſy on popery commenced with the publication of his "Rule of Faith," in anſwer to a book written by a convert to the Romiſh church. The part he took in a ſcheme for comprehending diſſenters under the eſtabliſhment, evinced his reſpect for that deſcription of Chriſtians and Proteſtants. (See Comprehension.) In 1666 he took his degree of D.D., and in 1669 he was made a king's chaplain, and was preſented to a prebend of Canterbury. When king Charles, in 1672, iſſued a declaration for liberty of conſcience, with a view of favouring the Roman Catholics, the biſhops took the alarm, and recommended to the clergy to preach againſt popery. The king was diſpleaſed, and Tillotſon, at a meeting of the clergy convoked by the biſhop of London, ſuggeſted the following apology for their conduct: "That ſince his majeſty profeſſed the Proteſtant religion, it would be an unprecedented thing that he ſhould forbid his clergy to preach in defence of a faith which they believed, and which he declared to be his own." Soon after this he preached a ſermon at Whitehall on the hazard of ſalvation in the church of Rome; and yet, offenſive as this ſermon muſt have been, he was advanced, in 1672, to the deanery of Canterbury, which was followed, in 1673, by a preſentation to a prebend of St. Paul's. At this time he publiſhed Dr. Wilkins's "Principles of Natural Religion," with a recommendatory preface; and the author, who died in his houſe, committed to him the diſpoſal of his papers. A ſimilar truſt was repoſed in him by Dr. Barrow. His dread of popery induced him, in 1680, to preach before the king a ſermon, afterwards publiſhed by the royal command, and entitled "The Proteſtant Religion vindicated from the Charge of Singularity and Novelty." In this ſermon a paragraph was introduced which incurred the charge of intolerance. "I cannot think," ſays he, "till I be better informed, which I am always ready to be, that any pretence of conſcience warrants any man that is not extraordinarily commiſſioned, as the apoſtles and firſt preachers of the goſpel were, and cannot juſtify that commiſſion by miracles, as they did, to affront the eſtabliſhed religion of a nation, though it be falſe, and openly to draw men off from the profeſſion of it, in contempt of the magiſtrate and the law. All that perſons of a different religion can in ſuch a caſe reaſonably pretend to is, to enjoy the private liberty and exerciſe of their own conſcience and religion, for which they

they ought to be very thankful, and to forbear the open making of profelytes to their own religion, (though they be never fo fure that they are in the right,) till they have either an extraordinary commiffion from God to that purpofe, or the providence of God make way for it by the permiffion of the magiftrate." The king flept while the preacher delivered the fermon, but a nobleman at the clofe of it faid to him, "It is a pity your majefty was afleep, for we have had the rareft piece of Hobbifm that ever you heard in your life," to which Charles replied, "Oddsfifh, then he fhall print it," which was the caufe of the order. The paragraph was unworthy of Dr. Tillotfon, and gave very general offence, both to the eftablifhed clergy and Prefbyterians. Tillotfon was an ardent promoter of the Bill of Exclufion, nor would he concur in the addrefs of the London clergy to the king on his declaration that he could not confent to fuch a bill. In 1682 he took occafion to vindicate the character of Dr. Wilkins from the afperfion of Anthony Wood, by a preface to a volume of fermons, which he publifhed from the doctor's MSS. He was alfo the editor, in 1683, of Dr. Barrow's fermons, in 3 vols. fol. It has been regretted as an inconfiftency in the character of Tillotfon, that when in company with Burnet he attended lord Ruffel preparatory to his execution, they fhould urge this martyr to liberty to acknowledge the abfolute unlawfulnefs of refiftance, though they were foon after decided friends to the revolution. By a "Difcourfe againft Tranfubftantiation," and another "Againft Purgatory," he commenced a prolonged controverfy with the Papifts. In 1685 he avowed himfelf a warm advocate for affording charitable relief to the French refugees, on the repeal of the edict of Nantes; and in reply to Dr. Beveridge, the prebendary of Canterbury, who objected to reading a brief for this purpofe, as contrary to the rubric, he remonftrated, by faying, "Doctor, Doctor, charity is above rubrics." After the fettlement of the prince of Orange at St. James's, he was inftrumental in perfuading the princefs Anne, who confulted him, to acquiefce in giving up her claim to the crown during the life of William, in cafe of her fifter's dying before him. After the revolution, no obftacle remained to the full gratification of his defires of advancement, which, however, he profeffed to be very limited. In 1689 he was appointed clerk of the clofet to the king, and permitted to exchange the deanery of Canterbury for that of St. Paul's. During archbifhop Sancroft's fufpenfion for refufing to take the oaths to the new government, Dr. Tillotfon was appointed to exercife the archiepifcopal jurifdiction; and it was then determined that he fhould have poffeffion of the fee. His whole conduct at this time evinced his attachment to the principles of toleration and civil liberty; and he was active in his endeavours for promoting a comprehenfion, though they ultimately proved unfuccefsful. He alfo failed in introducing a new book of Homilies; and in a fermon preached before the queen, againft the abfolute eternity of hell torments, he excited the refentment and oppofition of the orthodox party. After fome reluctance on his part, he was confecrated to the archbifhopric of Canterbury in May 1691, and alfo in a little while fworn a member of the privy-council. From this time he became very obnoxious to the high-church zealots, who attacked him in a variety of ways. Among other charges againft him, one was his attachment to Socinian principles, which feems to have had no other foundation than his rational defence of Chriftianity, and his friendfhip and intercourfe with Locke, Limborch, and Le Clerc; and for repelling which, he caufed to be republifhed, in 1693, four of his fermons "On the Divinity and Incarnation of our Saviour."—"If this be Socinianifm, for a man to inquire into the grounds and reafons of the Chriftian religion, and to endeavour to give a rational account of it," fays he in one of his pofthumous fermons, alluding to this charge, and alfo to the character of Chillingworth, "I know no way but that all confiderate inquifitive men, that are above fancy and enthufiafm, muft be either Socinians or Atheifts." Dr. Jortin, in reference to this unfounded accufation, obferves, "Tillotfon had made fome conceffions concerning the Socinians, which never were, nor ever will be, forgiven him, and had broken an ancient and fundamental rule of theological controverfy: 'Allow not an adverfary to have either common fenfe, or common honefty.'" After an examination of bifhop Burnet's expofition of the thirty-nine articles, which he fent him in MS., he concludes his eulogy on the bifhop's prudence and ability with obferving, "The account given of Athanafius's creed feems to be nowife fatisfactory; I wifh we were well rid of it." The archbifhop's affiduity and zeal in the duties of his exalted ftation were highly exemplary and laudable; and yet they were not fufficient to filence the clamours of his enemies. At length the period of his ufefulnefs terminated, in confequence of a paralytic ftroke, which feized him, November 1694, in the chapel of Whitehall, and which, on the fifth day, proved fatal, in the 65th year of his age. His funeral, at the church of St. Laurence Jewry, was attended by many perfons of rank. He left a widow, but no children; and as he took no pains to accumulate property, his debts could not have been paid, if the king had not remitted his firftfruits; and the copy-right of his fermons was the only provifion which he left for his widow, to which a penfion, fettled upon her by the crown, was added.

"The temper and character of Dr. Tillotfon," fays one of his biographers, "were intitled to every encomium. He was humble, open, and fincere, of kind and tender affection, extremely bountiful in his charities, and forgiving of injuries, in which laft virtue he was feverely tried. His public principles bore the ftamp of his difpofition; they were philanthropical, tolerant, and liberal; and if he retained fome predilections for the fect in which he had been educated, the chief profeffional fault with which he has been charged, candour will make due allowance for the effect of early habit. In fome points he was, perhaps, too compliant, and was led into fome inconfiftencies; but the times were difficult, and his intentions feem to have been always pure. As a writer, he is principally remembered for his fermons, which have long maintained a place amongft the moft popular compofitions of that clafs in the Englifh language.. A folio volume, comprifing his "Rule of Faith," and fermons, was printed in his life-time; and after his death two more folio volumes of fermons were publifhed by his chaplain, Dr. Barker. Abroad, as well as at home, his works have been held in high eftimation. The character given of them by Le Clerc, in his "Bibliotheque Choifie," is as follows: "The archbifhop's merit was beyond any commendation he could give. It confifted in the union of extraordinary clearnefs of head, great penetration, an exquifite talent of reafoning, a profound knowledge of genuine theology, folid piety, a moft fingular perfpicuity, and unaffected elegance of ftyle; with every other quality that could be defired in a man of his order; and whereas compofitions of this kind are commonly mere rhetorical and popular declamation, better to be heard from the pulpit than read in print, his are for the moft part exact differtations, capable of bearing the teft of the moft rigorous examination." Addifon confidered the fermons of Tillotfon as a ftandard of purity of the Englifh language. Dryden acknowledges, that

that if he had any talent for Engliſh proſe, it was derived from frequent peruſal of Tillotſon's writings. Mr. Melmoth, however, in his "Fitzorbone's Letters," expreſſes a very different, and in our judgment a leſs juſt, or to ſay the leaſt of it, a leſs candid opinion. He ſpeaks of "his words as frequently ill choſen, and almoſt always ill placed; his periods as tedious and unharmonious; and his metaphors as generally mean, and often ridiculous." Notwithſtanding theſe reflections, Tillotſon's ſermons, though ſurpaſſed by the correctneſs and elegance of modern compoſitions in this department, and leſs peruſed than formerly, will not ceaſe to be regarded as a valuable part of Engliſh literature. Birch's Life of Archbiſhop Tillotſon. Biog. Brit. Gen. Biog.

TILLS, in *Agriculture*, a term ſignifying tares or vetches in many places, in both the northern and ſouthern parts of the kingdom.

TILLURAH, in *Geography*, a town of Bengal; 21 miles E.N.E. of Purneah.—Alſo, a town of Hindooſtan, in Bahar; 22 miles S. of Patna. N. lat. 25° 14'. E. long. 85° 22'.

TILLY, a town of Canada, on the St. Laurence; 10 miles S.W. of Quebec.—Alſo, a town of France, in the department of the Meuſe; 9 miles S. of Verdun.—Alſo, a town of France, in the department of the Eure; 7 miles S.E. of Grand Andelys.—Alſo, a town of France, in the department of the Sambre and Meuſe; 6 miles W. of Gemblours.

Tilly *la Campagne*, a town of France, in the department of the Calvados; 4 miles S.S.E. of Caen.

Tilly *Verolle*, a town of France, in the department of the Calvados; 9 miles W. of Caen.

Tilly *Land*, in *Agriculture*, that ſort which is, for the moſt part, conſtituted and compoſed of materials of the till kind.

Theſe kinds of land, in their original ſtates, are in general of a very barren and unproductive nature; but when they have been fully turned over by the plough or other means, well and effectually wrought and reduced by other proper tools, and their parts completely divided and expoſed to the alternate action of different agents, ſuch as thoſe of froſt and thaw, of drought, dews, and rain, with the many other improving effects of the atmoſphere which ſurrounds them; and withal ſtimulated, ſeparated in their parts, and enriched by calcareous and other ſuitable manures and ſubſtances, they become, in various inſtances, of a far leſs ſtrong and ſtubborn nature, and greatly more diſpoſed to the raiſing of good and plentiful crops upon them. They are commonly much ameliorated and improved at firſt by growing beans, tares, and rape in ſucceſſion with wheat and other ſuitable ſorts of grain, having the green crops ſo managed as to ſtand as cloſe, thick, and ſmothering as poſſible on the land. See Land and Soil.

TILMUS, τιλμος, a term uſed by ſome of the medical writers to expreſs the effect of a ſort of delirium, in which people pull the bed-cloaths, or pick out threads from the ſheets. This is uſually eſteemed a dangerous ſymptom.

TILNOR, in *Geography*, a town of Bengal; 60 miles N.N.W. of Midnapour.

TILO-GRAMMUM, Ougli, or *Ongli*, in *Ancient Geography*, a town of India, ſituated, according to Ptolemy, to the right of the moſt weſtern arm of the Ganges, about 23° lat.

TILOTAMA, a nymph celebrated for her beauty in the mythological and amatory poems of the Hindoos. She appears to have been one of that numerous claſs of females, who, under the name of Upſara, aroſe from the churned ocean, as deſcribed under our article Kurmavatara: a fable as prolific of poetical incident, and as often referred to, as any in the whole range of invention. The chief of theſe Upſaras, or water-nymphs, was Rhen ba, of whom ſome mention is made under her name in this work. They are deſcribed in numerous Hindoo poems with all the warmth and fancy that may be predicated of "youthful poets when they love;" and in terms too glowing for readers beyond the tropics. Under the name of another of theſe beauteous damſels, Menaka, we have ſaid ſomething of them. See alſo Upsara.

The name of the elegant nymph, the ſubject of this article, occurs in an inſcription on a copper-plate found in the Deccan, bearing date A.D. 1359. The inſcription is given in the 9th volume of the Aſiatic Reſearches, and records a grant for pious purpoſes. After much adulation of the mother of the royal donor, it is ſaid that "by the charms of her graceful gaiety ſhe obſcured Tilotama."

TILOUTTAH, in *Geography*, a town of Hindooſtan, in Bahar; 10 miles S.S.E. of Saſeram. N. lat. 24° 48'. E. long. 84° 15'.

TILOX, in *Ancient Geography*, a promontory on the northern coaſt of the iſland of Corſica, between the mouth of the river Valerius and Cæſiæ Littus.

TILPHOSSÆUM, a ſmall country of Greece, in Theſſaly.

TILSIT, in *Geography*, a town of Pruſſia, in the Lithuanian department, large, rich, and commercial. It obtained the privileges of a city in the year 1552, though the caſtle is ſaid to have been ſtanding ſo early as 1289. The river Memel, which runs along the N. ſide of the town, opens to it a very advantageous trade with Konigſberg, in corn, linſeed, butter, and other proviſions. Tilſit, properly ſo called, conſiſts of two long ſtreets, of a proportionate breadth, which are called the German-ſtreet and the High-ſtreet, contiguous to which are the ſuburbs called the "Liberty." The number of houſes in this city is about 600, and the inhabitants amount to 7000 ſouls. The eccleſiaſtical buildings are an evangelical or Lutheran German church, a Lithuanian church, and a Calviniſt or reformed church. Without the town is a Lutheran chapel, and about an Engliſh mile from it a Roman Catholic chapel. The flat country about Tilſit, which is about 16 miles in length, and as many in breadth, is one of the moſt fertile ſpots in the whole kingdom: the inhabitants of it breed great numbers of horned cattle, and furniſh not only Pruſſia, but likewiſe other provinces, with excellent butter and cheeſe; and the fiſheries in this place are alſo conſiderable. The horſes are large and ſtrong, but clumſy. Barley is almoſt the only grain ſown in theſe parts, which afford little or no wood. The marſh-land is, in ſpring, expoſed to inundations by the overflowing of the rivers, which often do great damage. In 1807, it was taken by the French; ſoon after which a peace was made between France, Ruſſia, and Pruſſia, called the "Peace of Tilſit; 50 miles N.E. of Konigſberg. N. lat. 55° 8'. E. long. 22° 8'.

TILT. See Tournament.

Tilt, in *Rural Economy*, a term ſignifying the arched or other covering of a cart, waggon, or other carriage.

The hoops for ſupporting the tilts in theſe caſes, may be faſtened upon the ſides of the carriage-frames, after being properly prepared and bent in a ſort of half-circular manner, in ſeveral different ways, but the faſtening by means of ſcrews is probably the beſt, where they are to remain fixed.

Tilt-*Boat*, a boat covered with a tilt, *i. e.* a cloth, or tarpawling, ſuſtained by bails or hoops over the ſtern, for the sheltering of paffengers. Such are fome of thofe which carry paffengers between London and Gravefend.

TILT-*Hammer*, is a large and heavy hammer, adapted to be put in rapid motion by the power of a water-wheel or fteam-engine.

The tilt-hammer is diftinguifhed from the lift-hammer, or forge-hammer, by the manner in which it is lifted up by the cogs of a wheel which is turned by the mill.

The forge-hammer is mounted on a centre of motion at the extremity of the haft or helve of the hammer oppofite to the head of the hammer, and the cogs of the wheel operate beneath the helve near the head, to lift or tofs up the hammer againft a ftrong wooden fpring called the rabbit, which is firmly fixed over the head of the hammer. This fpring reflects the hammer down upon the anvil with greater force and fmartnefs than the hammer would defcend by the action of gravity alone. A lift forge-hammer is defcribed under the article IRON. See *Plate* IV. *Iron Manufacture.*

The tilt-hammer is poifed on pivots or a centre of motion, which is about the middle of the length of the helve, or fometimes at two-thirds from the head. The cogs of the wheel are made to act on the tail of the helve beyond the centre of motion, and they prefs down the end of the tail, and thus caufe a correfpondent elevation of the head of the hammer. Sometimes the fpring is placed over the head of the hammer, the fame as a lift-hammer; but more commonly, the tail of the hammer is made to ftrike againft a fixed floor; and when the head of the hammer is thrown up fuddenly, the momentum given to it caufes the head to rife up after the tail ftrikes the floor, and thus bends the helve, which by its elafticity caufes the head of the hammer to defcend fmartly upon the anvil.

The *tilt-mills* in the neighbourhood of Sheffield are very fimple: they are worked by a fmall water-wheel, upon the axis of which is a wheel with a great number of cogs, fixed in its circumference. Thefe fucceffively deprefs the tail of the hammer, and raife its head: the hammer falls by its own weight, aided by the fpring of the helve, upon the hot metal. The fize of the water-wheel, and the number of cogs in the wheel, are adapted to produce from three hundred to four hundred ftrokes *per* minute.

This great number requires the water-wheel to move with a velocity which is inconfiftent with the beft mode of applying the fall of water, becaufe it is well known that water, as well as any other heavy body, can only defcend with a certain fpeed. If, therefore, the floats of the wheel are required to turn with a great rapidity, it is evident the proportion of work the wheel will perform, will be but fmall in proportion to the quantity of water expended. For this reafon, it is found to be a great improvement in tilt-mills to add cog-wheels which will give the hammers a fufficient velocity, while the water-wheel turns at fuch a rate as is found to produce the greateft power from a given quantity of water.

A capital mill of this kind is delineated in *Plate* VIII. *Iron Manufacture.* It was made at the Carron iron-works in Scotland, after defigns of the celebrated Mr. Smeaton. It is adapted for forging iron into bars, and has three tilt-hammers of different powers for different kinds of work. Thefe hammers are not made to ftrike fo quick as is ufual in the Sheffield mills for the tilting and drawing out fteel bars; but by giving a greater number of cogs to the wheels, the requifite rapidity may be obtained without increafing the fpeed of the water-wheel. A capital mill was built at Sheffield about fix years ago, which is on Mr. Smeaton's plan, except in the proportions of the wheels, and its performance is fuperior to any of the other tilt-mills.

A A, in the plan *fig.* 1. are the walls of the building; B B the great water-wheel, which is of the kind called a breaft-wheel. (See WATER-*Wheel.*) It is 18 feet diameter and 5 feet broad. The total defcent of the water which actuates it is 7 feet 2 inches, and it falls upon the float-boards rather below the centre of the wheel, being retained againft the floats by what is called the breafting, that is, a fweep or curved wall of mafonry, which is accurately adapted to the float-boards of the wheel, and as clofe to them as is poffible, to avoid touching.

The axis C of the water-wheel is carried through the wall A, and on the extreme end of it is a large iron wheel D, of 90 wooden teeth, 9 feet 6 inches diameter. This turns a pinion E of 30 teeth, and 3 feet 2 inches diameter. The pinion is fixed on one end of a caft-iron axis G G, which is made very large, for ftrength, and hollow within, like a pipe. The gudgeons *b* and G are fixed into it at each end, and upon thefe gudgeons it revolves. F F is a caft-iron fly-wheel, fixed on the axis clofe to the pinion; it is 12 feet diameter, and the rim 6 inches by 5. The weight is very confiderable, and gives it a momentum to regulate the motion of the whole mill, and equalize all irregularities which arife from the fucceffive actions of the mill to raife the three hammers, L, M, and N.

Each hammer has a feparate cog-wheel, K, I, and H, to give it motion, which is effected by the cogs of thefe wheels acting upon the tails of the hammers and preffing them down. This is explained by the elevation *fig.* 2. where *e* is the iron head of the hammer, *f* its centre of motion, and *d* the tail or extreme end, upon which the cogs of the wheel act, and which is plated with iron on the upper fide, to prevent it from wearing.

P is the anvil-block, which muft be placed on a very firm foundation, to refift the inceffant fhocks to which it is fubjected: the centre, *f*, or axis of the hammer, is fupported in a caft-iron frame, *g h*, called the hirft. When the cogs of the wheel ftrike the tail of the hammer fuddenly down, and raife the head, the lower fide of the tail of the hammer ftrikes upon a fupport *n*, which acts to ftop the afcent of the head of the hammer *e*, when it arrives at the defired height; but as the hammer is thrown up with a confiderable velocity as well as force, the effort of the head *e* to continue its motion, after the tail ftrikes the ftop *n*, acts to bend the helve L of the hammer, and the elafticity of the helve recoils the hammer down upon the anvil with a redoubled force and velocity to that which it would acquire from the action of gravity alone.

To obtain this action of recoil, the hirft *g h* muft be held down as firmly as poffible; and for this purpofe, four ftrong iron bolts are carried down from the four angles of the bottom plate *h*, and made faft to the folid bafis of ftone R R, upon which the whole refts: upon this bafis are placed four layers of timbers, *i*, *k*, *l*, *m*, which are laid one upon another, and the timbers of each layer are laid crofsways over the others. Each layer confifts of feveral pieces laid fide by fide, and they are flightly treenailed together, to form a platform. Each platform is rather lefs than that upon which it refts, fo as to form a pillar of folid timber; on the top of which the hirft-frame *g h* is placed, and firmly held down by the four bolts, which defcend through all the platforms, and have fecure faftenings in the folid mafonry beneath.

The ftop *n* is fupported by a fimilar pillar, but fmaller, and compofed of three layers: the upper piece *n*, which is feen croffways in *fig.* 2, is about three feet long, and the under fide is hollowed, fo that the piece bears only upon the two ends, leaving a vacancy beneath it, which occafions it to bend or ſpring every time the tail *d* of the hammer ſtrikes upon it, and this aids the recoiling action very much.

The axis on which the hammer moves is formed by a ring of caſt-iron, through which the helve of the hammer is put, and held faſt by wedging round it. The ring has a projecting trunnion on each ſide, ending in an obtuſe conical point, which is received in a ſocket firmly fixed in the hirſt-frame *g h* by ſcrews and wedges, one of which is ſeen at *r*. Theſe two ſockets are thus capable of adjuſtment, ſo as to make the hammer face fall flat upon the anvil. The three wheels K, I, H, are of different ſizes and numbers of cogs to produce that velocity in each hammer which is beſt adapted for the work it is to perform: thus, the wheel K for the great hammer has eight cogs, and therefore produces eight blows of the hammer for each revolution of the fly-wheel; the wheel I for the middle hammer has twelve cogs; and the wheel H for the ſmall hammer ſixteen; the latter will therefore make two ſtrokes for every one of the great hammer. In fixing the three wheels upon the great ſhaft G H, care is taken that they ſhall produce the blows of the different hammers in a regular ſucceſſion, and equalize as much as poſſible the force which the water-wheel muſt exert. The wheels are fixed upon the ſhaft by means of a wedging of hard wood, driven in all round; the wood, being capable of yielding a little to the ſhocks occaſioned by the cogs meeting the tails of the hammers, renders the concuſſions leſs violent.

The following are the principal dimenſions:

The head of the great hammer, P, weighs $3\frac{1}{4}$ cwt., and it is intended to make 150 blows *per* minute: it is lifted 17 inches from the anvil at every blow.

The middle hammer, M, is 2 cwt., and makes 225 blows *per* minute: it is lifted 14 inches each time.

The ſmall hammer, N, weighs $1\frac{1}{3}$ cwt., and makes 300 blows *per* minute: it is lifted only 12 inches.

To produce theſe velocities, the great axis G muſt make $18\frac{3}{4}$ turns *per* minute; and the cog-wheels E and D, being in the proportion of one to three, the water-wheel muſt make $6\frac{1}{4}$ revolutions *per* minute; the water-wheel being 18 feet diameter, its circumference will be $18 \times 3.1416 = 56.54$, or $56\frac{1}{2}$ feet: this multiplied by 6.25 is about 353 feet motion *per* minute, or divided by $60 = 5.9$ feet motion *per* ſecond for the circumference of the water-wheel.

The tilt-mills employed in the manufacture of ſteel, do not have the great hammer P, but the largeſt they uſe is about the ſize of that at M, and is adapted for welding faggots of ſteel to make ſhear ſteel: the other two hammers are about the ſize of N, and are made to work much quicker, *viz.* from 350 to 400 blows *per* minute. This is very eaſily accompliſhed by making the wheels E and F as 1 to 4, inſtead of 1 to 3, as ſhewn in the drawing.

TILTH, in *Agriculture*, a term uſed to ſignify the condition of the earth or ſoil after the land has been ploughed and broken down by the harrow or other tool of the ſame kind; or the ſtate and circumſtances of the ground in regard to tillage, or heart, as relating to manure. Thus we have a *good* and *bad* tilth, as well as land *in* and *out* of tilth, in works on agriculture.

TILTIL, in *Geography*, a town of Chili; 30 miles S.E. of Valparayſo.

TILTING *of Steel*, the proceſs by which bliſtered ſteel, or ſteel in the raw ſtate, is rendered ductile and fit for the purpoſes of various manufactures. Tilting conſiſts in hammering or forging the ſteel by a large hammer called a *tilt*. See TILT-*Hammer*.

Steel is formed by two proceſſes: one in which it is made at once from pig or crude iron in the finery, nearly in the ſame manner as making bar-iron: this is called natural ſteel. In the ſecond proceſs, malleable iron, in bars, is imbedded in charcoal or other carbonaceous matter, and expoſed to a conſiderable heat, till the carbon is thought to have penetrated ſufficiently into the iron to have changed it into ſteel. This is called converting the iron by cementation with charcoal; and the furnace in which the operation is performed is called a converting furnace.

The object of this proceſs of cementation, is to impregnate the iron with a certain quantity of carbon, to be derived from the charcoal: like many other ſimple operations, it requires great care and nicety to perform it properly, when put in practice on a large ſcale. The iron muſt be expoſed to the action of an intenſe heat in contact with carbon (but defended from the acceſs of oxygen), until the iron imbibes a portion of carbon and becomes ſteel.

The quantity of carbon which muſt be combined with iron to produce ſteel, admits of conſiderable latitude, and the qualities of the ſteel vary in the ſame proportion: with too little carbon, ſteel will be ſoft; and not ſufficiently hard when it has been ſuddenly cooled by plunging in water. It has a rough and ſomewhat fibrous fracture, and in general may be ſaid to poſſeſs many of the qualities of malleable iron. On the other hand, in proportion as the quantity of carbon is diminiſhed, an over-cemented ſteel, containing an exceſs of carbon, is brittle, eaſily fuſible, exceſſively hard after being ſuddenly cooled, and is liable to crack on the ſudden change of temperature from hot to cold. All theſe properties are an approach to crude iron.

The received opinion reſpecting ſteel and the beſt caſt-iron is, that they have the ſame conſtituent parts, but in different proportions; the former containing a ſmaller proportion of carbon than the latter. All the crude or caſt-iron of commerce contains oxygen in greater or leſs proportion, but the beſt ſteel is ſuppoſed to be nearly free from this. Mr. David Muſhet, whoſe great practical and theoretical knowledge entitles his opinion to the greateſt reſpect, ſuppoſes that the carbon contained in caſt-iron and in ſteel, exiſts in very different ſtates; and that ſteel is a combination of iron with pure carbon, ſimilar to the diamond, but that crude iron, is iron containing the oxyd of carbon, which is charcoal. This opinion he founded upon the reſult of a very numerous ſeries of experiments, many of which he communicated to the Philoſophical Magazine, vol. xiii. He found that a piece of Swediſh bar-iron, weighing 885 grains, introduced into a Stourbridge clay crucible, and half its weight (442 grains) of charcoal well prepared; a clay cover, fitting exactly, being placed on, and the whole expoſed to a moderate heat for half an hour; that the reſult was, a perfect button of ſuper-carbonated crude iron, weighing 928 grains, which therefore had gained $\frac{1}{20}$th on its original weight; while the charcoal, which remained in the crucible in an intenſely black ſtate, weighed 290 grains, having loſt 34.4 *per cent.* of its original weight.

In a ſecond experiment, made in a ſimilar manner, but with only a quarter of the charcoal, the iron gained $\frac{1}{19\frac{9}{10}}$ of its original weight, and the loſs in charcoal was 45 *per cent.*: the metal was richly carbonated. When one-ſixth of charcoal was uſed, the iron produced, reſembled the produce of No. 1. and 2. of the crude iron of commerce; its weight was increaſed $\frac{1}{20\frac{3}{4}}$; and 57 *per cent.* of the charcoal diſappeared in the proceſs.

With one-eighth of charcoal, the iron gained $\frac{1}{22\frac{4}{10}}$ of its original

original weight; and the weight of the charcoal which disappeared was $67\frac{1}{5}$ *per cent.* The metallic button was very highly carbonated, and apparently formed an entire mass of carburet.

One-ninth of charcoal produced a super-carbonated button of crude iron, rather inferior to the preceding in point of carbonization: its surface was smooth, and of a dull lead-colour, entirely free from the usual shining specks of carburet, which very rich crude iron contains upon its surface. It had gained equal to $\frac{1}{26}$th in weight by the fusion; and the loss in charcoal was 80 *per cent.*

When treated in the same manner with $\frac{1}{12}$th of its weight of charcoal, the iron gained weight equal to $\frac{1}{27}$ parts: and 83.5 *per cent.* of the charcoal disappeared in the process. The metallic button possessed an uniformly smooth surface, partially covered with carburet.

One-fifteenth part of charcoal, exposed with the iron to a heat sufficient to melt it, was all lost; the metal gained $\frac{1}{30}$th in weight, which was exactly half the weight of charcoal lost. The surface of the button was not carbonated, as the foregoing experiments: the colour was blueish-black, smooth in the centre, but a little oxydated towards the edges. The fracture was that of close dark-grey crude iron; the crystals much closer and more minute than in the preceding experiments. Its quality was such as manufacturers term No. 2. grey melting pig-iron.

When only $\frac{1}{20}$th part of charcoal was employed, none of which remained after the fusion, the iron gained $\frac{1}{33}$ parts in weight: a small portion of amber-coloured glass was found round the edges of the button. The fracture of the metal was smooth silvery-white, occasionally studded with carbonaceous specks in form of small grains: it exactly resembled mottled pig-iron.

With $\frac{1}{25}$th part of charcoal, the metal gained $\frac{1}{63}$ parts in weight, the whole of the charcoal disappearing. The upper surface of the button was smooth, but the under considerably pitted. The concaves were chequered with the rude crystallization peculiar to cast-iron. Its fracture was bright silvery-white, destitute of grain, and exhibiting a very perfect streaky crystallization slightly radiated: its resemblance was strikingly similar to that of highly-blown crude iron, prepared in the finery for making malleable iron.

A piece of Swedish iron was placed in $\frac{1}{30}$th its weight of charcoal: the fusion of the mixture produced a metallic button weighing $\frac{1}{127}$ parts more than the iron employed, which increase is not quite a quarter of the loss in charcoal, which wholly disappeared in the experiment. The upper surface of the button was smooth without configuration, but the under surface was uneven, and covered with minute but perfect crystallization: its fracture was blueish silvery-white, composed of flat dazzling crystals, proceeding in lines from a centre to the edges of the button. Here it was evident, that from the small proportion of carbon combined with the iron, it was found to assume the earliest stage of granulation approaching to the state of steel. The brilliant concretions observable in the surface of the button were too indistinct and flat for steel capable of bearing the hammer.

When the proportion of the charcoal was reduced to $\frac{1}{40}$th of the iron, its consequent increase was but $\frac{1}{500}$th part. The upper surface of the button was smooth, with a faint impression of a chequered crystallization: the under surface possessed some large pits similarly though more perfectly crystallized; the fracture was one shade of blue beyond the last experiment. A regular granulated surface, composed of flat oblong crystals, was observable, still too indistinct and too much on edge for workable steel.

With only $\frac{1}{50}$th of the weight of charcoal, the button was deficient $\frac{1}{354}$th part of its weight originally used, yet the whole of the charcoal was lost. The surfaces of this button were uniformly smooth; the fracture dense, and displaying a grain peculiar to highly saturated blistered steel. When put under the hammer with a low red heat, it withstood a few blows, but afterwards parted.

Charcoal $\frac{1}{90}$: the metallic button weighed $\frac{1}{31\frac{6}{10}}$ less than the iron employed. Its surface was wavy and crystallized: the under surface was rough, and contained one large pit accurately crystallized: the fracture was regularly granulated, small but distinct, and of a light blueish colour. The crystals, though distinct, were not so prominent as those of easy drawing cast-steel; it however hammered with the usual degree of caution necessary in the working of cast-steel. The bar of steel formed from the button was very proper for file-making, and other purposes requiring highly converted steel.

The proportion was reduced to $\frac{1}{100}$th part the weight of iron: the produce was $\frac{1}{22\frac{8}{10}}$ less than the original weight of iron. The surface of the button was smooth, without crystals: the under surface rough, and possessed of one large pit in the centre, faintly marked with the usual crystalline appearance. The fracture presented regular light-blue grains, distinct and more prominent than in the last experiment. One half of this button was drawn into a neat square bar, and proved excellent steel. One end of it, being loose and shaled, welded tolerably well, and hardened afterwards with a low heat. From its quality, it seemed adapted for manufacturing penknives, razors, &c. possessing neither the extremes of hardness nor softness.

Mr. Mushet continued this series of experiments till the proportion of charcoal became so small as $\frac{1}{200}$th part; and he gives the following conclusions, deduced from the results.

	Parts by Weight.
Iron semi-steelified is made with charcoal	$\frac{1}{150}$
Soft cast-steel, capable of welding, with -	$\frac{1}{120}$
Cast-steel for common purposes, with -	$\frac{1}{100}$
Cast-steel requiring more hardness, with -	$\frac{1}{90}$
Steel capable of standing a few blows but quite unfit for drawing, - - -	$\frac{1}{50}$
The first approach to a steely granulated fracture, is from - - -	$\frac{1}{30}$ to $\frac{1}{40}$
White cast-iron - - - - - -	$\frac{1}{25}$
Mottled crude iron - - - - -	$\frac{1}{20}$
Carbonated crude iron - - -	$\frac{1}{15}$
Super-carbonated crude iron - -	$\frac{1}{12}$, or

when any greater quantity is combined with it.

In the above experiments it will be seen, that when more than $\frac{1}{40}$th part of charcoal is employed, the weight of the produce is increased; but when less than $\frac{1}{40}$th part is used, a loss is experienced proportioned to the diminution of the carbon. The increase of weight in the iron is by no means equal to the loss in the charcoal, never exceeding the half thereof; but this is accounted for in other experiments made by Mr. Mushet, where charcoal was found to be transmitted through close crucibles in a high degree of heat.

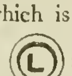
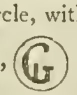
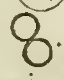
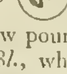
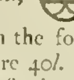
The French chemists made a direct experiment to prove that the diamond is really carbon in a crystallized state. By inclosing a small diamond in a piece of malleable iron, and melting this in a close crucible, it was found to be converted into steel, and the diamond had disappeared.

The manufacture of *natural steel* is carried on in Germany, and Swedenborgius gives us the following account of the method used in Dalecarlia for making steel from cast-iron. The

The ore from which the crude iron to be converted into ſteel is obtained, is of a good kind; it is black, friable, and compoſed of many ſmall grains: it produces very tough iron. The converſion into ſteel is made upon a forge-hearth, ſomething ſmaller than that commonly uſed for converting caſt-iron into malleable iron: the ſides and bottom are made of caſt-iron; the tuire is placed with very little inclination on one of the ſide-plates; the breadth of the fire-place is fourteen inches, its length is greater; the lower part of the tuire is ſix inches and a half above the bottom: in the interior part of the fire-place, there is an oblong opening for the flowing of the ſuperfluous ſcoria.

The workmen firſt put ſcoria on the bottom, then charcoal and powder of charcoal, and upon theſe the caſt-iron, run or cut into ſmall pieces. They cover the iron with more charcoal, and excite the fire. When the pieces of iron are of a red white, and before they begin to melt, they ſtop the bellows, and carry the maſs under a large hammer, where they break it into pieces of three or four pounds each: the pieces are again brought to the hearth, and laid within reach of the workman, who plunges ſome of them into the fire and covers them with coal. The bellows are made to blow ſlowly till the iron is liquefied, when the fire is increaſed; and when the fuſion has been long enough continued, the ſcoria is allowed to flow out, and at that time the iron hardens. The workman adds more of the piece of crude iron, which he treats in the ſame manner, and ſo on a third and fourth time, till he obtains a maſs of ſteel of about a hundred pounds, which is generally done in about four hours. This maſs is carried to the hammer, where it is forged and cut into four pieces, which are further beat into ſquare bars four or five feet long. When the ſteel is thus forged, it is thrown into water, that it may be eaſily broken, for it is yet crude and coarſe-grained. The ſteel is then broken in pieces, and carried to another hearth, ſimilar to the former. Theſe pieces are laid regularly in the fire-place, firſt two parallel, upon which ſeven or eight others are placed acroſs; then a third row acroſs the ſecond in ſuch a manner, that there is a ſpace left between thoſe of the ſame row: the whole is then covered with charcoal, and the fire is excited. In about half or three quarters of an hour the pieces are made hot enough, and are then taken from the fire one by one, to the hammer, to be forged into little bars from half a foot to two feet long, and while hot, are thrown into water to be hardened. Of theſe pieces, ſixteen or twenty are put together, ſo as to make a bundle, which is heated and welded, and afterwards forged into bars four inches thick, which are then broken into pieces of convenient length for uſe.

Converting of Steel by Cementation with Charcoal.—The quality of ſteel is intimately connected with that of the iron from which it is converted, and the iron made in Sweden is eſteemed the beſt for the purpoſes of cementation. This proceſs is almoſt wholly in the hands of the Engliſh, who pay a higher price for the iron, and by that means ſecure nearly all the iron of Roſlagia, which is the beſt iron of Sweden.

The beſt marks of Swediſh iron are: that called the hoop L, which is denoted by a circle, with an L in the centre; thus, : the G L; thus, : the double bullets; thus, . The iron of theſe three marks bears nearly the ſame price, which is ſometimes as high as 40*l.* *per* ton. There are alſo the Swediſh marks; as P L, : the hoop S, : and the gridiron, ; which are worth a few pounds *per* ton leſs than the former; *viz.* from 34*l.* to 38*l.*, when the beſt marks are 40*l.*

The Ruſſian marks are, firſt, that called the C C N D: the mark is ſix Ruſſian letters, C H E H P B, worth about 37*l.* *per* ton, when the others are at 40*l.*: and the P S I, which is marked by the Ruſſian letters P S I, is ſo inferior, as to ſell for only 26*l.* or 27*l.*

It is to be lamented that, in the preſent ſtate of our iron manufacture, we are unable to produce malleable iron which is equally fit for converting into ſteel with the Ruſſian and Swediſh iron. The general opinion upon this deficiency is, that it ariſes from ſome ſuperiority in the foreign ores of iron, but more immediately from the circumſtance of their uſing charcoal of wood inſtead of the coke of pit-coal in ſmelting or reviving them; and ſome of our manufacturers do not heſitate to aſſert, that they can make iron with charcoal equal to the foreign in quality; but that in reſpect to price, the circumſtances of this country will not allow them to cope with thoſe countries, where the deſtruction of wood is in ſome meaſure conſidered as beneficial, by clearing the land for the operations of huſbandry.

The Swediſh and Ruſſian iron is imported into this country by iron merchants in immenſe quantities together, this trade being in the hands of a few individuals: by them it is retailed in ſmaller portions to the converters, whoſe furnaces are chiefly about Sheffield and at Newcaſtle, who, after cementation, diſpoſe of the greater part of it to the manufacturers of ſteel goods in the ſtate of bliſtered bars. Its value is eſtimated by the Swediſh or Ruſſian marks of iron, which ſtill remain upon the bars. The manufacturers ſend their bars to the tilt-mills, where they are made into common ſteel and ſhear or German ſteel, or they melt it to form caſt-ſteel.

The converſion of iron into ſteel is performed in a furnace, hence called a converting furnace. The external building is a large and tall cone, ſimilar to a glaſs-houſe, within which, one or two large crucibles, called pots, are placed, and ſurrounded by flues in a manner beſt calculated to communicate a conſtant and regular heat to every part of them. In theſe pots the iron bars are placed, being ſtratified in pulverized charcoal, and the pots are covered over with ſand to exclude the external air.

A more perfect idea of the converting furnace will be had by referring to *Plate* VII. *of Iron Manufacture*, which contains a horizontal plan and two vertical ſections of one of the furnaces uſed in the neighbourhood of Sheffield, with two pots for containing the iron. In all the figures, the ſame letters of reference denote the ſame parts. C C is the external cone, built of brick or ſtone work; its diameter at the baſe varies in different furnaces, according to the ſize of the pots it contains: its extreme height from the ground to its vertex ſhould not be leſs than forty or fifty feet to cauſe a proper draught. To create a ſufficient heat for the proceſs, the top of the cone uſually terminates with a cylindric chimney of ſome feet in height. The conical form of the external building is by no means eſſential; any form will operate in the ſame manner, if it is of a proper height: ſome are in practice built nearly in the ſhape of the ſmall end of an egg, with a round chimney upon the top. The lower part of the cone is built ſquare or octangular, as is the plan of *fig.* 3. The ſides are carried up until they meet the cone, giving the furnace the appearance of a cone cut to a ſquare or octangular priſm at its baſe, and exhibiting the parabola where every ſide interſects the cone.

The conical building contains within it a ſmaller furnace, called

called the vault, built of fire-brick or ftone, which will withftand the action of a moft intenfe heat, without cracking or vitrification. D D in the fection is the dome of the vault, and E E its upright fides, the fpace between which, and the wall of the external building, is filled up with rubbifh and fand. The vault, as is fhewn in the plan, is always four-fided, that it may contain the pots which receive the iron bars to be converted. A B reprefent the two pots, built of fire-ftone, each ten feet long, three feet deep, and two feet nine inches wide; the fpace between them is twelve inches wide; and directly beneath it is the fire-grate. The pots are fupported by a number of detached courfes of fire-brick, as fhewn at *e e* (*fig.* 1.) which leave fpaces between them, called flues, to conduct the flame under the pots: in the fame manner, the fides of the pots are fupported from the vertical walls of the vault, and from each other, by a few detached ftones, (*f*, *fig.* 1.) placed fo that they may intercept as little as poffible of the heat from the contents of the pots. The adjacent fides of the pots are fupported from one another by fmall piers of ftone-work, which are alfo perforated, as fhewn at *d* (*fig.* 2.) to give paffage to the flame. The bottoms of the pots are built of a double courfe of brick-work, about fix inches thick; the fides neareft together are built of a fingle courfe of ftone, about five inches in thicknefs; and the other parts of the pots are fingle courfes about three inches, the fides not requiring fo much ftrength, becaufe they have lefs heat and preffure to refift.

The vault has ten flues or fhort chimneys, F F, rifing from it; two on each fide, to carry off the fmoke into the great cone, fhewn in the plan 3, communicating with each fide, and two at each end.

In the front of the furnace, at H, an aperture is made through the external building, and another correfponding in the wall of the vault: thefe openings form the door, at which a man enters the vault to put in or take out the iron: but when the furnace is lighted, thefe doors are clofed by fire-bricks luted with fire-clay. Each pot has alfo fmall openings in its end, through which the ends of two or three of the bars are left projecting in fuch a manner, that by only removing one loofe brick from the external building, the bars can be drawn out without difturbing the procefs, to examine the progrefs of the converfion from time to time: thefe are called the tap-holes; they fhould be placed in the centre of the pots, that a fair and equable judgment may be formed from their refult of the reft of its contents.

a b, in the elevation, is the fire-grate, formed of bars laid over the afh-pit I, which muft have a free communication with the open air, that it may convey a current of frefh air to fupply the combuftion. The afh-pit fhould alfo have fteps down to it, that the attendant to the furnace may get down to examine by the light, whether the fire upon the whole length of the grate is equally fierce; and if any part appear dull, he ufes a long iron hook to thruft up between the bars and open a paffage for the air. The fire-place is open at both ends, and has no doors. The fire-grate is laid nearly on a level with the floor of the warehoufe, before the furnace, and the fireman always keeps a heap of coals piled up before the apertures at its ends, fo as to clofe the opening. This forms a very fimple and effective door; and when the furnace requires a frefh fupply of fuel, a portion of the heap of coals is fhoved in by a fort of hoe, and the heap renewed, to ftop any air from entering into the furnace, except that which has paffed upwards through the ignited fuel, and by that means contributed to the combuftion.

The fire-ftones that compofe all thofe parts of the furnace which are expofed to the action of the heat, are firft hewn nearly to fize, and finifhed by grinding two furfaces together, fo that they make very perfect and clofe joints: when laid together, they are cemented with well-tempered fire-clay, mixed up very thin with water. The fire-clay which anfwers beft for this purpofe, is that brought from Stourbridge, in Staffordfhire, and is the fame of which the celebrated Stourbridge crucibles are compofed; but very good fire-clay for the purpofe is procured from Birkin-lane, near Chefterfield. When the furnace has been once burnt, this clay becomes equally hard with the ftone, and is lefs liable to fly or vitrify in an intenfe heat, than any other known cement.

The procefs of charging the furnace with iron for converfion is conducted as follows. The bars of iron are firft cut to the length of the pot; and for this purpofe an anvil is placed at fuch a diftance from the wall of the building, that the diftance from the edge of a cold chiffel wedged into the eye of the anvil, to the wall, will be juft the length of the pots. One workman places the end of a bar againft the wall, and lays the other end acrofs the edge of the chiffel, whilft another with a fledge-hammer ftrikes upon the bar till it is cut half through; then it is turned the other fide upwards, and the end cut completely off. By this gauge the bars are all cut to one length, and a man enters through the door in the vault, to difpofe of them in the pots: he is provided with a bafket of fine pulverized charcoal, a fieve, and a fhovel. An iron plate is put into the furnace, and lays over the fpace between the two pots to form the floor, upon which the man ftands while at work. He commences his operations by fifting a layer of charcoal over the bottom of the pot, about half an inch thick, and he is careful in ufing the fieve to lay the charcoal of an even thicknefs in every part; but if it fhould not be carefully done, he levels it with the fhovel. The workman on the outfide now introduces the bars into the furnace through a hole, made by taking out a brick in the wall, juft over the end of one of the pots, and the workman within depofits them upon the ftratum of charcoal in the bottom of the pot, arranging them parallel to each other, and leaving an interval of about an inch between each bar. When the bottom of the pot is in this manner covered with iron bars, charcoal is again fifted upon them, and levelled with the fhovel, to fill up the intermediate fpaces between the bars, and to cover them about an inch thick: another layer of bars is then introduced into the furnace, placed upon the charcoal, and in its turn covered over with a ftratum of charcoal; and in this manner the pot is filled to within two inches of the top. A layer of the fand which is found in the bottom of grindftone troughs, is then fpread three or four inches thick upon the whole, to cover the pots up clofe, and prevent the accefs of the common air and flame. In placing the fucceffive layers of bars in the pot, it is proper that each fhould be laid over the fpace between two of the bars in the layer beneath, becaufe each bar will then be furrounded by a greater thicknefs of charcoal, than it would if they were laid directly over each other. Two or three of the bars fhould be left fomewhat longer than the reft, and their ends fhould project through the trial-holes in the ends of the pots, and fand rammed round them in the holes to keep out the air.

The pots being both filled and covered up with the fand and rammed down, the holes for introducing the bars are clofed by a brick or fire-ftone, and luted with fire-clay. The apertures through the outer wall oppofite the ends of the trial-holes are alfo ftopped and luted. The iron plate upon which the man ftood is now removed, and the doors in the vault clofed up by bricks fet with fire-clay; next, the opening in the external building is fhut up, and the furnace is charged ready for lighting.

The furnace is kindled by lighted wood placed on the fire-grate, then a few coals are thrown in, and when well lighted, the quantity is increafed; the heat thus generated rarefies the air contained in the vault and in the great cone; and

and being thus rendered of lefs fpecific gravity than the external air, it rifes up in the cone, and a frefh fupply rufhes in through the bars of the grate, to reftore the equilibrium. By going through the fire, this air parts with its oxygen, and excites the combuftion, and becoming heated, rifes up the chimney, and caufes a very ftrong draught of air to enter the fire.

At firft kindling, the fuel is fupplied in fmall quantities, that the heat in the furnace may be gradually increafed, and not endanger the cracking of the ftones: in a few hours time the quantity of fuel is increafed, fo as to produce the full heat, which is to be maintained as equally as poffible throughout the whole procefs. The fuel, which is pit-coal, is introduced at both ends of the grate, through fmall arches in the wall, which are in a line and on a level with the fire-grate, a quantity of coals being always left before the end of the arch to ftop it up, and prevent any air getting into the furnace, without paffing through the grate. Part of thefe coals is forced into the furnace, as before mentioned, when it requires a fupply of fuel, which is generally at intervals of about half an hour each. The fireman frequently examines the appearance of the under fide of the fire-grate, and judges from it the ftate of the fire: he improves it where neceffary, as before defcribed, by thrufting a hook up between the bars to make way for the air.

The flame arifing from the ignited fuel upon the grate partly proceeds upwards between the pots, and heats them by that means; it then ftrikes the roof of the vault, and is reverberated down upon the pots, and efcapes through the fix flues or chimnies in the vault. The draught alfo draws the flame from the grate under the pots, and round the outfide and ends. The principal object in this ftage of the procefs, is to maintain the fame degree of heat in every part of the pot, that every bar may be equally converted in the fame fpace of time. The roof of the vault muft be built of very good ftone (none being better than from Roches quarry, in Afhover), to withftand the great heat exerted upon it: it is cuftomary to build them very thin, and cover the outfide with a fmall thicknefs of dry fand to keep them tight, in cafe of a ftone cracking.

In this way the fire is kept up in as equable a manner as poffible, until the iron is fuppofed to have imbibed a fufficient portion of carbon from the charcoal to render it fit for its intended purpofe: in this circumftance, the manufacturer regulates his judgment by his experience of former proceffes. About the time that he fuppofes the converfion to be fufficiently advanced, one of the trial-bars is drawn out from the pot, and by comparing the fize of the blifters raifed upon its furface with another bar which is known to be fufficiently carbonated, an idea is formed of the ftate of the furnace, and accordingly the fire is, at the proper time, difcontinued, and the furnace is fuffered to cool. Some manufacturers proceed to make experiment of the trial-bar by hardening and tempering it, fo as to prove to a certainty the degree of its converfion, the blifters being found in fome degree fallacious; for their fize depends as much upon the degree of heat to which the bar has been expofed, as upon its carbonization, and fhew the rapidity with which the converfion has been carried on, rather than its actual ftate.

The time which the iron is required to be in the procefs of cementation depends upon a variety of concurring circumftances. 1. The degree of carbonization required to form a fteel of the proper quality; this varies with the ufe the fteel is to be applied to. 2. The heat it is fubjected to. 3. The nature of the iron employed in the procefs. The combinations of thefe circumftances are fo numerous, that nothing but long experience can determine the proper duration of the procefs.

In general terms it may be obferved, that a fhort period will produce a fteel very foft and tenacious, which, when properly treated, will poffefs elafticity as its moft ftriking property, and is therefore very proper for fprings, wire-drawing, and other purpofes requiring ductility, but without the hardnefs requifite for edge-tools. The period of cementation for fuch fteel varies in different manufactories, from four to fix days and nights.

Steel which requires more hardnefs, but at the fame time fufficient tenacity to refift fudden fhocks, fuch as the edge-tools for working wood are fubject to, muft be cemented a longer time. This, which is moftly tilted into fhear fteel, is cemented fix, feven, or eight days, according to the heat and the quality of iron employed. The fteel employed for fabricating tools for cutting metals and hard fubftances being but fmall in demand compared with the others, is not cemented a longer time, but is returned into the furnace at the next charge, along with a charge of iron, and cemented again with frefh charcoal: this is termed double converted fteel. But for fome few purpofes, fuch as the turning and boring of caft-iron, the fteel is converted three times: in this ftate it becomes fo hard and brittle as to be totally unfit for any purpofe requiring tenacity, or for any cutting edge which is lefs than an angle of 70 degrees, or it would be continually breaking.

The heat which is requifite for the procefs, muft be as great as to give the iron nearly a welding heat, but if carried farther, will endanger melting the bars when the procefs has proceeded fome time; an accident which has frequently occurred through the inattention of the fireman. It is obferved by manufacturers, that the carbonization proceeds quicker when the heat is greateft, and for this reafon the duration of the procefs varies in different furnaces, in fome meafure from their conftruction, in urging a greater heat, and this depends chiefly upon the height of the chimney, and the draught it occafions.

When the converfion is fuppofed to be complete, the furnace is fuffered to cool, until a man can conveniently enter the furnace, to take out the bars and remaining charcoal, and prepare the furnace for a new charge. The bars which are brought out are (from being covered with blifters upon the furface) termed bliftered fteel.

On examination of the fracture of a bliftered bar, it is found full of internal cracks, which are generally parallel to the flat fide of the bar: fome of them are larger than others, and extend the parts of the bar fufficiently to raife numerous protuberances or blifters upon its furface. Thefe cracks have every appearance of being opened by the expanfive force of fome gas generated in the iron during the procefs, but what the nature of this gas is, ftill remains to be inveftigated. It feems to arife from the body of the iron itfelf, by the crack being within the folid fubftance of the bar. The fracture of the bliftered fteel is exceedingly irregular, of a white colour, like frofted filver, and appears like an irregular cryftallization; but the facets exhibited are larger in proportion as the cementation has been longer continued, and from this reafon they are larger towards the furface of the bar than in its centre.

The furnace above defcribed is of that kind which is efteemed the beft for the procefs, and is moft generally employed in and about the neighbourhood of Sheffield in Yorkfhire, where the manufacture of fteel is carried on in a larger fcale than in any other part of England. The furnaces ufed at Newcaftle, which is another feat of this trade, are very fimilar.

The charge confifts of twelve tons, each pot containing fix tons of iron; and it is neceffary that all the bars converted at at one procefs be of the fame fize, or the fmaller ones would be thoroughly converted before the others had taken up a fufficient dofe of carbon. This large quantity of a fingle article is more than the trade of fome manufacturers will difpofe of, they therefore employ fmaller furnaces, which contain only eight tons, and fuch are generally conftructed but with one pot ten feet in length, three feet broad, and two feet deep: the fire-place is directly beneath the pot, twenty inches wide, and flues are carried round it on both fides and ends: the vault and chimney of fuch a furnace are the fame as the double pot. It is found by experience that the fmall furnaces confume fomewhat more fuel in proportion to the quantity of iron they convert, than the large ones, becaufe the heat loft in the beginning and end of the procefs, and that tranfmitted through the walls of the building, is the fame in both inftances.

Mr. Daniel Little of America, in 1785, recommended a new fubftance to be ufed in the cementation of fteel inftead of charcoal: it is the marine plant known by the name of rockweed, or rockware, and is found in great plenty on rocky fhores in America. It was to be prepared by firft mowing it from the rocks by the fcythe or fickle, and fpreading it out on dry land till the rains have wafhed off the greater part of the fea-falt; it was then to be dried and pulverized, and may be ufed as any other cement for making of fteel. He fays that he difcovered this property in an experiment where a fmall piece of iron was put into a crucible, and filled with the powdered plant as a cement: after it had been expofed to little more than a cherry heat for five or fix hours, it was converted into fteel.

All cemented fteel in its raw ftate, after it is taken from the converting furnace, is called bliftered fteel; becaufe the furfaces of the bars are covered with blifters, and on breaking a bar it is found to be full of cavities withinfide, which feem to have been opened by fome gas generated in the iron when in the procefs of cementation, and to have raifed the furface into blifters, which are hollow within. In this ftate the fteel is not fit for any purpofe, becaufe of thefe numerous cavities, and from the great difpofition it has to break with the moft irregular and rugged fracture imaginable. To render it found and tenacious, it muft be well hammered while at a moderate heat, which operation is termed *tilting the fteel*, becaufe it is done under the tilt-hammer, worked by machinery. There are many reafons why the hammering of fteel cannot be fufficiently performed by hand: the principal are, that the expence of labour would be too great to anfwer, and that a man could not ftrike hard and quick enough, to complete the operation at one heat of the fteel: if more than one heat is taken, the fteel will not receive fo much advantage from the hammering, becaufe when it is heated, its pores are opened; and if fuffered to cool without hammering, the grain of the fteel will be found confiderably coarfer; therefore, every time it is heated, the good effects of the previous hammering are in a great meafure loft. Tilt-hammers are worked by water-wheels or fteam-engines, according to the local fituation of the manufactory. (See a defcription in the article TILT-*Hammer*, *Plate* VIII. *Iron Manufacture.*) The fame axis is made to actuate three or four tilt-hammers placed fide by fide, and the hammers are not all of equal lengths, each one being fhorter than the next: by this arrangement, when they are all working together, the workman of one tilt does not incommode thofe employed at the other two. The anvils of the hammers are nearly on a level, or at moft only a few inches above the furface of the ground; and the workman fits in a pit or foffe, dug for the purpofe, in a direction perpendicular to the helve of the tilt, upon a feat which is fufpended from the roof of the building by two iron rods: by this means he can with the greateft eafe advance to or from the hammer, by juft touching the ground with his foot, and pufhing himfelf backwards or forwards as he fits in the fwing. The three feats are in parallel directions, but fufficiently diftant from each other, in confequence of the different lengths of the hammers, to allow the workmen to perform their bufinefs. At a convenient diftance from each tilt, is placed the forge for heating the fteel. The two forges for the fmall hammers are placed together under the fame dome, while the other forge is by itfelf near the great hammer. The bellows for the forges are worked by a fmall crank on the end of the gudgeon of the fhaft; they are placed over-head in the roof of the building, and a copper pipe conveys the air to the tue iron. The forges are like thofe ufed by fmiths, except that they have a fmall cover built of fire-brick over the hearth: the cover is fquare within, about eight inches wide, eight high, and eighteen inches or two feet long. It is open in front, to introduce the bars. The coals are placed on the hearth, as fmiths ufually do, and the brick cover acts, to reverberate the flame down upon the fteel, and give a very regular heat. Each workman at the tilt is attended by two boys, who heat the fteel at the forge, and convey it to the workman, that he may lofe no time: another boy attends each tilt to take away the finifhed rods and cut them to length, and then to ftraighten them.

The operations of the tilt are conducted in the following manner: Suppofe a piece of fteel has been heated by one of the boys, and brought to the man at the hammer, he places it upon the anvil, at a part neareft to the centre of the hammer, where its furface is reduced to a round edge, about an inch wide: the face of the hammer is made round, to correfpond with the anvil, and from its fimilarity to the edge of a fmith's hammer, may be called the pen of the hammer and anvil. The machine is always in rapid motion, and between every ftroke that the hammer makes, he moves the bar forwards on the anvil, that it may be ftruck by the edge of the hammer in a frefh place. If the bar is flat, as bliftered fteel ufually is, it is firft hammered in this manner upon its edge, to reduce it to a fquare, and at the fame time draw it out in length. When it has been hammered thus all its length, the furface becomes indented on both fides by the edges of the hammer, the anvil being bounded by waving lines. This firft operation is called *notching down*. The tilter then removes the bar beneath the flat face of the hammer, and the rod is flattened at every ftroke, and all the indentation removed; when he gradually recedes from the hammer, drawing the rod along, and flattening it all the way. When the end of the rod comes under the hammer, he turns the other face of the rod upwards, and advancing to the hammer, pufhes the rod forwards under it: in this manner he proceeds, flattening it on one fide or the other, until he brings it to the proper fize, which he tries by a gauge. The moment it is finifhed, the boy brings another piece of hot fteel, which he places under the hammer, and then the other boy takes away the finifhed rod from the tilter, who takes the frefh piece: in doing this, they are careful that the hot piece of fteel is placed under the hammer before the other is taken away, that the faces of the hammer and anvil may not ftrike together, when there would be danger of breaking them, as they are both made of caft-iron: the fecond piece is tilted in the fame manner as before, and when finifhed, is changed for another.

The perfection of tilting fteel, depends upon drawing out a rod perfectly ftraight to the fame fize in every part of its length. Many workmen, particularly at Sheffield, have acquired fuch fkill and dexterity in the management of the rod while under the tilt, that their work is as ftraight and even as as though it had been drawn through a ſteel-plate, in the ſame manner as wire, and all its angles perfectly ſquare: its ſurface is of a black poliſh, and as ſmooth as though it had been filed. All artiſts uſe the ſquare ſteel rods for making their tools; and the ſtraightneſs and regularity of the rods are ſuch, that a perſon who has not been an eye-witneſs of the operation, would ſcarcely believe it poſſible to produce ſuch accurate work from the blows of a hammer. The points to be attended to by a tilter are, that in notching down the bar to draw it out to length and ſize, he cauſes the blows to fall exactly at equal diſtances from each other, unleſs (which ſeldom happens) the bar ſhould have any part thicker than the reſt; the ſtrokes muſt then be a little nearer together in that place, to reduce it all to one ſize. Afterwards, to flatten the bar, he muſt be careful to place the bar truly flat upon the anvil, and hold it in the ſame place, whilſt he draws the bar under the hammer, and that he moves himſelf with a perfectly equable motion, that every part of the bar may be alike ſubjected to the action of the hammer: the ſurface will then be true, and free from undulations. Another circumſtance to be attended to is, when he turns the bar upon the anvil to hammer the adjacent ſides, that he makes them truly ſquare to the former ſides. Theſe things muſt all be done in ſo little time, that it requires long practice and experience to perform them well. Beginners are always apt, when they place their feet on the ground, to move themſelves too quick juſt at that time, which cauſes the bar to be thicker at that place.

The different methods of conducting the operation of tilting, give the ſteel different qualities, which are diſtinguiſhed into 1. Common ſteel; 2. Shear or Newcaſtle ſteel, alſo called German ſteel; and 3. Tilted caſt ſteel.

Common ſteel is made by tilting bars of bliſtered ſteel, and drawing them out into rods of any ſize. The bliſtered bars are of various ſizes, but in general about an inch and a half broad by half an inch thick. If theſe are to be drawn into rods half an inch ſquare, they are broken into convenient lengths to handle, and one end of each piece is heated to a good welding heat by the boy who attends the forge, who puts three or four in the fire together, and, according to their ſize, he learns by experience at what time he muſt put every one into the fire, that it may acquire the proper degree of heat by the time that the tilter ſhall have juſt finiſhed the other bars.

The tilter firſt begins by notching down the narrow edge of the bar, holding the other end of it in his hand, and notches down ſuch a length of it as experience teaches him will be ſufficient to form a rod of the length and ſize required. The notching on the edge of the bar rather increaſes its thickneſs, while it diminiſhes its breadth, and brings it nearly to the ſquare figure of a rod: he then flattens it, and begins again to notch it down upon the broad ſide; afterwards he again flattens it; then proceeds to notch it upon the edge, and afterwards to flatten it once or twice on both ſides, and the rod is finiſhed.

When a ſkilful tilter has been ſome hours at work upon rods of one ſize, he judges by ſight when the rod is of the proper ſize; but on firſt beginning, he tries it by a gauge, and flattens it repeatedly, if neceſſary, the boy bringing a piece of hot ſteel to place under the hammer while he is gauging, and which is drawn out in its turn. When the tilting is completely finiſhed, the ſteel rod is taken away by another boy, who, with a pair of ſhears, cuts off the rod from the bliſtered bar from which it was drawn out. He places the rod on a flat caſt-iron table, and ſets it truly ſtraight by a hammer, then ſtamps the bar with a mark of the quality of the ſteel, and it is finiſhed.

All theſe operations are performed in ſo ſhort a time, that the rod ſtill retains a red heat; but this will excite leſs ſurprize when it is conſidered that the hammer ſtrikes four hundred blows *per* minute, and falls with great weight, ſo that it ſoon completes the work, and it is very probable that the great percuſſion it exerts upon the ſteel in ſome meaſure preſerves the heat. It is well known that blackſmiths are in the conſtant habit of lighting a match to kindle their fire, by only hammering a ſmall piece of iron quickly, and turning it about under the hammer, and in a ſhort time it acquires ſufficient heat to inflame the ſulphur of the match. This heat moſt probably ariſes from the friction which the hammer cauſes amongſt the particles of the iron, by rubbing them violently againſt one another; and the ſmiths obſerve, that the iron will not become red-hot if it is always ſtruck upon the ſame ſide; but it muſt be turned round, that a new ſurface may be continually expoſed to the action of the hammer.

Shear ſteel is ſo called, becauſe the ſhears for dreſſing woollen cloth are made of it. It is alſo called Newcaſtle ſteel, becauſe formerly made there; and German ſteel, becauſe the natural ſteel in Germany is treated in the ſame way; it is likewiſe called *faggotted ſteel*. To make ſhear ſteel, the bars of bliſtered ſteel are broken into lengths of about eighteen inches; then four or more of theſe are laid together with one of double the length, and all four are tied together with pieces of ſmall ſteel: this is called a faggot, and is placed in the forge, to be heated to a good welding heat; it is then taken to the tilt, and notched down on both ſides, to weld all the bars together, and cloſe up the internal flaws. The workman holds the faggot by the end of the long bar as a handle: the operation of welding takes but a few ſeconds, and a ſmall rod is then drawn out from a piece of the end, in the ſame manner as drawing out common ſteel.

Caſt ſteel is prepared by melting fragments of bliſtered ſteel, and caſting them into an ingot. (See STEEL.) The ingot is then drawn out under the tilt into the required ſize, and the manner of doing this is the ſame as for common ſteel.

It is the cuſtom of the manufacturers of cutlery and ſteel goods to purchaſe ſteel from the converting furnaces in the ſtate of bliſtered bars, which they ſend to the tilt-mills to be drawn out to the ſize they require for their uſe: this is done at regular prices. In tilting ſteel, a trifling loſs is ſuſtained by the metal oxydating upon the ſurface, and throwing off black ſcales. The manufacturers are in the habit of allowing 4.6 to 8 lbs. *per* hundred weight for ſuch loſs: this latitude is given, becauſe in drawing the bars out into rods of a ſmall ſize, the waſte muſt neceſſarily be greater; the metal being much longer expoſed to oxydation, and the ſurface throwing off more ſcales.

TILUTHA, in *Ancient Geography*, an iſland of Aſia, in the Euphrates, about 33° 55′ lat.

TILWARAH, in *Geography*, a town of Hindooſtan, in Gurry Mundella; 5 miles S. of Gurrah.

TIM, a town of Ruſſia, in the government of Kurſk; 44 miles E. of Kurſk. N. lat. 51° 40′. E. long. 37° 34′.

TIMA, THIMA, *Taima*, *Alablao*, or *Al Ablak*, a town of Arabia, in the province of Nedsjed; 180 miles N.N.E. of Medina.

TIMACUM, in *Ancient Geography*, a town placed by Ptolemy in Upper Mœſia, at a diſtance from the Danube.

TIMÆA, a town of Aſia, in the interior of Bithynia. Ptol.

TIMÆUS, the *Locrian*, in *Biography*, was a philoſopher of the Italic ſchool, and flouriſhed in the time of Plato, who derived from him principally the doctrine of Pythagoras, and whoſe book, entitled "Timæus," was founded on his book "On the Nature of Things." Proclus preserved a small treatise of Timæus "On the Soul of the World," and it is prefixed to some editions of Plato's Timæus. In this treatise, chiefly Pythagorean, he differs from Pythagoras in the following particulars: *viz.* that, instead of one whole, or monad, he supposes two independent causes of nature, God and Mind, the source of intelligent nature, and Necessity or Matter, the original of bodies; and that he explains the cause of the formation of the world, from the *external* action of God upon matter, after the pattern or ideas existing in his own mind. Upon a comparison of this piece with Plato's Timæus, it will be found that the Athenian philosopher has obscured the simple doctrine of the Locrian with fancies drawn from his own imagination, or from the Egyptian schools.

In the time of Ptolemy Philadelphus there was a Sicilian, named Timæus, who was a celebrated historian; but none of his writings are extant. He died at the age of 96, B.C. 262. Brucker by Enfield, vol. i.

TIMAGENUS, in *Ancient Geography*, an island in the Arabic gulf. Ptol.

TIMANA, in *Geography*, a town of South America, in the province of Popayan; 80 miles E. of Popayan. N. lat. 2° 12'. E. long. 74° 46'.

TIMANTHES, in *Biography*, a famous Grecian painter, was, as it is said, a native of Cythnos, one of the islands called Cyclades, or of Sicyon, and flourished about the year B.C. 400. The mind of this artist is supposed to have surpassed his art, in the exercise of which he displayed great skill, so that in his performances, something was to be understood, which he did not express. As an instance of this, we are referred to his picture of Iphigenia about to be sacrificed, in which, having exhausted every variety of the expression of grief in the other spectators, he has thrown a veil over the face of her father, thus intimating that his anguish surpassed all external tokens. In his Sleeping Cyclops, exhibited in a small tablet, he has introduced Satyrs measuring his thumb with a thyrsus, in order to give an idea of the magnitude of the principal figure. At Samos he was a competitor with the famous Parrhasius in a piece, of which the subject was the judgment for the arms of Achilles, between Ajax and Ulysses; on this occasion the prize was awarded to Timanthes. In the temple of Peace at Rome a hero of admirable workmanship by the same artist was preserved. Pliny Nat. Hist.

TIMAR, a tract or portion of land, which the grand signior grants to a person on condition of serving him in war, on horseback.

Some define the timar a portion of land assigned to a spahi, or other person fit to serve on horseback, to enjoy, during life, for his subsistence.

Meninski describes it as a stipend or revenue, granted to old soldiers who have deserved well, in lands, and possessions of castles, towns, villages, fields, or in tithes, and other fruits and incomes; sometimes with the prefecture, jurisdiction, or signory of the said places.

The timar is a kind of fief granted for life. The whole Ottoman empire is divided into sangiackies, or banneries, under which all such as hold timars, who are called *timariots*, are bound to list themselves when summoned upon any expedition. Timars may be resigned as benefices among us, only obtaining the consent of the beglerbey, or governor of the province. Indeed, for timars of above 2000 aspers *per annum*, called *zaim*, the grand vizier alone grants dispensations.

TIMARIOTS, those who enjoy lands on the footing and tenure of timars. See TIMAR.

The timariots are obliged to serve in war, personally, with as many men and horses for service as their timar, by the estimate made of it, contains 2500 aspers, or about 6*l.* sterling; and to maintain them constantly mounted and armed after their manner, to be ready to march at all hours when commanded, and that on pain of death; nothing, not even sickness itself, being allowed to excuse them.

Besides this service, they likewise pay an acknowledgment of one-tenth of their revenue. If they have any children of age to bear arms, and fit for the service after their decease, or, in defect of this, if they have any relations that have the least interest, the timar is used to be continued to them on the same conditions, otherwise it is transferred to others.

If the revenue thus held of the grand signior exceed 15,000 aspers, or 36*l.* sterling, they who hold it are not called *timariots*, but *subassi*, or *zaims*: these always have the administration of justice in the place, under the sangiac of the province.

The timariots have different appointments, from 4000 or 5000 aspers, equal to about 12*l.* sterling, to 20,000 aspers: but unless their timar exceed 8000 aspers, they are never obliged to march, except when the grand signior goes to the army in person, on which occasion none are exempted.

The origin of the timariots is referred to the first sultans, who, being masters of the fiefs or lands of the empire, erected them into baronies or commanderies, to reward the services of their bravest soldiers; and especially to raise and keep on foot a number of troops without disbursing any money.

But it was Solyman II. that first established the order and discipline among these barons, or knights of the empire; and by his order it was, that the number of horsemen each should maintain was regulated.

This body has heretofore been not only exceedingly powerful, but great and illustrious throughout all the empire; but avarice, the ordinary fault of the Orientals, has occasioned their declension of late years.

The viceroys and governors of provinces manage their matters so at court, that timars, even out of their jurisdiction, are given to their domestics, or to such as will give them the most money for them.

There are two kinds of timariots, the one appointed by the Porte, the other by the viceroy of the country; but the revenues of both are less than those of the zaims, and their equipage and tents less in proportion.

Those who have their patents from the court, have from 5000 or 6000 aspers to 19,999 aspers *per annum;* if they have one asper more, they become zaims. Those who receive their patents from the viceroys, have from 3000 to 6000 aspers *per annum.*

This cavalry is better disciplined than that properly called the *spahis*, though the spahis be the neatest and briskest. These last only fight in platoons; whereas the zaims and timariots are divided into regiments, and commanded by colonels, under the direction of bashaws. The bashaw of Aleppo, when in the army, is colonel-general of this militia.

TIMARISTAN, in *Geography*, a town of Persia, in the province of Farsistan; 15 miles E. of Pasa.

TIMAVO, a river of Carniola, which runs into the gulf of Trieste, near Duino.

TIMAVUS, in *Ancient Geography*, a fountain, lake, river, and port of Venetia.

TIMBANG, in *Commerce*, a measure at Batavia for rice, pepper,

pepper, and other dry goods. It is reckoned at ten facks, or five pikuls: another meafure is called kulack, and weighs 7¼ cattis: 7 kulacks make one timbang, liquid meafure.

TIMBER, in *Geography*, a river of Pruffian Lithuania, which runs into the Nemouin; 4 miles N.E. of Wipe.—Alfo, a town of Pruffian Lithuania, 6 miles W. of Infterburg.

TIMBER, or *Timber-Trees*, in *Rural Economy*, that fort of wood produce which is ufeful and proper for the purpofes of building, the conftruction of tools, implements, carriages, &c.; or fuch large trees of different forts as have reached their full or fuitable ftates of growth, and are in fituations fit for being cut down for ufe. The various kinds of trees which are the moft ufeful and important in this intention, have been noticed and confidered in fpeaking of the nature of common and other plantations and planting; but they are chiefly the different forts of pines, the larch, the birch, the common afh, the mountain-afh, the beech, the fycamore, the elm, the oak, the horfe and common chefnuts, the alder, and the poplar. However, in general, the oak, the afh, the elm, the larch, and the Scotch pine, are by much the moft ufeful and valuable for all the different ufes of this nature.

We fhall here mention from Evelyn's Sylva, &c. fome of thofe kinds of timber that are moft ferviceable, and give a brief view of the ufes to which they are applied, referring to their feveral denominations and other collateral articles for a further detail.

1. *Oak*, the ufes of which need no enumeration; to endure all feafons and weathers, there is no wood like it: hence its ufe in pales, fhingles, pofts, rails, boards, &c. For water-works, it is fecond to none; and where it lies expofed both to air and water, there is none equal to it.

2. *Elm:* this, felled between November and February, is all fpine or heart, and no fap; and is of fingular ufe in places where it either is always wet, or always dry: its toughnefs likewife makes it of ufe to wheelwrights, millwrights, &c.; nor muft it be omitted, that its not being liable to break and fly in chips, makes it fit for dreffers and planks to chop on.

3. *Beech:* its chief ufe is in turnery, joinery, upholftery, and the like, as being of a clean, white, fine grain, not apt to bend nor flit: it has been fometimes, efpecially of late, ufed for building-timber, and if it lie conftantly wet, is judged to outlaft oak.

4. *Afh:* its ufe is almoft univerfal; it is good for building, or other occafions where it may lie dry: it ferves the carpenter, cooper, turner, ploughwright, wheelwright, gardener; as alfo it is ufed at fea for oars, handfpikes, &c.

5. *Fir*, commonly known by the name of *deal*, is of late much ufed in building, efpecially within doors, for ftairs, floors, wainfcot, and moft works of ornament.

6. *Walnut-tree:* this is of univerfal ufe, excepting for the outfides of buildings; none is better for the joiner's ufe, it being of a more curious brown colour than beech, and lefs fubject to worms.

7. *Chefnut-tree*, next to oak, is the timber moft fought for by joiners and carpenters. It is very lafting.

8. *Service-tree*, ufed in joinery, as being of a delicate grain, and fit for curiofities: it alfo yields beams of confiderable fize, proper for building.

9. *Poplar, abel:* this and *afpen*, differing very little from one another, are much ufed of late inftead of fir: they look as well, and are tougher and harder.

10. *Alder*, much ufed for fewers or pipes to convey water: when kept always wet, it grows hard like a ftone; but where fometimes wet, and fometimes dry, it rots prefently.

The ufes of timber are fo many, and fo great, that the procuring of a fufficient fupply of it extremely well deferves the care of every ftate; as it muft be a great difadvantage to it to be obliged to have recourfe to its neighbours, and purchafe, at a very confiderable and continually renewed expence, what might, by an eafy economy, be fufficiently fupplied at home.

This economy, however, muft be applied in time; for our natural indolence, our love to reap the advantages of every thing ourfelves, and our little care for pofterity, give great room to fear fucceeding ages will want wood, both for private and public exigencies. All our arts fhould be employed on this fubject, with two views, the one to preferve and cherifh our growing wood, the other to renew the trees which have been, and are continually cut down.

The quantity of acorns which the oak bears, has made many people fuppofe, that Nature has taken care for a renewal for us; and that of this vaft quantity of feed, which annually fall, there will be always an over-fufficient fupply of young trees, which will grow up in the place of the old ones: but experience proves, that this is by no means the cafe. The greater number of thefe fallen acorns is devoured by many different animals, for whofe nourifhment Nature has provided that abundance of them: and of thofe which efcape this fate, we are to confider how few can come to good, from the natural accidents they are unavoidably expofed to; they fall on a covered ground, where dead leaves, and decayed parts of branches of trees, ufually prevent their touching the earth, into which they are to fhoot; or, if they can fhoot here, it is merely from the furface, where they are, in their flow growth, liable, while very tender, to all the inclemencies of frofts; and add to this, that it is very difficult for fuch tender plants as the young feedlings of thefe to find room for growth or nourifhment among the every-way fpreading roots of other trees; and the continual fhade and want of free air, muft render them very weakly and irregular in their growth, even fuppofing them to get over all the other difficulties.

It is very certain, that timber-trees of oak are frequently met with among the underwood of forefts; but we fhall always find this to be the cafe, not in the clofe places, but in certain fpots, where there has been a vacancy or opening; and that ufually, where there are not, nor have at any time been, oaks in the neighbourhood of the fpot. The acorns that fall from the oaks ufually come to nothing from the before-mentioned accidents; and thefe trees which grow at diftances, are owing to the acorns brought thither by birds, and accidentally dropped there. This is an inftance familiarly verified, by obferving, that there are frequently little bufhes near woods, which, though of white-thorn or other trees, are ufually furrounded and ornamented with young oaks; the jays and the like granivorous birds are the authors of this crop; for bringing the acorns from the adjoining woods, to eat under thefe bufhes, they drop many by the way, which they do not trouble themfelves to look for on the ground, and which having here a freer ground to ftrike root into, and an open air to grow in, feldom fail of coming to good, unlefs deftroyed when young.

In order to the prefervation of our growing timber-trees, it would be a very ufeful law, that all who cut down any number of oaks, fhould alfo leave a number in good condition for after-cutting; and that no timber fhould be cut down, but at a proper age, in regard to the nature of the foil;

ſoil; ſince it is certain, that trees grow to their perfection at very different periods of time, in proportion to the depth of ſoil they have to grow in; and that as it is, on the one hand, not for the intereſt of the ſtate to ſuffer trees to be cut till at their perfection for ſize and ſoundneſs, ſo after they are arrived at their perfection, it is equally certain that they gradually decay.

The quality of the ſoil the tree ſtands in may be neceſſary to be obſerved to this purpoſe; but the quantity or depth of it is the great ſubject of enquiry; and a great number of obſervations has proved, that the proper ſeaſon for cutting oaks, in a ſoil of two feet and a half deep, is at fifty years old; thoſe which ſtand in a ſoil of three feet and a half deep, ſhould not be cut down before ſeventy years; and thoſe which ſtand in a ſoil of four feet and a half deep, or more than that, will increaſe in goodneſs and in ſize till they are a hundred years old; and obſervation has proved, that after theſe ſeveral periods, the trees begin to decay.

This ſeems the beſt rule to eſtabliſh, in regard to the common ſoils; but thoſe which grow in a lighter or more ſandy ſoil, may have their periods changed from theſe to forty, to ſixty, and to eighty years at the greateſt depth; and after theſe times it is always beſt to fell the wood meant for public ſervice, whether then wanted or not, ſince it is much better to keep it in public magazines, than to leave it to be daily decaying.

Heaths, and other uncultivated places, where there is no regular growth of wood, but where fern and uſeleſs plants alone ſeem to flouriſh, uſually afford alſo ſome ſtraggling trees of the oak. Theſe probably have had their origin from acorns dropped by birds; but they ſeldom grow tall or regular; ſince, not having been defended from the injuries of cattle, they are uſually browſed on, and ſtunted while young, and ſo become crooked and ſhort-trunked, or pollard-trees. Theſe, though not of ſuch value as the more regular oaks, yet deſerve care, both with reſpect to their preſervation and felling; ſince they afford a number of trees naturally bent, and formed for many parts of ſhip-building.

The little care uſually taken of theſe trees, though on this occaſion of great value, ſeems to threaten a general loſs of them; but as trees, thus naturally crooked and bent, are of value, it is a laudable attempt to try at the finding of a regular method of producing ſuch; and this is eaſily practicable, by following the ſame methods by which theſe wild ones become ſo. They wholly owe their figure to the cattle's biting off their tops while young, and afterwards biting off again the tops of the ſhoots from the firſt wound. In this manner, if a number of young trees, ſet apart for the experiment, have their tops cut off at two, four, ſix, eight, ten, and twelve feet from the ground, and four years afterwards the ſhoots from theſe ſtunted tops are again cut in the ſame manner, the trees will be found afterwards to grow up in all the irregularly crooked figures that can be conceived, and by this means a ſupply of naturally crooked wood may be raiſed for all the occaſions of ſhip-building, with infinitely greater eaſe, and more certainty, than by the method propoſed by ſome, of bending them down with weights tied to their tops while young. See *Growth of Crooked* TIMBER.

As to the ſupply of young wood in the place of what is cut down, there are ſome circumſtances which have not had the attention paid to them which they deſerve. The ſpring froſts, which come on at a time when the ſhoots, by which nature is to raiſe the ſupply for what is cut down, are juſt preparing to grow, are of prodigious injury, and do not leſs miſchief to theſe than to the young ſhoots of garden plants, though the diſtant hope of the ſucceſſion of the proprietor, and uſually alſo the diſtance of the place, and want of repeated obſervations, occaſion its not being perceived. This, however, may in a great meaſure be guarded againſt. Frequent experiments and repeated obſervations prove, that the miſchief done by theſe froſts affect in a much greater degree thoſe ſhoots which are expoſed to the ſouth, than thoſe which face the north: and that it is greatly more powerful againſt ſuch as are wholly expoſed to the wind, than againſt ſuch as are ſheltered. Theſe known circumſtances may give the hint to a method of ſaving, at leaſt, a great part of the wood to be felled from this deſtruction, to its renewal, by the making it a rule to begin cutting down on the north ſide; and, as the whole felling is a work of ſome years, the ſtanding wood of every ſeaſon will defend the young ſhoots of the newly-cut ſtumps the following ſpring, not only from the ſouth expoſure, but will ſhelter them alſo from the wind.

Many prudent managers have made fine eſtates of their coppice-woods, by regularly felling a certain portion every year, and providing for a renewal of the firſt cutting, againſt the felling of the laſt portion, by proportioning the time of growth to the quantity to be cut every year; and there is great intereſt to be made of a true knowledge of the growth of wood in this manner. Whoever obſerves the growth of young trees, will find that the ſecond year's growth is much more conſiderable than that of the firſt; the third year is more than that of the ſecond, and ſo on for many years; the yearly growths of young wood greatly increaſing every ſeaſon up to a certain time or age of the tree, after which the increaſe in bulk, by growth, becomes gradually leſs. The great advantage to be made of coppice-wood, would be by knowing this intereſting period, and ſeizing on it, always to cut down the trees juſt at that time when they arrived at the end of their quick growth, and ſo ſetting nature to work with new ſhoots, to employ the ſame on enriching again the owner. Regular obſervation and experiment alone can aſcertain this happy period; but any man who has much coppice-wood upon his eſtate, may aſſure himſelf of it, by cutting a given quantity every year, for ten years ſucceſſively, and then carefully reviewing the differences of the yearly produce. Memoirs Acad. Scienc. Ann. 1739.

On the buſineſs of raiſing and growing good timber, or trees of that ſort, Mr. Loudon has thrown out ſome intereſting, ingenious, and philoſophical hints and ſuggeſtions, as well as ſtated ſome ſtrong facts in confirmation of them, in his work on forming and improving country reſidences. It is conſidered as remarkable, that the matter has never particularly engaged the attention of thoſe who have been employed in deſcribing the methods of rearing trees. The effects of culture on other vegetables is ſo great, it is ſaid, as always to change their appearance, and not unfrequently to alter, in a conſiderable degree, their nature. The common culinary vegetables, and cultivated graſſes, aſſume ſo different an appearance in our fields and gardens from what they do in a ſtate of wild nature, that even a perſon accuſtomed to the nature of plants might eaſily be deceived in regard to the ſpecies or kind. The ſame general laws operate upon the whole kingdom of vegetables; and thence it is thought plain, that the effects of culture upon trees, though different in degree, muſt be analogous in their nature. It is true, it is ſaid, that as yet we are poſſeſſed of no great number of either experiments or obſervations, to enable us to determine with minute accuracy the preciſe extent of of thefe effects; but ftill a perfon practically converfant with the fubject, who fhall pay attention to what he may notice to be taking place in different parts of the country, and who poffeffes a fufficient knowledge of the vegetable kingdom and phyfiology to reafon from analogy, may, it is thought, deduce fuch general confequences, as will fuggeft important practical rules and regulations.

It may be proper, it is faid, to remark, that by culture is not meant merely the operations upon the foil, or on even the form of the particular tree; but every thing that tends to remove it from its natural ftate in order to accelerate vegetation. It is confidered too, that a tree is in a natural *ftate* whenever it has fprung up fortuitoufly, and propagates itfelf without aid from man: whether it be in crowded forefts, woody waftes, or in fcattered groups on hills or commons. Some trees and other vegetables may be faid to be naturalized to fituations which, but for art, they probably never would have grown upon. Thus, for inftance, mountain plants are fometimes found common in plains, and even meadows; and alpine trees which diffeminate themfelves in level and warmer parts of the country: but then the perfon who is converfant with fuch matters, by comparing the effects of thefe different fituations on the vegetable, always knows to felect as general nature that which perfects all the parts, and where the foil and fituation are beft fuited for the reproduction of the fpecies or fort, and the prolongation of individual life. Thefe rules are, it is faid, founded in nature. For example; no perfon, judging from them, could miftake a warm Englifh common as the natural foil and fituation of Scotch firs, though they not unfrequently diffeminate themfelves there. It is, indeed, well known to every one in the leaft converfant with the vegetable economy, that in all herbaceous vegetables, and even fhrubs of confiderable fize, the effect of removal to an improved foil, climate, and fituation, is to expand the parts of the whole vegetable: that the effect of removing or cutting off part of the vegetable above ground is to expand thofe parts which remain: that the effect of removing any of the parts under ground, or of removing the whole vegetable into a colder climate and lefs congenial foil and fituation, is to contract or confolidate the whole. This, were it neceffary, could, it is faid, be illuftrated in a thoufand inftances from the commoneft vegetables: but for the prefent purpofe, it is only neceffary to notice further, that this takes place more or lefs in a degree correfponding with the rapidity of the growth of the vegetable, and its duration. Thus, all the annual graffes are much farther removed from a ftate of nature by culture than the perennial ones. So are the annual garden vegetables, as cabbages, legumes, and fpinach, in oppofition to ftrawberries, afparagus, and many others. Quick growing trees or fhrubs, as willows, rafpberries, and fome others, are alfo much eafier removed from their natural ftate, than fuch as oaks, thorns, hollies, and heaths, which grow much flower. If thefe remarks and conclufions be juft and well-founded, which, it is fuppofed, none will deny, it muft follow that the fame general effects take place more or lefs on all trees; that when they are removed into a colder climate, or have part of their roots cut off, it will in fome degree contract the fibre of the wood, and render it a of more folid and hard texture; and that when they are removed into a warmer climate, have moft of their branches taken off, or are placed in a better *ftate*, it muft, by accelerating their growth, it is thought, tend to expand the fibre of the wood, and of courfe render the wood fofter and more liable to fuffer by the action of the common elements, when the tree is cut down and applied to ufe. That this does really take place, will, it is faid, be gathered from the detached facts ftated below, which have come to the writer's knowledge, and to which every practical unprejudiced perfon, who has vifited different parts of the kingdom, will, it is thought, be able to add many others from his particular obfervation, attention, and examination.

Firft, that every hedger and forefter knows, that furze and thorns, which have been cultivated in fields or hedges, are of a much fofter or wider grain, and are much eafier cut over with the hedge-bill, than fuch as fpring up from feed in a wild fcenery, and never undergo any fort of pruning or cutting in, nor any kind of culture in any way. They know too, that in a common to be cleared of furze or thorns, or in a hedge to be cut over, there are fome parts which require a much flighter ftroke of the hedge-bill than others; and that thofe parts eafieft to cut, are uniformly thofe where the plants have grown the quickeft:—gardeners experience the fame thing in pruning or cutting over fruit-trees or fhrubs. Thus the difference between the texture of the cultivated and the wild rafpberry is, it is faid, ftriking, though the ftem of the one is nearly double the thicknefs of that of the other. In all the other of thefe cafes, the ftems of both are fuppofed alike in diameter and cleannefs, or abfence of knots; though the fame thing would, it is thought, take place in a confiderable degree, even if the ftem of the cultivated or quick growing one were thicker than that of the other in the wild ftate. Suppofing that there were no other proofs, this, it is contended, clearly fhews that cultivation, or whatever tends to increafe the growth of a tree, tends likewife to expand the vegetable fibre. But there are other concurring proofs, it is faid, which demonftrate this, and at the fame time fhew, what few, it is fuppofed, will doubt, that when the vegetable fibre is expanded, or when the annual ringlets or circles of wood, produced by a tree, are foft and larger than the general annual increafe of fuch tree, the timber muft be lefs hard, and more permeable by air, water, heat, and other matters, and, of courfe, inferior for all the purpofes of timber.

Secondly, that it is well known that the common oak in Italy, where it grows fafter than in this country, is comparatively of fhort duration. And that the oak which grows on the mountains of the Highlands of Scotland is much harder and clofer than any produced in England, though on thefe mountains it feldom attains one-tenth part of the fize of Englifh trees. Every country carpenter in Scotland knows, it is faid, the extreme difference between the duration of Highland and Englifh oak for fpokes of wheels. Many hedge-carpenters in both parts of the country know the relative duration of tranfplanted or *plantation* oaks, that is, the young oaks which are thinned out from thriving plantations of this fort, and thofe from natural forefts, when employed as pofts for railing. From different obfervations which the writer has made in Monmouthfhire and Herefordfhire, the duration of the oak in thefe counties, it is thought, is much inferior to what it is in Cumberland and Yorkfhire: it is thought no exaggeration, when it is faid that the difference is as eight to ten. Some timber dealers are known by the writer, who, in purchafing it, pay attention to the difference of foil and fituation even in the fame woods. When they can find oak in expofed fituations and on deep clay foil, and afh on rocky fteeps, they always give them the preference in their purchafes as timber.

Thirdly; that a known fact is ftated by the writer which is faid to be of fuch importance, that it is trufted, if it does not fatisfy every unprejudiced perfon in refpect to the truth of the general principles which are wifhed to be here laid down and explained, it will at leaft arreft the attention of all thofe who are interefted in the quality as well as mere bulk

of

of timber: and this, it is thought, may lead to more extenſive obſervations, and perhaps more favourable concluſions relative to it.

The plantations of the timber kind which were made at Kinnaird caſtle in the years 1770—1790, are, it is ſaid, well known in the north of Scotland. They were chiefly of deciduous trees, among which were generally introduced larches for ſhelter. Theſe larches, in ſome places, grow with aſtoniſhing rapidity. On many ſlopes, where the ſurface-ſoil was good though not deep, and the ſub-ſoil a ſandy gravel, they advanced upwards of five feet a year for the firſt ſix or eight years after being put in. As they overtopped and crowded the deciduous trees, they were gradually felled; and as much had been ſaid about the durability of larch-wood, the firſt trees that were cut down were ſawn up, and applied to a purpoſe which was perhaps, it is thought, one of the beſt teſts of their durable properties. This purpoſe was the foot-paths of peach-houſes and vineries, where they were expoſed to alternate drought and moiſture, heat and cold, and where common deal and other kinds of wood had repeatedly failed. The larch deal of theſe trees was, it is ſtated, applied in the ſame way as the others, and in leſs than two years was completely rotten and deſtroyed!

It may, it is conceived, be alleged by ſome, that this could only hold true in regard to the *ſap*, or laſt formed wood: but the *heart*, or red central wood which was preſent, though it laſted longer, did not, it is affirmed, endure three years! The vaſt number of theſe trees annually taken down, were afterwards, it is ſaid, chiefly made uſe of as fuel; and though this wood had been aſſerted not to flame, or be conſumed without the aſſiſtance of other wood, it did not, in this caſe, flame violently, but it burned by itſelf without care or attention, and unaſſiſted from other timber-wood, producing numerous fires for labourer's uſes. In rendering it fit for this purpoſe too, the workmen found it extremely brittle, a tree a foot in diameter being often broken with the greateſt eaſe, by means of two or three blows given with the back of the hatchet. The tops and ſide-branches of them were likewiſe remarkably light and brittle, as are known to many perſons in that part of the country as well as this. See Timber, *Crooked Growth of.*

Theſe facts are ſaid to deſerve a very ſerious attention, and to lead to very important concluſions, in reſpect to the cultivation and growth of this tree as timber in this country. They are not ſolitary ones; for though, as yet, ſufficient time has not elapſed for a fair trial of this wood in different ſoils and ſituations, yet ſome have found it much leſs durable than others; and that an attentive, nice obſerver will, it is thought, perceive larch-trees in ſome rich warm ſituations in a decaying ſtate, and others growing ſo rapidly, or ſo much ſide-lopped or pruned, as to ſuggeſt doubts, whether their duration will be much longer than thoſe of the above caſtle.

And, fourthly, that in Scotland, the difference of durability between common fir-wood which has been of ſlow growth, and that which has been *forced*, as it is termed, either by ſhelter, advantageous ſoil, ſituation, or climate, or by lopping off the ſide-branches, is known to every carpenter in the more northern parts of it, eſpecially in the diſtricts of Perth, Stirling, and Argyle. There, it is ſaid, they diſtinguiſh the wood cut as timber in the native foreſts, from that obtained in plantations, by calling the former highland-fir, and the latter park-fir. The highland-fir is moſt eſteemed, on account of its greater durability, being frequently found undecayed in ancient buildings when other ſorts are entirely waſted. Theſe circumſtances are ſtrongly ſupported, it is thought, by Mr. Lambert, who, in ſpeaking of the genus *Pinus*, has ſaid, that "this ſtriking difference between the highland and park fir, is probably to be attributed to the mountainous and rocky ſituations in which the native timber is found, and where, the trees being of ſlower growth, the wood is conſequently of a harder texture." The ſame writer is of opinion too, it is ſaid, that few ſpecies of pines will endure more than forty years in the ſoils in which they are commonly ſet out or planted in England. Indeed, there are many proofs of this, it is thought, from Croom, Kew, and other places; though there are ſome excellent fir-trees at Langhangles, where the ſoil is deep and cold, that are much older than that period. The greater durability of the former ſort of fir-timber may be daily ſeen, it is ſaid, in the ſtill more northern diſtricts of Aberdeen, Bamff, and ſome others, during the removal of old farm-houſes and cottages; as wherever a piece of the highland-fir appears, it is always of a much deeper yellow than the park or low country fir. At Gogar, it is ſaid, ſome large fir-trees were taken down in 1795; they grew upon a deep cold loam; the wood was ſawn up, and was found of excellent quality as timber. About a mile from this, at Lenny Park, a dry bank is covered with fir-trees of greater age than thoſe of the former ſituation; ſome of them have been taken down at different periods before and ſince that time, and have uniformly been found of inferior quality as timber-wood. In 1804, too, a number of fir-trees were taken down from the rocky banks of the Almond, between Craigie Hall and Cramond Houſe; and they were found of excellent quality in their wood. While at Bevelaw, there are extenſive plantations of fir-trees, which have been often thinned; but the trees have grown ſo faſt, and been ſo much cut or pruned in the branches, that they never laſt long, it is ſaid, as paling. All theſe caſes have either come under the writer's own particular notice, or that of a relation of his, who is highly intereſted in the value of park-fir, and, of courſe, has paid a more than common attention to the matter. A great number of other inſtances might, it is ſaid, be here added, but it is unneceſſary: and the compariſon of the wood of the common crab, the father of the orchard, with that of the cultivated apple, is in ſupport of the ſame. Any perſon who will take the trouble to examine the fir-woods at Gordon Caſtle, and contraſt them with others in the county of Perth, and thoſe in England, will, it is thought, unqueſtionably come to theſe concluſions: that *ſlow growth* is eſſentially neceſſary to the *durability* of fir-timber; and that wherever the *accumulation* of wood has been *accelerated* by culture of the ſoil, improvement of the climate, or by cutting and pruning, it is *injured* in quality in proportion to the ratio in which theſe agents have been employed. It is not ſaid, that no branches ſhould ever be cut from fir-trees, but that it is certain that judgment muſt direct to cut off, *in general* only, ſuch as indicate that they are no longer of much uſe, which is eaſily diſcovered by marks of approaching decay.

Much of the above principles, reaſonings, and concluſions, is probably, in ſome meaſure, equally applicable to other ſorts of timber.

In the raiſing and growth of timber of the fir or Scots pine kind, it is found not well ſuited to very elevated ſituations, as the ſharpneſs and keenneſs of ſuch expoſures bring it too quickly into a ſtate of decay and death. The writer of an agricultural ſurvey of one of the more northern diſtricts of Scotland has remarked, that there is a kind of laminated clay, much diſpoſed to diſſolve with water, which is not favourable to the growth of this, or any of the pine tribe. It ſucceeds very well, it is ſaid, however, in moſt

moſt parts of the clay ground of that tract, if care be taken to prevent ſtagnant water. It does exceedingly well too on land covering the freeſtone rock; but that the beſt timber of this ſort is produced on hard dry gravelly ſoils. But that the Siberian pine, and ſome others of a ſimilar nature, have been introduced with very little ſucceſs. The ſhort intervals of mild weather which happen in the beginning of the ſpring, excite them to vegetate too early, and the next cold blaſt deſtroys the young buds. The New England pine thrives in a tolerable ſoil, until from twelve to twenty years of age, in proportion to the nature of the expoſure, after which it generally begins to decay. And that the ſpruce is likewiſe unfit to weather the ſtorm on the greateſt heights. It ſucceeds on the hard dry rock where the Scots pine dies, but frequently decays at the end of eighteen or twenty years, on ſtiff wet clay. Its moſt favourite ſoil for timber is that which is dry and gravelly. The ſilver fir thrives in clay ſoils, where the ſpruce fails; nor is it averſe either to the hard rock or gravelly ſoil, which probably affords the beſt timber; but it makes little or no progreſs on any ſoil that is very poor. It unfortunately too frequently ſuffers ſeverely from the froſty mildews of the ſpring, eſpecially in its youth, or more early ſtate of growth. However, the *larix* or larch is now found to be the moſt hardy alpine plant. In moiſt places, it makes greater progreſs than almoſt any other timber-tree, and there is ſcarcely any ſoil, that is not drowned with water, on which it will not ſucceed. It ſuffers moſt in too luxurious ſituations, where its ſoft ſhoots, unable to keep erect, bend away from the ſlighteſt gale, and its timber produce is probably the worſt. It is liable while young, in ſome ſituations, to be much injured or wholly deſtroyed by early ſpring froſts taking place after mild weather has brought on its vegetation, and is occaſionally ſeized with diſeaſe, and dies when placed on miry clay.

It is ſuggeſted that the birch is next to the larch in the progreſs of its growth, and equal to it in ability to ſtand the blaſt in alpine ſituations; and that it is ſuperior to it in the plain. But in whatever ſituation it is placed, it delights moſt in a light ſoil and dry bottom, probably producing in ſuch the beſt timber-wood. It, however, thrives in moiſt ſoils, with very moderate draining.

The aſh alſo, when it enjoys a ſufficient depth of good ſoil, is capable of braving the ſtorm, and puſhing up its head in the moſt expoſed ſituations; however, in a thin ſoil, covering a ſtiff argillaceous bottom, it can make no progreſs. It notwithſtanding thrives well in ſome marſhy ſoils, where the banks are ſteep, ſo that the water gets away without ſtagnating. On dry rocky ſteeps, the timber is probably the beſt. It forms perhaps the moſt important wood in the country as timber, being uſeful in all its ages and ſtates, and fit for moſt purpoſes.

The mountain-aſh is likewiſe a hardy native, which grows freely in almoſt all ſoils and expoſures; but its favourite ſituation ſeems to be in hanging banks, among woods and coppices, where the timber-wood is perhaps the beſt. This and the gean-tree, or wild cherry, raiſe and propagate themſelves much when left at liberty, by putting up or out ſuckers from their roots.

The beech is ſaid to come near to the aſh in capability of braving the ſtorm, and has much the advantage of it in thriving in poor or ſtiff ſoils; but there are ſome barren argillaceous bottoms too much even for the beech; and it is moſt ſucceſsful, and affords the beſt timber, in friable ſoils. Its ſhoots, while young, are ſoon affected by froſt, but the tree ſpeedily recovers.

The ſycamore and elm require a light ſoil, and a dry, open under-ſtratum: and when this is the caſe, the timber is the beſt, and the trees thrive in a ſituation pretty much expoſed. They form good timber too on ſome ſoils of a heavier nature.

In regard to the oak, it is leſs patient of the blaſt than moſt of the timber-trees of the foreſt. Being late in putting forth its leaves, it continues to grow till the ſeaſon is far advanced; and the immature wood of its late ſhoots, unable to reſiſt the piercing effects of the cold wind in expoſed ſituations, withers before the next ſpring; ſo that, like Penelope's web, the progreſs of one ſeaſon is undone in the following. The moſt favourable ſituations for the oak, as timber or otherwiſe, are therefore hollows or hanging ſlopes, where the ſharp cutting winds are broken by the neighbouring heights. In ſuch ſituations, if ſtagnant moiſture be avoided, it will thrive in the ſtiffeſt ſoils, and with its ſtrong roots penetrate the deepeſt bottoms, affording good timber. Though the growth of this tree be ſlow in infancy, when it is placed in a favourable ſituation, it will make a progreſs in the courſe of fifty years, little inferior to many other kinds, and at length arrive at a great ſize of timber. See theſe timber-trees.

It has been found that the horſe cheſnut-tree thrives well on the lower grounds, and deep ſoils only. The ſweet cheſnut, which quickly becomes a timber-tree in diſtricts more northern than this, does not ſucceed here. Its ſeaſons of growth are too early, or too late, for the climate. In its firſt, it bears ſome reſemblance to the Siberian pine, &c.; in its laſt, to the oak; its early growths being almoſt as early as the former, and its later being nearly as late as thoſe of the latter, and ſtill more ſoft and ſuſceptible of the cold. Hence its ſhoots are alternately put forth and deſtroyed, and it generally becomes a low, ſtunted, ſhrubby tree. But this, it is ſaid, does not ſeem to have always been the caſe. The fate of the common walnut, which may be conſidered almoſt as much a timber as a fruit-tree, is nearly the ſame with that of the ſweet cheſnut. It probably affords the beſt timber on dry friable ſoils of ſome depth.

The poplar and moſt of that tribe delight moſt in waterformed ſoils, but are commonly averſe to marſh, and, when happily ſituated, make quicker progreſs than almoſt any other ſorts of trees, producing much light uſeful timber. See CHESNUT, WALNUT, and POPLAR.

Management of Timber.—The rules and regulations for the management of fir and other timber-trees, which are given below, deſerve attention. Mr. Salmon, of Woburn, in Bedfordſhire, who is in favour of much lopping or cutting of the ſide-branches of fir-timber, remarks, in a late volume of the Tranſactions of the Society of Arts, &c. that conſidering the purpoſes that this ſort of timber is commonly applied to, it muſt occur that clearneſs of knots, ſtraightneſs, length, and equality of ſize of the trunk, conſtitute its perfection, and that, if deficient in all theſe, it is of no value but for the fire. Next to theſe conſiderations, and the proſpect of an improved knowledge of raiſing and cultivating this kind of timber-wood, it may, it is ſaid, be a fair queſtion, if our own country be not capable of producing this timber little or not at all inferior to foreign fir? In this country at preſent, fir appears, it is thought, not for any length of time to have been conſidered much otherwiſe than as ornamental. For this purpoſe they ſerve only for a certain time, which, when paſt, it has been their fate to be cut down long before having attained maturity. But from the great extent of ground now covered with this ſort of timber-tree, it is to be hoped, it is ſaid, that another century may obtain to Engliſh fir ſome of the character of the oak of the ſame country: towards ſuch an end, if attainable, every means should, it is said, be used, and towards which nothing appears more likely to succeed, than a well-grounded general practical mode of management, from the time of the trees being put out, to their greatest imaginable age of improvement. That a knowledge of such may by perseverance be gained, is not, it is said, much to be doubted, as from different specimens there appears great reason to conclude, that early and proper side-lopping the branches, and thinning out the young trees, will form a considerable feature in the plan and system to be adopted and pursued.

The subsequent plan and rules for the general management in these cases, are given as the partial result of practical experience, but of only a few years' observations.

In the raising of this sort of timber, from every authority and observation, there can be no doubt, it is thought, that all firs should be set out or planted thick or near together, as not more than four or five feet apart. That where firs of the same kind are put out together, there is less loss of plants, too, from one sort not overgrowing and destroying the others; consequently, that it appears adviseable that all the different sorts should be set out separately by themselves. If any admixture at all be admitted, the Scotch fir and larch may, perhaps, best succeed together; but this is not certain, and they will unquestionably be best separate on two accounts; first, because they are not so likely to injure each other; and, secondly, because the larch may be put into the soil best suited for it, and the Scotch fir the same. And that in raising any particular sort extensively, it may be right to have a few of the spruce sort, or others, on the out or exposed sides, to prevent mischief from sudden gusts or blasts of wind: but if the situation be not liable to such gusts, the spruce had better be omitted, being mechanical agents only, and, by excluding the sun and air, act against the operations of nature. However, in these hints, ornament is not, it is said, considered, but only timber: if the former be wanted, and profit also, then the spruce, the larch, the silver, and some other sorts, may be combined.

It is contended, that from some years' observations on cutting out and side-lopping the branches, and the effects thereof, it appears certain that fir-trees, whenever they arrive at a certain age, should be cut or lopped to a certain height; and that for regulating thereof, the simple rule given below is recommended: the cutting-in to commence when the trees are six years old, or when there is discernible five tier of boughs and the shoot; the three lower tier of boughs are then to be taken off. After the first lopping or cutting-in, the trees to be let alone for four or five years, and then, and at every succeeding four or five years, the cuttings-in to be repeated, till the stem of the tree be clear to forty feet high, after which, as to such side-lopping, it may be left to nature. The rule for the height of thinning and cutting-in, after the first time, to be half the extreme height of the tree, until they attain twenty years' growth, and after that time, half the height of the tree, and as many feet more as it is inches in diameter at four feet from the ground. This cutting-out and retrenching the branches of such trees is known, from repeated observations, it is said, not to be excessive; and that the rule is calculated to check the too tapering top, and for strengthening the slender bottom, by carrying the cutting and retrenching to a greater proportionate degree, in a ratio compounded of the height and bottom bulk; and by this rule, too, it may be observed, that the trees will be at top clothed with somewhat less than half their branches. The proper time for such cutting-in is, it is said, between September and April, and the tool to be employed in the business, the saw.

It is noticed, that orderly thinning the trees at certain periods, when for timber, is the next essential to that of cutting in and lopping their side-branches; and that for this purpose, observations have been made on the most orderly and thriving collections of this sort of trees, and the subsequent simple rule is laid down: keep the distance of the trees from each other equal to one-fifth of their height. In the application of this rule to this purpose, it is evident that each individual tree can never be made to comply, for the original distance (even if set out in the most regular order) will allow only for certain modifications, by taking out every other tree, and so on; but even if the obtaining such equal distance were practicable, experience would shew, it is thought, that another way should be preferred, of which the eye must be the judge, by taking out such trees as are least thriving, stand nearest to other good trees, &c. &c. at the same time keeping in view the rule laid down: the directions and rules for which, given below, may easily be proved, by measuring a chain square, or any quantity of the land, and counting the trees thereon; then, by trying the height of two or three trees in that quarter, and taking one-fifth of such for the distance, it would be readily seen how many trees for timber should be contained in the piece measured: or the practice may be more simply regulated, it is said, by taking the distance of eight or ten such trees added together, the average of which should be equal to a fifth of the height of the trees. In these rules and directions there is nothing impracticable or complicated, it is thought.

The writer states, too, that he has for years known the expence and produce of this side-trimming alone, and finds that in Bedfordshire the produce of it doubly repays the charge or cost; and that although some experimentalists may differ from him, or time may shew some reason for somewhat deviating from his rule, it is presumed all will agree that some simple plan is adviseable, instead of having timber collections and woods mismanaged, to the great loss of the community and their proprietors. If such a plan of proceeding, as is here proposed, be generally promulgated, if not perfect, it will most likely, it is thought, in time become so, and thereby have its advantage; and in order to promote this, these concluding remarks are given: in the common course of gardening, it is understood that cutting and trimming invigorate the tree; that taking off the side-branches makes the upright ones shoot the stronger; and by cutting out the dead and decayed wood, the tree is kept alive: some of this doctrine will, it is supposed, certainly apply to the tribe of firs; it will certainly, too, substitute clean timber-wood for knots: and of all this treatment, from their particular uses, they of all other trees stand in most need, and will be the most improved by it. And that should it be admitted that the like treatment would on the fir, as well as other trees, produce the like effect, it would lead to a well-grounded expectation that, as well as producing clearness from knots, straightness, and length, the same operation would advance the quality nearer to that of foreign fir; for it may be traced, that where trees are tall and clear of boughs or knots, the whole substance of the wood is better and of finer grain, and that it appears likely that such will always be the case; the reason of which may probably, it is thought, be inferred from the sap having farther to rise and descend, and having no boughs to divert or delay it, the circulation must be more free and rapid, most increase be left in the neighbourhood of the boughs at the top of the tree, and least on the sides at the lower part, consequently adding to the length of the head, and rendering more fine each annual increase to the body; thereby producing a close-grained, clean, long, and regular easy-

eaſy-tapering uſeful piece of timber, inſtead of a coarſe-grained, ſhort, ſudden-tapering trunk, with a quantity of boughs and knots.

The foregoing rules, directions, and obſervations, are meant, it is ſaid, to apply to fir-timber only, but to a certain extent they may be applied to other timber; though by no means in the ſame degree or age. But if had recourſe to as far as the firſt fourteen years of their growth, and then ſuch cutting and ſide-lopping be altogether omitted, and the thinning out very much increaſed, any collection of ſuch timber-trees would, it is thought, be rendered much more valuable than if left to nature.

The firſt of the above writers has, however, already ſtated, that the general effects of ſide-cutting or lopping the branches of fir, and probably ſome other timber-trees, are of a correſponding nature with that of culture; that is, to increaſe the quantity of timber produce. And that the particular manner in which it does this, is by directing the greater part of the ſap, which commonly ſpreads itſelf in the ſide-branches, into the main ſtem. This muſt, of courſe, neceſſarily enlarge that ſtem in a more than ordinary degree, by increaſing the annual layers or circles of wood.

Now if the tree happen to be in a worſe ſoil and climate than thoſe which are natural to it, this will, it is ſuppoſed, be of ſome advantage, as the extra increaſe of timber will ſtill be of a quality not inferior to what would take place in its natural ſtate; or, in other words, it will agree with that ſtate of quality and quantity of timber which the nature of the ſpecies, or ſort of tree, admits of being produced. But if the tree be in its natural ſtate, the annual increaſed produce of timber occaſioned by this cutting or lopping the ſide-branches, muſt neceſſarily injure its quality, in a degree correſponding with the increaſed quantity. And if the tree be in a better climate and ſoil than that which is natural to it, and at the ſame time the annual increaſe of wood be promoted by ſuch cutting means, it is evident, it is ſaid, that ſuch wood muſt be of a very indifferent quality from that produced in its natural ſtate.

Conſequently, although it might, in ſome degree, it is ſuppoſed, be ſhewn from vegetable anatomy, and the analogy of what takes place in herbaceous vegetables, it is preferred to deduce, from the facts ſtated above, this propoſition: that whatever *tends* to increaſe the wood in a *greater* degree than *what* is natural to the ſpecies or kind when in its natural ſtate, muſt *injure* the quality of timber. Cutting or lopping the ſide-branches tends to increaſe this in a conſiderable degree; and, therefore, it muſt, it is thought, be a pernicious practice, in ſo far as it is uſed in theſe caſes.

It has been ſhewn, it is ſaid, in a very ſtriking manner by Mr. Knight, that timber is produced, or rather that the alburnum, or ſap-wood, is rendered ligneous, by the motion of the tree during the deſcent of the true ſap. It is ſufficiently known, too, to all who have attended to the phyſiology of vegetables, and greatly confirmed by ſome experiments not long ago communicated to the Royal Society by the ſame writer, that the ſolid texture of the wood greatly depends upon the quantity of ſap, which muſt neceſſarily deſcend, and likewiſe on the ſlowneſs of its deſcent. Now both theſe requiſites are, it is contended, materially increaſed by ſide-ſhoots or branches, which retain a large quantity of ſap, and by their junction with the ſtem occaſion a contraction and twiſted direction of the veſſels, that obſtructs the progreſs of this juice. That this is true in fact, is well known to thoſe accuſtomed to make wine from maple or birch trees, as in this buſineſs it is found that thoſe trees which have the feweſt ſide-branches, bleed more freely than the others, but during a much ſhorter ſpace of time. Theſe hints, conſequently, afford additional evidence againſt the practice of cutting or lopping the ſide-branches of timber-trees, and eſpecially againſt that of uſing it for fir-trees, which, as the above writer juſtly remarks, it is ſaid, have larger veſſels than moſt others, and therefore, when in an improved ſoil and climate, ſide-branches for the above purpoſes are eſſentially neceſſary, if ſolid, reſinous, and durable timber be the object in view.

The following concluſions may, of courſe, it is thought, be drawn in reſpect to the management of timber-trees from the above facts and remarks. Firſt, that timber-trees ſhould be ſet out in ſoils, ſituations, and climates, as much as poſſible analogous to thoſe of their natural ſtate: and that it is chiefly in this ſtate, or where there are ſome defects in regard to them, that ſuch cutting or lopping and culture can be exerciſed with advantage. Secondly, that in proportion to the ſuperiority of the ſoil, &c. in which trees are put, over the natural ſoil of ſuch trees; in the ſame proportion lopping and cultivating the ſoil ought to be avoided, and thinning encouraged. Thirdly, that particular regard ſhould be had to the ſoil and ſituation, where either larches or any of the pine tribe are placed out to remain finally for produce as timber: for as the roots of theſe chiefly run along the ſurface, and as in them the great current of the ſap is principally confined to one channel, that is, the trunk, that tribe of trees is, of courſe, peculiarly liable to change when ſubjected to unnatural agency of theſe kinds. Fourthly, that the only way in which oak-timber of *ſafe* quality can be raiſed and provided for the navy of this country, is by incloſing, preſerving from cattle, and properly managing, thoſe royal foreſts where oak is the natural produce of the ſoil. The neglect of this advice, there is reaſon to fear, it is ſaid, may at ſome future day be regretted. For park-oak, as has been ſeen, is by no means unfrequently much inferior to that of the foreſt kind in durability. And that, laſtly, as the practice adviſed tends to render trees characteriſtical of their peculiar ſpecies or kind, it muſt conſequently be the moſt agreeable to ornament too, or the principles of natural taſte.

The neceſſity of conſidering, thus fully, this branch of the management of timber-trees is, becauſe the matter ſeems, it is ſaid, to have been almoſt entirely overlooked by practical men, who appear, in general, to think culture and lopping, or cutting-in, of no other utility than to increaſe the produce in the *quantity* of timber. Though they are not, however, to be diſcarded in many other views, yet if ſolid and *durable* timber be the object, they ought, it is thought, to be had recourſe to with caution, and in a diſcriminate manner. As a contrary plan of proceeding has been attempted to be enforced by ſome, as has been ſeen, it is thought neceſſary to arouſe the attention of the country to the raiſing and improved management of the important article of timber, eſpecially as the conſequences of that plan are ſuppoſed to be more dangerous, as they cannot eaſily diſcover themſelves until it be too late to apply a remedy.

In the management of timber-trees of the deciduous kinds, the lopping, cutting-in, and thinning, ſhould be practiſed, in ſome meaſure, on the ſame principles as the above, but according to the particular nature, circumſtances, and habits of growth of the different ſorts; being conſtantly executed in ſuch a manner, as to prevent any injury or inconvenience ariſing by the too extenſive growth of the lateral ſhoots or branches, theſe being too few in number for the proper retention of the ſap; and without the trees being left at too great a diſtance, and too naked and expoſed. The trees for timber too are always to be kept clear of all foul wood, and any branches to be removed, taken off in a clean, careful, up-

ward

ward direction, as where the parts are left in any way rugged or uneven, they are liable to catch and detain the wet and moisture, and conduct it to the hearts of the trees, by which they are not only greatly hurt in their growths, but often much spoiled as timber-wood. The thinning of the trees for timber should be performed at different suitable periods, so as to prevent too much crowding, and afford proper room for the full growth and increase of their wood, on the principles laid down above. See Pruning and Thinning.

Sir Humphrey Davy has remarked in a late work, that trees possessing the firmest and the least porous heart-wood, are the longest in duration. That, in general, the quantity of charcoal afforded by woods, offers a tolerably accurate indication of their durability: those most abundant in charcoal and earthy matter are most permanent; and those that contain the largest proportion of gaseous elements are the most destructible. That, amongst our own trees, the chesnut and the oak are pre-eminent as to durability; and the chesnut affords rather more carbonaceous matter than the oak. That, in old Gothic buildings, these woods have been sometimes mistaken one for the other; but they may be easily known by this circumstance, that the pores in the alburnum of the oak are much larger and more thickly set, and are easily distinguished: whilst the pores in the chesnut require glasses to be seen distinctly. That, in consequence of the slow decay of the heart-wood of the oak and the chesnut, these trees, under favourable circumstances, attain an age, it is said, which cannot be much short of a thousand years. The beech, the ash, and the sycamore, most likely, never live half so long.

It is noticed too, that the oak and chesnut decay much sooner in a moist situation than in a dry sandy soil; and that their timber is less firm. The sap-vessels, in such cases, are more expanded, though less nourishing matter is carried into them; and the general texture of the formations of wood necessarily less firm. Such wood, it is said, splits more easily, and is more liable to be affected by variations in the state of the atmosphere.

The same trees, in general, are likewise much longer lived in the northern than in the southern climates. The reason of which seems to be, it is thought, that all fermentation and decomposition are checked by cold; and that at very low temperatures, both animal and vegetable matters altogether resist putrefaction: and in the northern winter, not only vegetable life, but likewise vegetable decay must be at a stand.

The antiputrescent quality of cold climates is, it is said, fully illustrated in the instances of the rhinoceros and mammoth lately found in Siberia entire, beneath the frozen soil, in which they most probably have existed from the time of the deluge.

Trees that grow in situations much exposed to winds, have harder and firmer wood than such as are considerably sheltered. The dense sap is determined, by the agitation of the smaller branches, to the trunk and large branches; where the new alburnum formed is consequently thick and firm: such trees abound in the crooked limbs fitted for forming knee-timber, which is necessary for joining the decks and the sides of ships. The gales in elevated situations gradually act so as to give the tree the form best calculated to resist their effects. And the mountain oak rises robust and sturdy; fixed firmly in the soil, and able to oppose the full force of the tempest.

Different states of timber are chosen for different uses, but the above writer remarks, that ship-builders prefer for their purposes that kind of oak-timber afforded by trees that have had their bark stripped off in the spring, and which have been cut in the autumn or winter following. The reason of the superiority of this timber is, it is thought, that the concrete sap is expanded in the spring in the sprouting of the leaf; and the circulation being destroyed, it is not formed anew: and the wood, having its pores free from saccharine matter, is less liable to undergo fermentation from the action of moisture and air.

It must, however, be considered as very extraordinary, that in a country where the navy is a matter of such vast importance, and in districts where the oak, or other sorts of timber-wood useful for the same purpose, may be said to be almost the staple articles, no complete or satisfactory trials should have yet ever been made of the means of increasing the duration of such timber, which are mostly so readily practicable, and so very material in their consequences.

Felling of Timber.—The proper periods or times of cutting down, or making *falls* of timber, as they are often called, must evidently, in some measure, depend upon and be regulated by the nature and the differences in the circumstances of the growths of the same or different kinds of trees. But as in them, as well as other living matters, there seem to be three stages of growth; as that of their early rising, their middle mature state, and that of their decline or decay; they may serve as more satisfactory guides in the business. In the first, the growth is mostly soft and rapid; in the second, it becomes firm, strong, and perfect; and in the last, it begins to become weak and unsound. Mr. Loudon has considered the beginning of the middlemost of these stages as the most profitable period or season for felling of timber; as after that time, though the tree may appear sound and healthy, its annual increase is so little, that the cutting it down and replacing it may be more beneficial than letting it remain. The number of years that a tree may stand before it arrives at such a state, must, it is said, vary in different soils, situations, and exposures; but the period itself may readily and without difficulty be ascertained,—by the annual shoots, the state of the bark, and by taking the circumference of the tree at the same place for two or three successive seasons, and comparing the difference. In the view of profit from timber produce, it is of material consequence, it is said, to cut down such collections of trees at maturity, or in their vigour and perfection, which, some suppose, for the oak, where the soil is natural, is from about the age of fifty to sixty or seventy years' growth. Many trees will stand a half, others a whole century after they are full grown, appear quite healthy, and, at the same time, make little or no increase of timber. There are particular cases too, depending on the nature and state of the markets, in which it may even be more profitable to cut timber before it is arrived at a full growth than afterwards.

It may be difficult, it is thought, to say when timber, which is principally planted for ornament, should be cut down. A tree, when young and fresh, is beautiful; when middle-aged, it is more or less picturesque; when in old age, strikingly so, with a degree of grandeur; and its greatest height of picturesqueness and sublimity, is when decaying under the pressure of age. Hence it is conceived, that if ornament, or expression, which is a more appropriate term, were the sole object in view, trees need almost never be cut down. But most persons have a feeling of what is beautiful; and though all may be struck with grandeur or sublimity, few have so much enthusiasm as to sacrifice the profit of valuable timber, for the pleasure of enjoying either of those characters.

The time and manner of cutting *underwood* and *undergrowth* will be seen under these heads.

There are persons in this country, who, unquestionably from

from neglect and mifmanagement of their timber, are now, it is faid, lofing annually very handfome incomes. The lofs of price which generally follows the refufal of a good or high offer, the certain lofs of intereft, the decay of timber, and the injuries arifing from the incumbrance of full-grown trees, are irretrievable loffes, which thofe who have the care and management of timber fhould ftudioufly endeavour to avoid. But while the difadvantages of fuffering timber to ftand until it be overgrown are thus held out, it is far from proper or advifeable to propofe or favour the premature felling of it.

The feafon of the year for this work ufually commences about the end of April; becaufe the fap then rifes, which makes the bark *run* freely, as it is technically termed; that is, it *ftrips* off the trees freely; fo that where a quantity of timber for ordinary ufes is to be felled, the ftatute 1 Jac. I. c. 22. formerly required it to be done between the 1ft of April and the laft of June, for the advantage of tanning: but this act was repealed by 48 Geo. III.

However, the opinions and practices of authors are very different as to the beft feafon for felling timber: Vitruvius recommends an autumnal fall; others advife December and January: Cato was of opinion, that trees fhould have borne their fruit before felled; at leaft, that their fruit fhould be firft ripe; which coincides with the fentiments of Vitruvius.

In effect, though timber unbarked be moft obnoxious to worms, yet we find the wild oak, and many other kinds, if felled too late, when the fap begins to be full, to be very fubject to worms; whereas about mid-winter, it neither cafts, rifts, nor twines. If trees were felled at a more early feafon than April, it is faid that the timber would be better feafoned.

It is, indeed, the common opinion, that timber which is felled in winter, is ftronger, and more lafting, as being more firm and clofe, than that which is felled in fummer. But M. Leeuwenhoeck apprehends that there is no difference, except in the bark, and outermoft ring of the wood, which in the fummer are fofter, and more eafily pierced by the worm: wood confifting of hollow pipes, which, both in fummer and winter, are full of moifture, and do not fhrink in winter; and therefore the wood cannot be clofer at one time than another, for if otherwife, it would be full of cracks and clefts. The unexpected and fudden rotting of fome timber, he conceives to proceed from fome inward decay in the tree before it was felled: having obferved all trees to begin to decay at firft in the midft or heart of the tree. Phil. Tranf. N° 213. or Abr. vol. i. p. 592.

The ancients had a great regard to the age of the moon in the felling of their timber. If their rules avail aught, they are thefe: fell timber in the wane, or four days after new moon; fome fay, let it be the laft quarter. Pliny orders it to be in the very article of the change, which happening on the laft day of the winter folftice, the timber, fays he, will be immortal: Columella fays, from the twentieth to the twenty-eighth day: Cato, four days after the full: Vegetius, from the fifteenth to the twenty-fifth, for fhip-timber; but never in the increafe, trees then moft abounding with moifture, the only fource of putrefaction.

Some even have a regard to the temper and time of the day; the wind to be low, neither eaft nor weft, neither in froft, wet, nor dewy weather, and finally, never in the forenoon.

Laftly, fome regard is had to the fpecies: fir is beft felled when it begins to fpring, both as it then quits its coat beft, and as the wood, according to Theophraftus, is by that means rendered wonderfully durable in water. Elm, fays Mr. Worlidge, is to be felled between November and January, in which cafe it will be all heart, at leaft the fap will be very inconfiderable: this, he adds, is alfo the only good feafon for felling afh. Some authors add farther, that in felling timber, care fhould be taken, firft, only to cut it into the heart, and fo to let it ftand till dry; by which means the moifture is evacuated in drops, which would otherwife occafion putrefaction.

M. de Buffon obferves, as a circumftance which greatly increafes the ftrength and folidity of timber, that the trees intended to be felled for fervice, fhould firft be ftripped round of their bark, and fuffered to ftand and die upon the fpot before the cutting. The fappy part, or blea of the oak, becomes by this management as hard and firm as the heart, and the real ftrength and denfity of the wood has been proved by many experiments to be greatly increafed by it: nor is this practice detrimental to the proprietor, becaufe the remaining ftumps of thefe trees fend up their young fhoots as vigoroufly, as if they had been cut down in their natural condition. Mem. de l'Acad. Sc. Par. 1739.

When any tree is to be cut down for timber, the firft thing to be taken care of is a fkilful difbranching fuch limbs as may injure it in its fall. In felling the tree, it fhould always be cut as clofe to the ground as poffible, unlefs it is intended to be grubbed up; and this will be of advantage both to the timber and the wood; for timber is never fo much valued, if it be known to grow out of old ftocks.

There are feveral different modes made ufe of in felling or taking down timber, and they muft neceffarily be fomewhat various, according to the nature, extent, and kind, of which the collection may be, as well as in the methods of performing the work: thus, in groves of the deciduous timber kind, the trees are moftly beft felled by gradually taking or thinning them out as they arrive at maturity; which, where they are to be continued, fhould be cut over by the furface of the ground, and the ftools be each feparately well fenced in, that by defending them from cattle, new trees may be produced; but when not defigned to be continued, they may at once be rooted out. Groves of the fir or pine fort, or any fingle fir-tree of any kind, fhould at once be taken out by the roots. In woods, any timber-trees that may be cut down, fhould have their places as nearly as poffible fupplied by fapplings, or any other proper forts of young timber-trees. However, previous to the work of felling, the trees fhould be marked by a proper perfon; in performing which, in a *fall* of timber, regard is to be had to the relative ftate of ftanding in the trees. In clofe timber-woods, the whole or nearly the whole may be marked and taken down; as if fome which appear flourifhing be left ftanding, they will not only be liable and in danger of being hurt in taking the others down; but, in confequence of their fituation in regard to expofure being changed, will no longer continue to flourifh. As their atmofphere is not only thus altered, and rendered too cool, perhaps, for their acquired habit, by the removal of the adjoining trees; but they thereby get room to throw out fide-fhoots from their ftems; in confequence of which their tops die, and their growth is irrevocably ftinted. While, on the contrary, in open woods of the fame kind, thin hedge-rows, and other open fpaces, fuch timber-trees only as are ripe for the axe, or are fuitable for the intended purpofe, fhould be marked: the youthful growing trees being left to be benefited moft probably by an increafe of air and head room, in an atmofphere and expofure to which they are habituated and accuftomed. On eftates that are timbered, it is directed that they fhould be frequently gone over by proper perfons, who, let the price and demand for timber be what they may, fhould mark every tree which

wears

wears the appearance of decay. Where the demand is brifk and the price high, he fhould go two fteps further, and mark not only fuch as are full grown, but fuch alfo as are near perfection; for the intereft of the money, the difincumbrance of the approaching young timbers, and the comparative advantages of a good market, are not to be bartered for any increafe of timber which can reafonably be expected from trees in the laft ftage of their growth.

In the work of felling timber, three diftinct methods are practifed and had recourfe to in different cafes; as, firft, that of cutting the trees *above ground;* fevering them from their roots, by means of the axe or the faw; leaving what are termed *ftools*, to occupy the fpots where they ftood. Second, that of cutting them, *within* the ground, with the axe and mattock; but leaving the principal parts of the roots in the foil. And third, that of *grubbing* them up by the *roots*, by the ufe of the fpade and mattock; thus throwing them down with the butts and large roots adhering to the ftems. The preference to be given to one or other of the two firft modes of taking down timber-trees, refts, it is faid, chiefly on the nature of the future application of the land upon which they grow. If it be intended to remain in the ftate of woodland, the firft method, or the fecond, if too much of the main roots be not cut away, is the beft and moft eligible. But if the land is to be cleared for the purpofes of agriculture, where fufficient hands can be had for difpatching the bufinefs, the fecond is, by far, the beft. The laft is improper in moft cafes.

The writer of the rural economy of the midland diftricts ftates, that there the methods of *ftocking*, *axe-grubbing*, and *axe-falling* are practifed. That the firft is a kind of partial grubbing, in which the roots are cut through a foot or more from the ftem; and, again, a foot or more from the inner cutting; taking up a fhort length of the thickeft part of the roots, and digging a trench round the tree, wide enough to come at the downward roots. That the fecond, or axe-grubbing, is fomewhat fimilar to the mode of grub-felling defcribed below, except that the end of the butt is left larger in thefe places than in that cafe. And that the third, or axe-falling, is the common method of Yorkfhire, and other places, of cutting off above ground, with the axe; a method which is feldom practifed, except in fome few cafes where another crop of timber, or of coppice-wood, is defigned to be taken. Stocking is the prevailing mode;—the charge for taking down varying with the fize of the tree: for a tree of two feet in diameter, it is about a fhilling; and about four-pence more for cutting off the butt; the ftocking and butting being, for the moft part, let together. Other modes, too, are practifed in other diftricts in performing the bufinefs; as that of fawing the trees off in an horizontal manner clofe by the furface of the ground, by means of a long faw with one or both handles fixed on the upper fide, the trees being firft dipped in by the axe on the falling fide.

The method of falling timber practifed in the county of Norfolk, is faid, by the fame writer, to be uniform, and perhaps peculiar to the county. It is very aptly called grub-felling; the operation partaking both of grubbing and of felling with the axe, in the common way above ground; a method which is wafteful of timber. The woodman of this diftrict, therefore, fells below the furface of the ground, by cutting off the horizontal roots clofe to the ftem, which, inftead of fhortening, he, in effect, lengthens, by adding to it a conical point, cut out of the crown of the root; fo that by this way of proceeding, a greater length of timber is obtained, than by firft grubbing and afterwards cutting off the butt with a faw. Grub-felling is, it is thought, without doubt, the moft eligible way of taking down hedge-row timber; and this, it is fuppofed, accounts for its being the eftablifhed practice in the above county.

The difpofal of timber, which often takes place before it is cut down, is to be regulated by the *occafion* of it, as arifing from the *ftate* of the timber, or other caufes and circumftances. It is, however, feldom proper and beneficial to fell and cut it down before its moft profitable ftate of growth is reached; though this principle may fometimes be fet afide by particular circumftances, as the nature of a market; the value of the land it encumbers by its growth, being greater than its annual increafe; the intereft of the money it is worth, with that of the growth from the ftools, being greater than the increafe of the ftanding timber, &c. It is confequently rarely advantageous to fuffer timber to remain upon its roots, after it has attained its *full* growth; —as, in this cafe, the whole of the intereft is loft, it is faid, to the owner; while the ufe of one of the moft valuable articles of the produce of the country is loft to it and the whole community.

In fpeaking of oak-timber, the late bifhop of Landaff has given fome ufeful and interefting remarks in regard to the difpofal of it, in the introduction to the Agricultural Report of the State of the County of Weftmoreland. Where profit is confidered, it is faid every tree fhould be cut down and fold, when the annual increafe in value of the tree by its growth, is lefs than the annual intereft of the money it would fell for. This being admitted, it is only neceffary to inquire into the annual increafe in the value of oaks of different ages. After different ftatements, thirty-fix fhillings each are fixed upon as the price of trees that fhould be cut down and fold; as, if they be cut down before they arrive at that value, or if they be allowed to remain until they will fell for a much higher price, the proprietor of the foil or land on which they grow will be a lofer. It is noticed too, as being the general opinion, that it is more profitable to fell and fell oak-wood at fifty or fixty years' growth, than to let it ftand for navy timber to eighty or a hundred, owing to the low price that is now paid for oak-trees of large dimenfions, either by the Navy Board or the Eaft India Company. On this account, it is advifed making a much greater increafe of price than ordinary on timber of this fort of large fcantling, as in place of four or five pounds the load, if eight or nine were given for trees containing each one hundred cubic feet and upwards, every perfon in the kingdom, it is thought, would have a reafonable motive for letting his timber ftand until it became of a fize fit for the ufe of the navy; whereas, according to the prefent eftablifhed price, it is every one's intereft to cut down and fell their trees before they arrive at a proper fize to be ufeful as navy timber. This fuggefts, too, the neceffity of attending to the royal forefts in a more particular manner; and may be an additional inducement to the trying the cultivation and growth of the larch in them, and training it for fhip-timber. See Timber, *Crooked Growth of*.

There are feveral different modes of difpofing of timber according to the nature of it, the fituation, and the cuftoms of the diftricts to which it belongs; but the principal of them are, firft, thofe of felling the trees ftanding; either by *auction*, by receiving *written* propofals, or by *bargain* and *fale:* fecond, cutting the trees down, and felling them in the rough; by any of the above modes: third, converting the fallen trees; that is, cutting them up into wares to which they are beft adapted, or which are moft faleable in the particular fituation. On a large timbered eftate, the firft mode is, is, in common, the moſt adviſeable to be had recourſe to; in which caſe, an accurate *valuation* of the marked trees is to be made, before they are offered for ſale: and, in the caſe of oak timber-wood, it is moſtly proper, and always ſatiſfactory, to have ſeparate valuations of the timber and the bark.

In ſelling timber in the county of Norfolk, the prevailing practice is, according to the writer of the rural economy of that diſtrict, to fell it ſtanding, at ſo much a ton when fallen; meaſuring the timber down to ſix inches timber girt; the *topwood* and the *bark* (of oak) becoming the property of the purchaſer; who is uſually at the expence of taking it down. And it is cuſtomary there, too, for the purchaſer to diſpoſe of the bark (of oak), and ſometimes the topwood, by the ſame admeaſurement.

In the midland diſtricts, after diſpoſing of and cutting out the timber, the arms or boughs of the trees are cut up into poſts, rails, and cord-wood for charcoal; the *ſpray* being moſtly made up into faggots.

The relative value of different ſorts of timber may be ſaid to depend almoſt wholly upon local circumſtances, as thoſe of contiguity and facility of being taken to the places where they are the moſt largely made uſe of, or where only employed. Some ſorts are, however, every where valuable on account of either their general application, or their ſcarcity, ſuch as the oak, the aſh, the elm, the beech, and the ſtill more valuable larch, and others of the firſt deſcription: and of the latter, the common cheſnut, the yew, the box, and the holly. The light products of different kinds, afforded by ſome timber-trees, are alſo of great uſe and value in moſt places.

Hunter, in his "Evelyn's Sylva," has juſtly remarked, that every perſon who can meaſure timber, thinks himſelf qualified to value ſtanding trees; but that ſuch men are often deceived in their eſtimates. That it is the perfect knowledge of the application of the different ſhaped trees that enables a man to be correct in ſuch valuations. That a foot of wood may be of little importance to one trade, but of great value to another. This is the grand ſecret, it is thought, which enriches the purchaſers of ſtanding timber.

On the whole, the great and conſtant demand for timber, on account of the increaſing ſcarcity of it, ſhould induce the proprietors of lands which are proper and ſuitable for it, to attend as much as poſſible to the raiſing and providing of this great object of rural economy, and national as well as individual wealth.

Timber, *Hardening of.* See Hardening *of Timber*, and *Seaſoning of* Timber.

Timber, *Seaſoning of*, a term uſed to expreſs the preparing of timber after it is felled, for cutting and working up for uſe.

As ſoon as felled, it ſhould be laid up in ſome dry airy place, but out of the reach of too much wind or ſun, which, when in exceſs, will ſubject it to crack and fly. It is not to be ſet upright, but laid along, one tree upon another, only with ſome ſhort blocks between, to give it the better airing, and prevent its becoming mouldy, which will rot the ſurface, and produce muſhrooms on it. Some perſons daub the trees all over with cow-dung, which occaſions their drying equally, and prevents their cracking, as they are otherwiſe very apt to do.

Some recommend the burying of timber in the earth, as the beſt of all ways of ſeaſoning it; and others have found it a fine preſervative to bury their timber under the wheat in their granaries; but this cannot be made a general practice.

In Norway, they ſeaſon their *deal* planks, by laying them in ſalt-water for three or four days, when new ſawed, and then drying them in the ſun; this is found a great advantage to them; but neither this, nor any thing elſe, can prevent their ſhrinking. And it has been recommended to lay boards, planks, &c. in ſome pool or running ſtream for a few days, to extract the ſap from them, and afterwards to dry them in the ſun or air; by this means, it is ſaid, they will be preſerved from chopping, caſting, or cleaving: but againſt ſhrinking there is no remedy. Mr. Evelyn particularly recommends this method for fir. See Hardening *of Timber.*

The ſeaſoning of timber by fire is the beſt way of all, for piles and other pieces that are to ſtand under the earth, or water. The Venetians firſt found out this method, and the way by which they do it is this: they put the piece to be ſeaſoned into a ſtrong and violent flame; in this they continually turn it round by means of an engine, and take it out when it is every way covered with a black coaly cruſt; by this means the internal part of the wood is ſo hardened, that neither earth nor water can damage it for a long time afterwards. This method is practiſed in many places for ſeaſoning the poſts for paling of parks, &c. and has this to recommend it, that in the very oldeſt ruins we have ever been acquainted with, there have been diſcovered many times pieces of charcoal, all of which have been found uninjured, though buried in the earth for ever ſo many ages. This method of charring timber is practiſed in many parts of England, and has been much recommended, both as to economy and effect.

For this purpoſe, all that is neceſſary is to light a fire upon the ground, which ſhall be ſurrounded with a wall built with looſe bricks or ſtones, and then, when the pieces of timber are laid acroſs the walls, to turn them round carefully ſo as to preſent every part to the action of the fire in ſucceſſion; and when the whole ſurface, to the depth of three quarters of an inch or an inch, is converted to charcoal, they will be ſufficiently prepared. While burning, they ſhould have a temporary covering of boughs or other fuel to preſerve them from the action of the atmoſphere, which would be apt to convert part of the wood into aſhes. See Parkes's Eſſays, vol. ii. See alſo Charring *of Poſts.*

An ingenious friend of the editor objects to this practice. The opinion that *paint* is a preſervative of wood is almoſt univerſal. Neverthleſs, we ſhall ſhew it to be not only erroneous, but that in moſt caſes the uſe of paint accelerates the deſtruction of every ſpecies of wood to which it is applied.

The decay of wood is occaſioned by *internal*, not external moiſture, and this only when it becomes ſtagnant. As long as there is a free circulation, no decay takes place. Stop the circulation, and if there be any moiſture whatever in the wood, ſtagnation commences, putreſcence enſues, and the deſtruction will proceed with an activity in proportion to the quantity and cloſe confinement of the internal moiſture. When wood is thoroughly painted on every ſide, it is evident that the moiſture within it is completely *ſealed* up, and which neceſſarily becoming ſtagnant, the decompoſition and decay of the timber immediately commence. Hence it is clear, that painting of wood, as above ſtated, in every caſe, except only when it is entirely free from moiſture, or as it is called *thoroughly ſeaſoned*, muſt be as effectual a method as any that can be deviſed for accelerating its decay.

Wood that is painted only on one ſide, will, *ceteris paribus*, laſt as long again as that which is painted on both ſides. And that which is not painted at all will be moſt durable. Experiment will prove this to be the fact, whether the wood is expoſed to the weather or not.

It

It is ſeldom that we meet with either a ſcaffold-pole or a ſcaffold-board (ſuch as are uſed by builders) that is rotten, although they are of fir, and are alternately wet and dry, and deſcend from father to ſon for ſeveral generations. The reaſon is, *they are never painted.*

Examine any old building, and it will be found that no part of the wood or timber is in a ſound ſtate, excepting that which has eſcaped the painter's bruſh. The wainſcot, doors, windows, &c. will be found to be rotten, when the floors and ſtairs, although alternately wet and dry from periodical waſhing, are perfectly ſound, *becauſe* they have never been painted.

It is a common practice in London to cover the baſement floors with painted oil-cloth; and it is aſtoniſhing to ſee how ſoon, in theſe caſes, the floors are rotten, and which is called the dry rot, but which is never once ſuſpected to be the ſtoppage of circulation by the uſe of the oil-cloth. Were carpets ſubſtituted for the painted cloths, no ſuch effect would take place.

The dry rot in buildings, and particularly in the *navy*, is comparatively a modern diſeaſe, and has very much increaſed ſince the pernicious practice of painting has become ſo general. The ancient city of Cheſter, where ſo much timber was introduced into the outſides of the buildings, and which is now black with age, but never painted, is a ſtriking illuſtration of this theory. The ſame may be remarked of the villages at a diſtance from the metropolis, where the outſide wood-work of the buildings, ſuch as doors, windows, window-ſhutters, weather-boarding, &c. which have never been painted, are nevertheleſs ſound, and yet ſome of them ſo ancient as to defy all enquiry as to their age. How different this from the gentlemen's houſes near London or other great towns, where the gates, poſts, rails, and palliſadoes are kept conſtantly *well painted*, but are ſeldom found to laſt longer than ten or a dozen years at moſt!

Paint indeed conceals from the eye the deſtruction which it occaſions; and our readers will doubtleſs by this time begin to ſuſpect their former opinions of it to be erroneous. We ſhall therefore only mention two other inſtances, which came under our own obſervation, to ſhew that wood never ought to be painted, except for the purpoſe of ornament.

A few years ago, ſome old houſes were pulled down near the Monument in London. Several of the principal timbers were ſo ſcorched and burnt on the outſide, that an enquiry took place as to the cauſe of it; and it was clearly aſcertained, that the timbers in queſtion muſt have been preſerved from the ruins of the great fire of London in 1666, ſo that this wood muſt now be much more than 150 years old; yet the writer of this article lately ſaw that ſame fir-timber ſawed out into deals, and again uſed as new ſtuff, being to all appearance as ſound as ever. The only perceptible difference was in the colour, which was darker than deals generally are.

The other inſtance referred to is the late old Jewry chapel in London. When that building was taken down, the pews, which were of oak, and the ſeats, which were deal (but never had been painted) were found to be in ſo perfect a ſtate of ſoundneſs, that they were removed to the new building in Jewin-ſtreet, and where there is no doubt they will remain as long as the building itſelf, although thoſe ſaid deal ſeats are known to be conſiderably more than one hundred years old.

The moſt effectual method of preſerving timber from decay is to char it; but when the purpoſe to which it is to be applied will not admit of that operation, the next beſt method is to waſh it over with charcoal and water, ſimilar to white-waſhing. Either of theſe methods will certainly preſerve it from the dry rot, charcoal being the greateſt antiputreſcent known, and no moiſture within the influence of its action will become putrid or decompoſed, and we have already ſhewn that this muſt take place before wood will periſh. It may be further obſerved, that vegetation cannot take place where charcoal or charring is uſed, and the dry rot is always accompanied with that ſpecies of vegetation called *fungi*, and this fungus never occurs till decompoſition or decay has begun.

When boarded floors are to be laid upon or very near the ground, it ſhould be ſtrewed over with dry aſhes, and the joiſts and underſide of the boards either charred or payed over with charcoal-waſh, as before directed. The ſame ſhould be done with the ſide of the wainſcot next the walls.

As painting is indiſpenſable from the faſhion of the times, to doors, window-ſhutters, wainſcot, &c. it would be well to have them painted once over in the carpenter's ſhop when the ſtuff is perfectly dry, and finiſhed afterward in the building for which they are prepared.

If the beſt ſeaſoned ſtuff be put up *unpainted* in a new building, the quantity of moiſture it will imbibe from the brick-work, plaſter, &c. before it can be painted, will defeat all former care of well ſeaſoning.

As to ſaſhes, mahogany is unqueſtionably the cheapeſt article they can be made of; for deal, when painted only a few times, will have coſt more than the difference of price of that very ſuperior wood, both as to look and durability. Air that is ſtagnant is equally pernicious as ſtagnant moiſture. When it is in that ſtate, it ſoon becomes decompoſed, and the hydrogen gas fixing upon wood, ropes, paper, and other vegetable ſubſtances, quickly brings on their deſtruction. Ventilation, and the uſe of charcoal, are the beſt preventives.

The above hints will be ſufficient to guide the intelligent workman in all other caſes.

Though it does not properly belong to this article, it may not be amiſs to mention, that theſe obſervations are quite inapplicable to the preſervation of iron. Iron decays from the effect of *external* moiſture, and the action of the atmoſphere upon its ſurface, which produces oxydation, and which is the ſole cauſe of its decay. This is only to be prevented *by painting.*

Timber, *Preſerving of.* When boards, &c. are dried, ſeaſoned, and fixed in their places, care is to be taken to defend and preſerve them; to which the ſmearing of them with linſeed-oil, tar, or the like oleaginous matter, contributes very much.

The ancients adviſe the ſmoke-drying of all inſtruments made of wood, by hanging them up in the chimnies where wood-fires are uſed. The whole benefit ariſing from this ſeems to be, that the oil of the burnt wood enters, as it aſcends in the ſmoke, into the pores of that which is propoſed to be preſerved.

The Dutch preſerve their gates, portcullices, drawbridges, ſluices, &c. by coating them over with a mixture of pitch and tar, on which they ſtrew ſmall pieces of cockle and other ſhells, beaten almoſt to powder, and mixed with ſea-ſand, which encruſts and arms them wonderfully againſt all aſſaults of wind and weather.

Timber felled before the ſap is perfectly at reſt, is very ſubject to the worms; to prevent or cure which, Mr. Evelyn gives us the following ſecret, as moſt approved: Put common ſulphur into a cucurbit, with as much aquafortis

as

as will cover it three fingers deep; diſtil it to a dryneſs, and let it have two or three rectifications.

Lay the ſulphur remaining at bottom on a marble, or in a glaſs, and, with the oil it diſſolves into, anoint the timber.

This, he adds, not only infallibly prevents or cures the worminess, but preſerves all kinds of woods, and even many other things, as ropes, nets, and maſts, from putrefaction, either in air, water, or ſnow.

For ſuch as would go a ſhorter way to work, two or three anointings with linſeed-oil may do very well.

As to the chaps, or clefts, green timber is liable to after working, and which is a very great defect in many fine buildings, they are cloſed by anointing, ſuppling, and ſoaking it with the fat of beef-broth, twice or thrice repeated. — Some carpenters uſe greaſe and ſaw-duſt mingled for the ſame purpoſe. But the former method is excellent. Mortimer's Huſbandry, vol. ii. p. 104.

Timber, *Strength of.* See Strength *of Materials*, and Beam.

Timber, *Crooked*, *Growth of*, the means of raiſing and providing bent or twiſted timber of different ſorts for the purpoſe of ſhip-building and many other uſes. It has been noticed by Mr. Loudon, that the form of the larch timber-tree is unſuitable for ſome of the purpoſes of naval architecture; and that to render it more proper and ſuitable for ſuch uſes, cutting or pruning it has been adviſed by ſome; and, what is ſtill leſs practicable, ſhading it, by others: but that when its mode of growth is well conſidered, it will be found that neither of theſe methods would prove effectual. The former could not ſucceed, it is ſuppoſed, becauſe in the larch and fir-tribe one ſtem conſtantly takes the lead; and that in this ſtem alone is contained the timber. The latter, or ſhade, might, it is thought, produce a crooked enough ſtem; but that in regard to ſtrength, or timber produce, it would evidently be ſo deficient, as to be totally unfit for naval architecture. In conſequence of which, he has recommended the plan of bending the young trees as preferable to every other practice; and as this mode may, at ſome future period, perhaps be deemed of public importance, he has given a few remarks concerning the method that ſhould be adopted and employed in the buſineſs.

It is ſaid that, in the firſt place, ſuppoſing a timber plantation or wood to be planted in regular rows, fifteen feet apart, and the ſame diſtance in the row; and grown from fifteen to twenty years; in bending or rendering the trees crooked, begin with the firſt row, and let every other tree be bent down in different degrees, and tied to the intermediate ones which remain erect, or be faſtened to the ground. After the trees have had the growth of ſeven or eight years longer in that ſituation or poſition, they may be bent backwards, ſo as to have ſomewhat the form of the letter S, the tops or leading ſhoots riſing directly upwards again from the upper bends, and the bent trees be either tied to themſelves between the bent parts, to keep them in their proper bent poſitions, or to the trees on the ſides, or to any of the trees which ſurround them, as may be found to be moſt convenient and neceſſary. When the ropes have held the trees in theſe ſituations or poſitions for a few more years, they will have received, and retained, in ſome meaſure, the above crooked appearance; which is a form that will afford knee and other pieces, which are of great uſe in ſhip-building, and which always, it is ſaid, bear a higher price than any other form of even oak-timber. Some trees need, however, it is thought, only be bent gently on one ſide, and others a little more ſo. This variation in the inclination of the trees, with thoſe which ſhould be left erect, would, it is ſuppoſed, ſerve to produce and afford proper ſhelter for the whole timber plantations to which they might belong, according to the uſes or purpoſes for which they are intended, or to the form which is moſt in demand. This plan is certainly thought worthy of a trial; and there is no great reaſon to doubt its ſucceſs; for the practice of bending trees is not new; as it was adviſed by Evelyn, and practiſed by the Romans in Virgil's time.

It is probable, too, that ſome other ſorts of timber-trees may be grown in this way with advantage.

It is ſuggeſted, that in planting the larch for this, or any other purpoſe, a careful attention ſhould be had to the choice of a proper ſoil, as when the tree is in one which is not too rich, it reaches a large ſize, and ſoon arrives at maturity; and that it is obvious, that if the above method were adopted, the timber would be fit for building the largeſt ſhips fifty years after it was planted, and for building ſmaller veſſels much ſooner. And that there is abundant evidence, that it would grow to a ſufficient ſize for this uſe in all the mountainous parts of the iſland; moreover, that the experiments which have been made by Mr. Knight, on the ſap and wood of trees, as well as common obſervation, prove, that the circumſtance of bending, eſpecially in an open expoſure, would produce a much thicker trunk and a larger quantity of timber, in a given time, than a ſtraight tree. Theſe circumſtances, in connection with the valuable qualities of this tree as ſhip-timber, and the growing ſcarcity of that article in this country, lead the writer to ſuggeſt the propriety of devoting ſome extent of the national foreſts to the cultivation and raiſing of the larch as timber, either bent in different ways, or even allowed to take its natural form; as the firſt coſt of planting and fencing in, even for five hundred acres, would not exceed 1000*l.*, and the yearly expences afterwards would be but a mere trifle. The culture of the oak, and perhaps ſome other timber-trees, ſhould not, however, be neglected in the ſmalleſt degree: but when it is conſidered that this tree takes two or three hundred years to come to perfection, and the larch not above half a century, reflecting at the ſame time on the approaching ſcarcity of oak-timber fit for the navy, theſe hints and remarks may not, it is thought, be unworthy of the attention of the legiſlature, or from other quarters. See Timber and Tree.

The excellent properties of larch-timber, for the uſe of the navy, have been noticed by many, as thoſe of reſiſting different dangerous effects. Anderſon, in his Catalogue of Trees, aſſerts, it is ſaid, that it does not fly in ſplinters by the impulſe of a ball in an engagement; that no force of heat makes it flame; but that when thrown into a ſtrong fire it conſumes imperceptibly. How many accidents then, it is aſked, might be prevented by a greater uſe of this timber, if applied in ſhips? Many lives are loſt by the ſplinters of oak in naval warfare: all theſe would be ſaved to the ſtate by having the planks of war-ſhips made of it. Decks of the ſame materials would reſiſt fire, either accidental or deſigned; for although burning materials in time will force their way through a plank of larch, yet it never would ſpread to the adjoining plank. To be in a ſhip on fire at ſea, is certainly, it is ſaid, the moſt dreadful ſituation in which any perſon can be placed; every exertion, therefore, to prevent ſuch calamity, is the duty of all well-wiſhers of their country. Beſide theſe advantages ariſing from the uſe of the larch as timber, there is another of no ſmall importance to a warlike and commercial nation, the ſaving of expence in ſhip-building; as by experience it is found that it laſts longer than oak under water, and worms will not touch it. Sailors are ſaid indeed to put larch chips among their clothes; which are found by experience to prevent vermin,

vermin, mould, &c. Confequently, in place of renewing fhips of war every twenty or thirty years, their exiftence may, it is thought, be lengthened to thrice that time.

Many other interefting circumftances and facts in fupport of thefe ftatements may alfo be met with in Newton's Vitruvius, which we have not room to admit in this place.

Timber, *Age of the Growth of*, the limit to the growth and increafe of wood in trees of this fort. It has been remarked by a late writer, that from the old alburnum of fuch trees being gradually converted into heart-wood, and being continually preffed upon by the expanfive force of the new fibres, it becomes harder, denfer, and at length lofes altogether its vafcular ftructure; and in a certain time obeying the common laws of dead matter, decays, decompofes, and is converted into aeriform and carbonic elements; into thofe principles from which it was originally formed. The decay of the heart-wood would confequently feem to conftitute the great limit to the age and fize of timber or trees of that kind. This is more liable to take place in fome cafes than in others. The age of growth in timber-trees is, however, moftly afcertained by the rings or layers of which they are formed.

In regard to the age of the growth of the oak, the writer of the rural economy of the midland counties has remarked, that there has been lately a fall of timber in the woods there, including fome large timber-trees. That he counted the rings of one which was found at the butt: the number, as nearly as he could afcertain it, was two hundred. But thofe of the laft forty or fifty years' growth were fo thin, he could not count them with certainty; though with fufficient accuracy upon which to ground the calculations given below. The girt of this tree, in the girting place, was nine feet, the diameter of which was fomething more than thirty-four inches. And the eftimated growth, in this part, was thirty inches diameter during the firft hundred and fifty years, and four inches (two inches thick) in the laft fifty years. The length of the ftem was twenty-two feet. The contents of the whole were one hundred and ten feet of timber. Thofe of the firft hundred and fifty years' growth, eighty-five feet; leaving twenty-five feet for the growth of the laft fifty years. It is therefore obferved, that although the increafe of diameter had been comparatively fmall during the laft fifty years, the increafe of timber had been nearly as great as in the firft ftages.

But fuppofing, it is faid, that this tree had been taken down at one hundred and fifty years old, it would, at 2*s.* a foot, have produced 8*l.* 10*s.*, the intereft of which would have amounted, in the courfe of fifty years, to more than 20*l.*; befide the ufe of the land during that time: whereas the tree, at that rate, is now worth only 11*l.* Thefe calculations and inferences are not, however, it is faid, intended to excite a fpirit of felling timber prematurely, or at too early an age, a fpirit which is already too prevalent; but to endeavour to decide on the moft *proper* age of growth for its being cut down; it being an incontrovertible fact, that, in point of utility, public and private, the fault of fuffering timber to ftand to too great an age, is infinitely greater than that of cutting it down before it has attained its full growth or age. In the latter cafe, it is faid, there is no wafte; the intereft of money, and the fucceeding fhoots, or the ufe of the land, ftand againft the lofs of growth of timber. But, in the former, the principal, intereft, after-fhoot, and the ufe of the land, are all thrown away: fo that the community, as well as the proprietors, are lofers by the management. In the one cafe, cutting part before it be fit, may fave other trees which are more fully grown; but, in the other, the whole is loft. Leaving, it is faid, the prefervation and management of fhip-timber to thofe to whom it properly belongs, it does not follow that, becaufe it is wrong to fuffer timber to ftand to wafte, it is right to take it down before it be of a proper age, or fufficiently grown, for the purpofe of fhip-building. It is not over-grown, but ftout-growing timber which is fit for that ufe. Timber is feldom cut down prematurely, or at too early an age, but by the neceffitous; or by thofe who have only a temporary poffeffion in their refpective eftates. And what argument, it is afked, can prevail with this clafs of proprietors? Another clafs, and it is trufted by much the largeft, is compofed of thofe who, confidering their timber merely as a profitable part of their feveral eftates, take it down whenever it becomes *full*-grown, and a *fair* opportunity offers. And a third clafs of this fort of proprietors confifts of thofe who, through falfe pride, falfe fear, or falfe economy, fuffer their timber to ftand until it be *over*-grown: and if the writer have any other motive for making known the above minutes on the ages of timber-trees, than that of recording facts, it is the defire of placing in its proper light, the improvident management of this clafs of timber proprietors; and, at the fame time, to endeavour to form juft ideas of a fubject, which has not, hitherto, been brought before the public; but which is pre-eminently entitled to public notice and difcuffion.

It is additionally ftated, that this matter having been rendered, in a confiderable degree, familiar to the writer by many years' obfervation and practice, he may here fet down what appears to him the *proper* ages of growth for cutting down the four following fpecies or forts of timber.

1. Poplar, from thirty to fifty years old.
2. Elm, from fifty to a hundred.
3. Afh, from fifty to a hundred.
4. Oak, from one to two hundred.

But it is faid that it very much depends on fituation, and on the foil and fubfoil in which timber-trees are rooted. On dry abforbent foils, the oak and the elm, at leaft, are obferved to go off much fooner than in cooler more retentive fituations. And in a wood, on a dry loam, with a rocky fubfoil, the oak was found going faft to decay at two hundred years old; while in another, in a cooler fituation, it was found, but unprofitable, at that age; and in a third, perhaps a ftill cooler fpot, it was found, profitable, and wearing every appearance of being in a fit ftate of growth for being taken down at the age of a hundred and fifty years. Thefe three woods were thofe of Merevale, Bagot-park, and Statfold, in the midland diftricts of this country.

A full knowledge of the age of growth in timber-trees is a matter of great utility and advantage to the proprietors of wooded lands.

Timber, *Marking of*, the putting of fuch marks upon timber-trees, or large falls of timber, as may be neceffary to diftinguifh them in felling, and which are of a proper age and growth for being taken down. It is ufually performed by means of an inftrument of the compaffes kind, by which a circle, with a number, or fome other particular fort of mark, is formed on the tree. It is of great ufe and advantage in felling and difpofing of timber, to have this bufinefs executed in a careful and judicious manner. See Timber.

Timber, *Meafuring of*. See Mensuration and Sliding-*Rule*.

For finding the area of a board or plank, the rule is fimple and eafy; which is that of multiplying the length by the mean breadth. If the board is tapering, the breadths at the two ends fhould be added together, and half the fum will be the mean breadth. The method by the fliding-rule is too obvious to need being mentioned.

Timber-*Carriage*, that ſort of wheel-carriage which is contrived and conſtructed for the purpoſe of conveying heavy and other timber. Carriages for this uſe are formed in a ſtrong firm manner, but in different methods, according to circumſtances, and the nature of the timber to be drawn. They are ſometimes made with four wheels, but much more frequently only with two. They have occaſionally ſhafts too, but are more often conſtructed with a pole merely.

Theſe carriages, the writer of the rural economy of Norfolk remarks, are in that diſtrict, as in moſt other places, of two kinds; the four-wheeled ſort of carriage, provincially "*a drag*;" and the pair of wheels, provincially "*a gill*." The laſt is moſt in uſe. The conſtruction of the gill of this county is, it is ſaid, ſimilar to that of the timber-wheels of moſt other counties; namely, a pair of tall wheels, with a crooked axle-tree, ſurmounted by a block; to which axle is fixed a pair of ſhafts, or ſometimes a ſingle pole only. But it is noticed, that the method of uſing them there, is different from that which has been obſerved in other places; where the only uſe they are put to is to raiſe the butt-end of a large timber to be drawn a ſhort diſtance; the top-end being ſuffered to drag behind upon the ground, to the great injury of the turf, or the road upon which it is drawn.

In the above county, however, a large ſtick of timber, or perhaps three or four ſmaller ones, are, it is obſerved, entirely ſlung to the axle; ſo that, in drawing, no part of them whatever touches the ground; the top-end or part being generally drawn foremoſt, and the end towards the horſes always the heavieſt.

It is ſtated, that the method of taking up a piece of timber is this: the horſes being taken off, the wheels are run, by hand, aſtride the timber to be ſlung, until the axle is judged to be a few inches behind the balance-point: or, which is better, a chain is firſt put round the timber, and the wheels run up to it. It is difficult to aſcertain the exact place of fixing the chain by the eye; but nevertheleſs, a perſon accuſtomed to ſling timber in this manner, will, it is ſaid, come very near the truth. The chain hooked, and the axle brought into its proper ſituation, the ſhafts, or pole, are thrown back in the uſual manner; the chain carried over the block, brought round the pole, its ends made faſt, and the ſhafts or pole brought down again by the horſes; by which means the timber is lifted from the ground, and ſuſpended to the axle. If the required point of balance be not hit upon at the firſt trial, the ſhafts are ſuffered to riſe again, the chain is unhooked, and ſhifted to its proper ſituation: the ſhafts being then again pulled down, are bound by an iron trace, or ſmall chain, cloſe down to the timber; while another ſmall chain or trace is faſtened round the foremoſt end to hook the horſes to; the team drawing by the timber, and not by the pole or ſhafts.

It is ſuppoſed, that the utility of having a ſuper-balance of weight forward is two-fold: if the piece were ſlung in exact equilibrium, it would, upon the road, be in perpetual vibration; thereby rendering the pull unſteady, and extremely inconvenient to the horſes: whereas, by throwing the balance forward, the traces are commonly kept down conſtantly in their proper place, and the pull becomes uniform: if, however, too much weight were to be thrown forward, the draught of the horſes would not raiſe the point of the timber from the ground; the friction would, of courſe, increaſe the draught, and the road be at the ſame time hurt. It therefore follows, it is ſaid, that the proper weight to be thrown forward is ſuch as is enough to prevent a vibration, but not ſo much as to prevent the point from being raiſed from the road by the draught of the horſes upon level ground. And that the other advantage, by a ſuper-balance forward, is gained in going down a hill; in which caſe, the draught not being wanted, the point, of courſe, falls to the ground, and ſerves as a pall to regulate the motion of the carriage: if the ſuper-balance alone be not ſufficient to check the too great rapidity of the motion, the driver adds, it is ſaid, his own weight. Likewiſe, if, in aſcending a hill, the balance be loſt; he, in like manner, ſeats himſelf upon the fore-part of the load, thereby keeping it down to its proper level.

It is added, that this method of conveying timber may, it is poſſible, be in uſe in other diſtricts; but the writer has not ſeen it practiſed any where except in the above county: and that it is known to be an excellent, but not a common mode of practice.

It is of great utility and convenience for timber proprietors and dealers to be always provided with good carriages of this ſort.

Timber *Hedge-Row*, ſuch trees of this kind as are raiſed and grown in the lines and rows of the hedges. It has been long a diſputed point among the writers on agriculture, and which is not yet fully decided, whether it be admiſſible or not to have trees of this ſort in the directions of the hedge-rows: ſome ſtrongly contending for its utility, on the grounds of the ſhelter, ſhade, and timber afforded by the practice; while others as ſtrongly oppoſe it, on the ſcore of the injury which it does to the crops and the hedges underneath the trees, as well as the obſtruction which it affords in working the land, when in the tillage ſtate. However, in many ſituations and caſes, there can be no doubt of the advantage of having timber-trees of the hedge-row kind, when under proper and ſuitable management.

It has been well obſerved by an able writer on the means of improving the rural objects and practices of the country, that although a few trees growing in a hedge, when conſidered ſingly, may have little effect, and be of no great value or conſequence; yet that a number of hedge-rows, all properly interſperſed with timber-trees, will completely change the appearance of a hilly country or diſtrict, improve its climate, and yield a conſiderable quantity of timber to the owners of the lands. The conſideration of the matter muſt, of courſe, it is thought, be of great importance to the landed intereſt of ſome parts of the iſland, eſpecially thoſe in the more northern or mountainous diſtricts of the kingdom. What is neceſſary to be ſaid on this ſubject here, may conſequently be introduced under the heads of the *nature* of the *lands* where timber of the hedge-row kind may be raiſed and grown without *injury* to the farmer; and the *ſpecies* or ſort of trees which is moſt proper to be raiſed in ſuch caſes. In regard to the *intereſt* of the farmer, the lands which are the moſt evidently and ſuitably adapted for the growth of hedge-row timber-trees are all thoſe which are naked and much expoſed, and which are kept for the moſt part under paſturage; and in ſo far as the beauty of a country or diſtrict, the improvement of its climate, and the health of its inhabitants, are concerned, the hedge-rows of the riſing-grounds alone ſhould be occupied by trees, except a few in the vallies, by the ſides of public roads or rivers, to form fore-grounds to the reſt of the country or diſtrict; and a few near houſes or villages to group with them, and afford a richneſs to their appearance. In low rich vallies between mountains, which are kept in perpetual aration, the hedge-rows ſhould not be taken up by timber-trees of this ſort. But a country or diſtrict wholly level, as many of the counties and diſtricts in the ſouthern parts of the kingdom are, may ſometimes have the hedge-rows partially ſet with trees, without doing any great injury to the farmer;

farmer; while, if properly managed, it may vary the country, and improve its climate. In ſuch levels, the hedges ſhould, however, be kept very low, and the trees be trained erect with ſingle ſtems, and few lateral arms or boughs near the ſurface; or, as is done in ſome places, the width of an ordinary ridge may be left on each ſide of the hedge, to be kept in perpetual paſture, which prevents the corn from being ſo much injured by the trees, and is a great ornament to a farm. This laſt mode is, however, not without its diſadvantages, as it is liable to diſſeminate and fill the adjoining tillage-lands with the ſeeds of noxious and hurtful weeds. However, in caſes where the whole farm is to be kept in perpetual paſture, the trees may often be allowed to extend their branches, and the hedges may be kept high or low, at pleaſure. Moiſt or clayey ſoils ſhould never, when under perpetual aration, be ſet with hedge-row trees; and indeed, before they are put into ſuch rows any where, or in any caſe, a full conſideration and eſtimate ſhould, it is ſaid, be made of their effect on the annual rent of the land, on their intrinſic value, on the climate, and on the appearance of the country.

The writer of the Yorkſhire rural economy conſiders this an intereſting ſubject to the proprietors of incloſed eſtates. The old incloſed parts of that neighbourhood, when ſeen at ſome diſtance, have, it is ſaid, the appearance of woodlands; the incloſures being moſtly narrow, and full of hedge-row timber. The age, on a par, is about 50 years. In half a century more, the value of the timber of ſome parts of it, if ſuffered to ſtand, will probably be equal to the value of the land; a circumſtance, it is ſuppoſed, of no ſmall import to the owner. But the detriment to the occupier requires to be conſidered. In this county, it ſeems, it is ſaid, to be a general idea, founded perhaps on experience, that lofty hedge-rows are beneficial to graſs-land; increaſing its productiveneſs by their warmth, and giving ſhelter and ſhade to paſturing-ſtock. The roots even of the aſh are conſidered as inoffenſive to land in the ſtate of graſs; in which ſtate the grounds, thus loaded with hedges and timber-trees, are almoſt univerſally kept. Indeed it would be impoſſible, in their preſent ſtate, to occupy them as arable land. They are entire incloſures, every foot of the areas of which muſt neceſſarily be occupied by aſhen roots; nevertheleſs they give an ample ſupply of hay and paſturage; one to two tons of hay an acre: and, in many of them, three acres will afford ſufficient paſturage for two cows of the largeſt ſize. The rent from thirty to forty ſhillings an acre. Strong evidence this, it is ſaid, that the roots of the aſh are not very hurtful to graſs-land.

It is evident, however, it is thought, that the oak, when ſuffered to thruſt its low ſpreading head into the incloſure, is injurious to the herbage beneath it; that the leaves of the aſh are very detrimental to after-graſs; and that the hedges are annually receiving irreparable damage: no general plan of training up the trees with tall ſtems having, it is believed, in any inſtance, been adopted, ſo as to prevent, in any complete manner, ſuch effects.

On theſe accounts it is concluded, that the advantages accruing from the planting of timber-trees in the hedge-rows of incloſed common fields, of a ſoil and lying in a ſituation adapted to graſs, are far ſuperior to any diſadvantages ariſing therefrom, even where they have been ſuffered to grow in a ſtate of almoſt total neglect. And that land which has lain open, and which has been kept in a ſtate of aration during a ſucceſſion of ages, is equally productive of graſs and trees. That it is generally good management to let it lie in graſs for ſome length of time, after incloſure. Beſides, that in the above neighbourhood, it is evident to common obſervation, that trees flouriſh with unuſual vigour in newly-incloſed lands of arable fields; and that their injury to graſs-land is inconſiderable, when compared with the value of the timber which they produce. The low ſpreading heads of the oak, and the leaves of the aſh, appear to be the chief inconveniencies of theſe two ſorts of trees to graſs-land.

But as an alternacy of corn and graſs is, it is thought, generally eligible on lands which our anceſtors have made choice of for common fields; and as the roots of the aſh are not only obſtructions to the plough, but the general nature of the plants is, in a ſingular degree, inimical to corn; it is conſequently neceſſary to eradicate the aſh from the hedge-rows, before the land be again broken up for arable; or to preclude this tedious operation, in the firſt inſtance, by planting oak in its ſtead. It is conceived that the head of the oak may be raiſed to ſuch a height, as not to be injurious to graſs, nor to the hedge, while yet in a youthful ſtate, even though it were ſuffered to run up to its natural height.

The roots of the fir tribe of trees afford equal obſtruction to the plough; they are, of courſe, equally objectionable in the hedge-rows of arable fields.

It is ſuggeſted, in concluſion, that whenever the incloſures are broken up for corn, the hedges ſhould, in common good management, be headed down, and kept in a dwarfiſh ſtate; in which caſe, tall ſtemmed oaks would be a valuable ſource of timber, without being, in almoſt any degree, injurious either to the hedges, or to the corn growing under them. But the training of young oaks, and the general management of hedge-row timber, cannot, with any degree of prudence, be left to a mere occupier. When intended as nurſeries of timber, they ſhould, it is conceived, be under the immediate direction and management of a perſon proper for the purpoſe. See Pollard and Fence.

The writer of the Glouceſter Report on Agriculture, however, remarks, that the practice of planting timber-trees at all in hedges is liable to objections; for if the tree be left to take its natural growth, which is the beſt mode of raiſing it for good timber, the lower fence is ruined by its ſhade and drippings; or if they are cut up and ſhreded into naked poles, or pollarded for the ſake of the lop or fire-wood, the timber is injured, and the beauty of the tree deſtroyed. A better plan is, it is thought, to aſſign certain ſpots on eſtates for the purpoſe of raiſing timber-trees only. This would eventually be no waſte of land, becauſe the graſs or corn growing near the hedges, which are filled with timber or fruit-trees, is worth little or nothing. In the ſmall incloſures at the angles of a field, for inſtance, the trees might take their natural growth; and this would be more rapid, in conſequence of their being planted in clumps, and protected. If, however, the old mode of planting in hedge-rows ſhould be continued, the aſh may be the beſt for the purpoſe. The timber, in ſome reſpects, is ſuperior to elm, and, in various caſes, uſeful where that cannot be applied. In durability it almoſt rivals the oak, and its growth is improved by being kept to a ſingle ſtem, the only mode of treatment in which trees ſhould be admitted into hedge-rows at all, but which few other trees will bear. The oak and beech particularly, when ſo large as to become heart-wood, appear to be greatly hurt by the loſs of their ſide branches; the immediate effect of which is a retardation of growth: and it is ſaid, that the oak will not thrive for ten years after this operation; and of the elm, that it is injured, though apparently ſuffering leſs. It is, however, to be noticed, that the fineſt and ſoundeſt trees are thoſe which have been moſt left to their natural growth.

In

In what relates to the moſt proper ſorts of trees for putting in hedge-rows, in different caſes, it may be further noticed, that when the ſoil is good and deep, according to the firſt of the above writers, the oak and Scotch elm may be the moſt ſuitable; in ſtrong land, the aſh; in poor ſoils, the beech, ſycamore, and birch; in caſes of moiſt ſoils, as meadows and ſuch like places, the Lombardy poplar, which, beſides its timber produce, forms, when in rows, a cloſe, erect, narrow hedge, fifty or ſixty feet high, in a few years. Such hedges are, however, of no very great value, whether the trees be cut low, or allowed to riſe to their full height. The oak and the above ſort of elm proſper better, it is ſaid, in hedge-rows than in any other ſituations; their roots have a free range in the adjoining incloſures, while their tops ſhoot out vigorouſly on every ſide, thus often producing excellent ſhip-timber. More remarks of this nature may be met with in Kent's hints, and Marſhal's work on planting. The beech, it is thought, is peculiarly ſuited for thin ſoils and expoſed ſituations. When put out about ten or twelve feet aſunder, it affords excellent ſhelter, and, at the ſame time, a very conſiderable quantity of timber. The aſh and the ſycamore will riſe and grow erect on the moſt expoſed upland ſituations, or near the ſea. When put out in good ſoils, they ſhould generally be trained to one ſtem; in which ſtate, their timber produce is the moſt valuable and uſeful. The reſinous tribe and the evergreen ſorts of trees are, for the moſt part, improper for being ſet out in hedge-rows. In the different cyder diſtricts or counties in the ſouthern parts of the kingdom, fruit-trees are not unfrequently introduced into the hedge-rows; the practice of which might probably be advantageouſly had recourſe to in many other diſtricts and counties in the ſame part of the country, as well as in ſeveral more to the north. In many different ſituations they would be a valuable acquiſition, without doing any injury, or taking up the more uſeful part of the land.

In a great number of diſtricts and places where hedge-row timber exiſts, the ſituation is often improper, and the management wretchedly bad and negligent; in conſequence of which, it has frequently become an injury to the farmer, without yielding any advantage to the proprietor. Two more glaring inſtances of this cannot, it is thought, be given than in the tall naked elms, and pollarded oaks, which prevail in many places in the ſouthern parts of the iſland: the former, by improper lopping and cutting, are worth nothing; and the latter, by being cut over at the height of eight or ten feet, form ugly buſhy-headed trees, which do great injury and miſchief to the farmer, and yield nothing to the owner. In defence of ſuch practices, it has been ſaid, that fuel alone is the intended produce; but certainly it would be much the beſt method, in ſuch caſes, it is thought, to allot a ſpace or portion by itſelf for the purpoſe of raiſing fuel, and devote the hedge-rows to the more important uſes of producing timber. The fuel part of the land might be rented by the farmer, and the hedge-rows belong excluſively to the proprietor. Keeping each ſort of woody collection ſtrictly characteriſtic of its kind is, it is thought, as beneficial in the raiſing of trees, as the diviſion of labour is in political economy. There is a great number of ſituations and places in the more northern parts of the iſland, as well perhaps as in ſome others, where hedge-row timber might be cultivated to the advantage of both the landlord and tenant, and the great ornament of the country. Suppoſe, it is ſaid, an eſtate of two thouſand acres, divided into fields of ten acres each, and the hedge-rows planted with trees at fifteen feet apart; this would be above the rate of eight trees upon the acre, or ſixteen thouſand trees in the hedges only. At the end of thirty years, if well managed, they would be worth from twenty to forty ſhillings each; but ſay only thirty ſhillings each, this would be ſixteen thouſand pounds: a very conſiderable ſum, it is ſaid, for a proprietor of only two thouſand acres to receive every thirty years, above the annual rent of his eſtate.

Theſe hints and obſervations place the utility and importance of hedge-row planting, where it can be done with propriety, in a ſtriking point of view.

Timber-*Inſpector*, a term applied to a perſon who is appointed to inſpect and examine the ſtates of timber-woods, plantations, and foreſts in any diſtrict or place. It has been ſuggeſted by the writer of the corrected account of the ſtate of agriculture in the county of Devon, that, as it is evident that the timber in that county is waſting in a very alarming manner, (and the ſame is the caſe in many other timber-wooded diſtricts,) it is neceſſary that an ordinance ſhould be made, that in future no timber-tree ſhould be cut down, or legally expoſed for ſale, without having the mark of the timber-inſpector of the diſtrict affixed to it, and a certificate accompanying it. This ſort of officer ſhould, it is thought, be appointed and paid by government, and to whom annual returns ſhould be made of all matters and circumſtances appertaining to his duty, which ſhould alſo extend to the inſpection and examination of all young timber-plantations, &c.: where it ſhould be required that he ſhould not only ſee that a certain number of young trees is planted for every timber-tree that is cut down, but that the ſame young trees and plantations are well fenced in and protected. That on his obſerving ſuch timber woodland fences inſufficient for their ſafety, and their owners perſiſtingly unmindful of the report he has made, he ſhould be empowered to order and direct the neceſſary repairs to be done, and to be enabled to recover the amount of ſuch expence, by levying an immediate diſtreſs upon the moveables on the premiſes of the parties.

It would unqueſtionably be of great utility and advantage in increaſing the quantity, and improving the quality of timber, to have ſuch inſpectors in all timber-wooded diſtricts of every deſcription.

Timber-*Plantation*, that ſort which is made ſimply for the purpoſe of raiſing and producing timber. Several points and circumſtances are neceſſary to be attended to in the performance of this buſineſs, in order to render ſuch plantations the moſt expeditiouſly and abundantly productive, ſuch as the proper choice of ſoil, ſituation, and expoſure, as well as proper fencing in, thinning, training, and pruning, all of which are noticed and explained under their appropriate heads. See Plantation, Planting, Pruning, Thinning, Timber, &c.

Timber-*Repairs*, ſuch as are done by ſome ſort of timber, to be cut down on eſtates, &c. Rough timber is moſtly allowed for repairs to be done by tenants, and it is commonly the cuſtom of this country to permit the top-wood of the trees to be taken by them for their trouble and expences in various ways with ſuch timber. In ſome caſes, however, the contrary mode takes place, ſuch top-wood being charged to them at a moderate rate or price. And, in all caſes, it is thought by the writer of the work on "Landed Property," that the tenant ſhould be charged for the bark of oak-timber, which is now become ſcarce and of great value, he being allowed for peeling and for carriage to market, or other places.

It is adviſed that the neat value of the bark and the top-wood, where it is charged in theſe caſes of repairs, ſhould be made a fair eſtimate of when the timber is marked, and charged to tenants in a ſum certain. By this means they become,

come, it is thought, interested in the peeling and harvesting or securing of the bark: no waste is consequently incurred through their neglect, or any unfair dealings risked; nor is there any disputable account to be settled, on the rent-day, between them and the receivers.

In the view too of enabling the acting managers, in such cases, to *select*, in the best and readiest manner, *proper* trees for the several different sorts of repairs that may, from time to time, be required, — let, it is said, the woodmen, or those who have the immediate charge of the timber of estates, be directed to note down, in going their rounds, such trees as may be faulty, and are likely to go soon to decay, or which are stinted in their growth, or too much crowded, and, in general, such as are proper to be taken down for the different uses of estates: whether for erecting or repairing buildings, or for gates or other purposes: in order that they may be able to lead or direct, without loss of time, the acting managers and the carpenters or builders of estates, with the estimates, in their hands, of the quantity and quality of the timber which is requisite to the trees most proper for any given purpose: thus preserving the *crop* of *sale* timber from unnecessary spoil, by a less discriminate choice or method of proceeding.

Timber, *Stick of*, a term frequently applied to any large boled or stemmed tree of the timber kind: a fine, large, perfect timber-tree. See Timber and Tree.

Timber-*Trees*, the wood of timber, before it be felled, particularly that of oak, &c. See Trees.

For the raising, planting, transplanting, pruning, &c. of timber-trees, see Seminary, Nursery, Pruning, and Transplanting.

Timber-*Wood*, a term signifying that sort of wood which is employed or designed for the raising and growth of timber, in contradistinction to that of the under-wood or coppice kinds, or such as has little or no brush-wood or under-growths in it. There are but few cases in which it is not advantageous for timber-woods to be kept pretty clear and free from most sorts of under-growths, especially where they approach near the trees. See Wood.

Timber-*Wood* or *Tree*, *Register of*, the account which is necessary to be kept of the timber-wood or trees of that kind, which are growing upon the different parts of a timbered estate. The writer of a late work on "Landed Property," has advised that it should consist of all that is met with on the several divisions of an estate; setting forth the number of such trees in each of the different woods, groves, hedge-rows, and all other places, with the several species or kinds, the number which is affixed to each, and the admeasurement of each of them. Separate accounts, containing those trees of each particular division, being entered and kept; for the satisfaction and occasional use of the land-manager and the woodward. Such lists or registers are always of great utility and benefit to the proprietors of timber-wooded estates, as ascertaining their nature, state, and situation in many different respects.

Timber-*Lode*, in our *Old Writers*, a service by which tenants were to carry timber from the woods to the lord's house.

Timber, *Bearing of*. See Bearing.

Timber-*Work*, *Casing of*. See Casing.

Timber or *Timmer of Furs*, as ermines, martens, sables, and the like, denotes forty skins; of other skins, six score. Rust.

"Hæc civitas (sc. Cestriæ) nunc reddebat de firma 45 libras et tres timbrias pellium martenarum." LL. Edw. Conf.

Timbers *of Ermin*, in *Heraldry*, denote the ranks or rows of ermin in noblemen's coats.

Timber, in *Falconry*. *To timber*, is to nestle, or make a nest, as birds of prey do.

Timber, *Prick*, in *Botany*. See Spindle-*Tree*.

Timbers, in *Ship-Building*, the ribs of a ship, or the incurvated pieces of wood branching outward from the keel in a vertical direction, so as to give strength, figure, and solidity to the whole fabric.

One timber in a ship is composed of several pieces united into one frame, which accordingly is called by the artificers a frame of timbers. The timbers whose planes are perpendicular to the keel, are called *square-timbers*; and those which are placed obliquely on the keel, as at the extremities of a ship, are called *cant-timbers*. The foremost of those pieces on the ship's bow are called the *knuckle-timbers*; and the hindermost on the quarter, the *fashion-pieces*. See Ship-building.

Timber *and Room*, or *Room and Space*, is the distance betwixt the moulding edges of two adjoining timbers, which must always contain the breadth of two timbers; and sometimes two or three inches between them.

TIMBO, in *Geography*, a town of Africa, on the Grain Coast. N. lat. 5° 28′. W. long. 9° 20′.

TIMBRE, or Timmer, in *Heraldry*, denotes the crest of an armory, or whatever is placed atop of the escutcheon, to distinguish the degree of nobility, either ecclesiastical or secular.

Such as the papal tiara, cardinal's hat, the cross, mitre, coronet, mortier, and particularly the casques or helmets, which the ancients called more especially timbres, from their resembling a kind of bell without a clapper, which the French call timbre, or because they resounded like those timbres when struck. This is the opinion of Loiseau, who derives the word from the Latin, *tintinnabulum*.

TIMBREL, *Tabret*, or *Tambour de Basque*, in *Music*, is an instrument of very high antiquity; having been in use among the Hebrews, Greeks, and Romans. To the rim were hung bells or pieces of metal.

TIME is a portion or part of infinite duration. It is generally measured by motion, and chiefly by the motions of the heavenly bodies.

There is nothing perhaps of which the mind is less capable of forming a distinct idea than time, unconnected with the motions of sensible objects; and yet, on account of this connection, every one thinks it a subject with which he is familiarly acquainted, until an explanation is required.

The opinions of ancient philosophers on the subject are generally vague and contradictory. Pythagoras and Heraclitus maintained that time was a substance, but the Stoics considered it as unsubstantiated. Aristotle and the Peripaticians define time to be "a multitude of parts of motion, which pass and succeed each other in a continual flux, and have relations to each other, inasmuch as some are anterior and others posterior." Archytas defined it to be "a continued and indivisible flux of *nows* or instants."

The Epicureans considered "time as merely an object of the imagination, or an attribute given to things by the mind while contemplating them either as enduring or ceasing; as possessing a longer or shorter existence, as enjoying such existence, as having enjoyed it, or as being about to enjoy it."

Lucretius, the great poet and philosopher of this sect, defines time as follows:

"Tempus item per se non est, sed rebus ab ipsis
Consequitur sensus, transactum quid sit in ævo;
Tum, quæ res instet, quid porro deinde sequatur:
Nec per se quemquam tempus sentire fatendum est
Semotum ab rerum motu, placidâque quiete."

Lib. i. 460.

Thus

Thus tranflated by Creech:

"Time of itfelf is nothing, but from thought
Receives its rife, by labouring fancy wrought
From things confidered, whilft we think on fome
As prefent, fome as paft, or yet to come.
No thought can think on time, that's ftill confeft,
But thinks on things in motion or at reft."

The above opinion of Lucretius, though fanctioned by many of the ancients, and even by fome of the moderns, does not appear to have fatisfied philofophers in general. Cicero fays (1 de Invent.) "difficile eft tempus definere." Thus alfo St. Auftin (2 Confeff. 24.) obferves, "fi nemo ex me quærat quid fit tempus, fcio; fe quærenti explicare velim, nefcio."

Locke feems to have confidered time more profoundly than perhaps any other philofopher. The following are among his opinions on the fubject. Human Underft. vol. i. ch. 14.

"The anfwer of a great man to one who afked him what time was, 'fi non rogas intelligo,' (which amounts to this; the more I fet myfelf to think of it, the lefs I underftand it,) might perhaps perfuade one that time, which reveals all things, is not itfelf to be difcovered. Duration, time, and eternity, are, not without reafon, thought to have fomething very abftrufe in their nature.

"To underftand time and eternity aright, we ought with attention to confider what *idea* it is we have of *duration*, and how we came by it. 'Tis evident to one who will but obferve what paffes in his own mind, that there is a train of ideas which conftantly fucceed one another in his underftanding as long as he is awake. Reflection on thefe appearances of feveral ideas, one after another in our minds, is that which furnifhes us with the idea of *fucceffion;* and the diftance between the appearance of any two ideas in our minds, is that which we call *duration* (which fee). Having thus got the idea of duration, the next thing natural for the mind to do, is to get fome *meafure* of this common duration, whereby it might judge of its different lengths, and confider the diftinct order wherein feveral things exift: without which, a great part of our knowledge would be confufed, and a great part of hiftory rendered very ufelefs. This confideration of duration, as fet out by certain periods, and marked by certain meafures or epochs, is that, I think, which moft properly we call *time*."

Nearly according to the above our modern Encyclopædifts define time; *viz.* "a fucceffion of phenomena in the univerfe, or a mode of duration marked by certain periods and meafures, and principally by the motions or apparent revolutions of the fun." Others define time to be "the duration of a thing, the exiftence of which is not without beginning or end; which diftinguifhes time from eternity."

Time is diftinguifhed into *abfolute* and *relative*.

Abfolute time is confidered in itfelf, without any relation to bodies or their motions flowing uniformly. *Relative time* is the fenfible meafure of any portion of duration by means of motion. As the equal and uniform flux of time does not affect our fenfes; and as there is nothing in this flux that can make us know immediately time itfelf; we muft, of neceffity, have recourfe to fome motion, by which we can determine the quantity of time, by comparing parts of time with thofe of fpace that the moving body traverfes. Therefore, as we judge that times are equal, when they flow whilft a body which is in an uniform motion traverfes equal fpaces; fo likewife we judge that times are equal, when they flow whilft the fun, moon, and the other celeftial luminaries, complete their ordinary revolutions, which to our fenfes appear uniform. See Motion.

But as the flowing of time cannot be accelerated nor retarded; as all bodies move fometimes quicker and fometimes flower; and as there is perhaps no perfectly uniform motion in nature, except the earth's rotation on its axis, fome authors are of opinion that abfolute time cannot be concluded to be fomething really diftinct from motion: for fuppofing for a moment the earth and the other planets have been without motion ever fince the creation, does it thence follow that the courfe of time would have been ftopped or interrupted? Would not the duration of this ftate of reft have been equal to the time which has elapfed fince the creation?

As abfolute time is a quantity which flows in a uniform manner, and which is very fimple in its nature, mathematicians reprefent it to the imagination by the moft fimple fenfible magnitudes, particularly by right lines and by circles, with which abfolute time appears to have a great analogy in refpect of fucceffion, the fimilarity of parts, &c.

In fact, it is not abfolutely neceffary to meafure time by motion; for the conftant and periodical return of a thing which happens or manifefts itfelf by intervals equally diftant from each other, as, for inftance, the budding of a plant, &c. may do the fame thing. It is faid there are people in America who reckon years by the arrival and departure of birds.

Time is ufually reprefented by the uniform motion of a point that defcribes a right line. The point is the fucceffive ftate, prefent fucceffively at different places, and producing by its fluxion a continual fucceffion, to which we attach the idea of time. The uniform motion of an object alfo meafures time; for when this motion takes place, the moving body traverfes, for example, one foot in the fame time in which it has traverfed a firft foot; therefore, the duration of things that co-exift with the moving body whilft it traverfes one foot being taken as one, the duration of thofe that will co-exift with its motion whilft it will be traverfing two feet will be two, and fo on; fo that by this means time becomes commenfurable, fince we can affign the reafon of one duration to another duration that we had taken for unity. Thus, in clocks, the hand moves uniformly in a circle: the twelfth part of the circumference of this circle is unity, and time is meafured by this unity, by faying two hours, three hours, &c. So likewife one year is taken for one, becaufe the revolutions of the fun in the ecliptic are equal, or nearly fo, to our fenfes; and we make ufe of it to meafure other durations in relation with this unity. We know the attempts made by aftronomers to find a uniform motion, to enable them to meafure time exactly; and this is what has been beft done by means of pendulums. See Pendulum.

There is no meafure of time exactly correct. Every one has his own meafure of time in the quicknefs or flownefs with which his ideas fucceed each other; and from thefe different degrees of quicknefs in different perfons, or in the fame perfon at different times, arife thefe modes of fpeaking, *I have found the time very long*, or *very fhort;* for time appears long to us, when the ideas fucceed each other flowly in our mind, and *vice verfâ*. The meafures of time are arbitrary, and may vary among different people: the only one that is univerfal is the prefent inftant; and yet fome deny the exiftence of prefent time, as being conftantly on the wing; or, according to Horace, (Carmen XI.)

"Dum loquimur fugerit invida ætas."

Time is indeed an inexhauftible fubject for figurative and poetical allufions, and even for paradoxes. Thus, it is faid

to

to owe its own immaterial being to the creation of material order; to have all its portions meafured by the periodical motions of matter, and yet to be diftinct from, and independent of, thofe motions for its exiftence, though it could not exift until they exifted: alfo that it operates upon every thing, yet touches nothing. Many other contradictory properties might be mentioned, but fuch tend to darken rather than to elucidate the fubject. Some philofophers have gone even fo far as to deny the exiftence of time; for if there be no prefent, there cannot be any future, and the paft certainly has no exiftence.

We now come to confider the application of mathematics to time, as connected with aftronomical computations, where the fubject is accurately calculated, and rendered fubfervient to the important purpofes of meafuring fpace, by which the longitude is determined both in the heavens and on earth.

Aftronomical time is diftinguifhed into folar or apparent time, mean time, and fidereal time.

Apparent time, alfo called *true folar* and *aftronomical time*, is regulated by the apparent motions of the fun. *Mean* or *mean folar time*, alfo called *equated time*, is a mean or average of apparent time: and *fidereal time* is fhewn by the diurnal revolutions of the fixed ftars.

An *apparent day* is the interval between two fucceffive tranfits of the fun's centre over the fame meridian, which interval is fubject to continual variations, owing to the eccentricity of the earth's orbit, and the obliquity of the ecliptic to the equator. Thefe variations are computed in a table, for which fee EQUATION *of Time*.

A *mean day* is the interval that would be obferved between two fucceffive tranfits of the fun's centre over the fame meridian, if the earth's orbit were circular, and the fun always in the equinoctial. Thus the intervals or tranfits would be all equal, fuch as are fhewn by a clock that goes exactly 24 hours in a day, and $365^{d}\ 5^{h}\ 48^{m}\ 48^{s}$ in a year. A clock thus fet is faid to be adjufted to mean time.

A *fidereal day* is the interval between two fucceffive tranfits of a ftar over the fame meridian; which interval is uniform, becaufe all the fixed ftars make their revolutions in equal times, owing to the uniformity of the earth's diurnal rotation on its axis.

The fidereal day is fhorter than the mean folar day by $3^{m}\ 56^{s}.55$ fidereal time. This difference arifes from the fun's apparent annual motion from weft to eaft, which leaves the ftar as it were behind. Thus, if the fun and a ftar be obferved on any day to pafs the meridian at the fame inftant, the next day, when the ftar returns to the meridian, the fun will have advanced about a degree eafterly (his daily portion of the ecliptic): and, as the earth's diurnal rotation on its axis is from weft to eaft, the ftar will come to the meridian before the fun, infomuch that at the end of the year it will have gained a day on the fun, that is, it will have paffed the meridian 366 times, while the fun will have paffed it but 365 times. Now as the fun appears to perform his revolution of 360° in a year, fay, as $365^{d}\ 5^{h}\ 48^{m}\ 48^{s} : 360° :: 1^{d} : 59'\ 8''.3$, which is the fpace the fun would defcribe in a day, if all the days were of an equal length; and this fpace reduced to time, $= 3'\ 56''.55 =$ the excefs of a *mean* day above a *fidereal* day, in fidereal time, or $3'\ 55''.91$ in mean folar time.

It therefore appears that the earth defcribes about its axis an arc of $360°\ 59'\ 8''.3$ in a *mean folar* day, and an arc of 360° in a *fidereal* day; therefore, as $360°\ 59'\ 8'' : 360° :: 24^{h} : 23^{h}\ 56'\ 4''.09 =$ the length of a fidereal day in mean folar time, or the interval between two fucceffive tranfits of a ftar over the fame meridian.

Hence the following general rule for converting fidereal to mean time, and the contrary:

As $24^{h} : 23^{h}\ 56'\ 4''.09 ::$ any portion of fidereal time to its equivalent in mean time. And as $23^{h}\ 56'\ 4''.09 : 24^{h} ::$ any portion of mean time to its equivalent in fidereal time. Thus Tables I. and II. in our article CHRONOMETER are computed.

From what has been faid, it is evident that apparent and mean time are the fame, with refpect to the length of the hour, minute, and fecond of each, as well as of the year; but the hour, minute, and fecond of fidereal time are refpectively lefs in the above proportion. It is only the folar and mean days that differ, and this variation is marked by the times of commencement. Thus the apparent day always begins when the fun's centre is on the meridian; but the mean day commences fometimes fooner and fometimes later, as computed in the tables of the equation of time. See EQUATION *of Time*.

The *reduction of time*, that is, to turn apparent, mean, and fidereal time into each other, may be performed by the following theorems, taken from Kelly's Spherics, p. 208, ed. 4.

Let $A =$ apparent time.
$M =$ mean time.
$S =$ fidereal time.
$E =$ the equation of time at apparent noon.
$e =$ the daily difference of the equation of time.
$R =$ the fun's right afcenfion at apparent noon.
$r =$ the daily increafe of the fun's right afcenfion.
$N =$ the fun's mean right afcenfion at mean noon, *i. e.* the fidereal time at mean noon.
$m =$ the reduction of fidereal time at the rate of $3'\ 55''.91$ for 24 hours fidereal time.
$s =$ the reduction of mean to fidereal time, at the rate of $3'\ 56''.55$ for 24 hours mean time.
And let $\pm$ fignify that addition or fubtraction which is to be ufed according as the quantity under confideration is increafing or decreafing.
Alfo let $A' = M \pm E$, as applied in cafe 2.

Formulæ for the Reduction of Time.

Cafe.	Given.	Req^{d}.	Solution.
1	A	M	$M = A \pm E \pm \frac{A \times e}{24}$
2	M	A	$A = A' \pm \frac{A' \times e}{24 \pm e}$
3	M	S	$S = N + \overline{M + s}$
4	S	M	$M = \overline{S - N} - m$
5	A	S	$S = A + \frac{A \times r}{24} + R$
6	S	A	$A = S - R - \frac{\overline{S - R} \times r}{24 + r}$

The

The foregoing ſix caſes comprehend all the varieties that occur in the reduction of time; and for their numerical illuſtration, ſee our article CHRONOMETER.

For the application of time to the meaſurement of ſpace and motion, ſee LONGITUDE and LUNAR *Obſervations*.

TIME, *Civil*, is aſtronomical time accommodated to civil uſes, and formed and diſtinguiſhed into years, months, days, and hours, with their ſubdiviſions: the reckoning of the hours as civil to twelve twice over, is meant to mark the natural day.

TIME, in *Heathen Mythology*, was perſonified and deified. Saturn was uſually the ſymbol of it. Time was repreſented with wings, to mark the rapidity with which it paſſes, and with a ſcythe, to ſignify its ravages. It was divided into ſeveral parts; the century, the generation or ſpace of thirty years, the luſtrum, the year, the ſeaſons, the months, the days, and the hours; and each of theſe parts had its particular figure in men or women, according as their names were maſculine or feminine; their images were uſed in religious ceremonies.

TIME, in *Muſic*, is an affection of ſound, by which we denominate it *long* or *ſhort*, with regard to its continuance in the ſame degree of tune.

Time and tune are the great properties of ſound, on whoſe difference or proportions muſic depends: each has its ſeveral charms: where the time or duration of the notes is equal, the differences of tune alone are capable of entertaining us with endleſs pleaſure.

And of the power of time alone, *i. e.* of the pleaſures ariſing from the various meaſures of long and ſhort, ſwift and ſlow, we have an inſtance in the drum, which has no difference of notes, as to tune.

Time, in muſic, is conſidered either with reſpect to the abſolute duration of the notes, *i. e.* the duration conſidered in every note by itſelf, and meaſured by ſome external notion foreign to the muſic; in reſpect to which the compoſition is ſaid to be *quick* or *ſlow*: or it is conſidered with reſpect to the relative quantity or proportion of the notes compared with one another. See NOTE.

The ſigns or characters by which the time of notes is repreſented, are ſhewn under the article CHARACTERS, in *Muſic*, where the names, proportions, &c. are alſo expreſſed.

A ſemi-breve, for inſtance, is marked to be equal to two minims, a minim to two crotchets, a crotchet to two quavers, and ſo on, ſtill in a duplicate ratio, *i. e.* in the ratio of 2 : 1. Now where the notes reſpect each other thus, *i. e.* where they are in this ratio, the muſic is ſaid to be in *duple*, *i. e.* *double* or *common* time.

When the ſeveral notes are triple of each other, or in the ratio 3 : 1, that is, when the ſemi-breve is equal to three minims, the minim to three crotchets, &c. the muſic is ſaid to be in *triple* time.

To render this part as ſimple as poſſible, the proportions already ſtated among the notes are fixed and invariable: and to expreſs the proportion of 3 : 1, a point (.) is added to the right ſide of any note, which is deemed equivalent to half of it; and by this means a pointed ſemi-breve, O. becomes equal to three minims, and ſo of the reſt.

From hence ariſe ſeveral other ratios conſtituting new kinds of triple time; as 2 : 3 and 3 : 4, &c.; but theſe, Mr. Malcolm obſerves, are of no real ſervice, and are not perceived without a painful attention. For the proportions of the times of notes, to afford us pleaſure, muſt be ſuch as are not difficultly perceived; on which account the only ratios fit for muſic, beſide that of equality, are the double and triple.

TIME, *Common* or *Duple*, is of two ſpecies: the firſt, when every bar or meaſure is equal to a ſemi-breve, or its value in any combination of notes of a leſs quantity.

The ſecond, where every bar is equal to a minim, or its value in leſs notes. The movements of this kind of meaſure are various, but there are three common diſtinctions; the firſt *ſlow*, ſignified at the beginning by the mark C; the ſecond *briſk*, ſignified by ; the third *very quick*, ſignified by

But what that ſlow, briſk, and quick is, is very uncertain, and only to be learned by practice. The neareſt meaſure we know of, is to make a quaver the length of the pulſe of a good watch; then a crotchet will be equal to two pulſes, a minim to four, and the whole meaſure or ſemi-breve to eight. This may be reputed the meaſure of *briſk* time; as for the *ſlow*, it is as long again, and the quick is only half as long.

Some propoſe to meaſure it by imagining the bar as actually divided into four crotchets, in the firſt kind, and ſo make the whole as long as one may diſtinctly pronounce theſe four words, *one*, *two*, *three*, *four*, all of equal length: ſo that the firſt crotchet may be applied to *one*, the ſecond to *two*, &c. and for other notes proportionally: and this is made the briſk movement of *common* time.

The whole meaſure then of common time is equal to a ſemi-breve, or a minim; but theſe are variouſly ſubdivided into notes of leſs quantities.

Now to keep the time equal, we make uſe of a motion of the hand or foot, thus: knowing the true time of a crotchet, we ſhall ſuppoſe the meaſure or bar actually ſubdivided into four crotchets for the firſt ſpecies of common time; then the half meaſure will be two crotchets; therefore the hand or foot being up, if we put it down with the very beginning of the firſt note or crotchet, and then raiſe it with the third, and then down to begin the next meaſure; this is called *beating of time*.

By practice, they get a habit of making this motion very equal, and conſequently of dividing the meaſure or bar into equal parts, up and down; as alſo of taking all the notes in the juſt proportion, ſo as to begin and end them preciſely with the beating. In the meaſure of two crotchets, they beat down the firſt, and the ſecond up. Some call each half of the meaſure in common time, *a time*; and ſo they call this the mode or meaſure of *two times*, or the *dupla* meaſure.

Again, ſome mark the meaſure of two crotchets with a 2 or $\frac{2}{4}$, ſignifying it to be equal to two notes, of which four make a ſemi-breve; and ſome mark it $\frac{2}{8}$ for quavers. Malcolm's Muſic, p. 385, &c.

TIME, *for Triple*. See TRIPLE-*Time*.

TIME-*Table*. See CHARACTERS, FRANCO, and *Plate* I*.

TIME, in *Fencing*. There are three kinds of time; that of the ſword, that of the foot, and that of the whole body. All the times that are perceived out of their meaſure, are only to be conſidered as appeals, or feints, to deceive and amuſe the enemy. See FENCING.

TIME, in the *Manege*, is ſometimes taken for the motion of a horſe, that obſerves meaſure and juſtneſs in performing a manege; and ſometimes it ſignifies the interval between two of his motions. In the manege of a ſtep and a leap, the horſe makes by turns a corvet between two caprioles; and in that caſe the corvet is one time that prepares the horſe for the caprioles.

The

The times obſerved in making a ſtop are nothing but ſo many falcades.

Time alſo ſignifies the effect of one of the aids; thus, we ſay, a good horſeman diſpoſes his horſe for the effects of the heel, by beginning with one time of the legs, and never runs precipitately upon his times.

Time *of ſhewing Flowers*, in *Gardening*, among floriſts, the period or ſeaſon of exhibiting thoſe of the finer kinds, either on the ſummer ſtages for this purpoſe, or in other places. For ſome ſorts of flowers, as thoſe of the auricula and other ſimilar kinds, it is uſually from about the latter part of April until about the beginning of May, in ſituations near the metropolis, in which length of period or ſeaſon there are commonly about four ſuch ſhows at different ſuitable intervals of time.

In other ſorts of fine flowers, the ſhows are moſtly ſomewhat later, and do not laſt any great length of time, as for tulips, carnations, and ſome other ſimilar kinds; and there are ſtill a few others which laſt differently in regard to time, or a great part of the ſummer ſeaſon. See Summer-*Stage*.

Time-*Keepers*, in a general ſenſe, denote inſtruments adapted for meaſuring time. See Chronometer.

Time *of Peace*. See Peace.

Time, in *Chronology*. See Chronology.

Time, in *Grammar*. See Tense, Prosody, and Measure.

Time, in *Mechanics*. See Motion.

Time, *Periodical*. See Period.

Time, *Equation of*. See Equation.

Time, *Kipper*. See Kipper.

Time, *Unity of*. See Unity.

TIMELFIOERD, in *Geography*, a bay of the North ſea, on the coaſt of Norway; 32 miles W. of Romſdal.

TIMEN-GUY, in *Rigging*, a rope faſtened at one end to the fore-ſhrouds, and nailed at the other end to the anchor-ſtock, on the bow, to prevent the fore-ſheet from entangling.

TIMENS, in *Geography*, a town of Norway, in the province of Chriſtianſand; 15 miles S. of Stavanger.

TIMERA, a town of Sweden, in the province of Medelpadia; 5 miles N. of Sundſwall.

TIMERY, a town of Hindooſtan, in the Carnatic; 6 miles S. of Arcot.

TIMERYCOTTA, a town and fortreſs of Hindooſtan, in Golconda; 54 miles S.E. of Hydrabad. N. lat. 15° 20′. E. long. 79° 26′.

TIMERYDURGAM, a town of Hindooſtan, in Baramaul; 21 miles N.N.W. of Darempoury.

TIMESQUIT, or Timasquit, a town of Africa, in the country of Darah; 80 miles W. of Tafilet.

TIMETHUS, in *Ancient Geography*, a river of Sicily, the mouth of which is placed by Ptolemy between Tyndarium and Agathyrium.

TIMICI, *Abat-el-Wed*, a place in Africa, S.E. of Arſinaria, on the banks of one of the rivers which formed the Carteimus; and in which are ruins.

TIMIRU, in *Geography*, a town of the iſland of Cuba; 20 miles W.S.W. of Villa del Principe.

TIMMER. See Timber and Timbre.

TIMMIA, in *Botany*, received that name from the celebrated Hedwig, in compliment to his correſpondent Mr. Joachim Chriſtian Timm, an apothecary and principal magiſtrate at Malchin, who publiſhed *Floræ Megapolitanæ Prodromus*, in 1788. This makes an octavo volume, containing the names, characters, places of growth, &c. of the native plants of Mecklenburg-Schwerin, diſpoſed according to the Linnæan ſyſtem, with the abolition of the 20th, 21ſt, 22d, and 23d claſſes, and a ſeparation of all the graſſes and graſs-like plants together, into a claſs by themſelves. The number of ſpecies is 1200, of which 501 belong to the *Cryptogamia*, the other claſſes being far from rich. Neither does the work contain any critical obſervations to compenſate for the inconvenience of the above changes.—Hedw. Crypt. v. 1. 83. Sp. Muſc. 176. Schreb. Gen. 761. Timm. Megapol. 234.—Claſs and order, *Cryptogamia Muſci*. Nat. Ord. *Muſci*.

Eſſ. Ch. Capſule ovate. Outer fringe of ſixteen pointed teeth: inner membranous, with jointed teeth combined at the top. Male flowers on the ſame plant, axillary, ſtalked, bud-ſhaped.

The known ſpecies are two only. *T. megapolitana*, Hedw. Crypt. v. 1. 83. t. 31, found near Malchin, growing in boggy ground among *Carices*, as well as in North America: and *T. auſtriaca*, Hedw. Sp. Muſc. 176. t. 42. f. 1—7, native of Schneeberg, a celebrated Auſtrian mountain. Both have the habit of Bryum, or Mnium; ſee thoſe articles. We cannot conſider *Timmia* as an admiſſible genus, being diſtinguiſhed from *Bryum* merely by the connexion of the points of the inner fringe, like Pohlia of Hedwig, which the reader will find in its proper place. Under the head of Fringe *of Moſſes* we have ſuggeſted the objections to founding genera on the differences of figure in the inner fringe, which are uncertain, variable, very difficult to obſerve, and lead to unnatural diſtinctions. Characters derived from the ſituation of the male flowers are ſubject to ſtill greater difficulties and objections.

TIMMISKAMAIN Lake, in *Geography*, a lake of North America, in Canada. This lake gives name to a tribe of Indians near it. N. lat. 47° 30′. W. long. 80° 40′.

TIMMS, a town of North Carolina; 15 miles S.S.E. of Fayetteville.

TIMOAN, an iſland in the Eaſt Indian ſea, inhabited by Malays: ſhips may obtain wood and water; the anchorage is good almoſt all round the iſland; but the inhabitants are ſurly and inſolent. N. lat. 2° 58′. E. long. 104° 25′.

TIMOCHARIS, in *Biography*, an aſtronomer of Alexandria, who flouriſhed in the third century B.C. He obſerved B.C. 294, on the 9th of March, four hours before midnight, a conjunction of the moon with the Spica Virginis, the ſtar being then, according to him, 8° W. from the equinoctial point.

TIMOK, in *Geography*, a river of Servia, which riſes in mount Hæmus, and runs into the Danube, 6 miles N. of Viddin.

TIMOLEON, in *Biography*, a diſtinguiſhed example of patriotiſm and attachment to liberty, was of noble parentage, and a native of Corinth. His diſcriminating character was exhibited at an early age in the reſcue of his brother Timophanes at a moment of danger, when he was thrown from his horſe in an engagement with the Argives, and ſurrounded by the enemy. Timoleon flew to his aid, covered him with his ſhield, and after receiving many wounds, liberated his brother. This ſame brother, being placed by the Corinthians for the ſafety of their city at the head of a ſtanding body of mercenaries, aſſumed the ſovereignty of the ſtate; but Timoleon, dreading the ſubverſion of the liberty of his country by the ambition of his own brother, remonſtrated againſt his proceedings; and, finding his own attempts for reſtraining him ineffectual, engaged two friends to concur with him in his efforts; but their united endeavours proving of no avail, Timoleon is ſaid to have ſtood by him weeping, with his face covered, while his aſſociates diſpatched the tyrant. Such is the account of Plutarch; but Diodorus ſays, that Timoleon killed his brother with his own hand. This act,

act, however, followed by the reproaches of his friends, and by the imprecations of his mother, was the occasion of poignant distress to Timoleon; so that he withdrew from all public affairs, and for some years wandered about in the most disconsolate state, in the most gloomy recesses of his grounds, without ever approaching the city. After a retirement of twenty years, the Syracusans applied to Corinth for succour in a season of calamity, occasioned by domestic tyrants, and by the hostile preparations of the Carthaginians. The Corinthians passed a vote for granting the assistance that was requested, and Timoleon, in preference to many others who were proposed, was appointed their general. Timoleon sailed for Sicily in the year B.C. 344, with a fleet of about ten sail, and arriving, by a stratagem, in the port of Tauromenium, disembarked his army, consisting of no more than one thousand men. Success and victory attended his arms; and having become master of Syracuse, he destroyed its citadel as a nest of tyrants, and caused to be erected in its place a hall of judicature; thus intimating, that the state was now to be governed by laws, and not by arms. He also colonized the city, which had been depopulated, by an importation of Greeks, and by inviting all the fugitives to return. Timoleon at the same time extended his attention to the other cities of Sicily, reducing those inhabitants who had usurped authority to the rank of private citizens, or sending them as exiles to Corinth. He prepared likewise to resist the Carthaginians, who were sending a powerful army against the island; and with a small force, but by extraordinary displays of valour and military skill, totally defeated them. He afterwards directed his attention to the internal state of Sicily, and by the measures which he adopted, settled its inhabitants in the unmolested possession of the advantages which they enjoyed in a fertile soil and propitious climate. The Sicilians acknowledged their obligations with gratitude and respect, and considered Timoleon as the common father of the nation. Having fixed his abode in Syracuse, he sent to Corinth for his wife and family, and lived as a private citizen, respected and esteemed for his virtues. Two demagogues, however, contrived to disturb his tranquillity, and brought charges against him, which he thought unworthy of refutation, and in reference to which he merely said, "he could not sufficiently express his gratitude to the gods for allowing him to see the time when the Syracusans enjoyed the liberty of speaking what they thought proper." Whilst Greece was involved in the calamities of a civil war, and in conflicts which terminated in the loss of public liberty, Timoleon was unmolested and tranquil, in a country which he had contributed to render happy. Fortunate in all his transactions after he left Corinth, he ascribed his successes to the goddess Fortune, and dedicated to her the house in which he resided. It has been observed, that in the system of the ancients, a regard to these nominal and fictitious deities did not exclude their belief of a superintending providence: and a particular instance occurs in the history of Timoleon which would lead him to imagine that his life and its incidents were under a providential care and direction. Soon after his arrival in Sicily, two strangers were hired to assassinate him: and whilst he was sacrificing in the temple of Adranum, where he then lived, these murderers mixed in the throng, and were preparing to execute their commission. At this instant a man gave one of them a blow on the head with his sword, which laid him at his feet, and then fled to the top of a rock. The other, supposing their design had been discovered, laid hold of the altar, and intreated Timoleon to spare his life, on condition of his revealing the whole plot. The first fugitive being brought down from the rock, asserted that he had committed no crime, because the man whom he had struck had murdered his father in the city of Leontium. Such an escape would naturally impress a mind less thoughtful than that of Timoleon.

At a late period Timoleon lost his sight, and this affliction he bore with perfect resignation: and it was alleviated to him by the assiduous attentions of the Syracusans. In his old age he was revered by the Syracusans as a father in the midst of his family: and at length terminated his life by a slight disease, in the year B.C. 335. His funeral obsequies were attended by a great number of people; and when the body was placed on the pile, a herald made the following proclamation: "The people of Syracuse inter Timoleon the Corinthian, the son of Timodemus, at the expence of two hundred minæ: they honour him, moreover, through all time, with annual games, to be celebrated with music, horse-racing, and wrestling: as the man who destroyed tyrants, subdued barbarians, repeopled great cities which lay desolate, and restored to the Sicilians their laws and privileges." A monument was afterwards erected to his memory in the market-place, which being surrounded with porticoes and other public buildings, was made a place of exercise for the youth, and named the "Timoleontéum." Plut. Vit. Timol. Anc. Un. Hist.

TIMON *the Phliasian*, a disciple of Pyrrho, flourished in the time of Ptolemy Philadelphus, and lived to the age of ninety years. At an early age he visited Megara, for the advantage of Stilpo's instructions in dialectics, and afterwards removed to Elea, where he became a hearer of Pyrrho. He first professed philosophy at Chalcedon, and afterwards at Athens, where he remained till his death. He took so little pains to invite disciples to his school, that it has been said of him, that as the Scythians shot flying, Timon gained pupils by running from them. This indifference to his profession was probably owing to his love of ease and indulgence; for he was fond of rural retirement, and so much addicted to wine, that he held a successful contest with several celebrated champions in drinking. This disposition probably led him to embrace the indolent doctrine of scepticism. He seems to have treated the opinions and disputes of the philosophers with contempt, for he wrote with sarcastic humour against the whole body. His poem, entitled "Silli," often quoted by the ancients, was a keen satire, abounding with bitter invectives against men and doctrines. The remaining fragments of this poem have been industriously collected by Henry Stephens, in his "Poesis Philosophica." The public succession of professors in the Pyrrhic school terminated with Timon. Brucker by Enfield.

TIMON, SAMUEL, a writer of history, was born at Tirnau, in Hungary, and died at Cassovia, in 1736, at the age of sixty-one years. In 1693 he entered among the Jesuits, and being of feeble constitution, declined the labours of the society, and devoted himself to literary occupation, particularly to the history of his own country, in reference to which he published several works. Nouv. Dict. Hist.

TIMONEER, TIMONIER, Fr., in *Sea Language*, the helmsman, or person who manages the helm to direct the ship's course.

TIMONITIS, in *Ancient Geography*, a country of Asia, in Paphlagonia, in the vicinity of Bithynia. Strabo and Ptolemy.

TIMONVILLE, in *Geography*, a town of France, in the department of the Moselle; 9 miles W. of Morhange.

TIMOORGOODA, a town of Hindoostan, in the circar of Cicacole; 10 miles S.W. of Cicacole.

TIMOPHEEVA, a town of Russia, in the government of Irkutsk, on the Ilim; 32 miles N.W. of Vercholensk.

TIMOR, an island in the East Indian sea, about 120 miles

miles in length, and 33 in breadth. The Portugueſe were the firſt Europeans who formed any kind of ſettlement on this iſland, who fled to it as a place of refuge from their enemies, the Dutch. But they were purſued by thoſe implacable enemies, and in the year 1613 driven from Cupan, or Coupang, a town ſituated at the weſt end of the iſland, where the Dutch have ever ſince poſſeſſed and garriſoned a fort which the Portugueſe had erected. The chief of the natives, or king of the iſland, is by the Dutch called *keyſer* (emperor). Some Portugueſe reſide in the north part of the iſland. The principal productions are ſanders or ſandal wood and wax, which the Dutch receive in exchange for coarſe linens or piece-goods; but on the whole, the profit ariſing from the commerce is little more than ſufficient to defray the expences, and the ſettlement in all probability is continued merely to keep out other nations. S. lat. 7° 16′ to 10° 24′. E. long. 124° to 126° 21′.

Timor *Laut*, or *Laoet*, ſignifying in the Malacca language *ſea*, an iſland in the Eaſt Indian ſea, about 60 miles in circumference. S. lat. 7° 25′. E. long. 132° 16′.

TIMOROSO, in the *Italian Muſic*, intimates that the ſong is to be played or ſung in ſuch a manner as to expreſs an awe or dread, either to ſhew reſpect, or to repreſent fear.

TIMOROUS, in the *Manege*. See Starting, Skittish, &c.

TIMOTEO da Urbino, in *Biography*, whoſe real name was T. della Vite, was born at Urbino in 1470. He received his education as an artiſt under F. Francia, at Bologna, but at the age of twenty-ſix returned to his native city, whence he ſoon after went to Rome to ſee his countryman, Raphael, and the great works in the Vatican which had recently acquired for him ſo much renown. Raphael employed him in painting the Sibyls in the church of La Pace, and was ſatisfied of his ability in the performance: ſo much ſo, that he allowed him to retain the Cartoons. After this he returned to Urbino, and there executed ſeveral great works for the cathedral and other public buildings. He improved his ſtyle, as it was natural he ſhould, under the tuition of his great maſter: and his latter productions exhibit much grace and vigour in their execution. His moſt eſteemed works are, the Conception, in the church of the Oſſervanti, at Urbino; and Chriſt appearing to Mary Magdalen, in S. Angeli, at Cagli. He died in 1524, aged fifty-four.

TIMOTHEUS, one of the moſt celebrated poet-muſicians of antiquity, was born at Miletus, an Ionian city of Caria, 246 B.C. He was contemporary with Philip of Macedon, and not only excelled in lyric and dithyrambic poetry, but in his performance upon the cithara. According to Pauſanias, he perfected that inſtrument by the addition of four new ſtrings to the ſeven which it had before; though Suidas ſays it had nine before, and that Timotheus only added two, the tenth and eleventh, to that number.

It ſeems neceſſary here to ſtate the ſeveral claims made in favour of different perſons who have been ſaid to have extended the limits of the Greek muſical ſcale.

Many ancient and reſpectable writers tell us, that before the time of Terpander, the Grecian lyre had only four ſtrings; and, if we may believe Suidas, it remained in this ſtate 856 years, from the time of Amphion, till Terpander added to it three new ſtrings, which extended the muſical ſcale to a heptachord, or ſeventh, and ſupplied the player with *two conjoint tetrachords*.

It was about 150 years after this period, that Pythagoras is ſaid to have added an eighth ſtring to the lyre, in order to complete the octave, which conſiſted of *two disjunct tetrachords*.

Theſe dates of the ſeveral additions to the ſcale, at ſuch diſtant periods, though perhaps not exact, may, however, if near the truth, ſhew the ſlow progreſs of human knowledge, and the contented ignorance of barbarous times. But if we wonder at the muſic of Greece remaining ſo many ages in this circumſcribed ſtate, it may be aſked, why that of China and Perſia is not better now, though the inhabitants of thoſe countries have long been civilized, and accuſtomed to luxuries and refinements.

Boethius gives a different hiſtory of the ſcale, and tells us that the ſyſtem did not long remain in ſuch narrow limits as a tetrachord. Chorœbus, the ſon of Athis, or Atys, king of Lydia, added a fifth ſtring, Hyagnis a ſixth, Terpander a ſeventh, and, at length, Lychaon of Samos, an eighth. But all theſe accounts are irreconcileable with Homer's Hymn to Mercury, where the chelys, or teſtudo, the invention of which he aſcribes to that god, is ſaid to have had ſeven ſtrings. There are many claimants among the muſicians of ancient Greece, to the ſtrings that were afterwards added to theſe, by which the ſcale, in the time of Ariſtoxenus, was extended to two octaves. Athenæus, more than once, ſpeaks of the *nine-ſtringed* inſtrument; and Ion of Chios, a tragic and lyric poet and philoſopher, who firſt recited his pieces in the 82d Olympiad, 452 B.C. mentions, in ſome verſes quoted by Euclid, the *ten-ſtringed* lyre; a proof that the third conjoint tetrachord was added to the ſcale in his time, which was about fifty years after Pythagoras is ſuppoſed to have conſtructed the octachord.

The different claimants among the Greeks to the ſame muſical diſcoveries, only prove that muſic was cultivated in different countries; and that the inhabitants of each country invented and improved their own inſtruments, ſome of which happening to reſemble thoſe of other parts of Greece, rendered it difficult for hiſtorians to avoid attributing the ſame invention to different perſons. Thus the ſingle flute was given to Minerva, and to Marſyas; the ſyrinx, or fiſtula, to Pan, and to Cybele; and the lyre, or cithara, to Mercury, Apollo, Amphion, Linus, and Orpheus. Indeed, the mere addition of a ſtring or two to an inſtrument without a neck, was ſo obvious and eaſy, that it is ſcarcely poſſible not to conceive many people to have done it at the ſame time.

With reſpect to the number of ſtrings on the lyre of Timotheus, the account of Pauſanias and Suidas is confirmed in the famous decree againſt him, for which ſee Senatusconsultum.

It appears from Suidas, that the poetical and muſical compoſitions of Timotheus were very numerous, and of various kinds. He attributes to him nineteen nomes, or canticles, in hexameters; thirty-ſix proems, or preludes; eighteen dithyrambics; twenty-one hymns; the poem in praiſe of Diana; one panegyric; three tragedies, the Perſians, Phinidas, and Laertes; to which muſt be added a fourth, mentioned by ſeveral ancient authors, called "Niobe," without forgetting the poem on "The Birth of Bacchus." Stephen of Byzantium makes him author of eighteen books of nomes, or airs, for the cithara, to eight thouſand verſes, and of a thouſand Προοιμια, or preludes, for the nomes of the flute.

A muſician ſo long eminent as Timotheus, muſt have excited great deſire in young ſtudents to become his pupils; but, according to Bartholinus, he uſed to exact a *double price* from all ſuch as had previouſly received inſtructions from any other maſter; ſaying, that he would rather inſtruct thoſe who *knew nothing*, for *half price*, than have the trouble of *unteaching*

unteaching ſuch as had already acquired bad habits, and an incorrect and vicious manner of playing.

Timotheus died in Macedonia, according to Suidas, at the age of ninety-ſeven; though the Marbles, much better authority, ſay at ninety; and Stephen of Byzantium fixes his death in the fourth year of the 105th Olympiad, two years before the birth of Alexander the Great; whence it appears that this Timotheus was not the famous player on the flute ſo much eſteemed by that prince, who was animated to ſuch a degree by his performance, as to ſeize his arms; and who employed him, as Athenæus informs us, together with the other great muſicians of his time, at his nuptials. However, by an inattention to dates, and by forgetting that of theſe two muſicians of the ſame name, the one was a Mileſian, and the other a Theban, they have been hitherto almoſt always confounded.

TIMOTHY, a favourite diſciple and companion of St. Paul, was the ſon of a Jeweſs by a Greek father, at Lyſtra in Iſauria. He was the confidential aſſociate and friend of St. Paul, and he addreſſed to him two epiſtles. (See Epistle.) According to the Roman martyrology, he was ſtoned to death at one of the feſtivals of Diana at Epheſus.

Timothy *Graſs*, in *Agriculture*, the common name of a graſs which is ſaid to be cultivated much in America. The ſeeds are ſaid to have been carried from the ſtate of Virginia, by Mr. Timothy Hanſon, to that of North Carolina, where it is much grown, and from which circumſtance it probably received its name. It is a ſort of graſs which thrives moſt in low, damp, marſhy grounds; in ſuch ſoils and ſituations, it will produce a fine turf in a ſhort time. It is very luxuriant, grows to a conſiderable height, and has, in ſome ſort, the appearance of wheat or rye, having a broad blade or leaf.

It may be noticed, that all ſorts of cattle are ſaid to be fond of it whilſt in the green growing ſtate, as well as in that of hay.

It is very productive, but coarſe, and flowers late. Almoſt all the agriculturaliſts and travellers of America concur in giving this graſs the higheſt commendations, as being the chief ſupport of cattle wherever meadows are found. And from the inquiries made by Mr. Strickland, at the requeſt of the Board of Agriculture, it appears to be extenſively cultivated in the middle and northern ſtates of the American union; he has frequently ſeen extraordinary crops of it growing as thickly as it could ſtand on the ground, three or four feet high, and in ſome inſtances as coarſe as wheat-ſtraw. In this ſtate it is cut before maturity; and as the hay in America is always well cured, however ſucculent it may be, at the time of cutting, horſes prefer it to every other kind of hay, and thrive better upon it.

No other graſſes approach it in produce; and it is ſtated to be particularly uſeful when mixed with red clover, in preventing it from falling too cloſe to the ground. And ſince his return, by cultivating it in his garden he has aſcertained it to be the ſame as the *cat's-tail* graſs; but he is doubtful whether, if it were cultivated in the field, and ſhould grow with American luxuriance, an Engliſh ſun would be able to cure it with American perfection. It has, however, been ſaid by Curtis, that it has no excellence that we are acquainted with, which the meadow fox-tail graſs does not poſſeſs in an equal degree. In the trials made by the Rev. Mr. Young of keeping it cloſely fed down by ſheep, upon a moiſt loam with a clayey marle bottom, the ſucceſs was ſufficiently encouraging to evince that it is deſerving of attention; eſpecially as its ſeeds may be eaſily procured in any quantity from America at the price of about one guinea the buſhel; which, he obſerves, is enough, in conjunction with that of other graſſes, for four or five acres of land. He thinks four pounds, the proportion for the acre as fixed by Rocque, who firſt introduced it into this country, are much too little; and is of opinion, that timothy is beſt adapted to moiſt loams, eſpecially thoſe of the peaty kinds.

It is ſaid to be common in the dairy paſtures of Cheſhire, by the writer of the Agricultural Report of that county, but that, although it has been ſtrongly recommended for cultivation, it ſeems by no means to merit the high character which was, at one time, given it. In moiſt lands or ſoils it grows tolerably well; but in all caſes and kinds of land, it is thought much inferior to the meadow fox-tail, and the ſmooth-ſtalked meadow-graſs. In a paper in the third volume of the "Tranſactions of the Highland Society of Scotland," the ſeed of this graſs is put down as uſeful in a mixture for one crop of hay, to be ſucceeded by paſture, in land of the clay kind. And that, in theſe circumſtances, late and coarſe as it is, it may be beneficial in ſuch ſort of land, as it is in ſome degree congenial to it.

The experiments, however, lately made at Woburn Abbey, under the direction of his grace the duke of Bedford, the reſults of which are detailed in an appendix to a late work on "Agricultural Chemiſtry," place its comparative merits in the ſtrongeſt and moſt certain point of view. It is there ſtated, that, at the time of flowering, from a clayey loam:

	Ounces.			Lbs.	oz.	dr.	
The produce *per* acre is - - - - -	653400	0	=	40837	8	0	*per* acre.
Weight when dry of produce of ſame ſpace - -	277695	0	=	17355	15	0	
Weight loſt by produce of ſame ſpace in drying - -				23481	9	0	
Weight of nutritive matter afforded by ſame - - -	25523	7	=	1595	3	0	
Weight of nutritive matter, loſt by leaving the crop till the ſeed be ripe, exceeding one half of its value - - -				2073	11	0	
At the time the ſeed is ripe:							
Produce *per* acre - - - - - -	653400	0	=	40837	8	0	
Weight when dry of produce of ſame ſpace - - -	310365	0	=	19397	13	0	
Weight loſt by produce of ſame ſpace in drying - -				21439	11	0	
Nutritive matter afforded by produce of ſame ſpace - -	58703	14	=	3668	15	14	
Latter-math, produce *per* acre - - - -	152460	0	=	9528	12	0	
Affords of nutritive matter - - - - -	4764	6	=	297	12	6	

Sixty-four drachms of the ſtraws, afford ſeven drachms of nutritive matter. The nutritive powers of the ſtraws ſimply, therefore, it is ſaid, exceed thoſe of the leaves, in proportion of 28 to 8; and the graſs at the time of flowering, to that at the time the ſeed is ripe, as 10 to 23; and the latter-math to the graſs of the flowering crop, as 8 to 10.

From the whole of theſe particulars, the comparative merits ments of this grafs will, it is fuppofed, appear to be very great; to which may be added the abundance of fine foliage which it affords early in the fpring; in which refpect it is inferior, it is faid, to the *fertile* meadow-grafs and *narrow-leaved* meadow-grafs only. The value of the ftraws at the time the feed is ripe, exceeds that of the grafs at the time of flowering, as 28 to 10; a circumftance which increafes its value, it is thought, above many others: for, by this property, its valuable early foliage may be cropped, to an advanced period of the feafon, without injury to the crop of hay, which, in other graffes that fend forth their flowering ftraws early in the feafon, would caufe a lofs of nearly one-half of the value of the crop, as is clearly fhewn in many inftances; and this property of the ftraws too, makes the plant peculiarly valuable for the purpofe of hay.

In the fmaller variety of this grafs, the produce *per* acre on the fame fort of land, at the time of ripening the feed; the weight when dry; the lofs of weight in drying; and the nutritive matter afforded, are all very confiderably lefs than in the above fort. In the latter-math produce on the fame fpace, the quantity is the fame as in that, but the nutritive matter afforded by it fomething lefs, as may be feen in the work referred to above.

In the bulbous-ftalked fpecies, the produce of the acre in the fame kind of land, at the time of flowering; the weight when dry; that loft by the produce of the fame fpace in drying; and the quantity of nutritive matter afforded by it, are all ftated in the fame work to be greatly lefs than in the firft kind. And that this grafs is inferior in many refpects to that of the firft fort. That it is fparingly found in meadows. And that from the number of bulbs which grow out of the ftraws, a greater proportion of nutritive matter might have been expected. This feems to prove, it is faid, that thefe bulbs, in this fort of grafs, do not form fo valuable a part of the plant as the joints, which are fo confpicuous in the firft fort, the nutritive powers of which exceed thofe of this bulbous-ftalked fort, as 8 to 28.

The qualities and ufeful properties of timothy grafs are thus well pointed out and determined. See PHLEUM and GRASS.

TIMOU, in *Geography*, a town of Thibet; 225 miles E.S.E. of Laffa.

TIMOUR, or TAMERLANE, in *Biography*, a famous Oriental conqueror, was born at the village of Sebzar, in the territory of Cafh, 40 miles S. of Samarcand, in the year 1336. At the time of his birth, the Khans of Cafhgar, with an army of Getæ or Kalmucks, invaded Tranfoxiana. In 1357, Timour, having lately loft his father, collected a number of followers with a view of delivering his country; but being deferted by them, he retreated to the defert, and his army was there farther diminifhed by an action with the Getæ. He then wandered with his wife and feven companions, and being arrefted, was kept two months in prifon. Upon his liberation he fwam over the rapid ftream of Oxus or Jihon, and for fome months led the life of a vagrant. In procefs of time, and on return to his native country, he was at the head of a confiderable force, which enabled him to expel the Getæ from Tranfoxiana. After a civil war between him and his brother-in-law, the Emir Houffein, who was defeated and put to death, Timour, at a general diet held in 1370, was feated on the throne of Zagatai, at the city of Balk, and invefted with the high title of Saheb Karan, or emperor of the Age; upon which he repaired to Samarcand, which became the feat of his empire. In confequence of this elevation, his ambition was directed to greater objects; and having reunited to Zagatai its former dependencies, Karizme and Kandahar, he fixed his views on the kingdoms of Iran or Perfia, which were then occupied by various ufurpers. Having reduced to fubmiffion Ibrahim, the prince of Sherwan, and fecured the conqueft of Fars or Perfia proper, by the defeat and death of Shah Manfour, its prince, and the extirpation of his male progeny, he advanced from Shiraz to the Perfian gulf, and exacted from the rich city of Ormuz an annual tribute. He then proceeded as a conqueror through the whole courfe of the Tigris and Euphrates from their fources to their mouths, entered Edeffa, and reduced the Chriftians in the mountains of Georgia. Retaliating upon the Getæ the invafion of his country, he paffed the Sihon, and fubdued the kingdom of Cafhgar. In his feveral expeditions he penetrated as far as 480 leagues to the N.E. of Samarcand, and his emirs croffed the Irtifch into Siberia, another fcene of his adventures and conquefts near Kipzak or Weftern Tartary. Having entertained at his court Toctamifh, a fugitive prince of that country, he fent him back with an army which eftablifhed him in the Mogul empire of the North. Toctamifh, however, after a reign of ten years, unmindful of his obligations to his benefactor, entered Perfia with a mighty army, paffed the Sihon, burnt the palaces of Timour, and reduced him to the neceffity of contending for his capital and empire. But his triumph was of no long duration; for Toctamifh was defeated, Kipzak was invaded, and Toctamifh was again encountered and routed. This purfuit led Timour to the tributary provinces of Ruffia, and a duke of the reigning family was made captive on the ruins of Yeletz, his capital. Timour then marched fouthwards, and having pillaged, reduced to afhes the commercial city of Azoph, and alfo thofe of Serai and Aftrachan. Under the influence of that ambition which was his ruling principle, he determined, in 1398, on the invafion of Hindooftan, and taking advantage of the rebellion againft the weak Sultan Mahmood, he led an army of 92 fquadrons, each of 1000 horfe, and found great difficulty in traverfing one of the fnowy ridges between the Jihon and the Indus. Having croffed the Indus at Attock, he entered the Panjab, and formed a junction with one of his grandfons, who had reduced Moultan. He then advanced towards Dehli, and having overthrown the army of Mahmood with its elephants, took poffeffion of the capital, which he defolated by pillage and maffacre. In this part of his march he manifefted his religious zeal, by deftroying infidels and idolaters without mercy, and having paffed the Ganges about 100 miles N.E. of Dehli, he flaughtered a great number of the Guebres, or fire-worfhippers. Whilft he was thus engaged, he received intelligence of the difturbances that had occurred on the confines of Georgia and Anatolia, of the revolt of the Chriftians, and of the ambitious projects of the Turkifh fultan Bajazet. Having iffued orders to his commanders, he haftened back to Samarcand; and after a fhort interval of repofe, he proclaimed a feven years' expedition to the weftern parts of Afia. In the year 1400 he began with the Georgian Chriftians, and foon reduced them to the alternative of tribute or the Koran, and to prifoners he allowed no other choice but death or abjuring their religion. Returning from this warfare, he gave audience to the ambaffadors of Bajazet, and after fome time fpent in mutual complaints and menaces, Timour laid fiege to Siwas or Sebafte, on the borders of Anatolia, which he took and deftroyed, burying alive with favage cruelty the Armenian garrifon of 4000 men. He then invaded Syria, and advanced towards Aleppo, from which iffued a numerous and well-appointed force to engage his army, the front of which was covered by a line of Indian elephants, carrying turrets filled with archers and

and Greek fire. This formidable hoft threw the Syrians into diforder, and they fled with precipitation into the city, whither the enemy accompanied them. Timour foon became mafter of this opulent capital. While the ftreets were ftreaming with blood and refounding with cries, the conqueror held a theological conference with the doctors of the law; protefting, towards the clofe of his harangue, that he was not a man of blood, that he was not the aggreffor in any of his wars, and that his enemies brought upon themfelves the calamities they fuffered: at the fame time his foldiers were piling up a certain tale of heads of the enemy, in conformity to his orders, which, according to his cuftom, were afterwards piled up in columns and pyramids. From Aleppo, Timour proceeded to Balbeck, which he took, and then advanced towards Damafcus. The fultan of Egypt had made great preparations for the defence of the city, and alfo for the affaffination of the invader; but the plot of ufing poifoned daggers was difcovered. The fultan pretended fubmiffion, and thus intended to put Timour off his guard; in the accomplifhment of this artifice, the camp of Timour was fuddenly attacked by the Syrian army, and thrown into diforder; but as foon as order was reftored, the Syrians were repulfed, and driven to the gates of Damafcus with great flaughter. The fultan in the mean while had returned to Egypt, and the city was left to make the beft poffible terms with the conqueror. During a truce, the foldiers broke into the city, maffacred a great part of the inhabitants, and made captives of the reft, carried off a great quantity of rich plunder, and the city was reduced to afhes. Bagdad was the next place of importance to which Timour directed his views. Here Timour attended in perfon, and ordered a blockade; after 40 days' defence on the part of the inhabitants, a ftorm was commanded; and the death of fome of the affailants was revenged by a maffacre which produced a pyramid of 90,000 heads. The city was completely razed, with the exception of mofques, hofpitals, and colleges. Timour's next object was the Ottoman empire. Having confulted the court-aftrologers, and obtained a favourable anfwer, he put himfelf at the head of an almoft innumerable force, and moved from the Araxes through Armenia and Anatolia, determining to carry the war to the heart of his rival's dominions. By his rapid advances, he invefted Angora before Bajazet was apprized of his movement. Upon receiving this intelligence, the Ottoman haftened to its relief with a very large army. An engagement enfued, and the conteft, which was very fanguinary, was at length decided by the defeat and capture of the Turkifh emperor. This battle was fought in July 1402. Bourfa, Nice, and Smyrna were fucceffively captured with the fame circumftances of cruelty that marked the progrefs of Timour's arms.

Timour's conquefts were extended from the Irtifch and Volga to the Perfian gulf, and from the Ganges to the Archipelago; and beyond thefe limits his name was a found of terror. Several princes purchafed his favour by tribute, or by extraordinary tokens of refpect. His want of fhipping prevented his entrance into Europe. From his various expeditions, Timour did not return to Samarcand until the fummer of 1404. In that capital, he difplayed his magnificence and power in difpenfing rewards and punifhments, attending to the complaints of his people, erecting palaces and temples, and giving audience to ambaffadors from Egypt, Arabia, India, Tartary, Ruffia, and Spain. Although he had profeffed fatisfaction with the extent of his empire, yet he indulged a project of ambition of very great magnitude, which was that of the conqueft of China. His preparations for this grand expedition were proportioned to its magnitude: 200,000 veteran foldiers were muftered, and they were furnifhed with means for conveying neceffaries over the defarts which feparate Samarcand from Pekin. The aged emperor mounted his horfe in the winter feafon, croffed the Sihon on the ice, and advanced to the diftance of 300 miles from his capital; but at the camp of Otrar he was feized with a fever, which fatigue, and the imprudent ufe of iced water, foon rendered mortal. He was not unapprized of his danger; and having fummoned round him his empreffes and principal emirs, he declared his grandfon Mehemet Jehan Ghir his univerfal heir and fucceffor, and exacted an oath of obedience to him. He thus expired April 1ft, 1405, in the 70th year of his age, and the 35th from his elevation to the throne of Zagatai. He left 53 defcendants, and his pofterity are to this day invefted with the title of the Mogul emperors, although the power and dominions have paffed into other hands.

His perfon and character are defcribed by one of his biographers in the following terms: "Timour was tall and corpulent, with a wide forehead and large head, a pleafing countenance, and fair complexion. He had broad fhoulders and ftrong limbs, but was maimed in one hand and lame of the right fide. His eyes were full of fire; his voice was loud and commanding; his conftitution hardy and vigorous; his underftanding found; and his mind firm and ftedfaft. In converfation he was grave and modeft, and he prided himfelf in an attachment to truth. He delighted in reading hiftory, and in difcuffing topics of fcience with the learned. His religion was fierce and fanatical, and he actually had, or affected to have, the fuperftitious reverence for omens, prophecies, faints, and aftrologers, which is general in the Eaft. He conducted his government alone, without favourites or minifters, and its fpirit was abfolute and uncontrouled rule. It was his boaft to have introduced fecurity and order throughout his wide dominions, and he challenged the praife of a benefactor to mankind; but no conquefts have been attended with greater deftruction of human lives, and greater defolation of flourifhing cities and diftricts, than his were; and his ambition prompted him to extend his authority beyond the poffible limits of a fingle government. He was not, however, a mere barbarian conqueror; but, if his inftitutions can be relied on as genuine, had enlarged ideas of the adminiftration of a great empire." The "Inftitutions of Timour" have been made known in Europe by two tranflations from a Perfian verfion: one in Englifh by major Davy and profeffor White, Oxford, 1783; and the other in French, by M. Langles, Paris, 1787. Mod. Univer. Hift. Gibbon's Rom. Emp. Gen. Biog.

TIMOURKENG, or *Fortrefs of Iron*, in *Geography*, a town of Thibet; 60 miles W.N.W. of Latac.

TIMPALU, a town on the W. coaft of the ifland of Celebes. N. lat. 0° 16′. E. long. 119° 44′.

TIMPANO, Ital., a kettle-drum. See TYMPANUM and TYMBALLES.

TIMPFE, or TYMPFE, in *Coinage*, an old filver coin of Poland. The *tympfe*, or *tympfen*, was reckoned at eighteen grofchen, and the florins were valued at thirty grofchen.

TIMURCOUGH, in *Geography*, a town of Thibet; 54 miles W.N.W. of Lahdach. N. lat. 35° 12′. E. long. 77° 12′.

TIMUS, in *Ancient Geography*, a town of Afia Minor, deftroyed by an earthquake.

TIMYRA, a town of Afia, in Ifauria.

TIN, *Stannum*, *Jupiter*, a whitifh metal, fofter, lefs elaftic, and lefs fonorous, than any other metal, excepting lead. In the Chaldee language, טין, *tin*, fignifies *flime*, *mud*, or *dirt*; and

and when the Phœnicians came into Cornwall, and ſaw this metal in its ancient ſlimy ſtate, they called it "the mud;" and hence, ſome have ſaid, the name *tin*, in Cornu-Britiſh *ſtean*, is derived. Some of the ancients called it *plumbum album*, white lead, probably to diſtinguiſh it from common lead; not knowing that it was radically another metal.

This metal, denominated κασσίτερος by the Greeks, and *ſtannum* by the Latins, ſeems to have been known from the moſt remote ages. It is mentioned by Moſes; ſee Numb. xxxi. chap. 22. It was tranſported to the Eaſt from Spain and Britain by the Phœnicians, with which nations they are ſaid to have carried on a lucrative commerce. Homer mentions it; and by Ariſtotle, the epithet Κελτικον, or *Celtic*, is applied to it, indicating plainly the country from which it was procured. See TIN-*Trade of Britain*.

TIN-*Stone*, in *Mineralogy*, is the moſt common ore of tin, and is nearly a pure oxyd of that metal. The colour is brown, which paſſes from a blackiſh-brown to black, and from a red-brown to yellowiſh and greeniſh-white. It occurs cryſtallized and amorphous, and in grains and rolled pieces, varying from the magnitude of a grain of ſand to that of an egg, or larger. The primitive form of the cryſtal is a flat octohedron: the angles are 112° 10′ and 67° 50′. The figure of the cryſtals is ſeldom perfect; ſometimes a rectangular priſm is interpoſed between the pyramids that form the octohedron. The edges and ſummits of the cryſtals are frequently bevelled or truncated, from which a great variety of ſecondary forms is derived. The cryſtals are alſo frequently united, forming compound cryſtals or macles: indeed, ſo numerous are the ſecondary cryſtals of tin, that more than one hundred and eighty forms of ſingle cryſtals have been obſerved, beſides the compound cryſtals, of which there is a conſiderable variety. The ſurface of the cryſtals is commonly ſmooth and ſplendent, but is ſometimes ſtreaked. The ſtructure is laminar, but the laminæ are rarely viſible. The fracture is uneven and imperfectly conchoidal, with a more or leſs ſhining and reſinous luſtre. When the laminar ſtructure is diſplayed, the luſtre is highly ſplendent. The cryſtals are ſemi-tranſparent or opaque, the darker colours being opaque, the lighter ſometimes nearly tranſparent; and the intermediate ſhades are only tranſlucent, or tranſlucent at the edges. The ſtreak is a greyiſh-white. Tin-ſtone is hard, ſcarcely yielding to the knife, and giving ſparks with ſteel. It is brittle and heavy. The ſpecific gravity varies from 6.759 to 6.970.

Before the blowpipe it decrepitates, and becomes paler; when finely pounded and mixed with borax, it is reducible on charcoal to the metallic ſtate.

Tin-ſtone contains the following conſtituent parts, according to Klaproth.

	From Alternon.	Schlackenwald.
Tin - -	77.50	75.
Oxygen -	21.50	24.50
Iron - -	0.25	0.50
Silex -	0.75	

Some analyſes of tin-ſtone give from two to three *per cent.* of alumine. The tin-ſtone of Cornwall, dreſſed in the common manner, is reckoned rich if it yield 65 *per cent.* of tin. Tin-ſtone may be diſtinguiſhed from *wolfram* by its ſuperior hardneſs, as it gives ſparks with ſteel; but wolfram yields eaſily to the knife. The powder of tin-ſtone is a greyiſh-white, that of wolfram a reddiſh-brown. It is diſtinguiſhed from *blende* by its ſuperior hardneſs, and its not emitting a ſulphurous odour when pounded. By its greater ſpecific gravity and luſtre, it may be diſtinguiſhed from *garnet*; and from *ſchorl*, by its colour, luſtre, form, and higher ſpecific gravity. This ore occurs in veins and beds, and diſſeminated in granite rocks. The veins interſect rocks of granite, gneiſs, mica-ſlate, and ſlate: tin-ſtone occurs alſo in alluvial ſoil in the diſtricts that contain tin-veins. See STREAM-*Tin*.

Wood-tin is a ſpecies of tin-ſtone, or oxyd of tin, found with ſream-tin in rolled pieces, which are wedge-ſhaped or reniform, and ſometimes globular. The ſtructure is divergingly fibrous, with concentric laminæ; and from the ſuppoſed reſemblance to the tranſverſe ſection of fine-grained wood, it received its name. The colour is commonly hair-brown or wood-brown, paſſing into yellowiſh-grey. The luſtre is glimmering or ſilky. It is opaque, hard, and brittle: the ſpecific gravity is 6.450. It is infuſible before the blowpipe, but is changed to a browniſh-red colour. When ſtrongly heated in a charcoal crucible, it yields about 75 *per cent.* of metallic tin. The conſtituent parts are, according to Vauquelin,

Oxyd of tin	-	91
Oxyd of iron	-	9

In Cornwall, this ore is almoſt always found with ſtream-tin, and never in veins: it is ſaid, however, to have been recently met with in cellular quartz, but in very minute pieces. It is one of the moſt common ores of tin in Mexico, and occurs in veins that traverſe a porphyritic trap, and alſo in alluvial depoſitions. In ſome wood-tin, there is a ſmall, black, ſmooth globule, from which, as from a centre, the fibres diverge: this has received the name of *bird's-eye tin*. Wood-tin, in its ſtructure and mode of formation, probably bears a near analogy to the kidney-ſhaped hematite iron-ore.

Bell-metal Ore, *Tin Pyrites*, or *Sulphuret of Tin*, is an extremely rare ore of this metal, being found only in Cornwall, at Huel rock, in a vein accompanied with ſulphuret of zinc and iron. Its colour is ſteel-grey, paſſing into yellowiſh-white: it has a metallic luſtre, and granular uneven fracture: it yields eaſily to the knife, and is brittle. The ſpecific gravity is 4.350. It fuſes into a black ſlag before the blowpipe, exhaling at the time a ſulphurous odour. It communicates a yellow or green colour to borax. The conſtituent parts differ in different ſpecimens; according to Klaproth, they are as under:

Tin - -	34	26.50
Copper - -	36	30.
Iron - -	3	12.
Sulphur -	25	30.50
Earthy matter	2	
	100	99

Klaproth obſerves, that the darker varieties of this ore are conſiderably poorer in tin than the lighter, but the proportion of iron increaſes.

Analyſis of the Ores of Tin.—The analyſes in the *dry way* were made by Klaproth in charcoal crucibles in the following manner, in which the reſults were always found to be conſtant. The ore was broken, and well cleaned from the matrix. One hundred grains were introduced into the cavity of a charcoal crucible, cloſing its orifice with a ſtopper of charcoal. The charcoal crucible was then fitted cloſe into one of baked clay, and placed upon the forge-hearth before the nozzle of the bellows. The contents in the charcoal crucible were reduced to the metallic ſtate by expoſing it to a ſtrong blaſt for half an hour. The button of metallic tin produced was a little blackiſh on the ſides, and

and its furface coated with a greenifh cruft. From one hundred grains of Bohemian tin-ftone, feventy-two grains and a half of tin were produced. Wood-tin and ftream-tin were treated in a fimilar manner. Brown tin-ftone, expofed to a porcelain fire in a clay crucible, formed a clear denfe glafs, greenifh-grey in the middle, but of a bright yellow on the fides and top. The interior of the veffel was glazed, of a milk-white, and overlaid with many fmall groups of needle-fhaped cryftals of a light-brown colour. The inner furface of the lid was lined with fimilar cryftals.

Analyfis of Tin-Stone in the humid way.—To Klaproth we are indebted for the difcovery of a fimple and effectual mode of analyfing tin-ftone in the humid way. Boil 100 grains of this ore, finely pounded, with a folution of 600 grains of cauftic potafh. Evaporate to drynefs, and then ignite the mafs moderately for half an hour. Add boiling water, which diffolves the principal part of the mafs, and the refidue muft again be ignited with fix times its weight of cauftic potafs, and diffolved in water, as before. Add this to the laft folution, and faturate the whole with muriatic acid, which will throw down an oxyd of tin. Let this be re-diffolved by an additional quantity of muriatic acid, and precipitated again by carbonate of foda; when lixiviated, and dried in a gentle heat, it acquires the form of bright-yellowifh tranfparent lumps. This precipitate muft be finely powdered, and once more diffolved in muriatic acid, affifted by a gentle heat. The infoluble part confifts of filex. Dilute the folution, which is colourlefs, with from two to three parts of water, and introduce a ftick of zinc, round which the tin will collect in a metallic ftate in the form of delicate dendritic laminæ. Scrape off the tin, wafh, dry, and fufe it under a cover of tallow in a capfule placed on charcoal. A button of fine metallic tin will remain at the bottom, the weight of which, deducted from that of the ore, indicates the proportion of oxygen.

Analyfis of Bell-metal Ore, or Tin Pyrites.—To two drachms of finely powdered ore, add one ounce of muriatic acid, and half an ounce of nitric acid: this will diffolve the greater portion of the metallic part without heat, but a gentle heat muft be applied to diffolve the whole. The fulphur will float on the furface of the folution, and muft be feparated by filtration. To the folution add carbonate of potafs, which produces a greenifh precipitate; let this be rediffolved in diluted muriatic acid, and introduce a cylinder of pure tin, the weight of which is to be previoufly afcertained. By this means the copper will be feparated in a metallic ftate. The cylinder of tin muft now be carefully weighed, and the quantity which it has loft muft be noted, and a cylinder of zinc muft be introduced into the foregoing folution: this will feparate all the tin, which muft be melted with tallow and weighed. Deduct the quantity of tin which was loft by the cylinder, and the remainder will be the quantity of tin from the ore, held in the folution.

The fulphur feparated by the firft filtration muft be ignited, and the unconfumed refidue, diffolved in nitro-muriatic acid, muft be added to the folution, in order to obtain the whole of the contents. The undiffolved part will be the filiceous matrix.

The copper may be brifkly digefted in nitric acid, which will leave behind a minute portion of oxyd of tin, and afcertain the precife quantity of pure copper contained in the ore.

The method of getting, preparing, &c. the tin in the Cornifh mines, much the beft and moft confiderable in the world, is given us in the Philofophical Tranfactions, Abr. vol. ii. p. 569, &c. and more diftinctly and fully in Pryce's Mineralogy.

The working of the tin-mines is very hard and difficult, not only by reafon of the great depth which the veins defcend to, even as low as fixty fathoms; but alfo becaufe the rocks, through which paffages are frequently cut, are extremely hard. Nor is the foft fhaking earth found in the tin-mines much lefs inconvenient to the workmen, both by reafon of the fetid, malignant vapours it exhales, and of the current of water often met with in them: thefe difadvantages often render it impracticable for the workmen to hold it above four hours together.

The exiftence of native tin has been always doubted, and till of late abfolutely denied by all mineralogifts, both ancient and modern: however, Mr. Borlafe, in his Natural Hiftory of Cornwall, p. 185, fuggefted, that its exiftence was far from being improbable; but he afterwards difcovered three fpecimens of this metal, native or pure, of which he prefented an account to the Royal Society. Mr. Mendes da Cofta made feveral experiments on one of thefe fpecimens, with a view of proving that it was really tin; from which he infers, that it is perfectly ductile and malleable; and being bent between the teeth, gives the fame crackling noife as tin always does: in an open fire it melts eafily, calcines on the furface, and fmokes; but forced in a ftronger fire with borax, it detonates with fmall phofphorefcent fparks, which is a property of pure tin; and it is only corroded to a white calx in fpirit of nitre, and oil of tartar *per deliquium* being added to the folution, none of it was precipitated: whence he concludes, that it was pure tin. Philof. Tranf. vol. lvi. art. 7. 39. Native tin is alfo faid to have been found in Saxony and Malacca.

The ores of tin may be generally claffed into fhoad or fhode, ftream, and bal or mine tin. The fhoad is disjunct, and fcattered to fome diftance from its parent lode, and is pebbly or fmoothly angular, of various fizes, from half an ounce to fome pounds weight. See Shoad.

Stream-tin ore is the fame as fhoad, but fmaller fized, &c. See Stream-*Tin* and Streaming.

Bal or mine tin-ore often rifes very rich; and inftances frequently occur, in which it has been difcovered in the richeft and pureft ftate imaginable. This kind of rich ore confifts of the blackeft grains or cryftals, and is ufually found at a moderate depth, or within the day-fide of forty fathoms.

When the tin-ore is raifed, or dug and drawn out of the mine, and laid by the fhaft, it is firft *fpalled*, as the procefs is termed, which confifts in breaking it into fmaller fragments, and feparating it from the worthlefs parts. When the beft parts are forted, they are divided into heaps by a hand-barrow, containing a fack and a half, or eighteen gallons. Each of thefe fhares, called *doles*, being turned over, equally levelled and mixed, is then divided with a fhovel into two equal parts; and after being bruifed by large fledges to the fize of a hazel-nut, is equally levelled and divided into four parts: the bruifing and divifions are repeated at pleafure, till the quantity defigned for fampling is well mixed, and made as fine as common fand. To make a rough guefs, or coarfe effay, the fampler takes a handful of it, and wafhes it on a fhovel, till the impure parts are carried off by the water, and the more folid and heavy particles, that are left behind, are bruifed with a fledge on the fhovel, till the whole affumes the appearance of mud. This is again wafhed, and by a peculiar motion the metallic particles are collected together on the fore-part of the fhovel. By repeating thefe bruifings, wafhings, and motions, it becomes clean black tin, fit for the fmelting-furnace. This is called a *van*, (probably from the French *avant*, *foremoft*,) as it is thrown upon the point of the fhovel by the dexterity of of the ſample trier. After the tin is thus cleaned, it is dried; and if there be as much black tin as will cover a ſhilling, or equal to the weight of a ſhilling, it is called a *ſhilling van*, which is not rich; but if the van will cover or equal the weight of a crown-piece, it is good tin-ſtuff, and called a *crown van*. The ſhilling van, the tinners ſay, will produce one hundred avoirdupois weight of block or white tin; and the crown van will yield five hundred weight of block tin, for every hundred ſacks in meaſure of the reſpective doles from which the ſample or van was taken, and ſo in proportion, to the richeſt tin-ſtuff, called *ſcove*, which is reckoned at the rate of ten thouſand of white tin-metal for every hundred ſacks. But a better judgment may be formed from the meaſure of a wine half-pint, than from a handful, which is indeed accounted a half pint. When the tin, thus meaſured, is reduced clean, and to a proper ſize, by uſing a large ſhovel, and taking off the ſized tin on another ſhovel, the van is dried in a ſhovel upon the fire, and then weighed by pennyweights and grains; and for every pennyweight and a half the van weighs, the produce will be one hundred weight of black tin for every hundred ſacks of tin-ſtuff; and for three pennyweights, two hundred weight, &c. in the ſame proportion; and if it be tin worth ten for twenty, or one for two, then the tin-ſtuff is valued at five hundred weight of block or white tin for every hundred ſacks: if it be worth twelve for twenty, the ſtuff is valued at ſix hundred weight of white tin a hundred; or if it be worth only eight for twenty, it is only valued at four hundred weight of white tin a hundred, &c. This *black* tin is rather of a liver colour, though called black in contradiſtinction from white tin, or the metal produced from this black ore: it is very heavy, and may in general be computed to hold one-half clean metal, and ſome of it will produce thirteen, or even fourteen parts in twenty; whence the mode of expreſſing ſo much white tin for twenty of black tin, *i. e.* eight for twenty, ten for twenty, twelve for twenty, &c. Thus, if the van of one hundred ſacks of tin-ſtuff weighs ſix pennyweights, being four hundred weight of black tin at twelve for twenty, the white tin or metal muſt be two hundred weight one quarter ſixteen pounds.

In this method of ſampling, the tinners form a near conjecture of the quantity of white tin which their doles of tin-ſtuff will produce at the ſmelting-houſe, when it is dreſſed, and brought into black tin. But if the black tin is combined with any bad mixture, as of mock-lead, copper, or mundic, after the van is bruiſed fine and waſhed, they lay the ſhovel over the fire, and burn the black tin, ſtirring it continually, till it has done ſmoaking: they then waſh it again on the ſhovel, and thus the heterogeneous matter, becoming light by being burnt, is carried off by the water: for when black tin is calcined or burnt, it ſtill retains its ſpecific gravity; but copper, lead, and other crude minerals, become much lighter by torrefaction, and are eaſily ſeparated from the tin by water. In the dreſſing and management of tin by ſtamping, &c. there are obtained two ſorts of black tin, *viz.* the crop and rough, or the crop and leavings of tin. The firſt is the prime tin: immediately ſeparable from the baſer parts by its ſuperior weight and richneſs. The latter is that which is carried off, and mixed with the lighter earthy parts, by being under ſize, and, therefore, more eaſily carried off by the water.

The tin-ſtuff, after this previous preparation and adjuſtment, is carried to the ſtamping-mill, in order to be dreſſed or pounded.

This operation of pounding in the ſtamping-mill is eſſential to the complete ſeparation of the ore from the matrix, through which it is diſſeminated. If full of ſlime, it is thrown into a pit, called a *buddle*, to waſh away the earthy matter, and render the ſtamping more free, without choaking the grates. The ore is ſhovelled into a kind of ſloping canal of timber, called the *paſs*, whence it ſlides by its own weight, and the aſſiſtance of a ſmall ſtream of water, into the box where the lifters work: the lifters are raiſed by a water-wheel, and are armed at the bottom with large maſſes of iron, weighing nearly two hundred weight each: theſe pound or ſtamp the ore ſufficiently to enable it to paſs through the holes of an iron grate fixed at one end of the box. To aſſiſt its pulverization, a rill of water keeps it conſtantly wet, and it is carried by a ſmall gutter into the fire-pit, where it makes its firſt depoſition; the lighter particles running forward with the water into the middle pit, then into a third, where what is called the *ſlime* ſettles. (See *Dreſſing of* Ores, and Buddle.) From theſe pits the ore is carried to the *keeve*, which is a large vat containing water; in which it is farther purified by an operation termed *packing*, and which conſiſts in beating the upper part of the contents with mallets for ſome minutes, by which the lighter particles are kept ſuſpended, whilſt the tin-ore, from its great ſpecific gravity, ſubſides. The waſte is ſkimmed and laid by, to be again buddled, under the name of the *ſkimpings*. The tin is ſifted through a copper-bottom ſieve into another keeve of water, by which the gravelly waſte ſtill remaining is ſeparated from the clean tin; and the tin that runs through the ſieve, if it requires no farther buddling, may be cleaned by repeatedly toſſing and packing it as before. If it be neceſſary to buddle it again after it is ſifted, let it be buddled and diſtributed in three parts, *viz.* the crop or pureſt, the creaſe or next in purity, and the hind-creaſe or tail, which is the moſt impure. The crop is to be cleanſed by toſſing, &c. and the creaſe muſt be buddled again, and out of this muſt be reſerved as much as may be cleanſed by toſſing and packing. The remainder muſt be cleanſed by an operation called *dilleughing*, from *dilleugh, to let go, or ſend away.* A dilleugher is a large fine hair-ſieve, which the dreſſer holds in a keeve one-third full of water, into which the tin is thrown by a ſhovelful at a time, and which is ſhook ſo as to put the tin into motion: one ſide of this dilleugher is dipped in water, and raiſed again in ſuch a manner, that the waſte may run over, which is laid aſide to mix with the ſkimpings, to make the ſamples of low value, called the *rough* (or *row*) tin. This uſually undergoes another operation, in which, by a rill of water paſſing over the buddle in which it is placed, it is farther cleanſed, and then dilleughed, ſo as to be fit to mix with the crop-tin.

Upon the ſame mechanical principle of ſeparation, the tinner is capable of eſtimating the value of a ſample of ore. For this purpoſe, the pounded tin-ore, or tin-ſtuff, as it is called, is placed on a ſhovel and waſhed under a ſtream, till the impure earthy parts are carried off by the water from its ſides, when, by a particular and dexterous motion, not eaſily deſcribed, all the metallic particles are collected together on the fore-part of the ſhovel: this operation is called *vanning*, which we have already deſcribed.

When the tin-ore is contaminated with the different pyritous ores of copper, arſenic, and iron, it is firſt roaſted in a burning-houſe, and then waſhed in water, by which means the tin, which is heavy, is eaſily ſeparated.

By this proceſs, as at preſent conducted in Cornwall, a conſiderable quantity of copper is loſt; for being converted into ſulphate of copper, which is ſoluble in water, it is loſt by waſhing: whereas, if the roaſted ore were ſuffered to remain in a cloſe pit for a few days, and the water drawn off

off into another pit, the copper might be feparated by iron in a metallic ftate.

The leavings of tin, confifting of the flime and tails, *i. e.* of tin-mud and tin-gravel, are dreffed by a particular kind of apparatus, for the conftruction and ufe of which, we muft refer to Pryce's Min. Corn. p. 226, &c.

Each ftamping-mill, which has conftant work and water, will employ one man and five boys; and one hundred facks are carried, ftamped, and dreffed, in the fpace of a few days, at the average rate of about four-pence *per* fack, or one guinea and a half *per* hundred.

When the tin-ore is dreffed, it is divided into as many fhares as there are lords and proprietors.

The next operation pertaining to tin-ore, or black tin, is that of *fmelting* it. The Phœnicians, who traded to Cornwall for tin in the earlier ages, probably conducted this procefs by digging a hole in the ground, and ftrewing the ore on a charcoal fire, which perhaps was excited by a bellows. But having no idea of confining the fire, and directing its force on the fubftance to be fmelted, they made no ufe of furnaces, either fimple or reverberatory. Charcoal was long ufed in the operation of fmelting, till at length neceffity fuggefted the introduction of pit-coal; and in the fecond year of queen Anne, a patent was granted for fmelting black tin with foffile coal in iron furnaces. The invention of reverberatory-furnaces built with brick, ftone, fand, lime, and clay, foon followed this difcovery; the form of which, being fimple, has admitted of little improvement to the prefent time. The charge for one of the tin fmelting-furnaces is from five to fix hundred weight of black tin, well mixed with a tenth or twelfth or eighth its weight of culm, which is a fpecies of coal from South Wales, that is very free from fulphur. The furnace is charged through a hole in its fide with a fhovel, and the tin levelled over the bottom with an iron rake or paddle. The apertures are then clofed, and the fire raifed to a very great ftrength, in which ftate it is left for four or five hours, when the door is taken off, and the whole charge well ftirred together. The ftate of the metal is examined, and more culm thrown in if neceffary; the furnace is again clofed, and the fire kept up till the end of about fix hours from its receiving the charge; when it is again examined, and if proper, it is then tapped, and the metal let out into a fixed bafon made of clay, and large enough to hold fomewhat more than the metal of the charge. The fcoria in the bottom of the furnace is raked out at the mouth into a fmall pit made for this purpofe, where it generally forms itfelf into a cake. When cold, it is carried to the ftamping-mill, in order to feparate the globules of melted tin diffeminated through the fcoria or flag. This, being broke by hammers to the fize of goofe-eggs, is put into the firft ftamping-mill, and paffed through fmall iron bars; by which means the *pillion* (for fo all tin recovered out of the flags is called) of the larger fize is taken out and prevented from wafte by too much ftamping. The refufe of this firft ftamping is put into other ftamping-mills of a fecond, third, or even fourth fize. Of the pillion, feparated from the fcoria, all the rough or grainy parts are confidered as metals, and refined accordingly, by being fmelted without any flux, and the produce of this fmelting refined, with the tin firft tapped.

The tin in the bafon, or float (as it is called), as foon as it comes down to a moderate heat, is laded out into the moulds, in flabs or pigs of about three-fourths of a hundred weight.

The method of fmelting in Saxony and Bohemia, does not differ greatly from that practifed in Cornwall. When the ore has been roafted it is wafhed upon tables, to feparate the oxyd of iron and the oxyd of copper, which are lighter than tin-ore. At Alt-Saint-John, the oxyd of tin is mixed with the black oxyd of iron: this is feparated by a powerful magnet, which is drawn over the table. That the powdered oxyd of tin may not be blown away by the blaft of the furnace, it is previoufly moiftened with water; but as the flame always carries away a part of the ore, a chamber is conftructed about the middle of the chimney, made of wood lined with clay, where the powdered ore that has been driven up by the flame is depofited.

The next procefs is that of *refining*. The furnace having, by the fide of the fmall float now defcribed, a larger one capable of holding twenty, or more blocks, is for this purpofe fuffered to cool to a certain degree, and then charged full with the flabs juft mentioned, the tap-hole being kept open, fo that as the tin melts in this moderate fire, it makes its exit through it into the float; where, while running out, it is frequently ftirred and toffed by a ladleful at a time held arm-high, letting it fall in a ftream into the mafs of metal, when the fcum which arifes is taken off. While the metal already put into the furnace is melting, more is added, fo as to be juft enough to fill the float with good tin: and this, after being toffed and fkimmed as before, and fuffered to cool to a proper temper, is carried in iron ladles to moulds holding generally fomewhat above three hundred weight (then denominated *block-tin*), where they are marked as the fmelters chufe with their houfe mark, which may be a pelican, plume of feathers, ftag, or horfe, by laying brafs or iron ftamps, in the face of the blocks while the tin is in a fluid ftate, and yet cool enough to fuftain the ftamping iron. The blocks are then ready to be weighed, numbered, and fent to the neareft coinage town to be coined. The privileged towns for coinage of tin, were anciently Lifkeard, Loftwithiel, Truro, and Helfton: but foon after the Reftoration, Penzance was added to the number; in which laft place there is every quarter more tin coined than in the towns of Lifkeard, Loftwithiel, and Helfton, for a whole year. When the tin is brought to be coined, the affay-mafter's deputy affays it by cutting off with a chiffel and hammer a piece of one of the lower corners of the block, about a pound weight, partly by cutting and partly by breaking, in order to prove the roughnefs and firmnefs of the metal. If it is a pure good tin, the face of the block is ftamped with the duchy feal, which ftamp is a permit for the owner to fell, and at the fame time an affurance that the tin fo marked has been examined and found merchantable. The ftamping of this impreffion by a hammer is *coining* the tin, and the man who does it is called the *hammer-man*. The duchy feal is argent, a lion rampant gules, crowned or, within a border garnifhed with bezants.

The droffy part remaining in the furnace is by an increafing fire wholly melted, which is then tapped into the fmall float, where the tin fubfiding, and the drofs rifing to the top, the latter is taken off, and the tin laded into fmall flabs, as at firft, to be again refined. The tin that remains in and about the fcoria and drofs of the laft tappings, &c. is recovered by repeated fmeltings, till at laft, being almoft entirely drained of that metal, they become what the workmen generally call *hard heads*, and efteemed of no farther value.

M. Groffe, in the Memoirs of the Academy of Sciences of Paris, has delivered a method he had invented of feparating tin from lead or filver. Having tried an experiment on the fcoriæ of metal, which contained with the tin a large quantity of filver, it feemed to him that one great ftep toward the feparation of the filver, was the haftening of the calcination of the tin, and with this view he tried a mixture

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of charcoal, faltpetre, and earth, which he put together into the coppel with the fcoriæ. It is eafy to fee that a detonation would happen from this, and this muft greatly add to the force of the fire, in acting upon the fcoriæ, while the ferruginous matter well known to be contained in the charcoal mixed itfelf with the tin, and muft greatly accelerate its calcination, divide its parts, and give the fire a new action over it. The confequence of this perfectly anfwered expectation, and recovered a large quantity of filver from the fcoriæ, in which the tin had before held it firmly imbodied; repeated experiments proved the truth of this obfervation, and it was found to be eafy by this means at any time to feparate filver from tin, or to purify filver without lofs, by means of lead in which tin has accidentally been imbodied.

The fcoriæ in which tin is mixed with filver, are compofed of tin half calcined, and run into an opaque vitrified fubftance, which forms a fort of net-work, in which the filver is confined in extremely fmall particles. If this is thrown into aqua fortis, the whole is diffolved: but then it requires a very ftrong fire to make the tin lofe its metallic form; finally, if the whole is finely powdered, and then put into this menftruum, the filver only is taken up or diffolved, the tin remaining untouched at the bottom of the veffel.

The fame gentleman found alfo a method of feparating tin from filver, by means of corrofive fublimate of mercury. To conceive the manner in which this feparation is effected, a piece of fine tin need only be caft into a folution of fublimate; in which cafe the acid of the fea-falt is feen to leave the mercury in order to fix upon the tin.

And, according to the fame principle, if fublimate corrofive be added to a mixture of tin and filver, the fame effect is produced, the acid affixes itfelf to the tin, and makes with it a butyrum joviale or butter of tin, the mercury becomes diffipated in the mean time by the action of the fire, and the filver remains pure and alone; but in this experiment, if too much corrofive fublimate be added, there is danger of lofing fome of the filver; fince the abundant acid will prey upon and carry off a part of that metal, making a fort of luna cornea which diffipates itfelf in the air, or if the operation be performed in a clofe veffel, a butyrum lunare.

Gold may alfo be purified from tin in this manner, and in this there is no rifk of lofs, fince the acid which takes up the tin has not the leaft power over that metal: in all thefe proceffes, however, the operator muft avoid the fumes iffuing from the crucible, for they are very dangerous.

Thefe methods of feparating of tin from filver are very certain and infallible, but they are too expenfive to be employed in common, and in larger works.

The feparating of tin from lead to be employed in the refining of filver is a matter of great importance; and this may be done in the following manner: melt the lead, and when in fufion throw into it a quantity of filings of iron, then increafe the fire to a confiderable degree, and the furface of the metal will be covered with a fort of fcum, which is no other than the iron and tin. At this time there fhould be a little alkali falt thrown in, and by this means the fcoriæ readily feparate themfelves, and the pure lead remains in form of a regulus at the bottom. The fame method may be ufed to feparate tin from filver in the larger way, but it will be neceffary for this purpofe to add fome lead, fince otherwife the fufion will be very flow and difficult, and the tin will calcine without feparating from the filver. This is a very eafy and very cheap method, and will obviate moft of the mifchiefs which happen to the refiners, of which they would have much lefs frequent reafon to complain, if they nicely examined the lead they were to employ. But if gold or filver be mixed with tin, the fhorteft method in fmall quantities is to calcine the whole very brifkly, and in order to complete the vitrification and feparation of the tin, to caft in a little glafs of lead, which will immediately join itfelf with it and carry it off from the mafs.

It may feem fingular that iron being one of the hardeft of the metals to melt, and tin being of all the eafieft, they fhould fo readily and eafily unite in thefe experiments; but this feems to be the refult of one of thofe natural and unexpected alliances which accident frequently difcovers to us in bodies. There is one conjecture, however, that may be worthy a place in this refearch, which is, that all tin-ore contains a quantity of arfenic; and it is well known that iron very readily mixes with arfenic, and is employed to feparate the arfenic from other ores, and a regulus may be formed of arfenic and iron. It is eafy to fuppofe that tin is, in its metalline form, not wholly divefted of the arfenic it contained when in the ore; and if this be allowed, it is no wonder that the two metals are eafily brought together by the mediation of that principle. Memoirs Acad. Scienc. Par. 1737.

Mr. Cramer gives the practical rules of feparating filver from tin, thus: Divide one centner of tin into two equal parts; put each of thefe into a feparate teft, and add to each fixteen centners of granulated lead, and one of copper; put the whole under the muffle, and make a very ftrong fire; the tin will be calcined immediately, and will fwim upon the lead. Then diminifh the fire a little, till the afhes of the tin that fwim upon the furface do no longer fparkle: when you fee this, add with a ladle two centners of glafs of lead to each teft, in fuch a manner that it may be fpread wide over the whole furface of the rejected calx; the calx will then change its form of powder into that of glafs; then increafe the fire to its higheft degree, ftir up the whole with an iron rod made warm; and when the fcorification is perfected, pour out the glafs into a mould; the fcoriæ being feparated, put both the regulufes into two coppels well heated; and into a third put fixteen centners of lead, and one of the fame copper ufed in the procefs: examine all thefe beads after the coppelling is over; if the two firft weigh exactly alike, it is a proof the procefs has been well performed; and fubtracting the weight of the bead, feparated from the third pan, from the joint weight of the other two, the remainder is the weight of the pure filver contained in the quantity of tin which was examined. Cramer's Art of Affaying, p. 228.

Tin is found in Europe, Afia, and America, but has not hitherto been difcovered in the continent of Africa. This metal is much lefs generally diffeminated than gold, filver, iron, copper, or lead; but where it occurs, it is moft frequently in large quantities. In Afia it is found on the coaft of Sumatra, and in Siam and Pegu. It is principally imported into our Indian poffeffions from Queda, Junkfeilon, Tavai in Lower Siam, and the ifland of Banca. The tin-mines of Banca are faid to be of great extent; and Mr. Ellmore informs us, that no lefs than from forty to fixty thoufand peculs of tin are furnifhed by thefe mines annually. Tin is faid alfo to be found at a place five days' journey from Nankin in China. The Indian tin was known to the ancients. Diodorus Siculus mentions it among the productions of India. Tin-ftone is found in Mexico in the ftate of ftream-tin, and is procured from alluvial depofitions by wafhing. It is alfo faid to occur in Chili.

Tin-ore occurs in Saxony and Bohemia in beds, and diffeminated in granite rocks; it is found alfo in veins in rocks of granite, gneifs, and mica-flate. Alluvial depofitions of tin are alfo met with in thefe diftricts. The mines fometimes confift of a mafs of ore formed by the junction of a multitude of of ſmall veins which paſs through the rocks in different directions. Theſe veins alſo contain topazes. Brongniart Traité Elementaire.

Tin is found near Monterey, in the province of Gallicia in Spain, in veins which traverſe granite and mica-ſlate. This ore has recently been diſcovered in ſmall quantities in grains and cryſtals, in a rock of granite at Puy les Vignes, in the vicinity of St. Leonhard, in the deparment of Haute-Vienne in France. It occurs in veins with wolfram, arſenical pyrites, and martial arſeniate of copper.

The moſt conſiderable repoſitory of tin-ore in Europe is that of Cornwall. The greateſt part of the tin conſumed in Europe is procured from thence; and Camden even ſuppoſes this abundance of tin in Cornwall and Devonſhire, to have given the original denomination *Britain* to the whole kingdom. In the Syriac language, *varatanac*, or *baratanac*, ſignifies *land of tin;* from which Bochart derives the name *Britain*. It occurs in Cornwall, both in veins and alluvial depoſitions, in various parts of the county. Alluvial depoſitions of this ore are alſo met with on Dart-moor, in Devonſhire. The veins which contain tin interſect both granite and ſlate rocks; the latter are provincially called *killas*. Theſe veins vary in width, and ſometimes contain large maſſes of the ore. One block was raiſed from the mine called Polberrow, in St. Agnes, which weighed more than twelve hundred pounds, and produced more than half that weight of pure metal. Tin-ſtone generally occupies the upper part of veins, and is ſucceeded by copper-ore; but there are inſtances of tin occurring at the depth of two hundred fathoms. Different modifications of the forms of the cryſtals are peculiar to certain veins. Cryſtals of tin-ſtone are alſo diſſeminated in ſome of the granite rocks in the vicinity of veins: the cryſtals appear to occupy the place of mica. Where the tin-ſtone is diſſeminated in ſlate, it is generally in ſmall ſtrings or minute veins. See Mine and Veins.

The workmen diſtinguiſh ſeveral kinds of tin; as *moor-tin*, which is the beſt ſort, a fool of which weighs eighty pounds; and *mine-tin*, which is the next, the fool of it weighing about fifty-two or fifty pounds. The tin got from the ſoft, gravelly earth, they call *pryan-tin*, to diſtinguiſh it from that obtained from the ſtones, which is better by almoſt half. See Stream-*Tin Ore*.

Grain-tin denotes the ore of tin that is ſometimes dug very rich in the form of grains or pebbles, or elſe in larger pieces, compoſed of many ſuch diſtinct grains, united in one maſs, always of a black or dark roſin colour, pointed like diamonds. Grain-tin is alſo uſed to ſignify the pureſt and fineſt block or white tin, ſmelted with charcoal in the blaſt or blowing-houſe furnace, which never had any brood or foreign mixture in the mine: whereas the mine-tin is uſually corrupted with ſome portion of mundic, or other mineral, and is always ſmelted with a bituminous fire, which communicates a harſh ſulphurous quality to the metal. Grain-tin is peculiarly produced from ſtream-work, and is worth ſeveral ſhillings *per* hundred more than mine-tin. See Streaming.

See on this article Macquer's Chem. Dict. art. *Tin;* and Pryce's Mineralogia Cornubienſis, fol. 1778.

There is a curioſity in the Corniſh mines, which is this: that in digging at the depth of forty or fifty fathoms, they frequently meet with large timber, ſtill entire.

Childrey, in his Natural Hiſtory, goes back as far as the deluge to place them there; but, without having recourſe to ſo great antiquity, they who believe that the mines, when exhauſted of their ore, or mineral matter, renew and fill again in courſe of time, will ſoon ſolve the difficulty, by ſuppoſing that, in the firſt working of theſe mines, theſe timbers had been let down to ſerve as props and pillars.

But there are other people who will think this renewal of the mines itſelf a difficulty as great as the former. However, what the former author adds, *viz.* that in ſome places in the mines they likewiſe find pick-axes, &c. with wooden ſhafts, as alſo braſs nails, and that even a medal of Domitian has been found in one, ſeems to countenance the opinion.

For the uſe of tin in the compoſition of pewter, ſee Pewter.

Tin-*Trade of Britain*. That tin was procured from Britain in a very early age, appears probable from the concurrent teſtimony of the moſt ancient hiſtorians. The Phœnicians are ſaid by Strabo to have paſſed the pillars of Hercules, now the ſtraits of Gibraltar, about twelve hundred years before Chriſt. At what preciſe period they diſcovered the Caſſiterides, or Tin iſlands, is unknown, nor is their exact ſituation determined; but it is generally believed that the Scilly iſlands, and the weſtern part of Britain, were the places from whence theſe early navigators procured the tin which they exported to other countries. The Phœnicians were extremely anxious to conceal from the reſt of the world the true ſituation of the Caſſiterides. Herodotus, who wrote about four hundred and fifty years before Chriſt, could not learn where theſe iſlands were ſituated; but he ſuppoſed that tin, like amber, was brought from the remoteſt parts of Europe. Strabo relates, that the captain of a Phœnician veſſel returning from Britain ſeeing himſelf purſued by a Roman galley, choſe rather to run his veſſel among the rocks, that the Romans might experience the like fate, than be the means of diſcovering ſo valuable a commerce to the enemies of his country. The captain having eſcaped from the wreck, claimed from his country compenſation for the loſs of his veſſel and the cargo; and it is ſaid he was paid from the public treaſury the amount of his claims. By theſe precautions, the Phœnicians are ſaid to have enjoyed a profitable trade to theſe iſlands for about three hundred years. The ſecret was at length diſcovered, and the Greeks, Gauls, and Romans, came in ſucceſſively for a ſhare of this trade. The Phocean Greeks eſtabliſhed a colony at Marſeilles five hundred and forty years before Chriſt; and after the deſtruction of Carthage, carried on this commerce: they endeavoured to conceal from the Romans their knowledge of the Britiſh iſles; for on being queſtioned by Scipio reſpecting the ſituation and extent of thoſe iſles from whence the tin was brought, they declared that they were entirely unknown to them. The Phœnicians, in their voyage to Britain, are ſaid to have ſailed from Cadiz to the harbour of the Artabici, near Cape Finiſterre, from whence, after four days' ſail, they arrived in Britain. Strabo relates, that Publius Lucius Craſſus having made fruitleſs attempts to diſcover whence the tin was brought, at length ſucceeded, and arrived in Britain. It is uncertain when this Craſſus lived, and even who he was, there being two of this name; the father, who was proconſul of Spain, and the ſon, who had a command under Cæſar in Gaul.

Diodorus Siculus, who wrote during the time of Auguſtus, appears, from the quotation which we ſhall ſubſequently give, to have been well acquainted with the tin-trade of Britain at that period. There cannot be a doubt, that from the conqueſt of Britain by the Romans, to the decline of their empire in the Weſt, they enjoyed the undiſturbed poſſeſſion of the Britiſh tin-trade.

What the ancient method was of preparing tin for the furnace we cannot learn, ſays Dr. Borlaſe. Polybius the hiſtorian is ſaid to have deſcribed it; and that work is commended recorded by Strabo, but now loſt. The ſhort deſcription of the tin-trade given by Diodorus Siculus deſerves particular attention. "Theſe men (the tinners) manufacture the tin by working the grounds which produce it with much ſkill. For though the land is rocky, it has ſoft veins running through it, in which the tinners find the treaſure, which they extract, melt, and purify. Then ſhaping it by moulds into a cubical figure, they carry it off to a certain iſland lying near the Britiſh ſhore, which they call Ictis; for at the receſs of the ſea between the iſland and the main land, the paſſage being dry, the tinners embrace the opportunity, and carry the tin over in carts to the Ictis or Port; for it muſt be obſerved, that the iſlands which lie between the continent and Britain have this peculiarity, that when the tide is full they are real iſlands, but when the ſea retires they are ſo many *peninſulæ*. From this iſland the merchants bring the tin of the natives, and export it into Gaul; and finally through Gaul, by a journey of about thirty days, to the mouth of the Rhone:" lib. 4. Poſidonius, as quoted by Strabo, ſays the port to which tin was brought in the ſouth of France was Marſeilles.

To what uſes the nations of antiquity applied all the tin which they obtained with ſo much labour from Britain, is not preciſely known. The Phœnicians were celebrated for their ſkill in the art of dyeing; and the Tyrian purple, which was either a bright crimſon or a ſcarlet, was held in the higheſt eſtimation; hence it has been conjectured, with much probability, that the Phœnicians were acquainted with the uſe of the ſolution of tin in the preparation of that colour. In the modern art of dyeing ſcarlet or crimſon, the ſolution of tin in the nitro-muriatic acid is eſſentially neceſſary to communicate thoſe colours to woollen cloths or ſtuffs, a practice which is probably derived from the ancient manufactures of the Eaſt.

The mirrors of the civilized nations of antiquity were made of a compoſition of copper and tin. The moſt ancient account that we have of theſe mirrors is that in Exodus, chap. xxxviii. 8. "And he made the laver of braſs (a mixture of copper and tin), and the foot of braſs of the mirrors of the women." The Jewiſh women probably received theſe mirrors from the Egyptians when they left the country; for it was the cuſtom of the Egyptians to carry a mirror in their left hand, when they went to their temples. Cyril de Ado.

Pliny ſays that the beſt ſpecula were anciently made at Brunduſium of copper and tin. The metallic mixture of tin and copper, for rendering the latter metal white, is mentioned by Ariſtotle. (De Mirab.) This compoſition is ſtill in uſe for the ſpecula of reflecting teleſcopes. (See SPECULUM.) The ancients alſo made uſe of an alloy of tin with copper and lead for pot-metal. In the time of Pliny, pot-metal, *ollaria temperatura*, was made of two pounds of lead, and an equal quantity of tin, mixed with one hundred pounds of copper. From the ſame writer we learn, that the bronze of which the Romans made their ſtatues, and the plates on which they engraved their inſcriptions, was compoſed of one hundred pounds of copper, mixed with twelve pounds and a half of an alloy made of equal parts of lead and tin. He informs us alſo that tin, *plumbum album*, was employed in coating or tinning copper veſſels, to render them more wholeſome; and it appears that the Romans not only uſed pure tin, but the ſame mixture of tin and lead which ſome of our workmen uſe at this time in tinning of veſſels. A mixture of equal parts of tin and lead they called *argentarium*; a mixture of two parts of lead and one of tin they called *tertiarium*; and with two parts of tin and one of lead, they tinned whatever veſſels they thought fit. (Watſon's Chemical Eſſays, vol. iv.) In the manufacture of arms, the ancients uſed an alloy of tin with copper, their braſs being a compoſition of theſe metals; but by what method they were enabled to communicate to it the neceſſary degree of hardneſs is unknown.

What was the relative value of tin, compared with that of gold and ſilver, as eſtimated by the Phœnicians, the Greeks, or the Romans, is uncertain.

The proceſs of extracting tin from its ores was probably very imperfect, and remained ſo in this country to the time of Elizabeth, when Carew informs us that ſir Francis Godolphin introduced great improvements in the tin-works.

The reverberatory-furnace appears, from Dr. Borlaſe, to have been introduced into Cornwall about the beginning of the laſt century; and about the ſame time the introduction of pit-coal became general, the wood of the country having been nearly exhauſted. Sir Bevil Granville had previouſly made many experiments for melting tin with pit-coal, but without ſucceſs, when the ore was ſmelted at the blowing-houſes by large bellows worked by a water-wheel.

Whether the Phœnicians or the Greeks intereſted themſelves in the management of the tin-mines, or whether they were ſimply merchants purchaſing and exporting the tin, is uncertain. It appears, however, by the paſſage quoted from Diodorus Siculus, that the veins of tin-ore were worked as mines; though it has been, and is ſtill generally believed, that ſtream-tin was the only ore worked by the ancients. From the teſtimony of Strabo, Pliny, and others, the Romans not only traded to Britain for tin, but improved the art of mining in Cornwall. The Romans being the conquerors, and the Britiſh under them having probably little or no property, they were the working miners, but under what regulations is uncertain. The Saxons did not obtain poſſeſſion of Cornwall till the reign of Athelſtan, and neither they nor the Danes appear to have directed their attention to the mines. After the Norman conqueſt, the working of mines is ſaid to have yielded great profit. In the time of king John, however, the right of working tin being as yet, ſays Borlaſe, wholly in the king, as earl of Cornwall, the property of the miners was precarious and unſettled, and all the tin that was raiſed was engroſſed and managed by the Jews. The *tin-farm* of Cornwall at this time amounted to no more than one hundred marks, according to which valuation, the biſhop of Exeter received then, and ſtill receives from the duke of Cornwall, the annual ſum of 6*l.* 13*s.* 4*d.*, ſo low were the tin profits then in Cornwall; whereas in Devonſhire, the tin was then farmed at 100*l.* yearly. King John, ſenſible of the languiſhing ſtate of the mines, granted the county of Cornwall ſome privileges, and is ſaid to have alſo granted a charter to the tinners.

In the time of Henry III. the tin-mines of Spain, which had been worked by the Moors, were ſtopped, and Cornwall had all the trade of Europe for tin. In the eighteenth year of Edward I., the Jews being baniſhed the kingdom, the mines were again neglected for want of proper encouragement to labour, and ſecurity to enjoy and diſpoſe of the products. In conſequence of a petition from ſome Corniſh gentlemen to Edmund, earl of Cornwall, a charter was obtained with more explicit grants of privileges of keeping courts of judicature, and managing and deciding ſtannary cauſes. About this time, ſays Borlaſe, it appears that the rights of bounding or dividing tin grounds into ſeparate portions, for encouraging the ſearch for tin, were more regularly adjuſted, and various laws introduced for the protection of the miner.

In

In the thirty-third year of Edward I. the above charter ſeems to have been confirmed, and the tinners of Cornwall were made a diſtinct body from thoſe of Devonſhire, before which time the tinners of both counties were accuſtomed to meet on Hingſton-Hill every ſeventh or eighth year, to concert the common intereſt of both parties. Two coinages of tin yearly were alſo granted by this charter, and the tinners had the liberty of ſelling their own tin, unleſs the king inſiſted on buying it himſelf. Other laws and regulations for the encouragement and protection of the miners, were paſſed in the reigns of Edward III., Henry VII., and Elizabeth. The mines having been much neglected during the reign of Mary, Elizabeth invited German miners into the country, and great encouragement was given to mining operations in Cornwall, and various parts of England. The quantity of tin procured annually in the ſucceeding reigns of James I. and Charles, amounted to ſixteen hundred tons. During, and for ſome time after the civil wars, the tin-trade declined, but revived again in the reign of George I., and has ſince been increaſing. For an account of the annual products of the tin-mines of Cornwall and Devonſhire, ſee the article MINE.

All the tranſactions connected with the tin-mines are under the controul of the ſtannary laws: courts are held every ſix months, and they decide by juries of ſix perſons, with a progreſſive appeal to the lord warden and lords of the duke of Cornwall's council. By whatever method or accident a vein is diſcovered, permiſſion of the proprietor muſt be obtained before any operations can be commenced, except in the caſe of ſuch tin-mines as are anciently embounded according to the proviſion of the ſtannary laws. (See STANNARY COURTS.) The owner of the ſoil is technically called the *lord*, whoſe ſhare (which is called his *diſh*) is generally one-ſixth or one-eighth of the ore. The duke of Cornwall receives a duty of four ſhillings *per* hundred weight of tin, which is taken when the tin is aſſayed and licenſed: this proceſs is called the *coinage*, from the French word *coin*, a corner. A corner is chipped off each block at the office, and if it be found ſufficiently pure, the blocks are ſtamped with the arms of the duke. The annual revenue of the tin is about 10,000*l.*; the average annual amount being about 3200 tons, and the value about 120*l.* *per* ton. The mode of aſſay is obviouſly rude and imperfect; and we have heard that foreigners have recently complained that the Britiſh tin was not ſo pure as that obtained from the Eaſt. But whatever be the purity of Britiſh tin, there can be no doubt that it is greatly adulterated on the continent. It is ſaid that every tin-founder in Holland has Engliſh ſtamps, and be the quality of the tin what it may, the inſcription makes it paſs for Engliſh. The metal with which Britiſh tin is adulterated on the continent is lead, which being five times cheaper, and when mixed in ſmall quantities not eaſily detected, the temptation for ſuch fraud is great. It is not true, as aſſerted by ſome foreign writers of reſpectability, that Britiſh tin is purpoſely alloyed with certain portions of copper and lead before it is exported from Cornwall. The ores of tin, in the tin-mines of Cornwall, are ſo intimately aſſociated with portions of copper-ore, lead-ore, arſenical pyrites, and other metals, of which a ſmall mixture will remain in the block-tin, and can only be ſeparated by ſubſequent refining, that any conſiderable portion of alloy may be detected by the increaſe of ſpecific gravity. Grain-tin, which is the pureſt tin of commerce, is ſmelted from the fineſt ore by a charcoal fire: the common block-tin is ſmelted with pit-coal or culm, as before ſtated. Grain-tin is uſed for various purpoſes in the arts, where tin of the pureſt quality is required.

Long as the tin-mines of Cornwall have been worked, they ſtill continue to ſupply in abundance this uſeful metal; but from the greater extent of the preſent works, and from the circumſtance of tin always occupying the upper part of the vein, we may infer that the tin-mines of that county will be exhauſted at no very diſtant period. At preſent, the principal part of the tin is obtained from the weſtern extremity of the county; but when the tin-mines in that diſtrict are worked out, we may conſider the tin-trade of Cornwall as nearly extinct. The granitic range of Dartmoor, in Devonſhire, has been leſs explored than Cornwall; but there is reaſon to believe that the metallic repoſitories of tin and copper which it contains will furniſh an ample field for the induſtry of future adventurers, and a failure in the ſupply from Cornwall would greatly enhance the price of this metal, and give increaſed ſpirit to mining ſpeculations.

TIN, in *Chemiſtry* and the *Arts*. The colour of tin is white, like that of ſilver: it has a ſenſible taſte, and when rubbed, emits a peculiar ſmell: its hardneſs is greater than that of lead, and leſs than that of zinc: its ſpecific gravity is ſtated by Briſſon to be 7.291, and it is ſaid to become a little greater by hammering: it is very malleable, and may be beaten into very thin leaves. *Tin-foil*, as it is termed, is uſually about $\frac{1}{1000}$th of an inch in thickneſs; but this is by no means the utmoſt degree of thinneſs which it will bear. Its ductility and tenacity are rather low: a tin wire, $\frac{1}{12.5}$th of an inch in diameter, is ſtated by Muſchenbroeck (as quoted by Dr. Thomſon) to be capable of ſupporting a weight of 31 lbs. only, without breaking. Tin may be eaſily bent, and when bent, produces a peculiar crackling noiſe: it fuſes at about 442° of Fahrenheit's ſcale, but will bear a moſt intenſe heat before it is volatilized. On being expoſed to the atmoſphere, its ſurface becomes ſlightly tarniſhed, but it undergoes no other change. When kept under cold water it undergoes no change; but red-hot tin, expoſed to the vapour of water, decompoſes it, an oxyd of tin is formed, and hydrogen gas is evolved. Expoſed to the action of the air in a melted ſtate, it quickly becomes covered with a greyiſh powder, or oxyd; and if the heat is very violent, it is ſtated to take fire, and to burn with a pale white light.

Tin unites with oxygen in two proportions, as has been lately proved by Gay Luſſac, in oppoſition to Berzelius, who concluded from his experiments that there were three oxyds of tin. (See Annal. de Chimie et Phyſ. vol. i. p. 40.) The firſt oxyd, or protoxyd, of tin, conſiſts of about

Tin	-	-	100.
Oxygen	-	-	13.6

The ſecond, or peroxyd, of about

Tin	-	-	100.
Oxygen	-	-	27.2

This gives the weight of the atom 7.352. Dr. Thomſon is inclined to conſider it as 7.375; but it perhaps will be found hereafter either 7.25 or 7.5. The firſt of theſe oxyds may be formed by diſſolving tin in muriatic acid, either by means of heat, or by adding occaſionally a little nitric acid: when diſſolved, add to it a ſolution of potaſh; a white precipitate falls, which is partly taken up again; but the remainder, on ſtanding, aſſumes a dark grey colour, and even a metallic luſtre; and on being heated to whiteneſs, is pure protoxyd of tin. The peroxyd may be formed by boiling

boiling the protoxyd in dilute nitric acid, drying by evaporation, and heating to rednefs.

Tin forms likewife two combinations with chlorine. When tin is burnt in chlorine, a very volatile clear liquor is formed, a non-conductor of electricity, and which, when mixed with a little water, becomes a folid cryftalline fubftance, a true muriate of tin, containing the peroxyd of tin. This compound has been called the *fmoking liquor of Libavius*, from its difcoverer, who formed it by diftilling together amalgam of tin and corrofive fublimate. According to the experiments of Dr. John Davy, it confifts of two atoms or proportions of chlorine united to one of tin; or of about

Tin	- -	100.
Chlorine	- -	121.82

Prochloride of tin, firft defcribed by Dr. J. Davy, is a grey, femi-tranfparent, cryftalline folid, and may be formed by heating together amalgam of tin and calomel. According to the fame chemift, it confifts of one atom or proportion of chlorine united to one of tin; or of about

Tin	- -	100.
Chlorine	- -	60.72

Tin combines readily with fulphur and phofphorus, but not with hydrogen, azote, carbon, or boron.

There are two fulphurets of tin; the firft may be formed by fufing tin and fulphur together: it is of a blueifh colour, and lamellated ftructure; and from the experiments of Dr. J. Davy, confifts of one proportion of tin united to one of fulphur. The other fulphuret of tin is made by heating together the peroxyd of tin and fulphur. It is of a beautiful gold colour, and appears in fine flakes. It was formerly called *aurum mufivum*, and various complicated proceffes given for forming it. Pelletier and Prouft inveftigated its nature, and concluded it to be a compound of oxyd of tin and fulphur; but Dr. Davy has fhewn that this is not the cafe, and that it confifts merely of one proportion of metallic tin united to one proportion of fulphur.

The phofphuret of tin may be formed by heating the two fubftances together. Only one phofphuret is known: it has a metallic appearance, and is fo foft that it may be cut with a knife. When gently heated in the air, the phofphorus takes fire. According to the experiments of fir H. Davy, it contains about 17 *per cent.* of phofphorus, and confifts therefore of one atom or proportion of phofphorus united to one of tin.

Tin combines with moft of the metals, and fome of its alloys are much employed.

Its alloys with the metals of the fixed alkalies fpeedily tarnifh in the air, and effervefce in water.

It readily unites with gold by fufion, and was formerly fuppofed to have the property of rendering this metal brittle; but this has been more recently denied. An alloy of 11 gold and 1 of tin, was found by Mr. Hatchett to have a pale whitifh colour, brittle when thick, but when cut thin, capable of being bent eafily. Its fracture was fine-grained, and of an earthy appearance. Mr. Alchorne found, that gold alloyed with no more than $\frac{1}{24}$th of tin, retains its ductility fufficiently to be rolled and ftamped in the ufual manner. But Mr. Tillet fhewed, that when heated to rednefs, the tin melts, and the alloy falls to pieces.

Its alloys with platina, according to Dr. Lewis, are brittle and dark-coloured, when the two metals are in equal proportions. The alloys of tin and filver are very hard and brittle. The alloys, or rather amalgams, of tin and mercury differ in hardnefs, according to the proportions in which the two metals are mixed: three parts of mercury and one of tin form an amalgam which cryftallizes in cubes, or, according to Sage, in the form of brilliant fquare plates, thin towards the edges. Tin readily combines with copper, and forms alloys exceedingly ufeful for a variety of purpofes, as will be briefly noticed when we fpeak of the ufes of this metal. Tin does not readily combine with iron, but their union may be effected by fufing them together in clofe veffels: it combines with zinc by fufion, and the alloy is harder than zinc, and ftronger than tin: with lead it readily unites in all proportions, and the lead by the addition becomes confiderably harder.

The oxyds of tin are capable of combining with the alkalies, and of forming with them peculiar compounds.

Salts of Tin.—Tin is oxydated and diffolved by many of the acids, and forms falts, differing in their nature according to the degree of oxydizement of the metal.

Nitrates of Tin.—Concentrated nitric acid (fpecific gravity 1.48) poured on tin, exerts but little action upon it; but if a little water be added, a violent action is exerted, and peroxyd of tin is formed, which feparates in the form of a white powder, this oxyd being apparently incapable of combining with nitric acid: in this cafe, both the acid and the water are decompofed, and nitrate of ammonia is formed; but if the acid be diluted, and care be taken to moderate its action upon the metal, the water only is chiefly decompofed, and the protoxyd of tin is formed, which combining with the nitric acid, forms a folution of a yellow colour, which is a real nitrate of tin. Still, however, a little nitrate of ammonia is formed, and the nitrate of tin itfelf is not permanent, the metal continuing to pafs to the ftate of peroxyd, and gradually feparating. The fame change is produced by heating the folution, a precipitate being depofited, which, however, is partly fubnitrate of tin.

Muriates of Tin.—We have already fpoken of the chlorides, or compounds of tin with chlorine. Now if water be added to thefe chlorides, they are converted into muriates of tin. The muriate of tin, in which the metal is in the ftate of protoxyd, may be formed, however, by diffolving tin in about four times its weight of muriatic acid: hydrogen efcapes, and the folution has a brownifh-yellow colour, and yields, on evaporation, fmall needle-fhaped cryftals, foluble in water, and fomewhat deliquefcent. Water poured upon it in fmall quantity decompofes it, and converts it into a fubmuriate, which is precipitated, and a fuper-muriate, which remains in folution. A fimilar effect is produced by the alkalies, when not added in excefs. This muriate of tin, formed of the protoxyd, has a great tendency to combine with oxygen, and to pafs into the ftate of muriates with the peroxyd, and this property enables it to exert many curious efforts upon other metallic falts. Thus, for example, the red oxyd of mercury, the black oxyd of manganefe, the white oxyd of antimony, the oxyds of zinc and filver, are deprived of their oxygen by this falt, and reduced to the metallic ftate. The muriate of tin with the peroxyd of the metal may be formed as before mentioned. It is capable of cryftallizing, and poffeffes properties quite different from thofe of the muriate above defcribed. It is much ufed by dyers, who generally form it by diffolving tin in nitro-muriatic acid.

Sulphate of Tin.—Sulphuric acid, when cold, has little action on tin, but affifted by a moderate heat, it attracts oxygen from it; fulphurous acid gas is evolved, and a fulphate of tin is formed, which yields, when evaporated, fmall needle-formed cryftals. It is probable there are two fulphates

fulphates of tin, though their properties do not appear hitherto to have been diftinctly defined.

The *phofphate*, *fluate*, and *borate of tin* may be formed by double decompofition, by adding folutions of their alkaline falts to a folution of muriate of tin. They are all infoluble compounds, and have been but imperfectly examined. No *carbonate of tin* appears to exift.

The other falts of tin are unimportant, and but little known. The *acetate* has been moft inveftigated: it may be formed by boiling tin in acetic acid. The folution has a whitifh colour, and yields cryftals by evaporation. There appears, however, to be another *acetate*, (formed probably with the peroxyd of the metal,) that does not cryftallize, but is capable of exifting only, on evaporation, in the form of a gummy mafs.

Ufes of Tin and its Compounds.—Tin and its compounds are extenfively ufed in the arts. We fhall here briefly point out fome of the more important operations in which they are concerned, referring our readers for further particulars to the different articles themfelves. An amalgam of tin and mercury forms the metallic coat of glafs mirrors. For the method of performing this operation, fee the article SILVERING *of Mirrors*.

The compounds of tin with copper are very important. Of this alloy *cannons* are made, alfo *bell-metal*, *bronze*, and the *mirrors* or *fpecula of telefcopes*. For thefe different purpofes, the two metals are mixed in different proportions, which are pointed out more particularly under their refpective articles.

Veffels of copper, efpecially for culinary purpofes, are ufually covered with a thin coating of tin, to prevent the copper from oxydating. (See the article TINNING.) Thin iron plates covered with this metal, form what is known by the name of *tin-plate*; which fee.

The oxyd of tin, mixed with that of lead, forms *putty*, which is much ufed in polifhing metals. See PUTTY and SPECULUM.

Tin alloyed with lead forms *folder*; which fee.

Of the falts of tin, a folution of the *muriate*, or *dyers' liquor*, as it is termed, is ufed as a mordant in dyeing fcarlet. ee the articles DYEING, MORDANT, and RED.

The folution of tin in aqua regia, added to the tinctures of cochineal, of gum-lac, and of fome other red tinctures, heightens the colour of thefe, and changes it from a crimfon or purple to a vivid reddifh-yellow, or fire-coloured fcarlet. The new fcarlet, or Bow dye, is obtained in this manner; and it is faid, that our moft beautiful and lafting-coloured fine cloths owe their fuperlative excellence to the retentivenefs given by our fine grain-tin; infomuch, that the Englifh fuperfine broad-cloths, dyed in grain by the help of this ingredient, are become famous in all markets of the known world.

Mr. Pryce apprehends, that the purple dye of the Tyrians owed its reputation wholly, or in part, to the ufe of our tin in the compofition of their dye-ftuff, as the tin-trade was folely under their own direction.

This colour, however, fucceeds only with wool and other animal matters. Attempts have been made, but without fuccefs, to give this colour to thread, to cotton, and even to filk, though this latter fubftance has many properties of animal matters. The folution of tin made with marine acid alone, or with vitriolic acid, does only give to red tinctures a crimfon colour, as alum does. Vegetable acids, as vinegar and cream of tartar, are alfo capable of diffolving tin.

Tin or its compounds are not ufed in medicine. They do not appear to be of a poifonous nature; but the muriate of tin, taken into the ftomach in confiderable quantity, fpeedily induces death, apparently merely from its corrofive qualities. It was formerly recommended for its anthelmintic virtues; but it is poffible, fays Dr. Lewis, that thefe may proceed not fo much from the pure metal, as from a certain fubftance of a different or arfenical nature, of which the pureft forts of tin are found to participate.

The principal preparations of tin are as follow:

TIN, *Butter of*, is a name given by fome chemifts to a combination of tin with the concentrated marine acid of corrofive fublimate. It is procured by reducing thefe fubftances into fmall parts, and mixing them together: this mixture will, by degrees, be moiftened by attracting the humidity of the air. The decompofition of the corrofive fublimate by the tin is more fpeedily effected by diftillation.

TIN, *Calx of*, is the metal reduced into powder, either by means of fire, or by being diffolved in an acid menftruum, and precipitated with an alkali.

TIN, *Cerufs of*. See *Spanifh* WHITE.

TIN, *Diaphoretic of*. See ANTIHECTICUM *Poterii*.

TIN, *Flowers of*, are a kind of white cofmetic, or paint for the complexion, drawn from tin with fal ammoniac, by means of fublimation.

TIN, *Gold-coloured preparation of*, is made by adding fix ounces of mercury to twelve of melted tin, pulverizing the cold mafs, mixing with it feven ounces of flowers of fulphur and fix of fal ammoniac, and fubliming in a matrafs.

This preparation is called *aurum mofaicum*, and as a medicine is little regarded, though formerly much efteemed againft hyfterical and hypochondriacal complaints, malignant fevers, and venereal diforders. Upon experiment, it appears to be little more than calx of tin.

TIN, *Salt of*, *Sal Jovis*, is prepared from twelve ounces of calx of tin, and four of aqua regia, diluted with twenty-four of water: after digeftion for two days, the veffel is to be fhaken, the more ponderous part of the calx fuffered to fettle, the turbid liquor poured off, and evaporated almoft to drynefs, and the mafs farther exficcated on brown paper: to the remaining calx half the quantity of frefh menftruum is to be added, and the procefs repeated. Dr. Lewis's experience has not enabled him to pronounce on the virtues of this falt, which is in tafte very fharp and corrofive: he thinks it needlefs to calcine the metal, as tin uncalcined diffolves much more eafily and plentifully, and the folution is in both cafes the fame. According to Hoffmann, the folution of tin is a ftrong purgative. Lewis's Mat. Med.

TIN is alfo a word ufed by fome of the chemical writers to exprefs fulphur.

TIN-*Coping*, in *Rural Economy*, a fort of covering of this kind of metallic fubftance in the fheet form, which is not unfrequently employed on the upper parts of the frames, ftands, or ftaddles of corn-ftacks, for the purpofe of preventing deftructive vermin from entering or getting into them. It is a cheap, ready, convenient, and ufeful material in this intention, in many cafes, which the arable farmer fhould not be inattentive to in his ftack-yard.

TIN-*Floors*, a contrivance ufed by our hufbandmen who propagate hops, to dry them after the gathering. See OOST.

It is thus done: Let a fquare brick room be built, with a door on one fide, and a long fire-place of a foot wide in the middle, reaching almoft acrofs it; let holes be made at the fides of this fire-place, to let out the heat into the room; and at the height of five feet above this, let a floor be made of laths of an inch thick, laid lattice-wife. Let this be covered with great plates of double tin, taking care that the joinings of the tin be well foldered, and lie upon the laths, nor over the interftices, which may be about four inches wide. Let a row of boards be fitted round the edge of this

this floor, to keep the hops from falling off; then lay on a covering of hops of a foot thick, and make a fmall fire of charcoal in the mouth of the fire-place, and the hops will dry very quickly and very regularly. They may be continually ftirred about while drying, and, when dry, a part of the boarded edge of the kiln may be taken down, and the dried parcel thruft out, and a frefh parcel laid on in their place. A very fmall quantity of fuel is fufficient in this way, and any fuel will do, for the fmoke never comes at the hops. There is a very great improvement ftill upon this method of drying hops, ufed by fome people: this is the making of a wooden cover, of the fize of the tin-floor; this is covered with plates of tin nailed on, and is fufpended over the kiln in fuch a manner, that it may be let down at pleafure, when the lower parts of the hops are dry. This is to be let down within ten inches of their furface, and there it acts as a reverberatory, and drives back the heat on the upper ones, fo that they are dried as foon as the lower ones. Thus all the trouble of turning is faved, and the hops are much better dried than in any other way. Mortimer's Hufbandry, p. 186. See VENTILATOR.

TIN-*Foil*. See FOIL, FOLIATING, and LOOKING-GLASS.

TIN-*Hatch*, in *Mining*, a term ufed by the people of Cornwall, to exprefs the opening into a tin-mine. They alfo call it *tin-fhaft*.

They make feveral openings in the fides of the hills where they expect veins of ore to be. All thefe, except that which opens on the head of the mine, are called *effay-hatches;* but that which does fo, is made their entrance afterwards, and changes its name to that of the tin-hatch. See HATCHES and SHAFT.

TIN-*Hoop for Cheefe*, in *Rural Economy*, a light thin hoop conftructed of this fort of fheet metallic fubftance, that is fometimes employed in cheefe-making, for holding and keeping the curd together while it is breaking and being crumbled down into the filling-vat, in order to prevent the trouble of raifing and holding up the corners of the cloth which is made ufe of in the bufinefs. It is ufually about nine inches in breadth, and formed fo as exactly to fit the top part of the cheefe-vat on which it refts when ufed. Thefe hoops are fometimes made of other materials, as wood, &c. and are ufeful in faving time and trouble.

TIN-*Ore*, called *tin-ftuff* by the miners in Cornwall. See TIN-*Stone*.

M. Gellert directs, that ores of tin fhould be affayed in the following manner: Mix a quintal of tin-ore, wafhed, pulverized, and twice roafted, with half a quintal of calcined borax, and half a quintal of pulverized pitch; thefe are to be put into a crucible, moiftened with charcoal-duft and water, and the crucible placed in an air-furnace: after the pitch is burnt, give a violent fire during a quarter of an hour, and then withdraw the crucible. If the ore be not very well wafhed from the earthy matter, as it ought to be, a larger quantity of borax is requifite, with fome powdered glafs, by which the too quick fufion of the borax is retarded, and the precipitation of the earthy matter is prevented. If the ore contains iron, to the above mixture may be added fome alkaline falt. See MOOR-*Stone*.

The method of affaying tin-ore, fays Mr. Pryce, is very eafy; for in its form and fize of black tin (which is the ore dreffed by ftamping, feveral wafhings, and calcination, if mineralized with vitriolic, arfenical, or fulphureous pyrites) great part of the work is done, and little more remains than fufion, which is accomplifhed by a red heat in the following procefs: Take four or five ounces of black tin as emptied from the facks, mix it well with about one-fifth part of its weight of powdered culm; put the mixture in a black-lead crucible, on the wind furnace, and, in about twenty minutes, the metal will be found precipitated to the bottom of the crucible, the culm and fcoria floating on the tin. On the furface of this matter there will be globules of tin; and therefore the mixture fhould be ftirred with an iron rod, to make them fall into the tin at the bottom. Clofe the furnace, and let the whole remain in fufion from three to five minutes. Keep in readinefs an iron or brafs mortar, and an ingot-mould about fix inches long; pour the tin into the ingot, and empty the culm and fcoria into the mortar, fcraping off what remains in and about the crucible with a fharp iron. As foon as cold, put them into another mortar, and pulverize them gently, fo as to feparate the fcoria from the largeft of the globules of tin. Select the larger globules, and pulverize the remainder a fecond time; then put this ftuff, twice powdered, on a fhovel, and paffing it often through water, in the fame manner as the lighter parts are wafhed from ores in vanning, and the fmaller globules will remain on the fhovel; and thefe, with the larger (both together being generally called *pillion-tin*), being added to, and weighed with the ingot, fhew the produce in metal of the four or five ounces affayed. See Macquer's Chem. Dict.; and Pryce's Min. Corn. p. 269.

TIN-*Plates*, an article of manufacture very common among us, and vulgarly called *tin*. It is iron plated over with tin. The French call it *fer blanc*, white iron, as we fometimes do in England. It was once known under a diftinct name, *lattin*, under which article the procefs of manufacturing it is defcribed.

The procefs ufed for this purpofe near Caermarthen, in South Wales, which is defcribed by Mr. Donovan, in his "Defcriptive Excurfions through South Wales in 1805," is as follows:

The iron-ore employed in this manufactory is the common kind of the country, intermixed with a large portion of the fine hæmatite from Ulverftone, in Lancafhire, which gives a very fine metal. This too is fmelted with charcoal inftead of coke, to produce a metal of the greateft purity and extenfibility, and clofenefs of texture, which qualities are particularly required in this manufacture. The reduced ore is fmelted in the ufual manner, and caft into pigs, which are then wrought by the hammer into long flat bars, that are afterwards cut into pieces of about ten inches in length. Thefe are then wrought into plates by being heated red-hot, and paffed through a flatting-mill, which confifts of two large cylinders of fteel, cafe-hardened and fecured in a frame of iron. Thefe are placed contiguous to each other, but with a certain interval of fpace, and revolve in a contrary direction, fo that when one end of the bar is thruft in the fpace between the cylinders, the whole is drawn through and proportionably extended and flattened in the paffage. The diftance between the cylinders, which of courfe determines the thicknefs of the plate, is maintained and regulated by fcrews which can be altered at pleafure. When the bar is thus made into a plate of twice the thicknefs of the ordinary plates, it is heated red-hot, cut in two by a pair of fhears, and one piece folded exactly over the other, and both repaffed repeatedly through the cylinders till the folded plate has extended to the fame length and breadth as the plate was before cutting. It is then clipped round the edges, and the two plates torn afunder (which requires fome little force) after which they are each finifhed by paffing through a finer rolling-prefs, fo as to take away every creafe or inequality in the plate, and thofe that are too rough to pafs through this finer prefs are thrown afide.

The plates are then fteeped in a very weak acid liquor, and when taken out are fcoured thoroughly with bran, fo as to to be quite bright and poliſhed to enable the tin to adhere. The tin is melted in deep rectangular crucibles, and kept fluid by a moderate charcoal fire beneath. To prevent its calcination, a quantity of greaſe prepared from linſeed-oil and ſuet is conſtantly kept floating on the ſurface of the tin, and renewed as it evaporates off, which gives an exceſſively nauſeous ſtench. The plate is then taken up by one corner by a pair of pincers, and dipped vertically into the tin, and when withdrawn is found beautifully white and reſplendent with the coating of this metal that adheres to it. This dipping is repeated three times for what is called *ſingle tin-plate*, and ſix times for the *double plate*. The plates are then only cleanſed and ſorted, and are fit for uſe.

We ſhall here add, with regard to the hiſtory of this manufacture, that in the year 1681, tin-plates were made in England by one Andrew Yarranton, who was ſent to Bohemia to learn the manner of making them. But the manufacture was diſcontinued by his employers, and afterwards ſo much diſregarded, as to be reckoned among the projects called bubbles of the year 1720; however, it was revived, and brought to ſuch perfection about the year 1740, that very little of it was imported from foreign parts; our own plates being of a finer gloſs, or coat, than that made beyond ſea, the latter being hammered, and ours being drawn under a rolling-mill. And. Hiſt. Com. vol. ii. p. 175, 361.

The two principal wholeſale houſes for this manufacture in London, are thoſe of Jones and Taylor in Tottenham-Court Road, and Howard and Co., in Old-ſtreet Road.

TINA, a name given by the old medical writers to a bath made of a ſtrong decoction of many carminative ingredients to be uſed in the colic.

Tina, in *Geography*. See Knin.

TINAGOB, a town on the W. coaſt of the iſland of Samar. N. lat. 12° 5′. E. long. 124° 30′.

TINALMO, a town on the S. coaſt of the iſland of Luçon. N. lat. 13° 38′. E. long. 122° 42′.

TINAMASAKI, a town of Japan, on the S. coaſt of the iſland of Niphon. N. lat. 34° 12′. E. long. 136° 55′.

TINAPA, a town of Mexico, in the province of New Biſcay; 120 miles N.W. of Duranga.

TINARA, a town of Nubia, on the Nile; 200 miles S.S.W. of Syene.

TINCA, the *Tench*, in *Ichthyology*. See Cyprinus *Tinca*, and Tench.

Tinca *Marina*, the *ſea-tench*, a name given by ſome authors to the common *turdus*, called in Engliſh the *wraſſe*, and *phycis*.

TINCAL, is a name given to borax in the crude ſtate in which it is brought from India, and before it is refined. It conſiſts of ſmall cryſtals of a yellowiſh colour, and it has a greaſy or unctuous touch. See Borax.

According to M. Cadet, it contains a larger quantity of the peculiar vitreſcible earth of borax than the refined ſalt commonly ſold does. See Baurac.

TINCAUSARIS, in *Ancient Geography*, a place of Africa, in Cyrenaica, on the route from Carthage to Alexandria, between Boreum and Atticis. Anton. Itin.

TINCHEBRAY, in *Geography*, a town of France, in the department of the Orne; 10 miles N. of Domfront.

TINCO, a town of Spain, in the province of Aſturias; 20 miles N.W. of Oviedo.

TINCONTIUM, or Tinconcium, in *Ancient Geography*, a town of Lyonneſe Gaul, between Avarican and Deccida. Anton. Itin.

TINCTOR, John, in *Biography*, born at Nivelle, in Brabant, and flouriſhed about the year 1474. He was a great muſician, long in the ſervice of Ferdinand of Aragon, king of Naples and Sicily, who reigned from 1458 to 1504, and ſtyles himſelf his arch-deacon, chaplain, and cantor. Beſides ſeveral muſical tracts by this early writer on counterpoint, he was author of the firſt muſical dictionary. All written muſic in counterpoint during the fifteenth century was compoſed for voices, at leaſt we have never ſeen any other; and being intended for the church, was ſet to Latin words: ſo that the firſt terms uſed in the art, were likewiſe in that language; and theſe were ſo numerous in Tinctor's time, that he collected them, under the title of "Terminorum Muſicæ Diffinitorium," and printed them at Naples. This was doubtleſs not only the firſt muſical dictionary that was ever compiled, but the firſt book that was printed on the ſubject of muſic in general. The work is ſo ſcarce, that we have never been able to find it, except in his majeſty's ineſtimable library. In this "Diffinitorium," we firſt met with the preciſe definition of the four principal parts in vocal counterpoint: *cantus*, *altus*, *tenor*, and *baſe*; which ſee under their ſeveral heads.

Tinctor, in one of his tracts, gives to the Engliſh the invention of counterpoint. See Dunstable.

Walther ſeems never to have heard of Tinctor's "Diffinitorium;" but he gives the title of his three tracts: "De Arte Contrapuncti;" "De Tonis;" and "De Origine Muſicæ;" from Geſner's Bibl. Univ.

TINCTORUM Rubia. See Madder.

TINCTURE, Tinctura, in *Pharmacy* and *Chemiſtry*, a ſeparation of the finer and more volatile parts of a mixed body, made by means of a proper menſtruum diſſolving the ſame.

Tincture is more particularly uſed for an extract of part of the ſubſtance of a body, eſpecially its flavour and colour, which are hereby communicated to the menſtruum.

Tinctures, in the *Materia Medica*, are ſpirituous ſolutions of ſuch of the proximate principles of vegetables and animals, as are ſoluble in pure alcohol or in proof-ſpirit; and they are ſaid to have been invented about the end of the thirteenth century, by a profeſſor of medicine at Montpelier, called Arnold de Villa Nova. From vegetable matter ſubmitted to its action, alcohol takes up ſugar, reſin, extractive, tannin, cinchonin, camphor, volatile oils, ſeveral acids, and the narcotic principle; proof-ſpirit alſo takes up the whole of theſe partially, and is beſides the proper menſtruum for gum-reſins; ſo that alcohol, either in a concentrated or diluted form, is capable of ſeparating the greater part of the active principles of vegetables from the ligneous inert fibres. The tinctures obtained from animal ſubſtances are very few in number, and the principles taken up by the ſpirit are analogous to thoſe enumerated above, belonging to the vegetable kingdom.

Pure alcohol is required in very few inſtances only for the formation of tinctures, proof-ſpirit being adequate for almoſt every purpoſe. The dilution of the ſpirit, however, muſt be varied according to the known principles of the ſubſtances to be ſubmitted to its action: when reſin predominates, it muſt neceſſarily be more concentrated; when gum-reſin or extractive is the moſt abundant conſtituent, proof-ſpirit then muſt be employed. In conſequence of the great affinity of water for alcohol, the addition of it to alcoholic tinctures ſeparates the reſin, camphor, and volatile oils they contain; but water is generally miſcible with tinctures made with proof-ſpirit, without producing any decompoſition. Tinctures are not liable to ſuffer ſpontaneous decompoſition, as is the caſe with infuſions and decoctions; and, independently of the loſs which takes place from the evaporation of the ſpirit and the volatile oils, if the bottles containing tinctures be cloſely corked, they may

be

be kept for an indefinite length of time, and their virtues remain unimpaired.

Tinctures are prepared by macerating the ingredients in the ſpirit in a temperature not exceeding 80°, at which degree, by allowing the menſtruum to remain on the ingredients for a ſufficient length of time, all the principles that can prove uſeful in the tincture are extracted, and the ſolvent ſaturated. The ingredients muſt be dried and reduced to a coarſe powder, and the maceration made in cloſe veſſels, and aſſiſted by frequent agitation. When completely made, tinctures ſhould not be allowed to remain upon the ingredients, but be filtered through bibulous paper, and kept in this ſtate in well-corked bottles.

The chief uſe of this claſs of preparations is to cauſe infuſions and decoctions to which they are added, to ſit lighter upon the ſtomach, or to unite with them ſome active principle, which the water is incapable of extracting. Thomſon's London Diſpenſatory.

A great variety of tinctures may be given to common water, and many remarkable things occur in their changes on the addition of common menſtruums. Take a large ſpoonful of the ſyrup of pomegranate-flowers, mix it with five ſpoonfuls of water; the mixture will be of a very lively and brilliant red: for a violet colour, take the ſame quantity of ſyrup of violets and the ſame of water. When theſe tinctures are thus prepared, have at hand a phial, in which is a ſmall portion of oil of tartar, which will only look like water remaining after the waſhing of the phial. Pour the red or the violet tincture into this phial, and it immediately becomes a fine graſs-green. Diſſolve the quantity of a walnut of crude ſal ammoniac in a glaſs of water, pour all out except three or four drops at the bottom, and pour into this glaſs the fine red liquor, and it immediately becomes black as ink. In order to change the purple liquor red, only have a ſmall quantity of ſpirit of vitriol in the bottom of a phial, and pour into this the violet water; it immediately on this becomes of a florid red.

Steep Braſil wood in common water, or in white wine, twenty hours; the liquor will then look of the colour of red wine: pour this into a glaſs waſhed with vinegar, and it becomes of a fine yellow, like ſack. If this experiment be made with white wine, the wood and the vinegar make ſo little alteration in it, that it may be drank afterwards, and the whole proceſs ſeems a way of turning red port into ſack. Into this liquor, when yellow, put a few drops of a tincture of benjamin made in ſpirit of wine, and it immediately loſes its yellow colour and becomes white. Beat ſome galls to fine powder, and rub the powder on a towel; then put into a baſon of water, in which any perſon is going to waſh their hands and face, a ſmall piece of common green vitriol, or copperas: after the perſon has waſhed, let them have this towel to wipe on, and the hands and face will be as black as if waſhed with the common writing-ink; the copperas in the water and the galls on the towel making real ink where they mix. This does no laſting injury to the ſkin, but will come off again upon waſhing with ſoap. Phil. Tranſ. N° 238, p. 88.

We ſhall here enumerate and deſcribe the principal tinctures that occur in the materia medica.

Tincture *of Acetate of Iron* is prepared, according to the Dub. Phar. by adding together two ounces of acetate of kali and one ounce of ſulphate of iron in a ſtone-ware mortar, till they unite in a ſoft maſs, and when dried by a moderate heat, triturating it with two pints of rectified ſpirit of wine; and then digeſting it for ſeven days in a phial, cloſely corked, and frequently agitated, and then pouring the clear tincture from the fæces.

Tincture *of Acetate of Iron with Alcohol*, is prepared by rubbing together ſulphate of iron and acetate of alkali, of each an ounce, and proceeding as in the former article, triturating with two pints of alcohol; and digeſting for twenty-four hours. Theſe tinctures have a peculiar odour, a reddiſh-brown colour, and a warm ſtyptic taſte; and poſſeſs the ſame medical properties as the other preparations of iron. The doſe of either may be from ♏ x to f℥j, given in water or any other ſuitable vehicle.

Tincture *of Acetate of Zinc* of the Dub. Ph., is obtained by rubbing ſulphate of zinc and acetate of kali, of each an ounce, and adding one pint of rectified ſpirit of wine, and then macerating for a week with occaſional agitation, and filtering through paper. This tincture is aſtringent, but requires to be diluted with water, before it is uſed either as a collyrium or an injection. It may be beneficially employed as an internal remedy in dyſpepſia and other debilities of the ſtomach.

Tincture *of Aloes* of the Lond. Ph., is prepared by macerating of extract of ſpiked aloes powdered, half an ounce; of extract of liquorice, an ounce and a half; of water, a pint; and of rectified ſpirit, four fluid-ounces, in a ſand-bath until the extracts are diſſolved, and then ſtraining.

The *tincture of aloes* of the Dub. Ph. is obtained by digeſting for ſeven days, half an ounce of ſocotorine aloes powdered, an ounce and a half of extract of liquorice diſſolved in eight ounces of boiling water, and eight fluid-ounces of proof-ſpirit, and then ſtraining.

The *tincture of ſocotorine aloes* of the Edinb. Ph. is formed by digeſting for ſeven days, with a gentle heat, in a cloſe veſſel, often ſhaken, half an ounce of ſocotorine aloes in powder, an ounce and a half of extract of liquorice, four ounces of alcohol, and a pound of water; and pouring off the clear tincture. Its doſe is from f℥ſs to f℥jſs.

Tincture, ethereal, of aloes of the Edinb. Ph., is prepared by digeſting an ounce and a half of myrrh with a pound of ſulphuric ether with alcohol, for four days, in a cloſed bottle, and then adding one ounce of Engliſh ſaffron cut, and one and a half of ſocotorine aloes in powder; digeſting again for four days, and pouring off the tincture. This is a warm ſtomachic purgative, and is given with advantage in dyſpeptic affections, jaundice, gout, chloroſis, and other caſes in which aloetics are proper; in doſes of fℨj or fℨij as a ſtomachic, and in larger doſes as a briſk purge.

Tincture, compound, of aloes of the Lond. and Dub. Ph., is prepared by macerating for fourteen days (ſeven days Dub.), of extract of ſpiked aloes powdered, and ſaffron, of each three ounces, in two pints of tincture of myrrh; and ſtraining.

Tincture of aloes and myrrh of the Edinb. Ph., is prepared by mixing a pound and a half of alcohol with half a pound of water, and then adding two ounces of myrrh in powder; digeſting for four days; and, laſtly, adding of ſocotorine aloes in powder an ounce and a half, and an ounce of Engliſh ſaffron cut; digeſting again for three days, and pouring off the clear tincture. This tincture may be adminiſtered in the ſame caſes and doſes as the former; and it is occaſionally uſed as a local ſtimulant to foul ulcers.

The *tincture of aloes*, formerly called *tinctura ſacra*, and *hiera picra*, was ordered to be made by digeſting five ounces of the powder, called *hiera picra*, or a powder formed of eight parts of aloes and two of canella alba, in five pints of mountain wine; or an ounce of aloes, with one drachm of the leſſer cardamom ſeeds, and the ſame quantity of ginger, in two pounds of the ſame wine. Lewis.

Dr. Buchan directs this tincture to be made by infuſing an ounce of ſocotorine aloes in powder, and two drachms of Virginia ſnake-root, and as much ginger, in a pint of mountain

mountain wine and half a pint of brandy, for a week, frequently ſhaking the bottle, and ſtraining off the tincture. This, he ſays, is a ſafe and uſeful purge for perſons of a languid and phlegmatic habit; but it is thought to have better effect when taken in ſmall doſes as a laxative. The doſe, as a purge, is from one to two ounces.

Tincture *of Ambergris*. See Ambergris.

Tincture *of Ammoniated Iron*. See Iron.

Tincture *of Anguſtura Bark*. See Angustura.

Tincture *of Antimony* uſed to be thus made: Take ſalt of tartar, a pound; antimony, half a pound; rectified ſpirit of wine, a quart; reduce the antimony to powder, and mix it with the ſalt by fuſion over a ſtrong fire. When it is cold powder it, and pour on the ſpirit of wine; digeſt them together in a ſand-heat, and then filtre off the clear tincture for uſe. The ſalt of tartar yields a tincture as well as antimony. It is a diaphoretic and attenuant. See Antimony.

This tincture, on an empty ſtomach, is ſaid to have ſometimes proved emetic.

Tinctura *Antiphthiſica*. See Tinctura *Saturnina*.

Tincture, *Aromatic*, may be prepared by infuſing two ounces of Jamaica pepper in two pints of brandy, without heat, for a few days, and then ſtraining off the tincture. This will anſwer all the intentions of the more coſtly preparations of this kind.

Tincture *of Aſſafœtida*. See Assafœtida.

Tinctura *Aurantii*, *Tincture of Orange-peel*, is obtained in the Lond. and Dub. Ph., by macerating three ounces of freſh orange-peel in two pints of proof-ſpirit for fourteen days (three days Dub.), and filtering. This is an uſeful adjunct to infuſions and decoctions in dyſpepſia, communicating to them an agreeable flavour, and not decompoſable by water.

Tincture *of Bark*. See Angustura and Tincture *of Cinchona*.

Tincture *of Benzoin*, *Compound*, of the Lond. and Dub. Ph., is prepared by macerating for fourteen days (ſeven days Dub.), three ounces of benzoin, two ounces of ſtorax balſam ſtrained, one ounce of balſam of Tolu, and half an ounce of ſpiked aloes, in two pints of rectified ſpirit, and filtering.

The *compound tincture of benzoin* of the Edinb. Ph., or *Traumatic balſam*, is obtained by digeſting for ſeven days, three ounces of benzoin in powder, two ounces of balſam of Peru, half an ounce of hepatic aloes in powder, in two pints of alcohol, and filtering through paper. This tincture is a ſtimulating expectorant, and ſometimes preſcribed in chronic catarrh and old aſthmatic caſes; but chiefly uſed as an external application to wounds and languid ulcers. Its doſe is from f℥ſs to f℥ij, or more. See Benzoin.

Tincture *of Calumba* of the Lond. Ph., is had by macerating for fourteen days of calumba (or Columbo) root ſliced, two ounces and a half, in two pints of proof-ſpirit, and filtering.

The Edinb. *tincture of calumba* is obtained by digeſting for ſeven days, two ounces of calumba root in powder, in two pounds of proof-ſpirit, and filtering through paper. This is an uſeful addition to ſtomachic infuſions and decoctions. See Columbo.

Tincture *of Camphor*, *Compound*, is ordered by the Lond. Ph. to be prepared by macerating for fourteen days, of camphor two ſcruples, of hard opium powdered and acid of benzoin, of each one drachm, in two pints of proof-ſpirit, and filtering.

The *camphorated tincture of opium*, or "paregoric elixir," is obtained by digeſting for ten days, of hard purified opium in powder, and benzoic acid, of each a drachm, of camphor two ſcruples, of eſſential oil of aniſeed a drachm, in two pints of proof-ſpirit, and filtering. This is an uſeful anodyne in chronic aſthma, hooping-cough, and catarrh after the inflammatory ſymptoms have abated, and contributes to allay the frequent cough. The doſe is from fʒj to fʒij occaſionally, uſing after it the inhaler, and fʒiij in caſes where quiet, rather than ſleep, is required. See Camphor.

Tincture *of Capſicum* of the Lond. Ph., is obtained by macerating for fourteen days, an ounce of capſicum berries in two pints of proof-ſpirit, and filtering. The doſe in tympanitis, cynanche maligna, the low ſtage of typhus, and ſuch caſes, is from fʒſs to fʒj; and a mixture of fʒvj with half a pint of water will anſwer all the purpoſes of the capſicum gargle. See Capsicum.

Tincture *of Cardamoms* of the Lond. and Dub. Ph., is prepared by macerating for fourteen days (ſeven days Dub.) three ounces of cardamom ſeeds huſked and bruiſed, in two pints of proof-ſpirit, and filtering.

The *tincture of cardamoms*, or "tinctura amomi repentis," of the Edinb. Ph. is had by digeſting for ſeven days, four ounces of leſſer cardamom ſeeds bruiſed, in two pounds and a half of proof-ſpirit, and filtering through paper.

The *compound tincture of cardamoms* of the Lond. and Dub. Ph. is prepared by macerating for fourteen days, cardamom ſeeds (huſked Dub.), carraway ſeeds and cochineal, of each, in powder, two drachms, cinnamon bark bruiſed half an ounce, ſtoned raiſins four ounces, in two pints of proof-ſpirit, and filtering. Theſe are agreeable additions to ſtomachic infuſions.

Tincture *of Caſcarilla*. See Cascarilla.

Tincture *of Caſſia*. See Cassia.

Tincture *of Caſtor* of the Lond. and Dub. Ph., is formed by macerating for ſeven days, of caſtor powdered two ounces, in two pints of rectified ſpirit (proof-ſpirit Dub.) and filtering. The Edinb. Ph. directs an ounce and a half of Ruſſian caſtor powdered to be macerated for ſeven days in one pound of alcohol, and then filtered. The doſe is from ♏xx to fʒij. See Castor.

The *compound tincture of caſtor* of the Edinb. Ph. is obtained by digeſting for ſeven days, one ounce of Ruſſian caſtor powdered, half an ounce of aſſafœtida, in a pound of ammoniated alcohol, and filtering through paper. This is advantageouſly given in hyſteria, cramp of the ſtomach, and flatulent colic, to the extent of fʒij for a doſe.

Tincture *of Catechu* of the Lond. and Dub. Ph., is prepared by macerating for fourteen (ſeven Dub.) days, three ounces of extract of catechu, and two ounces of cinnamon bark bruiſed, in two pints of proof-ſpirit, and filtering.

The *tincture of catechu*, formerly *Japonic tincture* of Edinb. Ph., is prepared by digeſting for ſeven days, three ounces of extract of catechu in powder, two ounces of cinnamon bark bruiſed, in two pounds and a half of proof-ſpirit, and filtering through paper. This tincture is a ſolution of tannin, extractive matter, and the oil of cinnamon. The doſe, in caſes where aſtringents are required, is from fʒj to fʒiij, taken in water or wine, or cretaceous mixture.

Tincture *of Cinchona* of the Lond. Ph., is obtained by macerating for fourteen days, ſeven ounces of lance-leaved cinchona bark in powder, in two pints of proof-ſpirit, and filtering.

The *tincture of cinchona* of the Edinb. and Dub. Ph. is had by digeſting for ſeven days, four ounces of cinchona bark in powder, in two pounds and a half (two pints Dub.) of proof-ſpirit, and filtering through paper. The doſe is from fʒj to fʒiv.

For the *compound tincture of cinchona*, ſee Snake-root.

This is the ſame as the celebrated tincture of Huxham, who

who gave it in intermittents and low nervous fevers, in diluted wine or other proper vehicle, with 10 or 15 drops of elixir of vitriol (aromatic fulphuric acid, Edinb.) in dofes of from f℥j to f℥iij, or more in intermittents. See Cinchona.

Tincture *of Cinnamon* of the Lond. and Dub. Ph., is obtained by macerating for fourteen days (feven days Dub.) three ounces of cinnamon bark bruifed (three ounces and a half Dub.) in two pints of proof-fpirit, and filtering. The dofe, as a fit adjunct to the chalk mixture and aftringent infufions, is from f℥j to f℥iij.

The *compound tincture of cinnamon* of the Lond. and Dub. Ph., is prepared by macerating for fourteen days (feven days Dub.) fix drachms of cinnamon bark bruifed, three drachms of cardamom feeds bruifed, long-pepper powdered and ginger, of each two drachms, in two pints of proof-fpirit, and filtering.

The *compound tincture of cinnamon* of Edinb. is formed by digefting for feven days, cinnamon bark bruifed, leffer cardamom feeds bruifed, of each one ounce, long-pepper in powder two drachms, in two pounds and a half of proof-fpirit, and filtering through paper. This is beneficially ufed in flatulencies, atonic gout, languors, and debility, in dofes of f℥j or f℥ij properly diluted.

Tinctura *Croci*, or *Tincture of Saffron* of the Edinb. and Dub. Ph., is prepared by digefting for feven days, one ounce of Englifh faffron cut in fhreds in fifteen ounces (a pint Dub.) of proof-fpirit, and filtering through paper. See Crocus and Saffron.

Tincture *of Fox-glove* (Digitalis) of the Lond. Ph., is obtained by macerating of fox-glove leaves dried (rejecting the large ones) and reduced to a coarfe powder, two ounces, in a pint of proof-fpirit, and filtering. The Dub. Ph. directs two ounces of fox-glove leaves (the larger ones rejected) dried and coarfely powdered, in a pint of proof-fpirit, and then to filter.

The *tincture of fox-glove* of Edinb. Ph. is had by digefting for feven days, one ounce of fox-glove leaves dried, in eight ounces of proof-fpirit, and filtering through paper. The dofe of this tincture fhould be ♏ at firft, and gradually increafed.

Tincture *of Galbanum* of the Dub. Ph., is formed by digefting for feven days, two ounces of galbanum cut into fmall pieces, in two pints of proof-fpirit, and then filtering. Ufed as tincture of affafœtida, but lefs naufeous and lefs powerful.

Tincture *of Galls* (Dub.) is prepared by macerating for feven days, four ounces of galls in powder, in two pints of proof-fpirit, and then filtering. The dofe, as an aftringent, is from f℥j to f℥iij.

Tincture *of Gentian*, *Compound*, (Lond. and Dub.) is obtained by macerating for fourteen days (feven days Dub.) two ounces of gentian root cut, one ounce of orange-peel dried, half an ounce of cardamom feeds bruifed, in two pints of proof-fpirit, and filtering.

The *compound tincture of gentian*, commonly called "ftomachic tincture," of Edinb. Ph., is prepared by digefting for feven days, two ounces of gentian root fliced and bruifed, one ounce of orange-peel dried and bruifed, half an ounce of canella alba bruifed, half a drachm of cochineal in powder, in two pints and a half of proof-fpirit, and filtering through paper. This is an elegant ftomachic bitter and cordial, but in dyfpepfia the infufion is preferable. See Gentian.

Tincture *of Gold*. See Aurum *Potabile*, and *Chemical Hiftory of* Gold.

Tincture *of Guaiac* of the Lond. and Dub. Ph., is prepared by macerating for fourteen days (feven days Dub.) half a pound of guaiac powdered (four ounces Dub.), in two pints of proof-fpirit, and filtering.

The *tincture of guaiac* of the Edinb. Ph., is formed by digefting for feven days, one pound of guaiac powdered, in two pounds and a half of alcohol, and filtering through paper. Adminiftered in the form of a draught, it muft be triturated with yolk of egg or mucilage, that it may combine with water. The dofe is from f℥j to f℥iij, in any convenient vehicle.

The *ammoniated tincture of guaiacum* of the Lond. and Dub. Ph., is obtained by macerating for fourteen days (feven days Edinb. and Dub.), four ounces of guaiac in powder, in two pints of compound fpirit of ammonia, and filtering. The dofe is from f℥j to f℥ij, triturated with any mucous or vifcid matter. See Guaiacum.

Tincture *of Black Hellebore* of the Lond. Ph., is obtained by macerating for fourteen days, four ounces of the root of black hellebore fliced, in two pints of proof-fpirit, and filtering.

The *tincture of black hellebore* of the Edinb. and Dub. Ph., is prepared by digefting for feven days, four ounces of black hellebore root bruifed (powdered Dub.), half a drachm (two fcruples Dub.) of cochineal in powder, in two pounds and a half (two pints Dub.) of proof-fpirit, and filtering through paper. This tincture was regarded by Dr. Mead as a powerful emmenagogue, and is ftill ordered in uterine obftructions, and in fome cutaneous affections. The dofe is from ♏xxx to f℥j, in any appropriate vehicle. See Hellebore.

Tincture *of White Hellebore*. See Tinctura *Veratri Albi*.

Tincture *of Henbane* of the Lond. Ph., is formed by macerating for fourteen days, four ounces of the dried leaves of henbane in two pints of proof-fpirit, and filtering. The Dub. Ph. directs to digeft for feven days, two ounces and a quarter of dried leaves of black henbane, in coarfe powder, in a pint of proof-fpirit, and then ftraining.

The *tincture of black henbane* of the Edinb. Ph. is had by digefting for feven days, one ounce of the dried leaves of black henbane in eight ounces of proof-fpirit, and filtering through paper. In a dofe of f℥j, it feldom fails of procuring fleep and quiet, and does not affect the head or produce coftivenefs. In cafes of diarrhœa, a few drops of tincture of opium fhould be added to counteract its tendency to pafs off by the bowels.

Tincture *of Hops* of the Lond. Ph., is formed by macerating for fourteen days, five ounces of hops in two pints of proof-fpirit, and ftraining. This has been recommended as a fubftitute for tincture of opium in gout and rheumatifm. The dofe is from f℥fs to f℥ij, or more. See Hops.

Tincture *of Jalap* of the Lond. Ph., is made by macerating for fourteen days, two ounces of jalap root powdered, in two pints of proof-fpirit, and filtering. The Dub. Ph. orders five ounces of jalap root in coarfe powder, to be digefted for feven days in two pints of proof-fpirit, and then filtered.

The *tincture of jalap* of the Edinb. Ph. is formed by digefting for feven days, three ounces of jalap root in powder, in fifteen ounces of proof-fpirit, and then filtering. See Jalap.

Tincture, *Japonic*. See Tincture *of Catechu*.

Tincture *of Kino* is obtained by macerating for fourteen days, three ounces of kino in powder, in two pints of proof-fpirit, and filtering through paper. In the Edinb. and Dub. Ph. two ounces of kino (three ounces Dub.) are digefted for two days in a pint and a half of proof-fpirit, and filtered through paper. The dofe is from f℥j to f℥ij.

Tincture *of Lacca*. See Lac.

Tinctura

Tinctura *Lyttæ*, or *Tincture of Bliftering Fly.* See Lyttæ.

Tinctura *Martis cum Spiritu Salis*, a medicine thus prepared: Take filings of iron, half a pound; Glauber's fpirit of fea-falt, three pounds; digeft all together without heat, as long as the fpirit will work upon the filings; then, after the fæces have fubfided, pour off the clear liquor, evaporating it to one pound, and adding of rectified fpirit of wine three pints.

Some combine the acid and inflammable fpirits firft, and digeft three ounces of iron-filings in a quart of the dulcified compound. A few drops of this tincture are a fufficient dofe.

This tincture is good in all the cafes in which the fal martis is fo.

Tincture *of Martial Flowers.* See Iron.

Tincture *of Metals*, called *Lily of Paracelfus*, may be prepared by melting together in a crucible two parts of martial regulus of antimony, one part of fine tin, and one part of pure copper. The alloy thus compounded is to be powdered, when cold, and mixed with thrice its weight of purified nitre. The mixture is to be thrown, at different times, into a red-hot crucible, where it detonates, and is expofed to a violent fire, till the metals be perfectly reduced to calces. The matter is to be taken from the crucible, while red-hot, and immediately thrown into a heated iron mortar, where it is quickly powdered. The powder, while hot, is to be put into a matrafs, and upon it fome rectified fpirit of wine is to be poured to a height equal to the breadth of four fingers. The digeftion is continued during fome days, or till the fpirit of wine has acquired a very deep yellowifh-red colour. The fpirit is to be decanted and kept in a bottle.

This tincture, although no part of the metals, reduced by calcination almoft to the ftate of pure earths, can be diffolved by the fpirit of urine, has a fpirituous, faponaceous, acrid, and alkaline character, and has been fuccefsfully ufed, when the fibres and veffels require to be excited and animated, as in apoplexies, palfies, and dropfies. It is alfo capable of accelerating the motion of the blood, and of increafing certain fecretions and excretions, particularly fweat and urine. The dofe is from fix or twelve drops to forty, or even more, and muft be adminiftered in fome proper cordial. Macquer's Dict. Chem.

Tincture *of Muriate of Iron.* See Iron.

Tincture *of Mufk* of the Dub. Ph., is obtained by digefting for feven days, two drachms of mufk in powder, in a pint of rectified fpirit, and then ftraining.

Tincture of mufk is directed, in the Edinb. Ph. of 1783, to be made by diffolving two drachms of mufk, in a pound of rectified fpirit.

Tincture *of Myrrh* of the Lond. Ph., is prepared by macerating for fourteen days, three ounces of myrrh bruifed, in twenty-two fluid-ounces of rectified fpirit, and a pint and a half of water, and filtering. The Edinb. Ph. directs three ounces of myrrh in powder to be digefted for feven days, in twenty ounces of alcohol and ten ounces of water, and filtered through paper. The Dub. Ph. orders three ounces of myrrh bruifed to be digefted for feven days, in a pint and a half of proof-fpirit and half a pint of rectified fpirit, and then ftrained. This tincture is tonic and deobftruent; it is ufed now generally in gargles, combined with infufions of rofes and acids; or applied to foul ulcers and exfoliating bones, or diluted with water, as a wafh for the mouth when the gums are fpongy. The dofe is from f℥fs to f℥j.

Tincture *of Opium* of the Lond. Ph., is formed by macerating for fourteen days, two ounces and a half of hard opium powdered, in two pints of proof-fpirit, and ftraining.

The *tincture of opium* of Edinb. Ph. or *Thebaic tincture*, or *liquid laudanum*, is obtained by macerating for feven days, two ounces of opium in two pounds of proof-fpirit, and filtering through paper.

Tincture of opium, or *Thebaic tincture* of Dub. Ph. is prepared by digefting for feven days, ten drachms of purified hard opium in coarfe powder, in a pint of proof-fpirit, then ftraining. The ufual dofe is from ♏x to ♏xl. In colica pictonum, f℥j, given before purges, facilitates their action, and renders the relief more fpeedy; and in tetanus, f℥vfs have been advantageoufly given in divided dofes, in twenty-fix hours. The tincture externally applied allays local pain, and affifts in relaxing the fpafm in lock-jaw and fimilar affections.

The *ammoniated tincture of opium* of the Edinb. Ph. is formed by digefting for feven days, in a clofe phial, three drachms of benzoic acid, and the fame quantity of Englifh faffron, cut in fhreds, two drachms of opium, half a drachm of volatile oil of anifeed, in fixteen ounces of ammoniated alcohol, and filtering through paper. This tincture is ufed in hooping-coughs and fpafmodic afthma. Each f℥j contains gr. j of opium. See Opium.

Tincture *of Quaffia* of the Dub. Ph., is obtained by digefting for feven days, an ounce of chips of quaffia wood in two pints of proof-fpirit.

Tincture *of Rhubarb.* See Rhubarb.

Tincture *of Saffron.* See Tinctura *Croci.*

Tincture *of Sena.* See Sena.

Tincture *of Salt of Tartar*, is made by pouring fome rectified fpirits of wine, to a height equal to the breadth of three or four fingers, into a heated matrafs, that contains fome hot falt of tartar, which has been previoufly fufed in a crucible and powdered. The matrafs is to be clofed, and the digeftion continued for feveral days with a gentle heat, or till the fpirit of wine has acquired a fine reddifh-yellow colour.

This is effentially the fame as tincture of metals, their medicinal qualities being the fame.

Tinctura *Saturnina*, the lead tincture, a name given in the late London Difpenfatory to the tincture before called *tinctura antiphthifica*, becaufe it was ufed to check the immoderate fweats in hectic complaints.

It is made of fugar of lead and green vitriol, of each two ounces, and of rectified fpirit a quart. The falts are feparately to be reduced to powder, and then put into the fpirit, then the whole is to ftand fome days without heat to extract the tincture, and afterwards filtered through paper.

Many perfons have found great perplexity in making this tincture, it having at firft begun to fhew a good colour, but afterwards loft it: this accident is owing to the heat ufually employed in making the tincture.

This tincture is a powerful ftyptic, and is often ufed with good fuccefs in hectic fevers, fpitting of blood, heat of the kidnies, fimple gonorrhœas, fluor albus, and tabes dorfalis.

It was firft recommended by Etmuller; who, from its effect, gave it the name of *tinctura antiphthifica*, which our College of Phyficians changed to that of *tinctura faturnina.* The Edinb. Ph. directed it to be made of three ounces of the fugar and two of the vitriol, to a quart of fpirit, and in the beft of the foreign ones. Mr. Boyle recommends it, and our moft eminent phyficians formerly ufed it, notwithftanding that fome authors confider it as a dangerous medicine, on account of its principal ingredient, the *faccharum faturni*, which fome call a flow poifon. Whether it be fo or not when given in fubftance, it is certain that there is a great difference between a corrofive falt fo given, and a tincture made of the fame, in fpirit of wine, and given in fmall dofes, as Dr. Mead obferves; who adds, that in flow hectic fevers attended with a loofenefs, profufe fweats, and a colliquation of the humours, he reckons two or three drachms, given at different times, in cooling liquors, every twenty-four hours, to be a convenient dofe. But the ufual dofe was from fifteen to thirty drops in Briftol water, or fome temperate or cool julep.

Concerning the danger of faturnine preparations, when applied to the purpofes of internal medicine, fee fir George Baker's Farther Obfervations on the Poifon of Lead, in Med. Tranf. vol. ii. p. 446, &c. See alfo Colica *Damnoniorum*, Lead, Saccharum *Saturni*, and Vinegar *of Lead*.

Tincture *of Snake-root*. See Snake-root.

Tincture *of Soot*. See Soot.

Tincture *of Squills*. See Squills.

Tincture *of Spanifh Flies*, or *Tinctura Cantharides*. See Tinctura *Lyttæ*.

Tinctura *Styptica*, a form of medicine made with very little trouble and apparatus, and ferving to fupply the place of that elaborate preparation the tincture of Helvetius: it is prefcribed in the late Lond. Ph., and is to be made by mixing a drachm of calcined green vitriol with a quart of French brandy tinctured by the cafk: this is to be fhook together, that the brandy may turn black, and then ftrained off for ufe.

Tincture *of Sulphur*. See Sulphur.

Tinctura *Thebaica*. See Tincture *of Opium*.

Tincture *of the Balfam of Tolu* of the Edinb. Ph., is made by digefting an ounce and a half of the balfam in a pound of alcohol in a gentle heat, till the balfam is diffolved, and filtering through paper.

This tincture poffeffes all the virtues of the balfam; and in coughs, and other complaints of the breaft, a tea-fpoonful or two of it may be taken in a bit of loaf-fugar.

But it is chiefly ufed for making the fyrup. An ounce of the tincture, properly mixed with two pounds of fimple fyrup, will make what is commonly called the *balfamic fyrup*. See Syrup.

Tincture *of Valerian* of the Lond. and Dub. Ph., is prepared by macerating for fourteen days (feven days Dub.) four ounces of valerian root in powder, in two pints of proof-fpirit.

The *ammoniated tincture of valerian* of the Lond. Ph. is obtained by macerating for fourteen days, four ounces of valerian root in two pints of aromatic fpirit of ammonia, and filtering. The Dub. Ph. directs two ounces of valerian root in powder to be digefted for feven days in a pint of fpirit of ammonia. It is beneficially employed in hyfteria and other nervous affections, in dofes of f ʒi, or f ʒij, given in milk, or fome other bland fluid.

Tinctura *Veratri Albi*, *Tincture of White Hellebore*, of the Edinb. Ph., is made by digefting for feven days, eight ounces of white hellebore-root bruifed, in a pound and a half of proof-fpirit, and filtering through paper. This tincture is employed to excite vomiting in maniacal and apoplectic cafes, and as an alterative in cutaneous eruptions. It is given in dofes of ♏v to ♏x; but its effects are fometimes very violent. Thomfon's Difpenfatory.

Tinctura *Zingiberis*, or *Tincture of Ginger*, of the Lond. and Dub. Ph., is formed by macerating for fourteen days (feven days Dub.) two ounces of ginger-root fliced, in two pints of proof-fpirit, and filtering. This is ufeful as a ftimulant and carminative, in atonic gout when it attacks the ftomach, in flatulent colic, and as a corrector of griping purgatives.

Tincture is alfo applied by the *Heralds* to the colours ufed in efcutcheons, or coats of arms; under which, with them, are likewife included the two metals, *or* and *argent*, becaufe often reprefented by yellow and white. See Colour.

Tincture comprehends *colours* and *furs*.

The writers on heraldry have had great difputes, which of thefe colours or tinctures are the moft honourable. All agree in giving the pre-eminence to the metals gold and filver, that is, to the yellow and white colours: as to the others, fome efteem them more noble as they approach more to light, that is, to whitenefs. Upton, on this account, ranges them thus: azure or blue, gules or red, purpure or purple, vert or green, fable or black: others wholly diffent from this, and prefer thofe colours moft which can be feen at the greateft diftance; with thefe, fable or black is the moft honourable or firft colour; and they allege the imperial black eagle, placed in a white field, as an inftance of this. Leigh prefers the red to the blue, as the red has fome alliance to gold, and the blue to filver; the fable is generally preferred to green and purple, by thofe who give the red and blue the firft places: it is in this efteem on account of its ftrong appearance; and green is preferred to purple, becaufe the latter is but of very late ufe in heraldry, and is called a new colour.

All the precedence given to tinctures muft however be confidered with this fpecial provifo, that there is no particular reafon for bearing them otherwife in the arms of kingdoms and families. In all coats of arms there fhould be two colours or tinctures; and it is the general rule that the field fhould be of a nobler colour than the figures placed upon it: thus in the arms of Scotland the field is yellow, and the lion placed upon it red; and if the field confifts of two different colours parted by fefs or by pale, then the nobleft colour muft always be in the beft place, as on the upper part, or on the right hand of the fheld; but all thefe rules are to be underftood with this limitation, that there are no other fpecial reafons in the family for the contrary. Nefbit's Heraldry, p. 19.

The two metals, or and argent, and the four colours, black, red, blue, and green, (fee Colour,) are the feveral tinctures, fays Edmondfon, of which the fields and all charges of arms ought in ftrictnefs to be made; excepting, however, fuch charges as are to be borne in their own proper or natural colour; which bearings, not having in blazon any particular technical or fixed terms, are all comprehended under the word *proper*. As to the tinctures *purpure*, *tawny*, and *fanguine*, thefe, being mixtures, are now feldom, if ever, ufed, either for fields or charges, though they are ranked among thofe, which, as fome whimfical heralds fay, have myftical fignifications, and reprefent the *moral*, *political*, and *military* virtues of thofe who originally bore their arms fo coloured or tinctured. Some heralds, fays the above-named writer, have blazoned the armorial colours in different terms, according to the rank and dignity of the perfon whofe arms they are defcribing. Accordingly, the arms of gentlemen, efquires, knights, and baronets, are to be blazoned by tinctures; thofe of nobles by precious ftones; and thofe of fovereign princes, kings, and emperors, by planets: but this mode of blazoning would, he thinks, introduce into the fcience of heraldry great abfurdity and confufion, and render blazons in fome cafes very ridiculous.

TINCULEN, or Tinzulen, in *Geography*, a town of Africa, in the country of Darah; 120 miles S.W. of Tafilet.

TINDAL, Matthew, LL.D. in *Biography*, a reputed deiſt, was the ſon of a clergyman, and born at Beer-Ferres, in Devonſhire, about the year 1657. From Lincoln college, Oxford, into which he was admitted in 1672, he was removed to Exeter college; and having graduated B.A., he was elected fellow of All-Souls college, and became LL.D. in 1685. About this time, the reign of James II., he was beſet by ſome of the popiſh emiſſaries, who were then active and induſtrious in making proſelytes, and converted to popery; but, upon farther examination, he returned to the church of England in 1687. To the revolution he was ardently attached; and having been admitted an advocate, he often ſat as judge in the court of delegates, and had a penſion from the crown of 200*l. per annum*. Tindal was both a political and theological writer, and under the latter deſcription he publiſhed "A Letter to the Clergy of both Univerſities," on the ſubject of the Trinity and the Athanaſian creed, with a view to ſome alterations in the Liturgy, which were ſubjects of diſcuſſion. But the treatiſe that attracted principal notice appeared in 1706, and was entitled "The Rights of the Chriſtian Church aſſerted againſt the Romiſh and all other Prieſts who claim an independent Power over it; with a Preface, concerning the Government of the Church of England, as by Law eſtabliſhed." This publication rouſed the animadverſions of the high-church clergy, and the venders of it were legally indicted. The favourable notice taken of this work by Le Clerc, in his "Bibliotheque Choiſée," gave great offence to the lower houſe of convocation; and this learned body circulated a declaration, implicating the foreign critic, and others of ſimilar ſentiments, which Le Clerc himſelf, and many other perſons, thought to be unjuſt and illiberal. Tindal alſo publiſhed a defence of his work, the ſecond edition of which, in two parts, was ordered by a vote of the houſe of commons, to be burnt in the ſame fire with Sacheverel's ſermons, in the year 1710. Some time after, the lower houſe of convocation, Atterbury being prolocutor, on a repreſentation of the ſtate of religion in the kingdom, animadverted on the dangerous conſequences of the doctrine of neceſſity. To which Tindal replied, by aſſerting the truth and uſefulneſs of that doctrine. Of the ſubjects and tendency of his political writings, it is now needleſs to give any account. It will be ſufficient to obſerve that he was an advocate for the Hanoverian ſucceſſion, and for the Whig miniſtry of that period. Hitherto Tindal had made no direct attack againſt religion; but in 1730 he no longer diſguiſed his ſentiments, which were announced to the public in a treatiſe entitled "Chriſtianity as old as the Creation, or the Goſpel a Republication of the Religion of Nature." He diſclaims, indeed, in words, oppoſition to the divine authority of the Chriſtian religion, and denominates himſelf and his friends "Chriſtian Deiſts;" but in reality it was his evident and avowed purpoſe to ſhew, that there neither has been, nor can be, any external revelation diſtinct from what he terms "the internal revelatiou of the law of nature in the hearts of all mankind." Tindal was attacked by Dr. Waterland, who treated him with a degree of contempt which called forth the animadverſions of Dr. Middleton. The author, though declining in health, wrote in his own defence, but concretions of the gall-bladder, with which he had been long afflicted, terminated his life in the year 1733. His remains were interred in Clerkenwell church, agreeably to his own deſire, near thoſe of Dr. Burnet, biſhop of Saliſbury. A ſecond volume of his "Chriſtianity as old as the Creation" was left in MS.; but the publication of it was prevented by Dr. Gibſon, biſhop of London. His firſt work had given occaſion to ſo many unanſwerable defences of Chriſtianity, that the learned biſhop was unneceſſarily alarmed, when he prevented further diſcuſſion of this intereſting ſubject.

Tindal, Nicholas, the nephew of the former, was educated at Exeter college, Oxford, and had different preferments in the church. He died in 1774, at a very advanced age, at Greenwich Hoſpital, of which he was chaplain. Among his literary undertakings, the moſt conſiderable was a tranſlation of Rapin's Hiſtory of England, with a continuation. Biog. Brit.

TINDALE. See Tyndale.

TINDEL, in *Geography*, a town of Africa, in the country of Zenhaga, on the ſea-coaſt; 18 miles S.S.E. of Cape Mirik.

TINDERCOTTA, a town of Hindooſtan, in the Carnatic; 15 miles E. of Tiagar.

TINDERO, a town of Sweden, in the province of Medelpadia; 12 miles N.E. of Sundſwall.

TINE, in *Agriculture*, a term applied to a tooth or ſpike, which is ſet or placed in any kind of tool or implement, but eſpecially thoſe of the harrow, drag, and other ſimilar kinds. Tines for this uſe ſhould, for the moſt part, be a little curved or racked forward towards the points, as laying hold of the ground better, and in a more perfect manner. Sometimes tines are neceſſary to be ſteeled a little in the points and front edges, in order to prevent the wear of them, and render them more effective in tearing, cutting up, and dividing the land.

Tine, or *Tyne*, in *Geography*, a river of England, which riſes in two ſtreams, one called the North Tyne, which riſes on the borders of Scotland, in the north-weſt part of the county of Northumberland; the other, which is called the South Tyne, riſes about ſeven miles S. from Aldſtone, in Cumberland: both theſe ſtreams unite near Hexham, from whence the united ſtream proceeds to Newcaſtle, and from thence to the German ſea, at Tinemouth.

TINEA, a river of France, which riſes in the Alps, and runs into the Var, about 12 miles N. of Nice.

Tinea, in *Medicine*. See Porrigo.

Tinea, in *Natural Hiſtory*. See Moth, &c.

TINEH, in *Geography*, a town of Egypt, ſituated between the ſouth extremity of lake Menzaleh and the Mediterranean, near the ancient Peluſium, and on a canal formerly called the *Peluſian* or *Bubaſtic* mouth of the Nile; through which Alexander paſſed with his fleet from Gaza: this canal is now choaked up with mud; 80 miles N.N.E. of Cairo. N. lat. 30° 48′. E. long. 38° 45′.—Alſo, a town of Africa, in Tripoli, on a river which runs into the gulf of Sidra. N. lat. 30° 5′. E. long. 19° 12′.

TINEHALY, a poſt-town of the county of Wicklow, Ireland; 41 miles S. by W. from Dublin.

TINEMAN, in our *Old Writers*, a petty officer in the foreſt, who had the nocturnal care of vert and veniſon, and other employments in the foreſt.

TINEMAR, in *Geography*, a town of Ceylon; 10 miles S.W. of Trinkamaly.

TINEMOUTH. See Tynemouth.

TINET, Tinettum, in our *Old Writers*, is uſed for bruſh-wood and thorns to make and repair hedges. In Herefordſhire, *to tine* a gap in a hedge, is to fill it up with thorns, that cattle may not paſs through it.

TINETO, in *Geography*, a ſmall iſland near the coaſt of Genoa, at the entrance of the gulf of Spezza. See Tino.

TINEVELLY, or Palamcotta, a city of Hindooſtan, and capital of a province of the ſame name, in the Carnatic;

natic; 74 miles S.S.W. of Madura. N. lat. 8° 42′. E. long. 77° 46′.

TINEVELLY, a province of Hindooftan, bounded on the N. by Madura, on the E. and S. by the gulf of Manara, and on the W. by Travancore, from which it is feparated by the Ghauts. The coaft of this ftate is called the Fifhing Coaft, and has long been celebrated for its pearls. It was formerly in poffeffion of the Portuguefe. The fifheries are carried on by the natives, but the Dutch claim the fovereignty, and fend two or three frigates to protect the boats, which fometimes amount to hundreds. The revenues of the country belong to the nabob of Arcot.

TINEWALD, the parliament or annual convention of the people of the Ifle of Man, of which this account is given: the governor and officers of that ifland do ufually fummon the twenty-four keys, being the chief commons of it, once every year, *viz.* upon Midfummer-day, at St. John's chapel, to the court kept there, called the tinewald-court; where, upon a hill near the faid chapel, the inhabitants of the ifland ftand round about the plain adjoining; and here the laws and ordinances, agreed upon in the chapel of St. John, are publifhed and declared unto them. At this folemnity the lord of the ifland fits in a chair of ftate, with a royal canopy over his head, and a fword held before him, attended by the feveral degrees of the people, who fit on each fide of him, &c.

TING, in *Geography*, a city of China, of the fecond rank, in Pe-tche-li, near the river Tam; 107 miles S.S.W. of Peking. N. lat. 38° 32′. E. long. 114° 39′.

TINGAM, a town of Hindooftan, in the circar of Aurungabad; 20 miles E.S.E. of Aurungabad.

TINGAMOLLY, a town of Hindooftan, in the circar of Ruttunpour; 6 miles W. of Kyragur.

TINGANO, a river of Malacca, which runs into the Chinefe fea, N. lat. 5° 27′. E. long. 103° 9′.

TINGAU, or TINCH, a town of Bavaria, late belonging to the abbey of Kempten; 7 miles N.E. of Kempten.

TING-CHAN, a town of the kingdom of Corea; 30 miles S.E. of Haimen.

TINGENTERA, ALGECIRAZ, in *Ancient Geography*, a town of Spain, in Bœtica, towards the S.W. It appears to have been the fame town with that called by Antonine "Portus Albus," and "Julia Traducta." It was the native place of Pomponius Mela.

TING-FAN, in *Geography*, a city of China, of the fecond rank, in Koei-tcheou; 992 miles S.S.W. of Peking. N. lat. 26° 5′. E. long. 106° 4′.

TING-HAI, a city and walled town of Chufan, on the coaft of China, fituated within a mile from the large open village or fuburb, built along the fhore. The way from the one to the other lies over a plain, interfected with rivulets and canals in various directions, and cultivated like a garden. The city walls are thirty feet high; and along thefe, at the diftance of every hundred yards, are fquare ftone towers. In the parapets are embrafures, and the holes in the merlons for archery, without cannon. The gate is double, and within it a guard-houfe, where military men were ftationed, and the bows and arrows, pikes and matchlocks, were arranged in an orderly manner. Of the towns of Europe, Ting-hai moft refembled Venice, on a fmaller fcale. The bridges are fteep, and afcended by fteps, like the Rialto; the ftreets are like alleys, or narrow paffages, and paved with fquare flat ftones. The houfes are low, and moftly of one ftory. Attention to ornament was chiefly beftowed on the roofs of the houfes; on the ridges of which were uncouth figures of animals, and other decorations in ftone and in iron. The town was full of fhops, containing, chiefly, articles of clothing, food, and furniture, difplayed to full advantage. Even coffins were exhibited to view in a variety of colours. The fmaller quadrupeds, including dogs, intended for food, as well as poultry, were expofed alive for fale, as were fifh in tubs of water, and eels in fand. The number of places where tin-leaf, and fticks of odoriferous wood were fold, for burning in their temples, indicated no flight degree of fuperftitious difpofition in the people. Loofe garments and trowfers were worn by both fexes; but the men had hats of ftraw, or cane, which covered the head, the hair, except one long lock, being cut fhort or fhaved; while the women had theirs entire, and plaited and coiled, in a becoming manner, into a knot upon the crown of the head. Activity and labour univerfally prevailed. None afked alms, and none fhunned labour. Staunton's Embaffy to China, vol. i.

TINGI, a clufter of fmall iflands in the Chinefe fea, near the eaft coaft of Malacca. N. lat. 2° 23′. E. long. 104° 21′.

TINGIA, a town of Peru, in the audience of Lima; 15 miles S.E. of Iça.

TINGIS, TANGIER, a town of Africa, fituated upon a ftrait between the promontory, the coafts, and the mouth of the river Valon, according to Ptolemy, who furnamed it Cæfarea. Mela fays that it was a very ancient city, founded by the giant Antæus. It gave name to Mauritania *Tingitana*, of which it was the capital. Pliny fays that it took the name of Julia Traducta, when the emperor Claudius fent thither a colony. Plutarch, in *Sertorio*, calls it Tingena, and fays that a fon of Tinga by Hercules, called Sophax, founded it, and gave it the name after that of his mother.

TIN-GLASS, a name frequently given to the femi-metal bifmuth.

TING-NGAN, in *Geography*, a town of China, of the third rank, in Quang-tong, on the river of Limou; 17 miles S. of Kiong-tcheou, in the ifland of Hai-nan.

TINGO, or TENNA, a river of Italy, which runs into the Adriatic, 3 miles N. of Fermo.

TINGORAN, a fmall ifland in the Chinefe fea, near the coaft of Malacca. N. lat. 4° 8′. E. long. 103° 33′.

TINGORCALLY, a town of Hindooftan, in Bengal; 40 miles W.S.W. of Calcutta. N. lat. 22° 9′. E. long. 87° 53′.

TINGRACALLY, a town of Bengal; 16 miles E. of Mahmudpour.

TINGRECOTTA, a town of Hindooftan, in Baramaul; 18 miles S.E. of Darampoury.

TINGRI, a town of Thibet. Here the Nepaulefe were defeated by the troops of China in 1792; 22 miles S.W. of Zuenga.

TING-TCHEOU, a city of China, of the firft rank, in Fo-kien; 870 miles S. of Peking. N. lat. 25° 48′. E. long. 116° 4′.

TINGUIRICA, a river of Chili, which runs into the Rahel; 40 miles from its mouth.

TINGUZGALPA, a town of Mexico, in the province of Nicaragua; 80 miles N.W. of Leon.

TINGWALL, a town of the ifland of Shetland; 4 miles W.N.W. of Lerwick.

TINGWALLA, an ifland of Sweden, in the north part of the Wenner lake, on which the town of Carlftadt is built.

TINIA, or TENEAS, in *Ancient Geography*, a river of Italy, in Umbria, which, according to Silius Italicus, ran into the Tiber.

TINIAN,

TINIAN, in *Geography*, one of the Ladrone iflands, in the North Pacific ocean, about 42 miles in circumference, firft difcovered by the crew of a Manilla fhip, which was caft away here in the year 1638. The author of Anfon's Voyage gives a pleafing defcription of this ifland, as found by the crew of the Centurion, in the year 1742. Commodore Byron, who vifited it in the year 1765, and anchored on the fouth-weft end of the ifland, in the fame place where the Centurion lay, inftead of delightful lawns, found the trees and underwood fo thick, that in endeavouring to force a paffage through, they were entangled and cut as if with whip-cord. After they had cleared the well, which they imagined was the fame at which lord Anfon filled his cafks, commodore Byron found the water brackifh, and full of worms. He fays, "the road alfo where the fhips lay was a dangerous fituation at this feafon (Auguft 1ft), for the bottom is a hard fand, and large coral rocks; and the anchor having no hold in the fand, is in perpetual danger of being cut to pieces by the coral; to prevent which as much as poffible, I rounded the cables, and buoyed them up with empty water-cafks. Another precaution alfo was taught me by experience, for at firft I moored, but finding the cables much damaged, I refolved to be fingle for the future, that by veering away, or heaving in, as we fhould have more or lefs wind, we might always keep them from being flack, and confequently from rubbing, and this expedient fucceeded to my wifh. At the full and change of the moon, a prodigious fwell tumbles in here, fo that I never faw fhips at anchor roll fo much as our's did while we lay here; and it once drove in from the weftward with fuch violence, and broke fo high upon the reef, that I was obliged to put to fea for a week; for if our cable had parted in the night, and the wind had been upon the fhore, which fometimes happens for two or three days together, the fhip muft inevitably have been loft upon the rocks. I foon found that the ifland produced limes, four oranges, cocoa-nuts, bread-fruit, guavas, and paupaus in abundance; but we found no water-melons, fcurvy-grafs, or forrel. Notwithftanding the fatigue and diftrefs that we had endured, and the various climates we had paffed through, neither of the fhips had yet loft a fingle man fince their failing from England, but while we lay here two died of fevers, a difeafe with which many were feized, though we all recovered very faft from the fcurvy. I am indeed of opinion that this is one of the moft unhealthy fpots in the world, at leaft during the feafon in which we were here. The rains were violent, and almoft inceffant; and the heat fo great as to endanger fuffocation: befides the inconvenience which we fuffered from the weather, we were inceffantly tormented by the flies in the day, and by the mufquitos in the night. The ifland alfo fwarms with centipedes and fcorpions, and a large black ant, fcarcely inferior to either in the malignity of its bite. Befides thefe, here were venomous infects without numbers, altogether unknown to us, by which many of us fuffered fo feverely, that we were afraid to lie down in our beds: nor were thofe on board in a much better fituation than thofe on fhore, for great numbers of thefe creatures being carried into the fhip with the wood, they took poffeffion of every birth, and left the poor feamen no place of reft either below or upon the deck. Our principal refource for frefh meat was the wild hog, with which the ifland abounds. Thefe creatures are very fierce, and fome of them fo large, that a carcafe frequently weighed 200 pounds. Mr. Gore, one of our mates, at laft difcovered a pleafant fpot on the north-weft part of the ifland, where cattle were in great plenty, and whence they might be brought to the tents by fea. We were now upon the whole pretty well fupplied with provifions, efpecially as we baked frefh bread every day for the fick; and the fatigue of our people being lefs, there were fewer ill with the fever; but feveral of them were fo difordered by eating a very fine-looking fifh which we caught here, that their recovery was for a long time doubtful." The author of lord Anfon's voyage fays, that the people on board the Centurion thought it prudent to abftain from fifh, as the few which they caught at their firft arrival furfeited thofe who eat of them. Befides the fruit that has been mentioned already, this ifland produces cotton and indigo in abundance, and would certainly be of great value if it were fituated in the Weft Indies. The furgeon of the Tamar enclofed a large fpot of ground here, and made a very pretty garden, but he did not ftay long enough to derive any advantage from it. Captain Wallis touched upon this ifland in 1767; and obtained beef, pork, poultry, papaw apples, bread-fruit, limes, oranges, and every refrefhment mentioned in the account of lord Anfon's voyage. The fick began to recover as foon as they went on fhore; but flefh meat would not keep fweet for fcarcely one day. N. lat. 14° 55′. W. long. 214° 7′.

TINICUM, a townfhip of Pennfylvania, in the county of Bucks, containing 1017 inhabitants; 20 miles N. of Philadelphia.—Alfo, a townfhip of Pennfylvania, in the county of Delaware, containing 249 inhabitants.

TINIETZ, a town of Auftrian Poland; 4 miles W. of Cracow.

TINIMA, a town of the ifland of Cuba; 22 miles W.N.W. of Bayamo.

TINING, in *Agriculture*. See TINE. See alfo TILLAGE.

TININGBURG, in *Geography*, a town of Hungary; 16 miles N. of Prefburg.

TINISSI, a town of Bohemia, in the circle of Koniggingratz; 10 miles S.E. of Konigingratz.

TINIT, a town of Africa, in Zanhaga, on the coaft; 25 miles S.S.E. of Cape Mirik.

TINJULEEN, a town of Africa, in the country of Darah; 105 miles S.E. of Morocco. N. lat. 29° 30′. W. long. 5° 30′.

TINKER'S ISLAND, one of the Elizabeth's Iflands, near the coaft of America.

TINKLING or TINGLING *of the Ear*. See TINNITUS.

TINMOUTH, in *Geography*, a poft-town of the ftate of Vermont, in the county of Rutland, containing 1001 inhabitants; 8 miles S. of Rutland.—Alfo, a town of Nova Scotia, on the eaft coaft, formerly called *Pictou*.

TINNA, or TINA, in *Ancient Geography*, a river of the ifle of Albion, between the gulfs Taua and Boderia, according to Ptolemy, fuppofed to be the river Eden, in Fife. —Alfo, a fmall river of Italy, in Picenum.

TINNE′, in *Geography*, a town of Africa, in Mafina, on the north fide of the Niger; 130 miles W.S.W. of Tombuctoo.

TINNING, the covering or lining any thing with melted tin, or with tin reduced to a very thin leaf.

Looking-glaffes are foliated or tinned with thin leaves of beaten tin, applied and faftened to them by means of quickfilver. See LOOKING-GLASS.

Kitchen utenfils are tinned with melted tin; and locks, bitts, fpurs, &c. with leaf-tin, by the help of fire.

For the method of tinning iron-plates, fee LATTIN and TIN-*Plates*.

Copper and brafs are covered over with tin by the help of fal ammoniac, the acid of which cleans the furface of the metals

metals to be tinned, and the oily matter contained in it furnifhes the phlogifton (according to the old fyftem) that is neceffary in this operation. The copper, or brafs, being made hot enough to melt tin laid upon it, is ftrewed over with fal ammoniac, and the melted tin rubbed about the plate. The fal ammoniac takes up the drofs of the tin, and leaves the tin to flow freely upon the metal. As the furface of copper is continually altered by the mere action of the air, the workmen, before the tinning of any veffel, fcrape its furface with a fteel inftrument till it be clean and bright; then they place the veffel upon kindled coals, and heat it to a certain degree: as foon as it is hot, in fome proceffes of tinning, they rub it with pitch, and apply the melted tin, which they fpread upon the furface of the copper by means of hards. For this purpofe pure tin is feldom ufed; but, in general, two parts of tin are alloyed with one part of lead.

The pitch ufed in this latter mode of tinning is quite neceffary, becaufe the degree of heat given to the copper is fufficient to calcine its furface in fome degree: and this alteration, however flight, would prevent the perfect adhefion of the tin, unlefs by means of the pitch the phlogifton was reftored to it at the very inftant of the application of the tin. The pitch alfo prevents the flight calcination which would happen on the furface of the tin, or revives the fmall particles of calx which are formed during the operation. In either way, or in the method of tinning iron plates, the fuccefs of the operation depends on the facility with which tin unites with thefe metals, which incorporates with them, diffolves in fome meafure their furface, and forms a kind of alloy, at leaft when the tinning is well performed; and moreover, on the cleannefs of the furfaces, both of the melted tin, and of the copper or iron to which it is applied; for the metals cannot perfectly unite unlefs they are in a metallic ftate, and free even from their own earth or calx.

It has been alleged that copper veffels, fo pernicious in themfelves, are not perfectly preferved from ruft or verdigris by tinning; and, befides, tin itfelf is combined with arfenic, and lead is alfo ufed in tinning. M. Malouin has, therefore, propofed in his Memoirs on Zinc (Mem. de l'Acad. Sc. 1742.) to fubftitute that femi-metal in place of lead and tin, for the tinning of iron and copper veffels; the greater hardnefs of the zinc, it is thought, would render it lefs liable to be worn, and the dangerous effects of lead and tin would be avoided. Macquer's Dict. Chem. Engl. edit.

The plumbers, on fome occafions, tin or whiten their fheets of lead: in order to which they have a tinning furnace, filled with live coal, at the two fides of which two men are placed, who hold up the fheets over the fire to heat: and the tin-leaves being laid over them, as faft as the fheets grow hot, and the tin melts, they fpread it, and make it take by rubbing it with tow and refin.

TINNITUS Aurium. A very common difeafe in the fenfe of hearing, is when certain founds, like thofe of a drum, a bell, the falling of water, &c. are heard, when no fuch noifes actually exift, or can be heard by other perfons. This affection is called *tinnitus aurium*, of which various kinds have been obferved. For the moft part, it is a very flight tranfient diforder; but fometimes it is moft obftinate, long continued, and troublefome. It fometimes arifes from the flighteft caufe, fuch as any thing partially ftopping up the meatus auditorius, or Euftachian tube itfelf, fo that the free paffage of air into the cavity of the tympanum is interrupted. A kind of tinnitus is heard by the moft healthy when they yawn.

A much more frequent and troublefome fpecies of tinnitus accompanies many difeafes both of the febrile and nervous kind. This is faid to be occafioned partly by the increafed impetus of the blood towards the head, with an increafe of fenfibility in the nervous fyftem itfelf, fo that the very beatings of the arteries are heard; and partly by the augmented irritability and fpafmodic motions of the little mufcles within the organ of hearing. In fevers, the throbbing of the carotid arteries at the fides of the fella turcica has produced exceffive annoyance in particular individuals, efpecially when they were in the recumbent pofture; and the celebrated Haller informs us, that when he was afflicted with fever, he fuffered much from the beating fenfation caufed in his ears, as he fuppofed, from the pulfation of the carotids in the neighbourhood of thofe organs.

According to writers, tinnitus aurium fometimes arifes from a vehement affection of the mind; fometimes from a diforder in the ftomach; fometimes from rheumatifm extending its effects to the ears and head; or from a catarrh, producing a temporary obftruction in the Euftachian tube. In the foregoing examples, the cure of the affection of the ear depends upon the removal of the other diforders, of which it is merely an effect.

In certain cafes, tinnitus aurium occurs as a feparate independent diforder, and may be the caufe of long-continued, diftreffing fuffering. The exiftence of unreal founds in the organ of hearing generally prevents the patient from hearing diftinctly other fonorous impreffions, and, of courfe, more or lefs deafnefs is a common attendant of the complaint.

The writer of this article lately had a patient, who is attacked five or fix times every year with tinnitus aurium, which caufes for feveral days the moft annoying fenfations in the ears, and a confiderable degree of deafnefs. The diforder is always accompanied with fevere pain in the branches of the nerve coming out of the infra-orbitary foramen, head-ache, indigeftion, and many fymptoms of the nervous and bilious kind.

In this cafe, relief is obtained by fomenting the affected ear with a decoction of poppies, and wafhing out the meatus auditorius with a fyringe and warm water. However, thefe means are always affifted with a few dofes of calomel and rhubarb, without which, in all probability, the local applications would not entirely anfwer.

We have alfo had other cafes, in which a ftrong folution of opium in water, camphorated oil, blifters, &c. were the remedies employed.

The tinnitus aurium, produced by fevers, fometimes does not fubfide at their termination, but lafts, either in a continued or periodical form, during life. Two fuch inftances are now within our own recollection; and every man of experience muft have witneffed the fame thing.

TINNUNCULUS, in *Ornithology*, the name of one of the long-winged hawks, called by Linnæus FALCO *tinnunculus*; which fee.

It is about the fize of a common pigeon. Its bill is fhort, crooked, and very fharp, and covered with yellow fkin at the top; near this the bill is white, elfewhere it is blue; its tongue is bifid; its mouth very wide, and its palate blue; its head is large and flatted, and is of an afh-colour, with longitudinal ftreaks of black; its back and wings are brown, variegated with black fpots; its rump is grey, with fome tranfverfe black fpots; and its breaft and belly of a pale ruft-colour, with a few longitudinal ftreaks of black; its tail is long and pointed, its tip of a pale ferruginous hue, with a broad tranfverfe ftreak of black over it; and the reft of the tail is a mixed grey and brown, with black fpots and ftreaks; its legs and feet are of a fine yellow.

The tinnunculus, or keftrel, breeds in the hollows of trees, in the holes of high rocks, towers, and ruinated buildings:

buildings: it lays four eggs, which are white, variegated with a number of red spots; its food is field-mice, small birds, and insects.

This is the hawk which we so frequently observe in the air fixed in one place, and as it were fanning with its wings, at which time it is watching for its prey. It flings up the indigested fur and feathers in form of a round ball. Ray and Pennant.

TINO, in *Geography*, a small island near the coast of Genoa, at the entrance of the gulf of Spezza; 8 miles S. of Spezza. N. lat. 44° 3′. E. long. 9° 40′. See TINETO.

TINO. See TENOS.

The form of this island is oval, about 60 miles in circumference. It is mountainous, but its rich plains are decked by the opulence of industry. Its fruits are excellent and its wine good; but the most abundant of its productions is silk, which is manufactured by the females, who are highly commended for the beauty of their persons and the elegance of their dress. The inhabitants are active and industrious, most of whom are of the Greek church, though it is the see of a Roman Catholic bishop. It is reckoned one of the most agreeable islands of Greece, but has no good harbour. The small town of San Nicolo is built on the ruins of the ancient Tenos. Its capital bears the name of the island. N. lat. 37° 36′. E. long. 25° 7′.

TINPHADUM, or TIMPHADUM, in *Ancient Geography*, a place of Africa, in Numidia, upon the route from Theveste to Sitifis, between Theveste and Vegesela. Ant. Itin.

TINSEDA, in *Geography*, a town of Africa, in the country of Darah. N. lat. 27° 30′. W. long. 5° 46′.

TINTA, a town of Peru, in the bishopric of Cusco, and jurisdiction of Canas y Canches, sometimes also called Tinta; 60 miles S. of Cusco.

TINTENIAC, a town of France, in the department of the Ille and Vilaine; 9 miles S.S.E. of Dinan.

TINTINNABULUM, among the *Ancients*. See BELL.

TINTO, in *Geography*, a river of Spain, in the province of Seville, which owes its name to its waters being tinged of a yellow colour. It is also of a petrifying quality; and it is said that it destroys all verdure, and that no fish can live in it. Its nature, however, is changed by the confluence of other rivulets; for when it passes by Niebla, it is not different from other rivers: and it falls into the Atlantic, six leagues lower down, at the town of Huelva, where it is two leagues broad, and admits the passage of large vessels as high as San Juan del Puerto, three leagues above Huelva.

TINTON, a town of the state of New Jersey, near the sea; 12 miles E. of Freehold, in the county of Monmouth.

TINTOQUE, a town of Mexico, in the province of Xalisco; 45 miles S.S.W. of Compostella.

TINTORETTO, IL, in *Biography*, the cognomen of a celebrated Venetian painter, whose real name was Giacopo Robusti. He was born at Venice in 1512, the son of a dyer; from whence he acquired the name of Il Tintoretto. His natural disposition towards the art of drawing manifested itself very early, and his father had the wisdom to indulge it; and seeing it likely to lead to something decisive, caused him to be instructed in painting, and finally placed him as a pupil with Titian, then in the prime enjoyment of his reputation and power. It is a painful thing to relate, and a severe lesson to the pride of the most able, that where so much ability, so much honour and wealth abode, the mean and degrading passion of jealousy should have found encouragement. Titian, the great, the honoured Titian, that man who possessed a mind capable of grasping almost all the art of painting required, who was richly and highly honoured, courted, and employed, is said (and the truth of the story rests upon too sound authority) to have seen with the corroding pangs of jealousy the early essays of his pupil Tintoretto, and to have permitted it to operate so strongly upon him, that he excluded the dreaded object from his house, about ten days after his admission.

But the aspiring talents of the young painter were not to be damped by so mean a measure, though even in the powerful hands of Titian. To him dismission from the eye of a master was emancipation. He dared to think for himself, and boldly aimed at selection in art, and an union unthought of till then; and as Lanzi says, generously aspired at the honour of being the founder of a school and style of his own, by combining the form of the great Florentine, M. Angelo, with the colour of his former master. To maintain a due excitation to the performance of so bold an undertaking, he wrote upon the wall of his study, "Il disegno di Michel Angelo e il colorito di Tiziano;" and with all the ardour of an intrepid mind, endeavoured to perfect the task he had assigned himself, by copying whatever pictures of Titian he could procure during the day, and drawing by night from casts taken from the works of M. Angelo, together with many others he procured from ancient basso-relievos and statues. It is doubtless to his studies by night and the lamp, that he acquired that perfect mastery of chiaro-scuro, those decided masses of light and shade, which distinguish his works, both in their groups and single figures. Add to these labours, that he modelled in wax and clay, and clothed his figures studiously, arranging them in different lights, and sometimes hanging them from the ceiling, to acquire, by drawing from them in that position, the knowledge of the *sotto in su*, then much in use for the adornment of ceilings, and in the houses of the grandees. By these deep studies, and a perfect knowledge of anatomy, he was enabled to exert the exuberant and glowing fancy with which nature had blessed him, in the freest and boldest manner; and had he always applied his powers with equal intenseness, with a careful discrimination of what was due to his own honour, there can be no doubt but that he would have left a name unrivalled in art. This for some time he attended to, and some of his best works lack only character and expression to place them in the highest rank. The large picture which lately adorned the walls of the Louvre, but is now returned to its original station, the Scuola di S. Marco at Venice, is a work of this class, which he painted when only 36 years old; and another is the Crucifixion, in the Scuola di S. Rocco. The former is known by the name of Il Servo, and represents the miracle of St. Mark descending, and breaking the bonds of a slave condemned to death by Turks. Grand but not correct in its style of design, astonishing the mind by the intrepid boldness of its colour and execution, it displays more complete mastery of the materials of art than is to be found in the works of any other painter. If there be any fault in this astonishing performance, it is that the subject is lost in the splendour of the execution, the spirit in the matter in which it is embodied. The same cannot be said of the Crucifixion above mentioned, in which the louring deep and ominous tone preserved through the whole, produces the most perfect unity, gives strength of expression to the picture, and overwhelms the spectator with terror. All seems to be hushed in silence round the central figure of the Saviour suspended on the cross, with his fainting mother, and a group of male and female mourners at his feet; and though many are the improprieties of costume and of action, yet all vanish in the power which compresses them to a single point, and we do not detect them till we recover from the first impression. Unhappily for his fame, he was not always so careful in his labours;

labours; and the impetuofity of his mind, or perhaps the feelings of his employers, who were numerous, did not allow him fufficient time to do juftice to himfelf; and he permitted many pictures to leave his eafel, poffeffing only the freedom of colour and execution which peculiarly belonged to his pencil.

Tintoretto was fo certain of his execution, that he is faid by Sandrart to have frequently wrought without a previous fketch, or any preparatory outline, finifhing as he went on, and adapting his labours to the price he was to receive; not fufficiently confidering that his works would outlive their author, and deprive him of a large portion of the fame fo juftly due to his power, when efficiently exercifed. It was, therefore, truly obferved by An. Caracci, that in fome of his works, Tintoretto was not inferior to Titian, while in others he fell below himfelf.

One remarkable inftance of his intrepidity and impetuofity of genius, and promptnefs of execution, is related by Vafari, *viz.*: The confraternity of S. Rocco at Venice had determined to decorate their church with a picture of the apotheofis of their patron faint, and, defirous of having the choice of good defigns, commiffioned fome of the moft eminent artifts to make compofitions for their felection. Paulo Veronefe, A. Schiavone, Salviati, Zucchero, and Tintoretto, were the competitors. On the day appointed for their decifion, the good fathers were aftonifhed to find a finifhed picture by Tintoretto placed in the appointed fituation; and when they remonftrated upon fo extraordinary a proceeding, as they had only required a defign from him, he told them that was his way of making defigns, and that if they hefitated to pay him for his trouble, they were welcome to the picture, which was allowed to keep poffeffion of its honours. His compeers rendered due juftice to fo extraordinary an exertion, and denominated him *Il furiofo Tintoretto.*

To do juftice to the power of Tintoretto, he muft be contemplated on the grand theatre of his pictorial exiftence, *viz.* at Venice, where alone his grander works are to be found; and there the public buildings are filled with them, in the higher and lower degrees of excellence. In ftyle, the grandeur which he borrowed of Michael Angelo was rather mufcular enlargement of line, and that not always correct, than felect or characteriftic; and it is not often that he rifes above common nature; moftly fo in his female characters, though they are often too flender for truth of action, and too affected for grace. His touch is delightfully free, with a full impafto of colour, and his chiarofcuro of the richeft and moft brilliant kind. He lived to the great age of 82, and died at Venice in 1594.

Tintoretto left a daughter named Marietta Robufti, who was born at Venice in 1560, and whom he inftructed in the art of painting, principally in portraiture, in which fhe acquired confiderable practice and reputation; painting many of the principal perfonages in her native city. She had the honour to be invited to the courts of the emperor Maximilian and of Philip king of Spain; but her father would not be prevailed upon to part with her. She died foon after him, in 1590. He left alfo a fon, Domenico Robufti, who practifed the art with confiderable fuccefs, though not with the fire of invention or execution which characterife his father's productions. He was born at Venice alfo, in 1562. His principal works are in the Sala di Configlio and the Scuola di San Marco at Venice. Portraiture was, however, his principal occupation, and moft fuited to his genius; and he had the honour of being eminently patronized. He died in 1637.

TINURTIUM, Tournus, in *Ancient Geography*, a town of Gaul, on the route from Lugdunum to Gefforiacum. Anton. Itin.

TINUS, in *Botany*, a name in Pliny, book 15, chap 30, for what he fays is fometimes termed a fort of wild laurel, and is diftinguifhed by the blue colour of its berries. This defcription is univerfally agreed to apply to our Laurus-tinus, *Viburnum Tinus* of Linnæus; a plant likewife indicated by Ovid's

Et bicolor myrtus, et baccis cærula tinus.

Linnæus has transferred this name to a Weft Indian fhrub, fuppofed by him to conftitute a new genus, having fome refemblance to the above fhrub.—Linn. Gen. 200. Schreb. 270. Juff. 264 and 451.—Clafs and order, *Enneandria Monogynia.*

The characters of this however were difcovered by Swartz to be founded in error, the plant being a genuine fpecies of Clethra; fee that article, n. 5.

The origin of the word *Tinus* has been fought by Vaillant in the Greek τινος, *fmall*, or *dwarf*, as meaning a fmaller or more humble kind of laurel; but this is fcarcely correct, nor does the derivation by any means fatisfy us.

TINZ, in *Geography*, a town of Silefia, in the principality of Brieg; 22 miles W. of Brieg.

TINZULIN. See Tinjuleen.

TIO, a town of South America, in the province of Cordova; 70 miles E. of Cordova.

TIOGA, a county of New York, erected from Montgomery county in 1791, and from the E. part of this county. The county of Brome was erected in 1806. Tioga is bounded N. by a fmall angle of Steuben county, and by Seneca and Cayuga counties, E. by Brome county, S. by the ftate of Pennfylvania, and W. by Steuben county. Its form is nearly that of a fquare, 26 by 34 miles; its area 571,306 acres: between 42° and 42° 25′ N. lat., and 2° 14′ and 3° W. long. from New York. Its towns are Condor, Caroline, Catharinas, Cayuta, Chemung, Denby, Elmira, Owego, and Spencer its capital. Its eaftern part is traverfed by the Sufquehanna; and the Tioga, the principal W. branch of that river, waters the S.W. part. The furface is confiderably broken and hilly. It is rapidly increafing in population, and contains a large proportion of good farming land. Rafts, arks, and fmall boats defcend the waters of this county, and find the principal market at Baltimore, in Maryland. Tioga fends one member to the houfe of affembly.

Tioga, a large townfhip in the S.W. corner of Brome county, 13 miles W. of Chenango Point; bounded N. by Berkfhire, E. by Union, S. by the ftate of Pennfylvania, and W. by Tioga county; about 15 miles long from N. to S., and 7 broad, having the Sufquehanna running W. acrofs its centre. The foil is various, and the furface uneven. It yields various kinds of trees, grain, and pafture. Fruit in general fucceeds well, and apples are no where better. This town has been fettled fince about 1790.—Alfo, a river of New York, which runs into the Sufquehanna at Tioga Point, N. lat. 41° 56′. W. long. 76° 33′.

TIOLO, a town of Italy, in the Valteline; 10 miles S.W. of Bormio.

TION, a river of France, which runs from the lake of Annecy to the Siers.

TIOOKEA, one of King George's iflands, in the South Pacific ocean, difcovered by commodore Byron. It is a low ifland, with a large lake in the centre. Captain Cook fent to examine a creek, which he fuppofed communicated with the lake. They found the creek fifty fathoms wide at the entrance, and thirty deep; farther in thirty wide and twelve deep; the bottom every where rocky, and the fides bounded with coral rocks: dogs feemed to be in great plenty, but no fruit

fruit was feen but cocoa-nuts. The inhabitants of this ifland, and perhaps of all the low ones, are of a much darker colour than thofe of the higher iflands, and feem to be of a more favage difpofition. This may be owing to their fituation, nature not having beftowed her favours on thefe low iflands with that profufion fhe had done to fome of the others. The inhabitants are chiefly beholden to the fea for their fubfiftence; confequently are much expofed to the fun and weather, and by that means become more dark in colour, and more hardy and robuft, for there is no doubt of their being of the fame nation. Captain Cook's people obferved that they were ftout well-made men, and had marked on their bodies the figure of a fifh, a very good emblem of their profeffion. S. lat. 14° 27′. W. long. 144° 56′.

TIORA, in *Ancient Geography*, a town of Italy, in the country of the Sabines, on the route from Reate to Lifta, between Vatia and Lifta.

TIORN, in *Geography*, an ifland in the North fea, near the weft coaft of Sweden, about 25 miles in circumference, containing three parifhes, and abounding in excellent paftures. N. lat. 58°. E. long. 11° 29′.

TIORNEBIERG, a fmall ifland in the Baltic, near the fouth coaft of Laland. N. lat. 54° 42′. E. long. 11° 18′.

TIORNEHOLM, a fmall ifland in the Baltic, near the fouth coaft of Laland. N. lat. 54° 39′. E. long. 11° 37′.

TIOS, Tieum, or *Tion*, in *Ancient Geography*, a town of Afia, in Paphlagonia, which lay, according to Ptolemy, on the coaft of the Euxine fea, between Pfyllium and the mouth of the river Parthenius.

TIOUGHNIOGA, in *Geography*, a river of New York, which runs into the Chenango, N. lat. 41° 56′. W. long. 76° 53′.

TIPARA, a town of Hindooftan, in Oude; 10 miles S.E. of Gooracpour.

TIPARENUS Insula, now *Specia*, in *Ancient Geography*, the ifle of Tiparena, fituated in the Argolic gulf, feparated by a fmall canal from the continent, which eftablifhed a communication between the gulfs Hermione and Argolic.

TIPASA, Tipsa, a town of Africa, in Mauritania Cæfariana, according to Ptolemy and the Itin. Anton. having the title of colony, and fituated on the route from Carthage to Tingis, between Cæfarea Colonia and Cafæ Caluenti. It ftill preferves its ancient port, and has fome remains of ancient walls.

TIPE, or Type, in *Rural Economy*, a trap or device of the wooden box, or excavated earth kind, for catching or taking rabbits, &c. Thefe tipes or traps are fet or formed in a particular track at the time the rabbits have departed from the warrens, or parts of them, in fearch of food, all the other holes or ways of return being ftopped up. Dogs are then employed in forcing the rabbits to return, when they are taken in the tipes or traps. The tipes are formed of different numbers and fizes, according to the nature and extent of the warren.

TIPER, or Tipra, in *Geography*, a country of Afia, annexed to Bengal, bounded on the N. by Silhet, on the E. by Ava, on the S. by Chittigong, and on the W. by Dacca, about 100 miles long, and 50 broad: the inhabitants are faid to be moft fubject to goitres or wens in the throat, a difeafe generally attributed to the water drank. Comillah feems the chief town. A town of the fame name is laid down in fome maps, as fituated on the river. N. lat. 24° 20′. E. long. 110°.

TIPHA, in *Ancient Geography*, a fmall town of Greece, in Bœotia, fituated on the gulf of Corinth, in which was a temple of Hercules, whofe feaft was annually celebrated. Paufanias.

TIPHCA Princeps, one of the Hebrew accents, fometimes ferving for a comma, and marked under a letter thus (ʻ).

TIPHIA, in *Entomology*, a genus of the Hymenoptera order of infects, in the Gmelinian fyftem of Linnæus; the characters of which are, that the mouth has a membranaceous roundifh jaw, a mandible arched, and acute, a fhort tridentated lip, and no tongue; the feelers are four, filiform, unequal, ftretched out in the middle of the lip; and the antennæ unfiliform and arched. This genus includes the following

Species.

Vespiformis. Black, with a ferruginous abdomen, black at the bafe, and cyaneous wings. The fphex vefpiformis of Fabricius. Found in Malabar.

Crassicornis. Black, the abdomen with three bands, the legs ferruginous, and the wings cyaneous. Found in Spain.

Nigra. Black, without fpots. An European infect.

Femorata. Black, with the four hinder thighs angulated and red. Found in England.

Histrionica. Black, thorax maculated, abdomen with five yellow bands, the two foremoft interrupted. Found in China.

Quinquecincta. Black, thorax fpotted, abdomen with five yellow bands, the fecond interrupted. Found in England.

Variegata. Thorax black, varied with yellow, abdomen yellow. A Siberian infect.

Ciliata. Black, the fegments of the abdomen yellow, with ciliated margin. Found in Spain.

Hæmorrhoidalis. Black, the abdomen with five yellow fpots on each fide, the toes and legs red. Found in South America.

Ephippium. Black, the thorax with a red dorfal fpot. Found in South America.

Radula. Hairs black, thorax reddifh before, the fecond and third fegments of the abdomen yellow. Found in New Holland.

Dorsata. Black, the fecond and third fegments of the abdomen yellow. A Coromandel infect.

Ruficornis. Ferruginous fpotted with black, yellow abdomen, and four black bands. Found in Tranquebar.

Tricincta. Black, the abdomen with three yellow bands, the anus and legs ferruginous. Found in South America.

Collaris. Black, the thorax on the fore-part cinereous villous, behind retufe, with cinereous wings. Found in Malabar.

Morio. Black, with brown wings, pofterior thighs banded with cinereous. Found in Spain.

Pedestris. Apterous, black variegated with yellow, thorax compreffed. Found in New Holland.

TIPHLE, in *Ichthyology*, a name by which fome authors exprefs the acus, or tobacco-pipe fifh.

TIPICA, in *Geography*, a town of Peru; 30 miles E. of Lipes.

TIPING, a town of Corea; 25 miles S.E. of King-ki-tao.

TIPIOCA, or Tapioca, a name given by fome authors to a fort of cream or flour made from the yucca or manihot-root, by maceration of it in water, after expreffing the juice.

TIPOR, in *Geography*, a town on the weft coaft of Celebes. S. lat. 2° 5′. E. long. 119° 22′.

TIPPACANOE Creek, a river of North America, which

which runs into the Wabafh, N. lat. 40° 18′. W. long. 86° 56′.

TIPPAL, a river of England, in Northumberland, which runs into the Tyne, near Haltwhiftle.

TIPPERARY, a county in the province of Munfter, Ireland, extending in a very irregular form between the King's and Queen's counties on the north, the latter county and that of Kilkenny on the eaft, the counties of Waterford and Cork on the fouth, and thofe of Limerick, Clare, and Galway on the weft. From the two latter counties, the river Shannon forms a natural boundary; as the river Suir does from Waterford for about 15 miles on the fouth. The length from north to fouth is 52 Irifh (or $73\frac{1}{2}$ Englifh) miles, and its breadth 31 Irifh (or $39\frac{1}{2}$ Englifh) miles. It contains 554,950 acres, or 867 fquare Irifh miles, equal to 882,398 acres, or 1420 fquare Englifh miles, including bogs, mountain, and wafte. There are twelve baronies, two of which, Upper and Lower Ormond, gave the title of duke, as they now do that of earl, to the family of Boteler, or Butler, fo diftinguifhed in Irifh hiftory. The population of Ireland not having yet been fatisfactorily afcertained, little can be faid on the fubject. Dr. Beaufort ftated the number of houfes in 1792, at 30,705; and from the means of information he had, and his ufual accuracy, there can be little doubt of his correctnefs: but from the great increafe of tillage fince that time, the number of houfes muft have increafed, though Tipperary has had more caufes to retard this increafe than any other county in Ireland: 30,703 houfes, at an average of $5\frac{1}{2}$ fouls *per* houfe, would be about 169,000; but if, according to Mr. Bufhe's opinion, as given in the Tranfactions of the Irifh Academy, we take $6\frac{1}{2}$ as the average, it would exceed 190,000, a very fmall population for fuch an extent of ground. The number of parifhes is 187, which, when Dr. Beaufort wrote, were comprifed in 63 benefices, and had only 46 churches. A number of churches have however been fince built, as well as feveral glebe-houfes, and fome benefices have been divided; to which the exertions of the prefent archbifhop of Cafhel (Brodrick) have greatly contributed. Unions of parifhes which were formed, when from the ftate of the country the income of a parifh was very fmall, and the number of inhabitants very few, are now as unneceffary as they are injurious. The archbifhopric of Cafhel, and bifhopric of Emly, which are united, contain 116 parifhes, Waterford 32, and Killaloe 41. Tipperary returns four members to the imperial parliament, two knights of the fhire, and two for the boroughs of Clonmell and Cafhel. This reduction was lefs than in moft other counties, as Tipperary had only three boroughs before the Union, of which Featherd was disfranchifed. Though the towns reprefented are confiderable ones, efpecially Clonmell, yet the boroughs are both what are called *clofe* ones, the proprietors in fact exercifing an undifputed right of chufing the member. The lands of Tipperary have been always ranked amongft the moft productive in Ireland, and one tract in particular, including the neighbourhoods of Tipperary and Cafhel, has been called the *Golden vale*, on account of its extraordinary fertility. It has however been always a great grazing country; and as this fyftem drives the peafantry into barren mountains, or forces them to crowd into towns and villages, that they may procure a precarious and wretched fubfiftence, they too commonly become turbulent, violent, and difcontented. Whether this be the caufe or not, fuch is certainly the character of the peafantry of this county, who have been engaged in every difturbance, and who are now groaning under an infurrection act, attended with enormous expence, which the ufual parliamentary opponents of government could not object to, and which, though there is an apparent calm, it would be yet unfafe to repeal. The increafe of tillage would operate favourably, but the exemption of grazing land from every kind of tithe, operates as an encouragement to it, which the prefent ftate of the market for grain is not likely to counteract. Whilft, however, Tipperary contains a confiderable portion of very fertile land, it has alfo extenfive tracts of bog and mountain. Of the former, the moft extenfive is a tract lying in the north-eaft of the county, between the towns of Rofcrea, Templemore, Urlingford, Littleton, and New Birmingham, and forming a part of the Great Bog of Allen. This was furveyed by Mr. Ather, of Caftle-comer, under the directions of the commiffioners for enquiring into the nature, extent, &c. of the bogs of Ireland; and from his report it would appear, that about 36,000 acres, moftly in this county, might be eafily reclaimed, and at a moderate expence, on account of the favourable fituation for draining, and the abundance of limeftone gravel, of which the diftrict is principally compofed, and which is the beft material for reclaiming them. To the fouth of this range of bog, and fituated between the fmall town of Killenaule and the county of Kilkenny, is the coal diftrict. It refembles what has been called the Leinfter coal diftrict in the very able geological and mining report lately given of that diftrict by Richard Griffith, efq. mining engineer to the Dublin Society. It feems indeed to be only a continuation of that diftrict, and is feparated from it by a fecondary limeftone country. The fpecies of coal is the carbonaceous or ftone-coal, better known by the name of Kilkenny coal. To the fouth of this, and in the fouth-eaftern angle of the county, is Sliebh-na-man mountain. On the borders of the county of Waterford, over the town of Cloghen, are the Knockmele-down mountains, which occupy a confiderable fpace in both counties. Nearly parallel to thefe, and north of them, are the lofty Galtees, extending from the borders of Cork and Limerick to the town of Cahier. Between thefe and the town of Tipperary is the lower range, called Sliebh-na-muck; but the greateft extent of mountain croffes the county from fouth-weft to north-eaft, running from the county of Limerick to the Queen's county, and completely feparating the two Ormonds from the reft of the county. The high hills adjoining Limerick are called the Keepe mountains, from the higheft of them, which is a remarkable object to the traveller and the adjoining country. The hills near the fmall town of Silvermines, have been marked in fome maps as the Silvermines mountains; others have been called the Devil's Bit; and adjoining the Queen's county, they take the name of the Sliebh-bloom mountains. In this diftrict, lead and copper mines have been wrought with various fuccefs; and fome parts of it afford fine mill-ftones. The river Suir rifes in the north of the county, near Rofcrea, and flows from north to fouth, when it takes an eaftern direction, and becomes the boundary between it and Waterford. This and its tributary ftreams afford an abundant fupply of water; and turn a very great number of boulting-mills. The weftern divifion of the county has the Shannon for its boundary, and is well watered by the ftreams which flow to it from the range of mountains above mentioned. Clonmell, on the Suir, and at the fouthern extremity of the county, is the fhire-town, and though very inconveniently fituated for the affizes, has an excellent gaol, court-houfe, &c. It is a place of confiderable trade, and one of the principal inland towns of Ireland. Cafhel, Rofcrea, Nenegh, Tipperary, Carrick, and fome others mentioned in their proper places, are of refpectable fize, but none of them diftinguifhed for trade or manufactures, unlefs we except the manufacture of ratteens at Carrick. Tipperary was, previous to the arrival of the Engliſh, a part of the kingdom of Munſter; ſometimes ſeparated as an independent ſovereignty under the kings or princes of Caſhel. The name Ormond is a corruption of Oir Momond, *i. e.* Eaſt Munſter, and was ſo called in oppoſition to Deſmond, South Munſter, and Thomond, North Munſter. After the Engliſh ſettlement, the O'Briens were confined to Thomond, the Fitzgeralds eſtabliſhed themſelves in Deſmond, and the Butlers became the poſſeſſors of Ormond and Kilkenny, acknowledging indeed the ſovereignty of England, but maintaining ſuch authority as rendered it only nominal. The counties of Kilkenny and Tipperary were palatinates; and it was not till the attainder of the duke of Ormond, in 1716, that this diſtinct juriſdiction was aboliſhed. As the inhabitants of Tipperary were actively engaged againſt the Proteſtants in 1641 and the ſucceeding years, great forfeitures took place on Cromwell's ſucceſs, and many of the preſent landholders are deſcendants from his officers. Tipperary abounds with ruins. The number of old caſtles is very great, ſome of them boldly ſituated, and forming very ſtriking objects to the traveller: ſuch as the caſtle of Ardfinnan, built by king John, and that of Cabier, on an iſland in the Suir. The chief eccleſiaſtical ruins are thoſe of Holycroſs, Monaincha, and Caſhel, which all deſerve to be viſited by the curious. No ſtatiſtical account has been publiſhed of the county of Tipperary, and there appear to be very ſcanty materials for its hiſtory.

Tipperary, a market and poſt-town in the county of the ſame name, 87 miles S.W. from Dublin, and about 20 miles N.W. from Clonmell, on the road to Limerick. Its name is ſaid to be in Iriſh Tiobrad-arain, ſignifying the *well* of the territory called *Arain*. The town is not large, and appears to be in a ruinous condition, though it was formerly of ſufficient importance to give its name to the county. The adjoining county is very rich, and there are ſome fine ſeats, eſpecially Thomaſtown, the ſplendid ſeat of the earl of Llandaff, deſcended from the Mr. Matthew whom Swift viſited; and Damers-Court, a ſeat of the earl of Dorcheſter. In the neighbourhood are the ruins of Emly, the church of which was once the metropolitan church of Munſter, and which ſtill gives name to a biſhopric, united to the archiepiſcopal ſee of Caſhel.

TIPRA. See Tipera.

TIPREE, a dry meaſure at Bombay; where the candy contains 8 parahs, the parah 16 adowlies, 64 ſeers, or 128 tiprees. Rice is ſold by the batty meaſure, in which the morah is = 4 candies, or 25 parahs, the parah 20 adowlies, 150 ſeers, or 300 tiprees. A candy is ≐ 25 Wincheſter buſhels nearly.

TIPSA, in *Geography*, a town of Algiers, in the province of Conſtantina, on the borders of Tunis, near the banks of the Melagge, anciently called *Tipaſa;* at preſent a frontier city and garriſon of the Algerines. This place, which enjoys a fine ſituation, with ſome mountains at a ſmall diſtance, ſtill preſerves the principal gate, ſeveral fragments of old walls, and other marks of the rank and figure it formerly obtained amongſt the cities of Numidia; 85 miles S.E. of Conſtantina. N. lat. 35° 27′. E. long. 8°.

TIPSTAVES, officers appointed by the marſhal of the king's bench, to attend the judges with a rod or ſtaff tipped with ſilver, and take charge of ſuch perſons as are either committed, or turned over at the judge's chambers.

The denomination is alſo ſometimes given to thoſe more frequently called *boſtons;* who are the wardens of the Fleet's officers, attending the king's court with a painted ſtaff, for the taking into cuſtody ſuch priſoners as are committed by the court; and to attend ſuch priſoners as go at large by licence.

TIPUL, in *Natural Hiſtory*, a name given by the people of the Philippine iſlands, to a ſpecies of crane common there, and ſo tall, that when it ſtands erect, it can look over a man's head. See Dongon.

TIPULA, in *Entomology*, a genus of the Diptera order of inſects, the characters of which are, that the mouth has a very ſhort proboſcis, membranaceous, canaliculated on the back, receiving a briſtle; the hauſtellum ſhort, without a vagina; the feelers two, incurved, equal, filiform, longer than the head: the antennæ are moſtly filiform.

The ſmaller ſpecies of this genus ſo much reſemble gnats, that the generality of authors, not excepting even Goedart and Swammerdam, have confounded the two genera, and deſcribed theſe among the gnats.

The long form of the body, the poſition of the wings, and the length and poſition of the legs, are the circumſtances that make the reſemblance between the gnats and tipulæ; but the ſtructure and organs of the head are alone a very ſufficient diſtinction.

As the tipulæ differ from the gnats in the figure of the mouth, and in being without a trunk, they differ as much from the other flies of that character, by their reſembling the gnat in the ſhape of their body. They differ alſo in the conformation of the mouth, and its ſeveral parts and organs. The opening of the mouth is a ſlit extending itſelf from the fore part of the head toward the hinder part, and its lips cannot be called upper and lower; but they are lateral ones. When the body of the creature is preſſed, this mouth opens, and ſhews what ſeem to be a ſecond pair of lips within. Theſe are more firmly cloſed than the others, and reſemble only certain duplications of the fleſh. The exterior lips are cartilaginous, and are furniſhed with ſhort hairs; the interior are perfectly ſmooth, and of a fleſhy texture. The head of the tipula is of a long and ſlender figure; the lips are articulated at the extremity of this head, and on each ſide there ſtands, on the upper part, a ſort of beard, which, when minutely examined, is found to be articulated in the manner of the antennæ of inſects. Theſe two beards, in their uſual poſition, are placed cloſe together, and bent forwards over the head; their office ſeems to be the covering of the aperture of the mouth. Theſe ſeem conſtantly to be found in all ſpecies of the tipulæ, and placed exactly in the ſame manner.

The largeſt ſpecies of tipulæ are uſually found in our meadows, and theſe are in no danger of being confounded with the gnat kind, their ſize alone being a ſufficient obvious diſtinction. Theſe are often found of nearly an inch in length from head to tail; but their bodies are very ſlender, and are compoſed of only nine rings. The male tipula is eaſily diſtinguiſhed, at ſight, from the female; it is much ſhorter in the body, and is thicker at the tail than any where elſe; this tail alſo uſually turns upwards, whereas that of the female is placed in the ſame line with the body, and is ſlender, and compoſed of ſeveral ſcaly parts, proceeding from the laſt ring of the body. Theſe creatures are found in our meadows through the whole ſummer; but the end of September and beginning of October is the time when they are moſt of all plentiful.

The legs of theſe creatures are greatly diſproportioned to the body, according to the common rules of nature, eſpecially the hinder pair, which are in the larger ſpecies uſually three times the length of the body.

This large ſpecies is a creature of no great beauty; its body is of a browniſh colour, and its corcelet is ſo elevated, that the creature ſeems hump-backed; the head is ſmall, and the

the neck very ſhort, the reticulated eyes are ſo large, that they cover almoſt the whole ſurface of the head; theſe are of a greeniſh colour, with a caſt of purple, when viewed in ſome lights. Reaumur ſuppoſes that two very lucid ſpecks, on the anterior part of the breaſt, are eyes, though placed in ſo very ſingular a manner; the wings of this creature are long, but very narrow, and ſeem ſcarcely well proportioned to the ſize of the animal; they are tranſparent, but have a ſlight caſt of brown; and their ribs, when viewed by the microſcope, appear beſet with ſcales, or feathers, in the manner of thoſe of the gnat kind. Some ſpecies of the tipulæ have them alſo fringed with theſe ſcales at the edges; there are no ailerons, or petty wings, at the origin of theſe, but in the place of them there are two very fine balancers or mallets; theſe have long pedicles, and roundiſh or oval heads; the ſtigmata of the corcelet are four; one pair is placed immediately underneath theſe balancers, and the other immediately below the firſt pair of legs; the firſt pair is very long, the others ſmall, and thoſe on the rings of the body, if there be any, are too ſmall for our ſight, even with good glaſſes. Each ring of the body is compoſed of two half cylinders, which are joined into one, by means of a membrane, which gives them room to diſtend or cloſe up at the creature's pleaſure. The large tipulæ all carry two antennæ, or horns, upon their heads; but theſe are of no remarkable ſtructure, they are only compoſed of a great number of joints, each covered with a fine downy hairineſs; and at the joining of each to the next, there is a tuft of longer and more ſtiff hairs. This is the deſcription of the common large tipulæ which we find in the meadows, and in almoſt all its parts is applicable to the generality of the larger ſpecies of theſe inſects.

The ſmaller kinds are very numerous, and of great variety. Theſe are frequent in all places, and at all ſeaſons of the year; the ſpring ſhews us immenſe clouds of them, and even the coldeſt winter's day ſhews a great number of them in the ſun-ſhine about noon. Theſe creatures fly much better than the larger tipulæ; they ſeem indeed to be almoſt continually upon the wing, and their manner of flight is very ſingular; they are continually mounting and deſcending again, and that without quitting the direction of the line in which they go forward; this they will often do for many hours together. In tracing theſe flies from their origin, they are all found to be produced from worms which have no legs, and have a regular ſcaly head. Thoſe from which the larger tipulæ are produced live under ground; they are moſt fond of marſhy places, but any ground will do that is not often diſturbed. They uſually are found at about an inch under the ſurface, and are ſo plentiful in ſome places as greatly to injure the herbage.

Theſe creatures do not find it neceſſary to their living, that plants ſhould be upon the ſurface of the earth in which they live. There is frequently found in the hollows of the ſtumps of old trees, a ſort of earth which ſeldom produces any vegetables; yet the female flies of this ſpecies well know that their young will find a proper ſubſiſtence there; and there are uſually found great numbers of them in all theſe places. The hollow elms and willows, ſo common in our hedges, and by ditch ſides, afford innumerable proofs of this: but it muſt be obſerved, that they are only found in ſuch earth of this kind as is continually ſomewhat moiſt.

M. Reaumur mentions a very ſingular ſpecies of large tipulæ, which was produced with him from one of the worms found in the earth of an old elm; this was of the larger kind, and had ſome beautiful ſpots on the wings. It had alſo a very elegant tufted antenna; whereas, in the common large tipulæ, theſe are plain and ſimply granulated ones, as well in the males as females. Reaumur's Hiſt. Inſ. vol. ix. p. 7, &c.

The numerous ſpecies are diſtributed, by Gmelin, into ſeveral claſſes, as follow:

* *With patent Wings.*

Pectinicornis. With pectinated antennæ; the wings with a black ſpot; the thorax yellowiſh. Found in moiſt places in Europe.

Rivosa. With hyaline wings; rivules brown, with a ſnowy ſpot. Frequent in Europe.

Sinuata. With white wings, ſinuated margin and ſpots brown; cinereous body, and ferruginous feet. Found in the north of Europe.

Quadrimaculata. With wings brown-veiny, margin and four ſpots brown; abdomen above yellowiſh. There is a variety denominated *calmarienſis*. Found in the meadows of Europe.

Crocata. With wings having a brown ſpot; abdomen black, yellow bands. Frequent in the north of Europe.

Oleracea. With hyaline wings; the margin of the rib brown. Found in Europe at the roots of pot-herbs, grain, &c. &c.

Hortorum. With hyaline wings; ſcattered obſolete ſpots. Found among the pot-herb plants of Europe.

Tricolor. With whitiſh wings; the exterior margin and bifid apex brown. Found in North America.

Triangularis. With wings dimidiate-brown, and white triangular ſpot. Found in Scotland.

Variegata. Black; baſe and ſides of the abdomen red, ſpotted with yellow. Found in the gardens of Europe.

Contaminata. Black, with white wings; two bands, and a point black. Found in moiſt places of Europe.

Lunata. With aſh-coloured wings, and white marginal lunule. Found in the meadows of Europe.

Turcica. With veiny wings; white marginal lunule; cinereous body, and abdomen with a black dorſal line.

Pratensis. With variegated thorax; brown abdomen; ſides ſpotted with yellow; front tawny. Found in the meadows of Europe, deſtroying the roots of graſſes.

Dorsalis. Yellowiſh; brown back; hyaline wings; marginal ſpot black. Found in Germany and Italy.

Plumbea. Brown-cinereous, with white wings; rib and nerves black. An Italian inſect.

Terrestris. With hyaline wings; brown marginal point; back of the abdomen cinereous. Found in Europe. See Crane-*Fly*.

Cornicina. With hyaline wings, marginal point brown: abdomen yellow; three lines brown. Found in Europe at the roots of plants.

Nigra. With brown wings, and black body. Found among the plants of Europe.

Albimana. Black, with teſtaceous thighs, and hinder tarſi white.

Costalis. Sordidly yellow; with antennæ twice longer than the body; hyaline wings, and browniſh coſta. Found in Van Diemen's Land.

Clavipes. Brown; with tarſi annulated with white in the middle; ovated, incraſſated. Found in North America.

Atrata. With glaucous wings; marginal point and body black; firſt ſegment of the abdomen and feet red. An European inſect.

Bimaculata. With hyaline wings; two brown ſpots; the middle of the abdomen ſpotted ferruginous; plumoſe antennæ; as the former.

Annulata.

ANNULATA. With wings variegated with brown; thighs with white rings; as the former.

OCELLARIS. With whitiſh wings, very numerous, blackiſh, ocellar ſpots. North of Europe.

CINEREA. With whitiſh wings, three brown ſpots, cinereous unſpotted body. A Norwegian inſect.

FASCIATA. With whitiſh wings, four brown flexuoſe bands; abdomen and feet yellowiſh. Found in the marſhes of Sweden.

MELANOCEPHALA. Teſtaceous; head and dorſal line of the thorax black; wings hyaline; three brown ſtreaks. A Cayenne inſect.

SEXPUNCTATA. With white wings; three marginal brown points; thorax compreſſed, yellow; dorſal line black. Found in Italy.

FLAVIPES. Brown, with obſcure wings ſpotted cinereous, and three brown coſtal ſpots; feet yellowiſh; joints brown.

TRIPUNCTATA. With hyaline wings; three marginal points brown; yellow body. Found in Italy.

FLAVESCENS. With unſpotted wings; yellow body; brown back. Found in the fields of Europe.

ENSIFORMIS. With lanceolate ſerrulate antennæ; wings, veins, and ſpot black. Found in Sweden.

REGELATIONIS. With hyaline gloſſy wings; cinereous brown body. Found frequently in Europe.

PILIPES. Cinereous; with ſtriated browniſh wings; foremoſt legs hairy

MORIO. Black; with white wings; marginal point brown; pallid feet.

REPLICATA. With hyaline wings; margin ſlender, recurved; body brown; ſimple antennæ. Found in the waters of the north of Europe.

MONOPTERA. Black; with feet and feelers pallid. North of Europe.

ARUNDINETI. Whitiſh; villoſe antennæ; black eyes. Found among the reeds of Europe.

BARBICORNIS. Black; with plumoſe antennæ; ſimple at the apex. Found occaſionally in Europe.

GIGANTEA. With wings brown, hyaline, waved longitudinally in the middle. Found in the gardens of Auſtria and France.

VENOSA. With hyaline wings; veins brown, and brown margin. In Upper Auſtria.

PLICATA. Cinereous; with hyaline wings; brown veins; external margin and middle line interwoven in ſmall folds. Upper Auſtria.

PUNCTATA. With hyaline wings, pointed with black; exterior margin ſpotted with black. As the former.

PHRAGONITIDIS. Yellow; with black head, hyaline wings, and three black points. Found among the reeds in Auſtria.

LINEATA. Yellow; pointed with three lines on the thorax, and four on the abdomen. Auſtria and Carniola.

OCREATA. Black; with hyaline wings, ſpotted and pointed with black; the band before the hinder tarſi white. Upper Auſtria.

BIFASCIATA. Yellow; with hyaline wings, ſubfaſciated with brown. Upper Auſtria.

DEPRESSA. With cinereous thorax; abdomen yellow, depreſſed; wings yellowiſh-brown; four marginal ſpots brown. An European inſect.

DISCOLOR. Cinereous; abdomen on both ſides yellowiſh; wings with brown and white ſpot. As the former.

PECTINATA. Black; with antennæ ſemi-pectinated; glaucous wings; marginal point and apex large; thighs and legs red; apices black. As before.

VERSICOLOR. Yellow; thorax yellow, ſpotted with black; abdomen and back, beneath and ſides, cinereous; wings, veins, and ſpot brown. As before.

MACULOSA. Black; bill, legs, and apex of abdomen yellowiſh; wings with ſcattered brown ſpots. As before.

LUTEA. Pale yellow; with yellowiſh wings. As before.

FUSCIPES. Black; with two yellowiſh bands on the abdomen; white wings, ſpotted with black; yellowiſh legs, joints, and ſoles; with the toes brown. As before.

QUADRIFASCIATA. Cinereous-yellowiſh; with grey wings; four yellowiſh bands, and margin of coſta pointed; with yellow legs; black joints. As before.

OCTOPUNCTATA. With white wings; eight black points; black abdomen; thorax and legs paliſh. Found at Paris.

PARISIENSIS. Green; with hyaline wings; brown band; the two bands of the abdomen and anus black. As before.

SECALIS. Cinereous; with ciliated wings; eyes, antennæ annulated with white; the apex of the abdomen and feet black. Found in fields of rye. Gmelin queries whether the two laſt ſpecies belong to this tribe of inſects.

* *With incumbent Wings:* "Culiciform."

PLUMOSA. With greeniſh thorax; white wings; brown point; and plumoſe antennæ. In the marſhes of Europe.

LITTORALIS. Greeniſh; with unſpotted wings; and fore-legs very long. In the maritime parts of Europe.

CINCTA. Livid; with wings and three marginal ſpots black; the abdomen black, annulated with white. Found in Sweden.

MOTITATRIX. With fore-legs very large and motatory; with white ring. Frequent in Europe, yellow-green.

PILICORNIS. Blackiſh; fore-legs as before; thorax lineated; white wings unſpotted.

FASCICULATA. Black; fore-legs as before; ſides of the abdomen ſpotted with ferruginous. Found in Germany.

TENDENS. Ferruginous; with white unſpotted wings; fore-legs very long and pale. In marſhes of Denmark.

VIBRATORIA. Fore-legs very large, motatory; white at the apex. Found in marſhes of Europe.

VARIA. Brown; fore-legs elongated; abdomen yellowiſh; wings varied with white and black.

TREMULA. Fore-legs very long, motatory; black, with white wings. In the marſhes of Sweden.

FLEXILIS. Fore-legs motatory, all pallid; wings with duſkyiſh band. In the watery places of Europe.

MONILIS. With white legs, nine black rings; wings varied with white and cinereous. In the gardens of Europe.

ZONATA. Pallid; with wings, two bands, and three points brown; thighs with brown angle. Found in Orford.

VIRENS. Green; with unſpotted wings; brown ſoles. A Swediſh inſect.

VIRIDULA. Green; with antennæ verticillate, hairy; pallid legs. North of Europe.

GENICULATA. Beneath yellowiſh; lines of the thorax and back of the abdomen black, with white immaculate wings.

PALLIPES. Smooth-brown; with hyaline unſpotted wings, and paliſh legs.

MACROCEPHALA. Greeniſh; with eyes and back of the thorax black. In the marſhes and moiſt ſhores of Europe.

PUSILLA. Green; with three black ſpots on the hinder part

part of the thorax; antennæ of the male plumoſe. In the lakes of Europe.

Marci. Black, ſmooth; with blackiſh wings; fore-thighs furrowed inwards. In the dunghills and putreſcent ſoil of Europe: probably a variety of hortulana?

Thomæ. Black, ſmooth; with black wings; ſides of the abdomen marked with a ſaffron line. At Upſal.

Chrysanthemi. Black, ſmooth; the abdomen red at the baſe; the antennæ incraſſated, piloſe. On the chryſanthemus coronarius of Spain.

Ferruginata. Black, ſmooth; brown wings; abdomen brown-ferruginous. South of Europe.

Johannis. Black, ſmooth; white wings; black point; ſhort antennæ; black legs. In ſhady parts of Europe.

Pomonæ. Black, ſmooth; hyaline wings; black point; ferruginous thighs. In the plains of England and Norway.

Ruficollis. Black, ſmooth; red thorax. At the Cape of Good Hope.

Brevicornis. Black, ſmooth; with wings blackiſh at the margin; abdomen brown; fore-ſhanks ſpinoſe. In the ſhady gardens of Europe.

Putris. Brown; the baſe of the wings cinereous. In the teeming ſoil at the commencement of ſpring.

Febrilis. Black, oblong, hairy; with blackiſh wings. An European inſect in cloſe places.

Insularis. Black, hairy; with ferruginous legs, hinder elongated.

Forcipata. With cylindric black abdomen; wings brown-hyaline; anus appendiculated. An Engliſh inſect.

Vernans. Cinereous; thorax black-lineated; white wings ſpotted with brown. In meadows of Denmark.

Florilega. Black, ſilken. On the apple-flowers of Europe, which it deſtroys.

Hortulana. With hyaline wings; exterior margin black. In the flowers of aſparagus and apple.

Phalænoides. With wings deflexed, cinereous, ovate-lanceolated, ciliated. In the walls of dunghills and mixens of Europe.

Hirta. Hairy; with wings deflexed, ovate-ciliated, teſſellated with white and black. In Lapland.

Persicariæ. Black; with wings incumbent, ſubciliated; under the leaves of the peach-tree.

Notata. Black; with white wings; with a white ſpot in front of the ſides of the abdomen. In Europe.

Juniperina. Cinereous; with white wings; margin villous; found in the juniper.

Culiciformis. Cinereous, with pallid legs; wings marked with two blackiſh ſpots. At Upſal.

Incarnata. Incarnated; with moderate antennæ. At Upſal.

Palustris. Pallid; black head; reddiſh abdomen. In marſhes of Europe.

Longicornis. With antennæ longer than the incarnated body. In moiſt places of Europe.

Rufipes. Black; with red legs; wings black in the middle; yellowiſh at the baſe. North of Europe.

Stictica. Black; ſegments of the abdomen white at the apex; wings with a brown point. In Germany.

Pallida. Pallid, piloſe; legs punctated with black. In Germany.

Hafniensis. Brown; lateral line of the thorax and legs whitiſh, unſpotted.

Flabellicornis. Pallid; abdomen annulated with black; wings ſpotted. Germany.

Bipunctata. Brown; wings cinereous; marginal point white. Found in Europe.

Sericea. Black; back black; ſides of the thorax bare; balancers yellow. In Sweden.

Minutissima. Yellow; eyes concurring in the vertex black. In the ditches of Sweden and Auſtria.

Pulicaris. Black; ſides of the thorax, ſcutellum, and abdomen yellow. In the ditches of Europe.

Pennicornis. With antennæ bipectinate; black body; halteres, or balancers, white. In the flowers of ariſtolochia clematis.

Scathopse. Black; antennæ moniliform; with wings incumbent hyaline. In the privies of Auſtria.

Buxi. Yellow; head and thorax black; wings brown incumbent. In the box-tree of Europe.

Berberina. With wings incumbent, fuliginous; ſpotted white at the baſe and margin. In the excreſcences of the barbery.

Lutescens. Yellowiſh; three brown ſpots on the back; antennæ plumoſe. Found in Europe.

Trifasciata. Ferruginous; with three bands on the wings. In Europe.

Multicolor. Yellowiſh body; greeniſh abdomen; white wings with a brown band. As before.

Alba. Grey; with white wings and abdomen; the apex of the latter brown. As before.

Carbonaria. Black; legs ferruginous; wings hyaline. As before.

Plumicornis. Brown; antennæ browniſh-plumoſe; legs yellowiſh. As before.

Dichroa. Black; legs ferruginous. As before.

Leucoptera. Brown; apex of abdomen and legs pale yellowiſh; wings white. As before.

Moschifera. Wings cinereous; thorax and abdomen yellow. Found in Chili.

TIPULA Wasp. See Wasp *Tipula*.

TIQUADRA, in *Ancient Geography*, one of the ſmall iſlands ſituated near the Balearic iſlands, near the town of Palma.

TIQUINA, in *Geography*, a town of Peru, in the dioceſe of La Paz; 55 miles N.N.W. of La Paz.

TIR, a town of Perſia, in the province of Khoraſſan; 40 miles N. of Herat.—Alſo, a town of Perſia, in the province of Farſiſtan; 50 miles N.E. of Schiras.

TIRABOSCHI, Girolamo, *Abate*, in *Biography*, author of the beſt hiſtory of Italian literature which that country, fertile in men of learning, taſte, and talents, has produced. He was born at Bergamo in 1731, and is ſtyled *Cavaliere* by his biographer, and the laſt editor of his Hiſtory, in a life prefixed to the index of the ſecond edition, publiſhed at Modena in 1794. He had his education in the Jeſuits' college from fifteen till the abolition of the order. He was profeſſor of eloquence in the univerſity of Brera at Milan till the year 1770, when he was appointed præfect of the Eſte library at Modena, by the intereſt of count Firmian. He firſt diſtinguiſhed himſelf, after this appointment, by a new edition of the Italian and Latin Vocabulary of Mandoſio; which work was almoſt wholly new written by him, and corrected and augmented with the moſt refined purity of the two languages; and the Latin and Italian orations which he delivered publicly at Milan, two of which were printed, and eſtabliſhed his reputation for eloquence.

He diſtinguiſhed himſelf during the firſt years of his præfectorſhip of the duke of Modena's library, by drawing up a new catalogue of the manuſcripts, books, medals, gems, and rarities of that celebrated library, and compiled the firſt volume of his Hiſtory of Italian Literature, publiſhed in 1771, which manifeſted ſuch taſte and ſolid learning

learning as aftonifhed his readers; but the public in general was ftill more aftonifhed at his finifhing the whole work in eleven years, confifting of thirteen large volumes in 4to.; a work which, by its immenfe erudition, profound critical difcuffions, and judgment in every kind of literature, acquired him the praife of the whole republic of letters.

Befides this great work, he produced during the fame period the life of St. Olympia; a letter on the comparative excellence of Italian and Spanifh literature; the life of Fulvio Tefto; the two firft volumes of the Biblioteca Modenefe; and all the articles which he furnifhed to the twenty-three firft volumes of the Giornale di Modena, a kind of review and hiftory of new books and difcoveries in arts and fciences within the year.

He was knighted by the duke of Modena, though a regular ecclefiaftic, and ennobled by his fellow-citizens at Bergamo. To enable him to proceed in his great work with more convenience, his patron augmented his appointment, and gave him an affiftant in the library.

His correfpondence with the learned throughout Europe muft have occupied much of his time: as at his deceafe, among his papers were found materials for twenty-eight volumes of original letters addreffed to him as author of the Literary Hiftory of Italy, and editor of the Giornale di Modena. In his numerous minor productions, as well as in thofe of greater volume and importance, he difcovers himfelf to have been gifted with a quick penetration, and poffeffed of great facility in writing, as well as a clear conception of the works of others, which to have acquired, muft have been ftudied with conftant application.

This admirable writer died at the age of fixty-two, of a bloody flux, in 1794.

From this celebrated work, we expected to acquire new and authentic information concerning the rife and progrefs of mufic previous to the feventeenth century, in a country which has taught every other part of Europe all the refinements of the art, a country in which we fought in vain, by travelling, converfation, and the perufal of all the books written by the natives which we could procure on the fubject, to trace the origin of Italian melody. Dull and pedantic elementary books we procured in abundance; but fcarcely any that we could read with pleafure, previous to the eftablifhment of the opera at the beginning of the feventeenth century. Quadrio's heavy volumes are filled without tafte, felection, or folicitude concerning the authenticity of facts. Padre Martini, unfortunately for modern mufical hiftory, did not live to finifh his plan; having advanced no farther than the ancient mufic of the Greeks.

Tirabofchi is copious on all other parts of literature, arts, and fciences. It is only on mufic, and mufical writers, our peculiar refearch, that we have ever found him unfatisfactory: we never confulted him on any other fubject unprofitably. The little he tells us of Pythagoras, Ariftoxenus, the Etrufcans, and Guido, we had often previoufly read in innumerable books in various languages.

He fpeaks of the Lyric poetry of the Greeks and Romans; but that of the Italians has not furnifhed an article. We did hope to be informed what kind of melodies were fet to the fongs of Dante, Petrarca, and Boccaccio. We could not reafonably expect fpecimens of this melody in notation, any more than prints of pictures and buildings that are mentioned in his work; but when a capital work of Raphael, Michael Angelo, or Palladio is mentioned, we are generally told where it is to be feen, or at leaft where it *has* been feen. Had Tirabofchi told his readers where the original melodies to the fongs of the old Italian poets were to be found, it would have been a great fatisfaction to thofe who confult books for ufeful and folid information, or feek in them for any thing but mere amufement.

Of the laft century he fays nothing, as his plan went no farther than the end of the feventeenth century. And, indeed, of that period, his information is very fcanty; neither Cariffimi nor Stradella, the two beft compofers which Italy had then produced; nor among contemporary theorifts, or writers on harmonics, is any notice taken of Lemme Roffi, or Daniel Bartoli, authors of two books, which in a general hiftory of literature ought to have been mentioned. See BARTOLI, and ROSSI.

TIRACHEA, in *Ancient Geography*, a town of Judea, in the Decapolis, on the coaft of the fea of Galilee.

TIRADE, in *French Mufic*, formerly implied what the Greeks meant by *αγωγω*, *agogo*, *ductus*, the filling up a wide interval by the intermediate diatonic notes. (See GREEK *Mufic*.) But, at prefent, *tirade* feems nearly equivalent to *volata* in Italian; a divifion, a flight.

TIRAGHT, in *Geography*, an ifland in the Atlantic, near the W. coaft of Ireland; 8 miles S.W. of Dunmore-Head.

TIRAMANGALUM, a town of Hindooftan, in Madura; 10 miles S.W. of Madura.

TIRAMANY-MUTOO, a river of Hindooftan, which runs into the Cauvery; 8 miles N. of Carroor.

TIRAN. See TYRAN.

TIRANADUM, or TIRINADUM, in *Ancient Geography*, a town of Africa, in Mauritania Cæfariana, on the route from Carthage to Cæfarea, between Rapidum and Caput-Cillanum. Anton. Itin.

TIRANDURG, in *Geography*, a town of Hindooftan, in Myfore; 12 miles S.S.E. of Ouffoor.

TIRANO, a town of Italy, in the department of the Lano, late belonging to the Grifons, the capital of the Upper Terzero, and refidence of a governor called Podefta, on the Adda, which divides it into two parts, connected by a ftone bridge of a fingle arch: formerly furrounded with walls by Ludovico Sforza, as a defence againft the Grifons, who deftroyed the fortifications when they gained poffeffion of the Valteline. The chief trade is in wine and filk, which is not confiderable. The wine is fent into the country of the Grifons, to Bormio, and into the territories of Venice; the filk, which is drawn from this diftrict of the Valteline, is not of the beft quality, nor very abundant; part is forwarded to Venice, and the remainder, through Chiavenna, to Germany. About half a mile from the town, on the other fide of the Adda, is the church of the Madonna, or Virgin, much vifited by Catholic pilgrims; the modern building annexed to what remains of the old edifice is in an elegant ftyle of architecture, and the era of it is 1533, the ancient part having been erected in 1206. In the area before the church is held the fair of Tirano, remarkable for the number of cattle brought hither for fale; they are fed upon the higheft Alps, where they continue until the fnow begins to fall, and are chiefly fent from hence into Italy. The fair is in October, and lafts three days, during which time the authority of the podefta is fufpended, and the governor of the Valteline has abfolute jurifdiction over the town and the diftrict; 24 miles E.N.E. of Morbegno.

TIRANY, a town of Hindooftan, in the Carnatic; 3 miles N. of Ootatore.

TIRATA, in old *Italian Mufic*, implied a regular afcent or defcent of notes of the fame kind; but, at prefent, the term has a more extenfive acceptation than its original import, *drawn out*: as when a fubject is well treated, productive

ductive of beautiful paſſages, made the moſt of by a compoſer; it is then ſaid to be *ben tirato*.

TIRBIA, in *Geography*, a town of Spain, in Catalonia; 16 miles N.W. of Urgel.

TIRE, or, as the ſeamen pronounce it, *tier of guns*. See Tier.

TIREBOLI, in *Geography*, a river of Turkiſh Armenia, which runs into the Black ſea at Tireboli.—Alſo, a town of Turkiſh Armenia, on the Black ſea, at the mouth of a river of the ſame name; 20 miles N.E. of Kereſour.

TIREH, a town of Aſiatic Turkey, in Natolia, ſituated on the Meinder; the inhabitants are chiefly Turks: 32 miles S.S.E. of Smyrna. N. lat. 38° 8′. E. long. 27° 40′.

TIRES *of Wheels*, in *Rural Economy*, the ſtraps, ſlips, bands, or hoops of iron which are put round them for the purpoſe of guarding and protecting them againſt the effects of the roads, as well as ſecuring and keeping them tight in their different parts. The moſt advantageous and beneficial form of tire for wheels of different kinds and breadths in different points of view, have probably not yet been well aſcertained. It is obvious, however, that it ſhould be ſuch as may have the leaſt poſſible tendency to penetrate and deſtroy the ſurfaces on which the wheels act and move. It would appear, that almoſt all of thoſe who have written on this ſubject, have gone upon a wrong or falſe principle; nearly all having directed that the exterior ſurface, when more bands than one are uſed, as in the caſe of broad-wheeled waggons, ſhould be unequal; in ſuch a manner as that the centre band may receive the whole of the preſſure, when the road is even and compoſed of hard materials; the other bands being only in readineſs to ſuſtain their portions of the burthen, when, either from unevenneſs or the want of firmneſs in it, they may be brought into contact with it.

It is well known, however, to every one, that it is the nature of a wedge to work its way, when forcibly applied to a cleft or opening; and that the extent of its penetration will depend on the ſharpneſs or acuteneſs of its wedge-form, and the power by which it is impelled. Admitting this to be the fact, it is plain that every wheel, the tire of which acts in the ſmalleſt degree as a wedge, muſt enter a looſe ſoil, ſurface, or road, more or leſs, in proportion as its edge or projection is more or leſs acute and protruding, or the contrary.

A rolling cylinder is not eaſily capable of penetrating below the ſurface, for this reaſon, that it preſents no *one protruding* point; but where a rolling body ſwells out in a projecting manner in the middle, it will unqueſtionably act or work deeper in that part where it is the moſt prominent, than in any other, as it is a ſort of obtuſe wedge. And ſuch muſt be the caſe in every wheel of which the tire is not cylindrical; as when its protruding part gets in, the whole body ſoon finds its way.

A broad flat tire is not, however, without its inconvenience; as, whether the road be good or bad, it preſents the ſame ſurface, and, of courſe, is as much reſiſted in its front, while on a hard ſurface, as while on one into which it ſinks. Conſequently, the cylindrical tire can never draw light and free, though it will not by any means penetrate deeply into any tolerably ſound ſurface.

Flat tires are probably, however, the beſt of any for narrow wheels.

In conſequence of the above, it has been propoſed by ſome, that every wheel ſhould be furniſhed with a *concave* or hollow tire which is cylindrical; but, that after leaving two rims, of proportionate breadth, at the edges, the whole intermediate ſpace ſhould be ſcooped out, or otherwiſe hollowed. By this means, on hard roads, the wheel would ride on the two rims only: while on ſoft roads, the whole would bear up the burthen. All ſuch wheels, the tires of which have even the ſmalleſt tendency to a wedge-like form, invariably, it is ſaid, throw the ſoil or earth from them; ſqueezing it out at the ſides, and burying themſelves, not only in the furrows they make, but under the very mud which they force from out of them: while, on the contrary, the concave tire, it is ſuppoſed, keeps in the ſoft ſoil, unleſs, indeed, it be in an abſolutely ſloppy ſtate, and forces it, by compreſſion, to bear up the weight or burthen. It is obſerved, that let two wheels be tried on a meadow which is not very firm in its ſurface, the cylindrical tired wheel will, aſſuredly, act better than that with a receding or convex edged ſort of tire; but that the concave tired wheel could not, it is believed, fail to diſplay its ſuperiority in ſeveral of the moſt deſirable points and reſpects.

Let it be ſuppoſed that the tire of a waggon-wheel is nine inches in breadth, and cylindrical: at the two edges leave a band of one inch in breadth, or more; then groove out the intermediate ſpace, to an inch and a half in depth in the centre, rounding it in gradually. Such a tired wheel would, it is ſaid, on a hard road, preſent only two inches of bearing; while the reſiſtance would gradually increaſe in proportion as the incumbent weight, and the ſoftneſs of the ſurface over which it may be proceeding, ſhould bring the whole to bear in an equal manner. The ſoft ſoil could not eſcape ſo eaſily, at leaſt, it is conceived, from under a concave tire, as thoſe of the oppoſite kind, conſequently it could not add to the exterior impediments of wheels.

It muſt neverthleſs be admitted, it is ſaid, that the concave tire is liable to ſome diſadvantage; for inſtance, it will at times clog, and, poſſibly, not only choke its own groove, but even accumulate conſiderably more; which will adhere to the clay and other matters with which the groove may be filled. In this way, it would, in fact, it is thought, become, in a certain meaſure, cylindrical. But that if it did no more than fill its groove on heavy ſoils, it would not prove ſo highly objectionable; for, on ſuch, the whole breadth of the tire *ought* to preſs the ſoil or ſurface.

The remedy ſuggeſted for the above inconvenience, in ſuch caſes, is that of a ſuitable fixed ſcraper, which has no difficulty in it, at leaſt, for carriages on one pair of wheels, or for the hind wheels of waggons. Such a ſcraper, and the mode of fixing it in ſuch caſes, may be ſeen deſcribed in ſpeaking of ſcrapers for different kinds of implements, tools, &c.

Theſe hints and ſuggeſtions may be uſeful in leading to farther improvements on the tires of wheels, which is a matter of great importance in different points of view, and which, as has been ſeen, has yet been thought but little upon in a proper manner. See Wheel.

TIREYMEG Lake, in *Geography*, a lake of North America. N. lat. 61° 52′. W. long. 107°.

TIRGUBIS, or Tigubi, in *Ancient Geography*, a town of Aſia, in Meſopotamia, on the banks of the river Chaboras, according to the Theodoſian table and Ptolemy; ſituated N.W. of Reſaina.

TIRGUL, in *Geography*, a town of European Turkey, in Moldavia; 62 miles W. of Jaſſy.

TIRGULFORMOSA, a town of European Turkey, in Moldavia; 20 miles W. of Jaſſy.

TIRING,

TIRING, in *Falconry*, is the giving a hawk the leg or pinion of a fowl to pluck at. Dict. Rust.

TIRIPANGADA, in *Ancient Geography*, a town of India, on this side of the Ganges. Ptol.

TIRIPIN, in *Geography*, a sea-port of South America, in the province of Cumana.

TIRISTA, in *Ancient Geography*, a town of Lower Mysia, near the Danube, between Trimanium and Durustorum, Ptol.

TIRISTRIA, or Tetrisia, a promontory of Lower Mysia, on the Euxine sea, between Dionysopolis and Odessus. Ptol.

TIRKA, in *Geography*, a town of Africa, in the kingdom of Ghana, on the north side of the Niger; 120 miles E. of Ghana. N. lat. 15° 20′. E. long. 14° 30′.

TIRLEMONT, a town of France, in the department of the Dyle, called by the people of the country *Tienen*; on the Geete. It was anciently one of the principal cities of Brabant, and made a fourth quarter in the assembly of the States; but that precedence was afterwards removed to Bois-le-Duc. It certainly has been a very flourishing and populous city, and many vestiges of its grandeur are yet visible; but it has suffered much by war, and other calamities; 9 miles S.E. of Louvaine.

TIRMAKUL, a fort of Hindoostan, near Gooty, taken by the British in 1801.

TIRMANIZ, a mountain extending from Bukovina to Transylvania.

TIRNA, a river of Hungary, which runs into the Danube, a few miles below Presburg.

TIRNAU, a town of Hungary, containing nine churches, and as many convents. This town was built in the thirteenth century; 20 miles E.N.E. of Presburg. N. lat. 48° 24′. E. long. 17° 44′.

TIROAN. See Taron.

TIROCOOR, a town of Hindoostan, in Golconda; 8 miles S. of Calloor.

TIRRETO, a town of Naples, in Calabria Ultra; 15 miles E.S.E. of Reggio.

TIRROUP-MEW, a town of the Birman empire: the meaning of the word is the *Chinese city*, and the appellation was derived from a victory obtained over the Chinese some centuries ago, when they invaded Birmah; 35 miles N.E. of Paghan.

TIRSÆ, in *Ancient Geography*, a town of Macedonia, in Mygdonia.

TIRSCHENRIED, in *Geography*, a town of Bavaria; 28 miles N.N.E. of Amberg.

TIRSCHNITZ, a town of Bohemia, in the circle of Kaurzim; 4 miles N.W. of Kosteletz.

TIRSIO, in *Ichthyology*, a name given by Gaza and some other authors to the phocæna of Willughby and others, the *porpesse* or *marsum*. Pliny, Bellonius, and many others call it *tursio*.

TIRSRUM, in *Geography*, a town of Sweden, in East Gothland; 25 miles S. of Linkioping.

TIRUA, a small island in the Pacific ocean, near the coast of Chili. N. lat. 38° 30′.

TIRUAN, a town of Hindoostan, in Bundelcund; 20 miles N.E. of Callinger.

TIRUMBORE, a town of Hindoostan, in Madura; 7 miles N.E. of Madura.

TIRUN, or Tedong, a name given to tribes who live chiefly on the N.E. coast of Borneo, and are reckoned a savage and piratical race, addicted to eating the flesh of their enemies. Their language is peculiar. It is probable, however, that they are only a tribe of Idan, who are imagined to be only a race of Haraforas or Alfoërs, as they are termed by the Dutch, who seem to be the most original race of all the eastern islands, excepting perhaps the Papuas. The Idan are sometimes termed Marut; they are certainly the original inhabitants of Borneo, and resemble the Haraforas equally in stature, agility, colour, and manners. The Haraforas are indigenous in almost all the eastern isles, and are sometimes found on the same island with the Papuas or oriental negroes. They are often lighter in colour than the Mahometan races, and generally excel them in strength and activity. They are universally rude and unlettered, and where they have not been reduced to the state of slaves of the soil, their manners have a general resemblance. In their manners, the most singular feature is the necessity imposed on every person, of some time in his life embruing his hands in human blood; and, in general, among all their tribes, as well as the Idan, no person is permitted to marry, till he can shew the skull of a man whom he has slaughtered. They eat the flesh of their enemies, like the Battas, and drink out of their skulls; and the ornaments of their houses are human skulls and teeth, which are consequently in great request among them, as formerly in Sumatra, the ancient inhabitants of which are said to have originally had no other money than the skulls of their enemies. The Haraforas are found in all the Moluccas, in Celebes, the Philippines, and Magindano, where they are termed Subano or Manubo; and the ferocious race mentioned by Marsden, who live inland from Samanka in Sumatra, and are accustomed to atone their own faults by offering the heads of strangers to the chiefs of their villages, are probably of the same description. As. Ref. vol. x.

TIRUVELORE, a town of Hindoostan, in the Carnatic; 30 miles E. of Tanjore.

TIR-Y, or Tyrie, one of the islands of the Hebrides, situated in the district of Mull, and shire of Argyle, Scotland, is about 11 miles in length, and $2\frac{1}{2}$ miles in breadth. Its coast is mostly rocky, and intersected with many beautiful sandy bays, some of them a mile broad. About one-half of the surface is arable, interspersed with small rocks and rising grounds, none of which are above 250 feet above the sea-level; but the surface in general is so even, that the waves are often seen from the one shore rising apparently several feet above the level of the other. In the centre of the island is a large plain, which contains about 1200 Scotch acres, and is elevated about six feet only above high-water mark: consequently, in stormy weather the sea often meets across this plain, and is productive of bad consequences. The inhabitants have endeavoured to avert this evil by building a defence of stone and earth on the one side, while the sea, on the other, has raised a considerable barrier of bowlder stones; yet neither has been sufficient to resist the waves of the Atlantic. Here are several lakes, covering in all about 600 acres: in one of these is a small island, on which are the ruins of an ancient castle, on the scite whereof a neat house has been erected for the residence of the factor of the duke of Argyle, who is proprietor of the whole island. The fisheries employ a number of hands, as well as the manufacture of kelp, of which about 245 tons are annually made. The hill of Cean-Mharra, the western point of the island, is remarkable for a great number of large natural caves, frequented by innumerable flocks of sea-fowls. Here are the remains of many Danish forts, and also of several old chapels, at some of which burying-grounds and crosses are still visible. In the time of St. Columba, this appears to have been part of the patrimony of of that church. Here is a parochial ſchool, and alſo one eſtabliſhed by the Society for Promoting Chriſtian Knowledge, both of which are well attended. The population of the pariſh (which comprehends the iſlands of Coll, Gunna, and Tir-y) was, in the year 1811, eſtimated at 3186. There is a regular ferry from Tir-y to Coll, three miles diſtant, which is often dangerous, owing to a heavy ſwell from the Atlantic, and a rapid current over rocks and ſhifting ſands. The two iſlands appear to have been formerly united: the iſle of Gunna, which lies in the ſound, being apparently part of the intermediate land which has eſcaped deſtruction.—Beauties of Scotland, vol. v. Carliſle's Topographical Dictionary of Scotland, vol. ii.

TIRYNS, in *Ancient Geography*, a town of the Argolide, N. of Midea, ſituated in an encloſure of the mountains; called anciently Halicis, or the town of fiſhermen, from its having been the abode of the Hermionean fiſhermen. In the time of Pauſanias it was in ruins.

TISÆUS, or Tisæum, a very lofty mountain of Theſſaly.

TISALPHATA, a town of Meſopotamia, ſituated W. of the Tigris, on one of the ſmall rivers which diſcharged themſelves into the Mygdonius.

TISBURY, in *Geography*, a ſmall fiſhing town on the N. coaſt of Martha's Vineyard, belonging to the ſtate of Maſſachuſetts.

TISCHNOWITZ, a town of Moravia, in the circle of Brunn; 13 miles N.W. of Brunn.

TISDRA, Tusdro, or *Thyſdrus*, in *Ancient Geography*, a town of Africa, ſix leagues S.W. of Sarſura and five leagues S.W. of Achola. It has many ancient relics of altars, inſcriptions, columns, and fragments of marble ſtatues; and alſo the remains of an amphitheatre.

TISEBARICA, a country of Ethiopia, according to Arrian, which commenced near the port of Berenice, and extended along the Red ſea, as far as the country of the Moſchophagi.

TISHEET, in *Geography*, a town of Africa, with a ſalt-mine; 150 miles N. of Benown. N. lat. 17° 20'. W. long. 26° 50'.

TISHOLTZ, a town of Hungary; 10 miles E.N.E. of Libeten.

TISIDIUM, in *Ancient Geography*, a town of Africa, the command of which, according to Salluſt, was given by Metellus to Jugurtha.

TISIPHONE, in *Mythology*, one of the three Furies. She is repreſented by the poets with vipers, ſometimes as looſe ſerpents, intermixed with her hair, and ſometimes as ſerpents growing from her head inſtead of hair. As ſhe is one of the chief of all the infernal executioners, her robe is deſcribed either as dropping with freſh blood, or ſtiff with human gore: this robe is faſtened round her with a ſerpent inſtead of a girdle; and ſhe has ſometimes vipers twiſted round her arms inſtead of bracelets. They ſometimes give her a torch in her hand wet with blood; ſometimes a torch in one hand and a ſerpent in the other; and ſometimes ſerpents in both. Statius, Theb. i. v. 91. v. 111. v. 113. Theb. vii. v. 467. Ovid. Met. iv. v. 483. v. 490. v. 495. v. 510.

TISMANA, in *Geography*, a town of Walachia, at the ſource of a river of the ſame name; 18 miles W. of Tergoſyl.—Alſo, a river of Walachia, which runs into the Syl, 15 miles S. of Tergoſyl.

TISQUIUU Lake, a lake of North America. N. lat. 56° 10'. W. long. 95° 45'.

TISRI, or Tizri, in *Chronology*, the firſt Hebrew month of the civil year, and the ſeventh of the eccleſiaſtical or ſacred year.

The Hebrews call it *raſh-haſhanna*, that is, the beginning of the year. It anſwered to part of our September and October. On the firſt day of this month was kept the feaſt of trumpets, becauſe the beginning of the year was then proclaimed by ſound of trumpets. On this day they refrained from all ſorts of ſervile buſineſs, and offered in ſacrifice a calf, a ram, and ſeven lambs. Levit. xxiii. 24. Numb. xxix. 1.

The tenth day of this month was the great day of expiation, and on the fifteenth the feaſt of Tabernacles began, which laſted till the twenty-ſecond day incluſively. See Scenopegia.

TISSA, in *Ancient Geography*, a ſmall town of Sicily, at the northern foot of Ætna, near the river Onobala. Ptol.

TISSANAH, in *Geography*, a town of Hindooſtan, in the circar of Sumbul; 16 miles S.W. of Sumbul.

TISSIA, a town of Bengal; 35 miles S.E. of Palamow.

TISSUE, Cellular, in *Anatomy*, the cellular ſubſtance. It is an expreſſion borrowed from the *tiſſu cellulaire* of the French, who alſo often call it *tiſſu muqueux*. See Cellular *Subſtance*.

TISTE, in *Geography*, a poſt-town of Germany, in the county of Verden; 20 miles N.E. of Rotenburg.

TISURUS, Tozer, in *Ancient Geography*, a town of Africa Propria, S. of Adrametum, and 4 leagues S.W. of Tichaſa. It has ſome Roman remains.

TIT, in *Geography*, a town of Morocco, near the Atlantic ocean; 8 miles S.W. of Mazagan.

Tit, in *Rural Economy*, a term provincially applied to a ſmall ſtiff horſe, or ſort of poney, and ſometimes to other horſes, as a handſome or ugly tit, &c.

TITALBARY, in *Geography*, a town of Bengal; 20 miles N.N.W. of Goragot.

TITALEEA, a town of Bengal; 6 miles E. of Moorſhedabad.

TITALLYA, a town of Bengal; 50 miles N. of Dinagepour.

TITAN. See Levant.

TITANA, in *Ancient Geography*, a town of Sicyonia, E. of the river Sitas, and W. of the river Aſopus; ſituated on a mountain, and regarded as a fortified town. Here was a temple of Eſculapius, and a ſtatue of this god; and alſo a ſtatue of Hygeia. In the temple of Eſculapius were nouriſhed ſacred ſerpents.—Alſo, a ſmall country of Sicyonia. — Alſo, a river of Aſia, which had its ſource in mount Zagrus, and flowed into the river Sillas.

TITANIA, τιτανια, in *Antiquity*, a feſtival in memory of the Titans.

TITANIDÆ, or Artemidæ, the ſeven daughters of Chronus, ſon of Uranus, by Aſtarte.

TITANIS, in *Ancient Geography*, a port on the weſtern coaſt of Corſica, between the mouth of the river Ticarius and the town of Fiſera. Ptol.

TITANIUM, in *Mineralogy*, a metal originally diſcovered by Mr. Gregor of Cornwall, in the grains of a black mineral found in the bed of a rivulet in the valley of Menaian, in that county. It occurs alſo in different ſtates of oxydation or intermixture in various parts of the world; and, according to the recent obſervations of M. Cordier, is a conſtituent part of moſt volcanic rocks. The oxyd of titanium is reduced by expoſure to an intenſe heat, being previouſly moiſtened with oil and ſurrounded by powdered charcoal.

charcoal. A blackifh bliftered fubftance is obtained, which has a reddifh colour in fome points. According to Lampadius, its colour refembles that of copper, but is deeper, and the luftre is confiderable. It is brittle, but when in thin plates, its elafticity is confiderable.

When titanium is boiled with nitric acid, no remarkable effect enfues, but the bright fpots difappear, and are fucceeded by a white compound. Nitro-muriatic acid forms alfo a white powder, which remains fufpended in it. Sulphuric acid exhibits a fimilar appearance, fulphurous acid is difengaged, and the titanium is partly changed to a white oxyd, and partly diffolved. Muriatic acid diffolves titanium, but not its oxyd.

The folution of titanium gives a white precipitate with alkaline carbonates, a grafs-green mixed with brown with pruffiate of potafh, and a dirty dark green with the hydrofulphurets. Infufion of galls precipitates a reddifh-brown fubftance, which, if the folution be concentrated, has the appearance of blood. A rod of tin immerfed in the folution imparts to the liquid round it a fine red colour, and a rod of zinc a deep blue.

Titanium tarnifhes by expofure to the air, and is oxydized when heated in contact with it. It can exift in three ftates of oxydation; the firft is blue or purple, the fecond red, and the third white. The white oxyd is the only one the compofition of which is accurately known. It has been fhewn by Vauquelin and Hecht to confift of eighty parts of red oxyd, and eleven of oxygen. Titanium has not yet been combined with fulphur, but has been combined by Mr. Chenevix with phofphorus.

The only alloy of any confequence which it forms is with iron; it is of a grey colour, interfperfed with brilliant particles, and is quite infufible. The above are the principal properties of this metal which have yet been difcovered: it has not hitherto been applied to any ufeful purpofe in the arts.

The ores of titanium have been divided into fix fpecies by mineralogifts; *viz.* menachanite, iferine, nigrine, fphene, rutile, and octahedrite.

Menachanite is fo called from the valley of Menaian, in Cornwall, where it was originally found. It occurs alfo on the fhores of the ifland of Providence, and in the vicinity of Richmond, in the United States of America; and alfo at Botany Bay, in New South Wales. It is found in fmall angular grains, which are of a greyifh or iron-black colour, and have a rough glimmering furface. From its appearance it has been confounded with iron-fand, but its magnetic attraction is much weaker: it is lefs hard, and may be diftinguifhed by its fracture, and particularly by the luftre, which approaches to femi-metallic. The fracture is imperfectly foliated: the fragments are angular and fharp-edged, and it is perfectly opaque. It yields to the knife, retaining its colour in the ftreak. It is opaque and brittle. The fpecific gravity, according to Gregor, is 4.427; but as given by Lampadius, is 4.270. Menachanite is infufible by the blowpipe without addition, but tinges borax of a greenifh-brown colour. Its conftituent parts, according to Klaproth, are

Cornwall.

Oxyd of iron	- -	51.00
Oxyd of titanium	-	45.25
Oxyd of manganefe	-	0.25
Silex	- - -	3.50
		100

Botany Bay.

According to Chenevix:

Oxyd of iron	- -	49
Oxyd of titanium	- -	40
Silex	- - - -	11
		100

Iferine is fo called from having been originally found near the fource of the river Ifer, in Silefia: it is diffeminated in granitic fand, with iron-fand. It occurs alfo with fimilar fand in the bed of the river Don, in Aberdeenfhire. It is fufpected by profeffor Jamefon to be affociated with trap-rocks; and from the obfervations of M. Cordier, that it is found as a conftituent part of lava, this opinion is rendered the more probable. Iferine is of a brownifh iron-black colour. It is found in fmall grains and rolled pieces, with a rough and glimmering furface. The internal luftre is femi-metallic. Its fracture is conchoidal, which diftinguifhes it from menachanite, to which it bears a near refemblance. The fpecific gravity is 4.5. Before the blowpipe it melts into a blackifh-brown coloured glafs, which is flightly attracted by the magnet. The mineral acids have no fenfible effect on it, but the acid of fugar extracts a portion of the titanium. According to Dr. Thompfon, its conftituent parts are

Oxyd of titanium	- -	48
Oxyd of iron	- -	48
Oxyd of uranium	- -	4
		100

Nigrine; Titane oxydé ferrifére of Haüy, is fo called on account of its colour, which inclines to a velvet-black. It occurs, like the preceding fpecies, in angular grains and in rolled pieces. The external luftre is gliftening, that of the fracture fhining: the ftructure is imperfectly foliated. It is opaque, and harder than menachanite. Nigrine is brittle, and gives a yellowifh ftreak. The fpecific gravity varies from 3.700 to 4.740. It is not attracted by the magnet, and is infufible by the blowpipe, but with the addition of borax melts to a tranfparent hyacinth red globule. The acid of fugar extracts the titanium from this ore. It is found in alluvial ground in Tranfylvania, Bavaria, and the ifland of Ceylon: it occurs alfo in the granite of the Uralian mountains.

The conftituent parts of nigrine are given as under:

Tranfylvania.

		Klaproth.
Oxyd of titanium	- -	84
Oxyd of iron	- -	14
Oxyd of manganefe	-	2
		100

The Uralian Mountains.

		Lowitz.
Oxyd of titanium	- -	53
Oxyd of iron -	- -	47
		100

Octahedrite; Schorl bleu, Romé de Lifle; *Titane anatafe,* Haüy. This ore of titanium is fo called from its conftant occurrence in cryftallized forms, which are varieties of the octahedron.

octahedron. The cryftals are fmall; the furface is tranfverfely ftriated, and has a femi-metallic luftre: the internal luftre is alfo fplendent. The ftructure is foliated. This mineral is more or lefs femi-tranfparent; it fcratches glafs, and is brittle. The fpecific gravity, according to Haüy, is 3.8571. The colour of octahedrite is indigo-blue, paffing through many fhades to brown. It is infufible by the blowpipe, but with borax it forms a reddifh-brown coloured glafs. At the extremity of the flame, the brown colour changes to blue, and becomes opaque; by the continued action of the blowpipe, the brown colour reappears, and may be again chauged by variation of temperature. This mineral is rare: it occurs in veins with felfpar, axinite, rock-cryftal, and chlorite, in the primitive rocks of Dauphiny, and in drufy cavities in limeftone, at Hadeland, in Norway.

Sphene and Rutile.—Thefe ores of titanium have been already defcribed. (See SPHENE and RUTILE.) In addition to thofe articles we may ftate, that common fphene has been difcovered in fmall cryftals in the fienite of the mountains in Galloway, and on the fouth fide of Loch-Nefs; in the granite of Bennevis and Aberdeen; and alfo in other parts of Scotland. Rutile has alfo been difcovered in the granite of Cairngorum, and near to Beddgelert, in Carnarvonfhire.

TITANOS, a word ufed by fome authors to exprefs lime; by others for the calx of burnt gypfum or plafter of Paris, and by others a lixivium of quicklime.

TITANS, TITANES, Τιτᾶνες, in the *Ancient Mythology*, the fons of Uranus or Cœlus, and Vefta, or Titæa, or Terra, *i. e.* of Heaven and Earth, according to Hefiod and Apollodorus; or, which comes to the fame thing, of Æther and Tellus, according to Hyginus. They are faid to have derived their name from their mother, and hence the moft ancient fabulous hiftories have made them pafs for fons of the Earth. Apollodorus reckons fix Titans; Oceanus, Cœlus, Hyperion, Crius, Iapetus, and Saturn or Cronus: Hyginus alfo reckons fix, *viz.* Briareus, Gyges, Sterope, Atlas, Hyperion, and Cottus; but he feems to include the hundred-handed giants in the number, which Apollodorus, and the generality of mythologifts, diftinguifh from the Titans.

The tradition is, that Cœlus, by the fame wife Vefta, had Briareus, Gyges, and Cottus, the hundred-handed giants, and had chained them up in Tartarus: Vefta, the earth, their mother, refenting this treatment, raifed the Titans againft their father, her hufband: all, excepting Oceanus, made war upon him and dethroned him, fetting up Saturn in his place.

Saturn, it feems, proved no more favourable to them than his father; but continued the giants in their prifon. Upon this, Jupiter revolted againft Saturn; ferving him as he had done Cœlus; and refcued the three giants; who afterwards proved of great fervice to him in the war which the Titans waged againft him.

This war lafted ten years: but at length the Titans were vanquifhed; Jupiter remained in peaceable poffeffion of heaven; and the Titans were buried under huge mountains thrown on their heads.

Hyginus gives another origin of the Titans: he derives them from Titan, Saturn's eldeft brother, by Cœlus and Vefta; who, though prefumptive heir of heaven, yet finding his father and mother more inclined for Saturn than for him, furrendered to him his right of fucceffion, on condition he fhould not bring up any male child, that the empire of heaven might revert to his own iffue the Titans.

But Jupiter, Neptune, and Pluto, having been afterwards faved by the artifice of Ops, Titan, and his fons the Titans, made war on Saturn, who had difpoffeffed his father Uranus of the throne, and acquired an extenfive empire, vanquifhed and imprifoned him; thus he continued in the power of his enemies, till Jupiter, who had been conveyed by his mother Rhea for fafety to the ifle of Crete, being grown up, left Crete, made war on the Titans, and delivered his father.

Having re-eftablifhed him on the throne, he returned to the place of his retreat. Saturn afterwards reigned for fome time in tranquillity; but upon confulting an oracle, he received information that he would be expofed to danger from the youngeft of his fons. Accordingly he recurred to all poffible means for getting aid of Jupiter. Having fought him in Crete, he was betrayed and conftrained to make a hafty retreat into the Peloponnefus. Thither Jupiter purfued him, and obliged him to take fanctuary in Italy, under the protection of Janus.

The Titans, thus difperfed through feveral countries of Greece, being jealous of the power of this new conqueror, as they had been of his father's, levied troops againft Saturn, and gave him battle; but being defeated, they retired into the interior parts of Spain, whither Saturn followed them. Jupiter fought them out in their retreat, and beat them for the laft time near Tarteffus, and with this battle terminated the war, which had lafted ten years. Saturn made his efcape into Sicily, and there, as it is faid, died from grief. With this laft victory, and the death of Saturn, commenced the reign of Jupiter. During the war of the Titans, Atlas feized on thofe provinces of Africa which were remote from the centre of the empire. Pluto was fettled governor of the weftern parts of the empire of the Titans, of the Gauls, and Spain, which government, after the death of Pluto, was given to Mercury, who is faid to have become the great divinity of the Celtæ; and Jupiter referved to himfelf the whole Eaft, that is, Greece, the Ifles, and that part of Afia whence his anceftors came. For the explication of the fable that reprefents the Titans as thruft down to Tartarus by Saturn, fee TARTARUS.

The moft judicious among our mythologifts, fuch as Gerard Voffius, Marfham, Bochart, and father Thomaffin, are of opinion that the partition of the world among the fons of Noah, Shem, Ham, and Japhet, was the original of the tradition of the fame partition among Jupiter, Neptune, and Pluto; and hence they have been led to form comparifons between the three fabulous princes, and the three fons of the patriarch. Accordingly the learned Pezron contends that the divifion which was made of this vaft empire, came in aftertimes to be taken for the partition of the world: that Afia remaining in the hands of Jupiter, the moft potent of the three brothers, made him be looked upon as the god of Olympus, a celebrated mountain where he had his refidence, and which was afterwards taken for heaven itfelf: that the fea and iflands which fell to Neptune, occafioned their giving him the title of god of the fea: and that Spain, the extremity of the then known world, thought to be a very low country in refpect of Afia, and famous for its excellent mines of gold and filver, falling to Pluto, occafioned him to be taken for the god of the infernal regions. However this be, the empire of the Titans, according to the ancients, was very extenfive. Thefe princes were poffeffed of Phrygia, Thrace, a part of Greece, the ifland of Crete, and feveral other provinces, to the inmoft receffes of Spain. To thefe Sanchoniathon feems to join Syria; and Diodorus adds a part of Africa and the kingdoms of Mauritania.

F. Pezron, in his Antiquity of the Celtæ, makes that people to be the fame with the Titans; and their princes the fame with the giants in Scripture. According to him, the

the Titans were the defcendants of Gomer, the fon of Japhet. He adds, that the word Titan is perfect Celtic, and derives it from *tit, earth*, and *den* or *ten, man:* and hence it was the Greeks alfo called them very properly γηγενεις, *q. d. terriginæ, earth-born.*

Banier obferves, that although moft of the ancients have confounded the giants (fee *Rebel* GIANTS) with the Titans, they ought to be diftinguifhed. The latter, he fays, were of an illuftrious family, and extended their empire over one part of the world; the others were fo many banditti difperfed over Theffaly, who occafioned great trouble to the Titans. Hefiod diftinguifhes them from one another, and ftates that the giants were not born till long after the overthrow of the Titans, and after the wars which thefe carried on againft the others. The occafion of confounding them feems to have been, that both the giants and the Titans made war upon the gods; with this difference, that the Titans, though of the fame race, had often feparate interefts; fome taking part with Saturn, and others of them with Jupiter: whereas the giants were a gang of robbers, who had a defign equally upon all the Titans. Both giants and Titans were reprefented as fons of Heaven and Earth, and hence they have been confounded, for want of confidering, what Apollodorus fays, that Earth brought forth the giants only becaufe fhe was incenfed againft Jupiter for keeping the Titans fhut up in Tartarus. Thus the Titans were born long before the giants.

The Titans, according to the learned Mr. Bryant, were thofe Cuthites, or fons of Chus, called *giants*, who were employed in building the tower of Babel, and who were afterwards difperfed. See DISPERSION *of Mankind.*

He fuppofes that they were denominated from their religion and place of worfhip, *Titæa*, which is reprefented as the mother of thefe people, being compounded of *Tit-aia*, and fignifying literally *a breaft of earth*, analogous to τιτθος αιας of the Greeks, and therefore expreffing the figure as well as the materials of the ancient altars, which confifted of a conical hill of earth, in the fhape of a woman's breaft. Thefe altars were alfo called *Tit-an* and *Tit-anis*, from the great fountain of light, ftyled *An* and *Anis*. Hence many places were called *Titanis* and *Titana*, where the worfhip of the fun prevailed; for *Anes* and *Hanes* fignified the *fountain of light* or *fire*. Titana was fometimes expreffed Tithana, and by the Ionians Tithena; and Tithena was faid to be the nurfe of the Titans. But Titæa their mother, and Tithena their nurfe, were all of the fame nature, *viz.* altars raifed of foil. Hefiod, in his account of the difperfion of the Titans, and of the feuds which preceded (Theogon. ver. 676, &c.), fays that the Deity at laft interpofed, and put the Titans to flight, and condemned them to refide in Tartarus at the extremities of the earth; but Mr. Bryant obferves, that he has confounded the hiftory by fuppofing the giants and Titans to have been different perfons. The fons of Chus, he fays, were the aggreffors in thofe acts of rebellion defcribed by the poets as the war of the giants, who were alfo reprefented under the character of the Titanians. The fictions of the poets with regard to the banifhment of the Titans after their war againft heaven, took their rife from this true hiftory. A large body of Titanians, after the difperfion, fettled in Mauritania, upon the Atlantic ocean, which is the region ftyled Tartarus, and reprefented as the realms of night, becaufe it was fituated in refpect to Greece towards the regions of the fetting fun. The term ζοφος, by which it was expreffed, fignified both the weft and darknefs; as did alfo Ereb, ערב, whence Erebus, which was alfo another name for Tartarus, to which the poets condemned the Titans and giants. The firft war of the Titans, according to this ingenious writer, confifted in acts of apoftacy and rebellion againft heaven: and this refers to that part of the hiftory of the fons of Chus, which reprefents them as building a mighty city in the region, which they had ufurped, and erecting a lofty tower, to prevent their being fcattered abroad: but there was another war in which they were engaged with men, which happened in confequence of the difperfion. This was no other than the war mentioned by Mofes, which was carried on by four kings of the family of Shem, againft the fons of Ham and Chus, to avenge themfelves of thefe enemies by whom they had been greatly aggrieved. See Bryant's Analyfis of Ancient Mythology, vol. iii. p. 48, &c. p. 71, &c.

The word Titan is alfo ufed by the poets for the fun; in which cafe it is likewife Celtic, though from another root, being formed from *ti, houfe* or *habitation*, and *tan, fire.*

Hefychius obferves, that Titan is likewife ufed for fodomite. He adds, that it is alfo one of the names of antichrift; in which fenfe it muft be written *Teitan*, in Greek, to contain the numeral letters of 666, which in the Apocalypfe, xiii. 18. is the number of the beaft.

TITANUS, in *Ancient Geography*, a town of Afia Minor, on the coaft of the Æolide, on the banks of a river of the fame name.

TITARESSUS, a town of Afia, in Leffer Armenia, in the country named Melitane. Ptol.

TITARESUS, or TITARESSUS, a river of Theffaly, mentioned by Homer, which had its fource in mount Titarus.

TITATY, in *Geography*, a town of Bengal; 55 miles N. of Dinagepour.

TITCHFIELD, a fmall market-town in the hundred of the fame name, in the Portfdown divifion of the county of Hants, England; is fituated near the Titchfield river, 3 miles W. from Fareham, and 78 miles S.W. from London. It is inhabited by many refpectable families. The church, which is the only object of particular notice, is a fpacious edifice, of the workmanfhip of different ages: the N. fide is faid to have been built by William of Wykeham; but the S. fide is more ancient. In the S. chancel is an interefting monument to the memory of fir Thomas Wriothefley, firft earl of Southampton, Jane his lady, and Henry their fon, the fecond earl; all of whom are reprefented by effigies on the tomb. Four annual fairs are held in Titchfield; and a weekly market on Saturdays. The population of the parifh, under the act of 1811, was returned as 3227, the number of houfes at 553.

At a fhort diftance from the town, on the N., are the ruins of Titchfield Houfe, the ancient feat of the Wriothefleys. It was erected, by the firft earl of Southampton, on the fcite, and with the materials of an abbey, founded for Premonftratenfian canons, by bifhop Peter de Rupibus, in the year 1231. The annual revenues of this eftablifhment, at the period of the diffolution, amounted, according to Dugdale, to 246*l.* 16*s.* 1*d.*; but according to Speed, to 280*l.* 19*s.* 4½*d.* Its poffeffions were then granted by Henry VIII. to his favourite fecretary, Wriothefley, who built here, Leland reports, "a righte ftatelie houfe embattled, and having a goodlie gate, and a conducte caftelid in the middle of the court of it, in the very fame place wher the late monafterie ftoode." This building is now in a very dilapidated ftate: the entrance gateway is the principal part left ftanding; fixteen rooms having been recently pulled down for the fake of the materials. The eftate is the property of John Delmé, efq. of Cam's Hall. In Titchfield Houfe, Charles I. was concealed after his efcape from Hampton Court in 1647, and previous to his refigning himfelf to colonel Hammond,

 who

who conducted him to the Isle of Wight.—Beauties of England and Wales, vol. vi. Hampshire; by J. Britton and E. W. Brayley.

TITCHVIN, a town of Russia, in the government of Novgorod, on the river Sias; 84 miles N.N.E. of Novgorod. N. lat. 59° 52'. E. long. 33° 14'.

TITE. See TICHT.

TITEA, in *Mythology*, the wife of Uranus or Cœlus, by whom he is said to have had eighteen children, each of which had his own name, though they were generally designated by the appellation of *Titans*; which see. This princess, after her death, received divine honours, and she was called after her name.

TITERUD, in *Geography*, a town of Norway, in the province of Aggerhuus; 38 miles N. of Christiana.

TITHENIDIA, τιθηνίδια, in *Antiquity*, a Spartan festival, so called from τιθηναι, *nurses*, who at this time carried the male infants committed to their charge to the temple of Diana Corythallia. For the ceremonies observed on this occasion, see Potter, Archæol. Græc. lib. ii. cap. 20. tom. i. p. 432, seq.

TITHES, TYTHES, *Tenths*, *Decimæ*, or *Dixmes*, the tenth part of the increase, yearly arising and renewing from the profits of lands, the stock upon lands, and the personal industry of the inhabitants; allotted to the clergy for their maintenance.

Tithes essentially differ from *offerings*, *oblations*, and *obventions*, which are the customary payments for communicants at Easter, for marriages, christenings, churching of women, burials, and such like. See OBLATIONS.

Tithes, with regard to their several kinds or natures, are *personal*, *predial*, and *mixt*.

TITHES, *Personal*, are those due or accruing from the profits of labour, art, trade, navigation, and industry of men; and of these, only the tenth part of the clear gains and profits is due; after charges deducted.

TITHES, *Predial*, are those which arise merely and immediately from the ground; as grain of all sorts, hay, wood, fruits, herbs; for a piece of land or ground, being called in Latin *prædium* (whether it be arable, meadow, or pasture), the fruit or produce of it is called *predial*.

TITHES, *Mixt*, are those which arise not immediately from the ground, but from things immediately nourished by the ground, as from beasts, and other animals fed with the fruits of the earth; as colts, calves, lambs, chickens, milk, cheese, eggs.

Tithes, with regard to their value, are divided into *great* and *small*.

TITHES, *Great*, are those of corn, hay, and wood.

TITHES, *Small*, are the *predial* tithes of other kinds, together with those that are called *mixt* and *personal*. It is said, that this division may be altered by custom, which will make wood a small tithe in the endowment of the vicar; by quantity, which will convert a small tithe into great, if the parish is generally cultivated with it; and by change of place, which makes the same things, *e. g.* hops in gardens, small tithes, in fields great tithes. But it has been admitted, that the quantity of land within any parish, that is cultivated for a particular produce, cannot change the nature of the tithe: and, according to this opinion, the law is now settled, that the tithes are to be denominated *great* or *small*, according to the nature and quality of them, and not according to the quantity.

It has been said by lord Coke and many others, that before the council of Lateran in the year 1180, a man might have given his tithes to what church or monastery he pleased; but this is denied by Dr. Prideaux. It is now certain, that tithes of common right do belong to that church, within the precincts of whose parish they arise; and this regulation, corresponding with the ancient law of the land, was enjoined by a decretal epistle of Innocent III. to the archbishop of Canterbury, in the year 1200. (2 Inst. 641. 2 Blackst. Com. 27.) But though one person may prescribe to have tithes within the parish of another; this is what is called a "portion of tithes." (Gibs. 663.) Tithes extra-parochial, or within the compass of no certain parish, belong to the crown, and may be granted to whom the king will. 1 Roll's Abr. 657. 2 Inst. 647.

It is a general rule, that of common right tithes are to be paid for every thing that yields an annual increase; but this rule admits of exceptions, *e. g.* tithe is due from saffron, though gathered but once in three years; and on wood that is felled or lopped, called *sylva cædua*, though it is not renewed every year: and on the other hand, tithes shall be paid for the produce of seeds, as of clover, sown on the same ground, though renewed oftener than once a year. No tithes shall be paid of common right for any thing that is of the substance of the earth, or which is not of annual increase, as stone, lime, coal, tin, lead, and such like; nor for creatures that are *feræ naturæ*, or of a wild nature, as deer, hawks, fish, &c. whose increase so as to profit the owner is not annual, but casual; unless tithes in either of these cases are payable by custom. Degge, p. 2. c. 8. 1 Inst. 651. 664.

Lands, and their occupiers, may be exempted or discharged from the payment of tithes, either in part or totally, by a real composition, or by custom and prescription.

A *real* composition is when an agreement is made between the owner of the lands, and the parson or vicar, with the consent of the ordinary or patron, that such lands shall for the future be discharged from payment of tithes, by reason of some land, or other real recompence given to the parson, in lieu and satisfaction thereof. But these compositions are now restrained by the disabling statute 13 Eliz. cap. 10. See COMPOSITION.

A parson may bind himself by *deed* to accept of a composition for tithes during life, or incumbency of a particular living. It is also very common to agree by *parol* for an annual composition for tithes, which binds the parties to it till sufficient notice given of dissent from the agreement, but what is sufficient notice to determine such an agreement, has never been decided in terms. See LEASES *by Statute*.

A discharge by custom or prescription is, where time out of mind such persons, or such lands, have been either partially or totally discharged from the payment of tithes. The difference between *custom* and *prescription* is this: *Custom* is that which gives right to a province, county, hundred, city, or town, and is common to all within the respective limits; in pleading of which it is alleged, that in such a county or the like, there is, and time out of memory hath been, such a custom used and approved therein. *Prescription* is that which gives a right to some particular house, farm, or other thing; in pleading of which it is alleged, that all they whose estate is had in such land, have time out of mind paid so much yearly, or the like, in full satisfaction of all tithes arising on those lands. (Gibson, 674.) And there is this difference between a prescriptive and customary modus, that the former is annexed to the lands which it covers, whereas the latter exists in action of law, independent of the lands by force of the custom of the district. In a prescriptive modus, therefore, the lands must be definite, and not liable to shift. And therefore a bill to establish a modus for every ancient farm, but not setting out the abuttals of each, was dismissed, difmiffed, although it was ftated that the whole parifh confifted of ancient farms. (See Custom and Prescription.) This cuftom, or prefcription, is either *de modo decimandi*, (fee Modus *Decimandi*,) or *de non decimando*. No modus can be eftablifhed at this day, but by act of parliament. A modus founded upon good confiderations may be in various ways difcharged, and tithes become due in kind: as,

1. Where land is converted to other ufes: fo, when the prefcription is for hay and grafs, fpecially, in fo many acres of land; if the land is converted into a hop-garden or tillage, the prefcription is gone.

2. By the alteration or deftruction of the thing for which the money was paid: as where two fulling-mills were under the fame roof, and turned into a corn-mill; where alfo there was one pair of ftones in a mill, and another pair was added; and where the water-courfe was altered by the owner, and the mill was pulled down and re-edified upon it; in all thefe cafes, it was adjudged that the modus was gone. But where a man was feifed of eight acres of meadow and one of pafture, for the tithes whereof he had paid time out of mind 5*s*. 4*d*. and afterwards the owner built a corn-mill upon the fame; it was adjudged that he fhould pay no tithes for the corn-mill, becaufe the land was difcharged by the modus. 2 Inft. 490.

3. By non-payment of the confideration, or payment of tithes in kind, for fo long a time as to deftroy the poffibility of making proof that fuch cuftom or prefcription was: but an interruption for fome fhort time only, will not difcharge it; efpecially if made by the leffee, to the prejudice of the leffor. Watf. c. 47.

The rule is, that the modus is to be fued for in the ecclefiaftical court, as well as the very tithe; and if it be allowed between the parties, they fhall proceed there; but if the cuftom be denied, it muft be tried at the common law: and if it be found for the cuftom, then a confultation muft go; otherwife the prohibition ftandeth. The like is affirmed, in cafe a jury upon an iffue joined in a prohibition upon a modus decimandi, find a different modus; fince a modus is found, they fhall not have confultation. 2 Inft. 490.

The principal reafon why the courts of common law prohibit the fpiritual court from trying of modufes, is, that whereas every modus is lefs than the real value, the rule of the canon law is, that lefs than the real value fhall not be taken, and that a cuftom to the contrary is void; and that the ecclefiaftical and temporal laws differ in the times of limitation, forty years or under making a good cuftom by the ecclefiaftical laws, whereas by the temporal laws it muft be beyond the time of memory. Gibf. 691.

But the fpiritual courts have commonly allowed and do allow pleas of modus decimandi; and the averment in the prohibition is not that they do take cognizance, but that the plea hath been offered and refufed; which fuppofeth, that if the plea be admitted, the prohibition ought not to go. And accordingly it hath been affirmed by Doderidge and others, that the fpiritual court may as well try the modus, as the right of tithes, and that a prohibition is not to be granted, till the fpiritual court either refufe to admit the plea, or proceed to try it by methods different from the rules of the temporal law, as to the time of limitation, or number of witneffes, or the like. And where lord Coke contended for the contrary doctrine, it was declared by Kelynge and Twifden, that in cafe one libel for a modus decimandi, if the fpiritual court allow the plea, they may try it. Gibf. 691.

But, notwithftanding, it feemeth now to be clearly fettled, that if a modus decimandi be fued for in the ecclefiaftical court, a prohibition lies to ftop the trial of it, if the modus be denied; and the reafon is not upon the account that the fpiritual court wants jurifdiction, but in regard of the notion the temporal law hath of cuftom, different from the fpiritual: and feeing that every modus is due by cuftom, it is the common law only that can determine, what time and ufage with us fhall be fufficient to create fuch cuftom, that is, time beyond all memory to the contrary. Whereas by the fpiritual law, fometimes ten years, fometimes twenty, they will adjudge fufficient to create a cuftom. And prohibitions in fuch cafes are granted, not becaufe the fpiritual court hath not jurifdiction of the matter, but in refpect of the trial which is to be by the temporal law only; and if upon the trial it be found for the modus, the proceedings fhall go on in the fpiritual court; if againft the modus, the prohibition fhall ftand. Watf. c. 56.

If in the trial of a modus, the defendant permits the fpiritual court to proceed to fentence, he is then too late to come for a prohibition; becaufe it is only for defect of trial, and not for defect of jurifdiction: but a man is never too late for a prohibition, where it is for defect of jurifdiction. Bunb. 17. 10 Eaft's Rep. 349.

A bill in equity, in the nature of a bill of peace, will alfo lie to eftablifh a modus, where a fuit has been inftituted for tithes in kind; but a bill to eftablifh a modus or cuftomary payment in lieu of tithes, cannot be fupported, where there has been no attempt to enforce the payment of tithes in kind. 4 Gwill. 1596.

The following modufes have been eftablifhed as good, by decifions in the courts of law: One penny for ancient gardens and orchards. (Bunb. 79.) Seventeen-pence for every cow having a calf, for the tithe of the milk and calf; eleven-pence for the tithe of the milk of a milk cow, milked without a calf; for every heifer, the firft year fhe has a calf, thirteen-pence for the milk and calf—thefe payable at Michaelmas. Eight-pence for every hogfhead of cyder, made of apples grown in the parifh; for hoard apples, one penny; for fire-wood fpent on the farm, one hearth penny; for fruit, herbs, roots, and other garden ftuff, a garden penny; for a colt, one penny;—thefe payable at Eafter. (Bunb. 57.) Eight-pence for a cow, four-pence for an heifer; three fhillings and four-pence, payable at Eafter, for every fcore of fheep fhorn out of the parifh, and fo proportionably for a lefs number than twenty, or for a lefs time than a year, for their wool and lambs. (Bunb. 171.) Two-pence an hogfhead for cyder. (Roll. Abr. 649.) The non-refident occupiers of land in B. and W. to pay on Good Friday, or as foon after as demanded, four-pence an acre for the tithe of hay, and the herbage of pafture lands not ploughed or fown; but, if refident, to pay tithes in kind. (2 P. Wms. 565.) Four-pence an acre for high land, and three-pence an acre for low land. (Ibid.) Twelve-pence for an acre of low meadow, and eight-pence for an acre of high meadow, for tithe of hay. (1 Bro. P. C. 214.) One penny for hay for an ancient meffuage, with the demefne lands thereunto belonging, containing 60 acres, &c. One pound fix fhillings and eight-pence for an ancient tenement, containing 625 acres, for hay, fmall tithes, and Eafter offerings. (Bunb. 161.) Nine cart-loads of logwood, delivered to the rector by the lord of the manor, for himfelf and tenants, in lieu of all tithes. (Bunb. 279.) So of fix pounds *per annum*. (Cro. Eliz. 559.) A halfpenny for each calf, in lieu of calves, payable on Wednefday before Eafter. A fmoak penny for fire-wood. An halfpenny, payable on Shear-day, for the wool of each fheep dying between Candlemas and Shear-day. Four-pence a month, payable on Shear-day, for the tithe wool of every hundred fheep fhorn in the parifh, which were brought in after the 2d day of February.

Three

Three eggs for every cock and hen, duck and drake, payable on Wednesday before Easter, in lieu of tithe eggs, and chickens and ducks hatched in the parish. (Bunb. 307.) Thirty eggs for all tithes of eggs. (1 Roll's Abr. 648. 651. 2 Salk. 656.) The tenth cheese made from the 1st of May until the last of August, in discharge of the tithe of milk. (Cro. Eliz. 609.) An halfpenny for the wool of sheep sold after shearing, and before Michaelmas. (Moore, 911.) One penny *per* head for sheep brought into the parish after Candlemas, and clipt in the parish, in lieu of tithe of wool; three-pence *per* head for sheep in the parish before Candlemas, and carried out before shearing time, though the wool tithe is not then actually due. (1 Anst. 341.) It is a good modus for an innkeeper, that in consideration that he and all, &c. have paid tithe hay and grain growing upon the land belonging to the said inn, and have paid tithe for all their own cattle feeding upon the land, that they have been time, &c. discharged of the tithes of the horses of their guests agisted in the said land, when they travel by the said inn; for some have said that this was but a personal tithe, and others have said that no tithes should be paid for such *agistment* by the common law, without any modus. 9 Vin. Ab. 13.

The things that are titheable are, for the most part, as follow: corn is a predial great tithe, and titheable according to the custom of the place, commonly by the tenth shock, cock, or sheaf. Beans and pease, expended in the house, are subject to no tithes; but if they are gathered to be sold, or to feed hogs, they are titheable, and are in their nature great tithes. Hay is a predial great tithe, and is to be tithed in swathes or cocks, according to the custom of the place. Clover, rape, and woad, are small tithes; heath, furze, and broom are also titheable: but no tithe shall be paid of fern. (2 Inst. 652.) The tithe *agistment* is a small tithe, and due of common right. Wood is a predial tithe, but whether great or small, hath been questioned between the parsons and the vicars; but it has been resolved, that if a vicar be only endowed with the small tithes, and has always had tithe-wood, in such case it shall be accounted a small tithe, otherwise it is to be accounted among the great tithes. Timber fit for building of houses and ships, and comprehending oak, elm, and ash, are exempted from tithes, by 45 Edw. III. c. 3; but timber-trees, cut and corded for fuel, have been adjudged to pay tithes, as well as under-wood; however, no tithe shall be paid for the roots of trees, for wood cut for husbandry or fuel, for hurdles of sheep, for hop-poles, and for making of bricks, and also fruit-trees. When the wood is titheable, it is set out while standing by the tenth acre, pole, or perch; or, when cut down, by the tenth faggot or billet. Of under-woods sold standing, the tithe shall be paid, not by the seller, but by the buyer. The tithe of flax and hemp is a small tithe, and by statute this is charged at 5*s. per* acre. (11 & 12 Will. c. 16.) The tithe of madder is also a small tithe, and charged at 5*s. per* acre, by 31 Geo. II. c. 12. The tithe of hops is predial, and reckoned among small tithes; it is not to be paid till after they are picked, and before they are dried, every tenth measure. Out of gardens is paid tithe of all garden herbs and plants, which are small tithes, and may be demanded in kind: potatoes and turnips are also small tithes, as are likewise tobacco and saffron. However, in lieu of the tithes of gardens, a certain consideration in money is paid, either by custom, or by agreement with the parson. Fruits of trees, as apples, pears, plums, cherries, and the like, are predial tithes, to be paid in kind when they are gathered, unless there is some modus, or rate-tithe, paid in lieu of them. The tenth calf is due to the parson of common right; and if there are seven, he shall have one; if under seven, a halfpenny, or what custom shall direct, for each calf. But in most places, at this day, the custom hath obtained, that if there are five, the parson shall have the value of half a calf, lamb, or other such like; if there are six, he shall have one entire; and shall receive or pay out respectively a proportionable sum for each number under five, or above six. Colts and pigs are titheable in the same manner as calves; and the time of payment of these tithes is when they are so old that they may be weaned. Wool and lamb are generally reckoned mixt small tithes. Milk is a mixt tithe: where tithe-milk is paid in kind, no tithe-cheese is due; and where tithe-cheese is paid in kind, no tithe-milk is due. The tithe of milk is to be paid, not by the tenth part of every meal, but by every tenth meal entire. Deer and conies, being *feræ naturæ*, are not titheable of common right, but by special custom. Of fowls, which are domestic, as geese, hens, and ducks, tithes are to be paid, either by paying the tenth egg, or the tenth of their young, according to custom. It hath been adjudged, that the paying of thirty eggs in Lent, is a good modus for all tithes of eggs. Bees are free of tithes, but the wax and honey are chargeable at the rate of the tenth measure of honey, and the tenth weight of wax. By the books of common law it appears, that some tithe or other is due for a mill. Fish in ponds and private fisheries, and in common rivers, are titheable only by custom. Fish taken in the sea are chargeable by custom as a personal tithe. Personal tithes are regulated by stat. 2 & 3 Edw. VI. c. 13; but personal tithes are now scarcely any where paid in England, unless for mills or fish caught in the sea, and then payable where the party hears divine service, and receives the sacrament.

The manner or form of setting out or payment of tithes, is for the most part governed by the custom of the place. The parson, vicar, impropriator, or farmer, cannot come himself, and set forth his tithes, without the licence and consent of the owner; for if of his own head he shall tithe the corn or hay of any land-holder within his parish, and carry it away, he is a trespasser, and an action will lie against him for it. But every person is bound of common right, to cut down, and set out the tithes of his own lands. And that it may be done faithfully and without fraud, the laws of the church entitle the parson to have notice given him; but by the declaration of the common law, such notice is not necessary. Yet neverthelefs, the common law declareth a custom of tithing without view to be an absurd custom: and by the statute of 2 & 3 Ed. VI. c. 13. it is enacted, that at all times whensoever, and as often as any predial tithes shall be due at the tithing of the same, it shall be lawful to every party to whom any of the said tithes ought to be paid, or his deputy or servant, to view and see their said tithes to be justly and truly set forth and severed from the nine parts.

The care of the tithes, as to waste or spoiling, after severance, rests upon the parson, and not upon the owner of the land. For it seemeth that the parson is at his peril to take notice of the tithes being set out; and so it hath been declared, that although the parishioner ought *de jure* to reap the corn, yet he is not bound to guard the tithes of the parson. Gibs. 689.

But after the tithes are set forth, he may of common right come himself, or his servants, and spread abroad, dry and stack his corn, hay, or the like, in any convenient place or places upon the ground where the same grew, till it be sufficiently weathered and fit to be carried into the barn. But he must not take a longer time for the doing thereof, than what is convenient and necessary; and what shall be deemed a convenient and necessary time, the law doth not nor can define; for the quantity of the corn or hay, and the weather,

ther, in this cafe are to be confidered; and what fhall in this and all other cafes of like nature be faid to be a reafonable and convenient time, is to be determined by the jury, if the point come in iffue triable by a jury; but if it come to be determined upon a demurrer, or other matter of law, the judges of the court where the caufe depends are to refolve the fame. Deg. p. 2. c. 14. Str. 245.

And it fhall be lawful quietly to take and carry the fame away. And if any perfon carry away his corn or hay, or his other predial tithes, before the tithe thereof be fet forth; or willingly withdraw his tithes of the fame, or of fuch other things whereof predial tithes ought to be paid; and if any perfon do ftop or let the parfon, vicar, proprietor, owner, or other their deputies or farmers, to view, take, and carry away their tithes, as is above faid; he fhall forfeit double value, with cofts; to be recovered in the ecclefiaftical court. 2 & 3 Ed. VI. c. 13.

And he may carry his tithes from the ground where they grew, either by the common way, or any fuch way as the owner of the land ufeth to carry away his nine parts. But if there are more ways than one, and the queftion is, which is the right way, this is cognizable in the temporal court. Deg. p. 2. c. 14.

It feems, that if tithes fet forth remain too long upon the land, the owner of the foil may take them damage feafant; but then, if he be fued for them, in order to juftify, he muft fet forth how long they had remained before he took them; and when they fhall be faid to remain too long is triable by the jury. Watf. c. 54.

Or an action upon the cafe will lie againft the parfon for his negligence in this behalf: but no action in fuch cafe will lie, unlefs the parifhioner hath duly fet forth his tithes, and hath alfo given notice to the parfon, that they are fo fet forth. Deg. p. 2. c. 14. L. Raym. 187.

But the occupier of the ground cannot put in his cattle and deftroy the corn or other tithe: for that is to make himfelf a judge, what fhall be deemed a convenient time for taking it away: but the court and jury, upon an action brought, are to determine of the reafonablenefs of the time, and of the recompence to be made for the injury fuftained. L. Raym. 189.

Tithes are recoverable in the fpiritual court by the canon law, and by divers ftatutes, as the ftatute of *circumfpecte agatis*, 13 Edw. I. ft. 4; the ftatute of *articuli cleri*, 9 Edw. II. ft. 1. c. 1. 18 Edw. III. ft. 3. c. 7. 1 Rich II. c. 13, 14. 27 Hen. VIII. cap. 20. 32 Hen. VIII. c. 7. 2 & 3 Edw. VI. c. 13. 7 & 8 Will. III. c. 6. 34. 1 Geo. ft. 2. c. 6. 27 Geo. II. c. 20.

Tithes in London are fubject to particular regulations. By a decree made in 1545, according to the ftatute 37 Hen. VIII. c. 12. it is ordered, that the citizens and inhabitants of London and its liberties, fhall yearly pay their tithes to the parfons, vicars, and curates, after the rate of 16½*d*. for every 10*s*. annual rent, and 2*s*. 9*d*. for every 20*s*. rent, and fo above the rent of 20*s*. by the year, afcending from 10*s*. to 10*s*., according to the faid rate. The wife, children, fervants, or others of their family, taking the rites of the church at Eafter, fhall pay 2*d*. for their four offering days yearly, &c. Notwithftanding the fettlement of this decree, divers prefcriptions for the payment of leffer rates than the parfons might require by it (as to pay 10*s*. for the tithe of a houfe, although its rent was 40*l*. a year, or more) have been gained and allowed. But by 22 & 23 Ch. II. c. 15. after the fire of London, annual certain tithes, or fums of money in lieu of tithes, for fifty-one churches, were appointed to be raifed by affeffments, in the manner prefcribed by the faid act. For the ftipends of the minifters of the fifty new churches, provifion is made by the feveral acts of parliament relating to them, to be raifed from the duties on coals. There are alfo particular ftatutes for particular churches, in London and in other places.

Original and Hiftory of Tithes.—The cuftom of giving or paying tithe is very ancient; in Gen. xiv. 20. Abraham gives Melchifedech the tenth of all the fpoils he had taken from the four kings he had defeated: in Gen. xxviii. 22. Jacob makes a vow at Bethel, to give the tenth of all the riches he fhall gather in that fojourn, to God.

But thefe tithes were free and voluntary, and, befides, differed in divers other refpects from what was afterwards called tithe: what Melchifedech received, was only the tenth of the fpoils, not of Abraham's poffeffions; and this once, not annually; and befide, not as maintenance, which Melchifedech wanted not, but as homage: add, that this was only from one prieft to another; for Abraham had not only a prieft in his loins, but was a prieft himfelf. And as to Jacob, who was alfo a prieft, what he did was the effect of a vow, voluntarily taken, to offer the tenth of all he fhould poffefs; not to any other prieft, but to God himfelf upon an altar.

Tithe was firft legally enjoined by Mofes, Lev. xxvii. 30. Numb. xviii. 21. Deut. xiv. 22. That legiflator obliged the Ifraelites to the payment of feveral kinds of tithes: as,

1. The *firft tithe* מעשר הראשון, which was a tithe of all the fruits given to the Levites: this was not taken till after the oblation called תרומה *terumah*, which was a tenth part allotted to the priefts, had been made.

2. The *fecond tithe* was a tenth part of the nine remaining, after payment of the firft tithe. This tithe was fet apart in each family, and the mafter of the family was obliged to carry it to Jerufalem, and to ufe it there; or, in cafe he could not, he was to redeem it, or convert it into money: in which cafe he was to add a fifth to it, and carry the money to Jerufalem.

3. The *tithe of the tithe*, was the tenth part of all the tithes that had been given to the Levites by the people: for the Levites, after they had got all their tithes of the people, divided the whole into ten parts; and in their turn gave a tithe to the priefts.

4. The *tithe of the third year* was another kind of tithe, not much different from the fecond tithe, excepting that it was lefs troublefome; becaufe they did not carry it to Jerufalem either in kind, or in money, but kept it by them, to be fpent by the Levites, the ftrangers, the fatherlefs, and the widows of the place, Deut. xiv. 28, 29. This was alfo called the *tithe of the poor*, and the *third tithe*; and thefe third years when it was paid, were called the *tithe-years*. Several learned Jews and Chriftians, however, conceived that this was not a diftinct tithe, but the fame as the fecond; fo that, as Mr. Mede apprehends, what was wont in other years to be fpent in feafting, was every third year fpent upon the poor. All thefe tithes are calculated to amount to above one-fixth of the revenue of each perfon.

Thefe matters are all farther explained in the Talmud, in which are two books on tithes; alfo in the book of benedictions, ברכין, in the commentaries of Bartenora, Maimonides, R. Schelomoh Jarrhi, in Scaliger, Amama, Selden, Frifchmuth, Quenfted, Varenius, Hottinger, Sigonius, Cunæus, Godwyn, Leidecker, &c.

Under the new law, tithes are not eftablifhed by Jefus Chrift, or Chriftian difpenfation, as they were under the old law by the miniftry of Mofes; the Chriftian priefts, and the minifters of the altar of the new covenant, lived at firft wholly upon the alms and oblations of the devout.

In after-times, the laity gave a certain proportion of their revenues

revenues to the clergy, but voluntarily, and not out of any conſtraint or obligation: the firſt inſtances we have of this, are in the fourth and fifth centuries.

This gift was called tithe, not that it was really a tenth part of their income, or near ſo much; but only in imitation of the tithes of the old law.

In the following age, the prelates in their councils, in concert with the princes, made an expreſs law to the purpoſe; and obliged the laity to give a full tenth part of their revenues, their fruits, &c. to the eccleſiaſtics.

This the church enjoyed without diſturbance for two or three centuries; but in the eighth century the laity got hold of part of theſe tithes, either by their own authority, or by grants and donations of the princes; and appropriated them to their own uſes.

Some time afterwards they reſtored them, or applied them to the founding of monaſteries or chapters, and the church conſented, at leaſt tacitly, to this reſtitution. In 1179, the third council of Lateran, held under Alexander III. commanded the laymen to reſtore all the tithes they yet held to the church.

In 1215, the fourth council of Lateran, held under Innocent III., moderated the matter a little; and, without ſaying any thing of the tithes which the laity already poſſeſſed, forbad them to appropriate or take any more for the future.

We may obſerve, that, upon the firſt introduction of tithes, though every man was obliged to pay tithes in general, yet he might give them to what prieſts he pleaſed, which were called *arbitrary conſecrations of tithes:* or he might pay them into the hands of the biſhop, who diſtributed among his dioceſan clergy the revenues of the church, which were then in common. But when dioceſes were divided into pariſhes, the tithes of each pariſh were allotted to its own particular miniſter; firſt by common conſent, or the appointments of lords of the manors, and afterwards by the written law of the land. However, arbitrary conſecrations of tithes took place again afterwards, and became in general uſe with us till the time of king John. This was probably owing to the intrigues of the regular clergy, or monks of the Benedictine and other rules, and will account for the number and riches of the monaſteries and religious houſes which were founded in thoſe days, and which were frequently endowed with tithes. But in proceſs of years, the income of the laborious pariſh-prieſts being ſcandalouſly reduced by theſe arbitrary conſecrations of tithes, it was remedied by pope Innocent III. about the year 1200, in a decretal epiſtle, ſent to the archbiſhop of Canterbury, and dated from the palace of Lateran, which enjoined the payment of tithes to the parſons of the reſpective pariſhes, where every man inhabited, agreeably to what was afterwards directed by the ſame pope in other countries. This epiſtle, being reaſonable and juſt, and correſpondent to the ancient law, was allowed of, and became *lex terræ*. This put an effectual ſtop to all the arbitrary conſecrations of tithes; except ſome footſteps which ſtill continue in thoſe *portions of tithes*, which the parſon of one pariſh hath, though rarely, a right to claim in another: for it is now univerſally held that tithes are due, of common right, to the parſon of the pariſh, unleſs there be a ſpecial exemption. This parſon of the pariſh may be either the actual incumbent, or elſe the appropriator of the benefice: appropriations being a method of endowing monaſteries, which ſeems to have been deviſed by the regular clergy, by way of ſubſtitution to arbitrary conſecrations of tithes.

Fa. Paolo, in his "Treatiſe of Beneficiary Matters," is of opinion, that the cuſtom of paying tithes, under the new law, began in France; and affirms, that there are no inſtances of it before the eighth and ninth centuries: but he muſt be miſtaken; for in the ſecond council of Matiſcona, held in 585, it is ſaid expreſsly, that the Chriſtians had a long time kept inviolate that law of God, by which tithe of all their fruits was enjoined to be given to the holy places, &c.

In effect, Origen (Hom. xi. on Numb.) thinks, that the old laws of Moſes, touching the firſt-fruits and tithes, both of cattle and of the fruits of the earth, are not abrogated by the goſpel; but ought to be obſerved on their ancient footing.

The 5th canon of the council of Matiſcona orders tithe to be paid to the miniſters of the church according to the law of God, and the immemorial cuſtom of the Chriſtians, for the uſe of the poor, and the redemption of captives, and that upon penalty of excommunication: which is the firſt penalty we find impoſed on ſuch as would not pay tithe. On which grounds it is that many among the modern clergy hold their tithes to be *jure divino*.

Others, on the contrary, plead, that the recompence to be given church miniſters, is differently ordained by God, according to the differences he has put between his two great diſpenſations, the law and the goſpel: under the law he gave them tithes; under the goſpel, having left all things in his church to charity, and Chriſtian freedom, he has given them only what ſhall be given them freely, and in charity. That the law of tithes is in force under the goſpel, all the Proteſtant divines, except ſome among the Engliſh, deny; for though hire to the labourer be of moral and perpetual right, yet that ſpecial kind of hire, the tenth, can be of no right or neceſſity, but to the ſpecial labour for which God ordained it; that ſpecial labour was the Levitical and ceremonial ſervice of the tabernacle, (Numb. xviii. 21. 31.) which was aboliſhed: the right, therefore, of the ſpecial hire muſt be aboliſhed too.

That tithes were ceremonial, is evident from their not being given to the Levites till they had been firſt offered as an heave-offering to the Lord, ver. 24. 28.

He, then, who by the law brings tithes into the goſpel, brings in likewiſe a ſacrifice, and an altar; without which, tithes, by the law, were unſanctified and polluted, ver. 32. And, therefore, they were never thought of in the firſt Chriſtian times, till ceremonial altars and oblations had been brought back.

The Jews themſelves, ever ſince their temple was deſtroyed, though they have rabbies, and teachers of the law, yet pay no tithes, as having no proper Levites to whom, nor any altar upon which to hallow them; which argues that the Jews themſelves never looked on tithes as moral, but merely ceremonial. Add, that tithes were not allowed to the prieſts and Levites merely for their labour in the tabernacle; but in conſideration of this likewiſe, that they were not allowed to have any other part or inheritance in the land (ver. 20. 24.), and, by that means, for a tenth, loſt a twelfth.

Beſides, it has been urged, that the prieſts and Levites were properly the officers and miniſters of ſtate under God as king of Iſrael; and the Iſraelites paying through their hands one-tenth to him, was agreeable to the cuſtom of almoſt all nations to pay one-tenth to their king. Tithes, therefore, are to be conſidered as an appendage to the theocracy, and it has been ſaid, that it will be extremely difficult to prove, that Chriſtian miniſters have a divine right to demand them, from this circumſtance of a conſtitution peculiar to the Jewiſh nation. As to the original of tithes, judge Blackſtone obſerves, that he will not put the

the title of the clergy to them upon any divine right; though fuch a right certainly commenced, and, as he apprehends, as certainly ceafed, with the Jewifh theocracy; yet an honourable and competent maintenance for the minifters of the gofpel is, undoubtedly, *jure divino*; whatever the particular mode of that maintenance may be. Accordingly, all municipal laws have provided a liberal and decent maintenance for their national priefts or clergy: ours, in particular, have eftablifhed this of tithes, probably in imitation of the Jewifh law; and, perhaps, confidering the degenerate ftate of the world in general, it may be more beneficial to the Englifh clergy to found their title on the law of the land, than upon any divine right whatfoever, unacknowledged and unfupported by temporal fanctions. But, however beneficial this appointment may be to the clergy, it has been complained of as impolitic in a variety of refpects, and peculiarly burdenfome to the ftate.

Mr. Smith obferves (Nature and Caufes of the Wealth of Nations, vol. iii.), that tithes, as well as other fimilar taxes on the produce of the land, are in reality taxes upon the rent, and, under the appearance of equality, are very unequal taxes; a certain portion of the produce being in different fituations, equivalent to a very different portion of the rent. In fome very rich lands the produce is fo great, that the one-half of it is fully fufficient to replace to the farmer his capital employed in cultivation, together with the ordinary profits of farming-ftock in the neighbourhood. The other half, or, what comes to the fame thing, the value of the other half, he could afford to pay as rent to the landlord, if there was no tithe. But if a tenth of the produce is taken from him in the way of tithe, he muft require an abatement of the fifth part of his rent, otherwife he cannot get back his capital with the ordinary profit. In this cafe the rent of the landlord, inftead of amounting to a half, or five-tenths of the whole produce, will amount only to four-tenths of it. In poorer lands, on the contrary, the produce is fometimes fo fmall, and the expence of cultivation fo great, that it requires four-fifths of the whole produce to replace to the farmer his capital with the ordinary profit. In this cafe, though there was no tithe, the rent of the landlord could amount to no more than one-fifth or two-tenths of the whole produce. But if the farmer pays one-tenth of the produce in the way of tithe, he muft require an equal abatement of the rent of the landlord, which will thus be reduced to one-tenth only of the whole produce. Upon the rent of rich lands, the tithe may fometimes be a tax of no more than one-fifth part, or four fhillings in the pound; whereas, upon that of poorer lands, it may fometimes be a tax of one-half, or of ten fhillings in the pound.

It is a great difcouragement to the improvement of land, that a tenth part of the clear produce, without any deduction for the advanced expence of raifing that produce, fhould be alienated from the cultivator of the land to any other perfon whatever. The improvements of the landlord and the cultivation of the farmer are both checked by this unequal tax upon the rent. The one cannot venture to make the moft important, which are generally the moft expenfive improvements; nor the other to raife the moft valuable, which are generally too the moft expenfive crops; when the church, which lays out no part of the expence, is to fhare fo very largely in the profit. When, inftead either of a certain portion of the produce of land, or of the price of a certain portion, a certain fum of money is to be paid in full compenfation for all tax or tithe; the tax becomes, in this cafe, exactly of the fame nature with the land-tax of England. It neither rifes nor falls with the rent of the land. It neither encourages nor difcourages improvement. The tithe in the greater part of thofe parifhes which pay what is called a modus in lieu of all other tithes, is a tax of this kind. Some have propofed, as a better method for raifing a revenue for the clergy, to lay an equivalent tax upon all eftates, cultivated or not cultivated. It is well known, and has often been lamented, even by the clergy themfelves, that this method of raifing a revenue for their fubfiftence, is a continual fource of difpute between the clergy and their parifhioners, and contributes to obftruct the ufefulnefs of their miniftry. In Holland, and fome other Proteftant countries, the civil magiftrates have adopted what fome have thought a better plan, by allowing their minifters a fixed ftipend, paid out of the public funds.

In effect, for the firft three hundred years after Chrift, no mention is made in all ecclefiaftical hiftory of any fuch thing as tithes; though, in that time, altars and oblations had been recalled, and the church had miferably judaized in many other things. The churchmen confeffedly lived all that time on free-will offerings: nor could the defect of paying tithes be owing to this, that there were wanting civil magiftrates to enjoin it; fince Chriftians, having lands, might have given out of them what they pleafed; and the firft Chriftian emperors, who did all things by advice of the bifhops, fupplied what was wanting to the clergy, not out of tithes, which were never propofed, but out of their own imperial revenues.

The firft authority produced, fetting afide the Apoftolical Conftitutions, which few of the patrons of the tithes will infift on, is a provincial fynod at Cullen in 356, where tithes are voted to be God's rent: but before that time, divers other abufes and complaints had got ground, as altars, candles at noon, &c. And thus one complaint begat another; as it is certain that tithes fuppofe altars.

It is not eafy to afcertain the time when tithes were firft introduced into this country. About the year 794, Offa, king of the Mercians, made a law, by which he gave to the church the tithes of all his kingdom, in order, as it is faid, to atone for the death of Ethelbert, king of the Eaft Angles, whom, in the preceding year, he had caufed to be bafely murdered. But that they were paid in England before this time, by way of offering, according to the ancient ufage and decrees of the church, appears from the canons of Egbert, archbifhop of York, about the year 750, and from an epiftle of Boniface, archbifhop of Mentz, written about the fame time to Cuthbert, archbifhop of Canterbury, and from the 17th canon of the general council held for the whole kingdom at Chalchuth, in the year 787. But the law of Offa firft gave the church a civil right to them in this land by way of property and inheritance, and enabled the clergy to recover them as their legal due, by the coercion of the civil power. However, this eftablifhment of Offa reached no farther than to the kingdom of Mercia, over which he reigned; until Ethelwulph, about fixty years after, enlarged it for the whole realm of England. See Revenue.

Judge Blackftone fays, that poffibly tithes in this country were contemporary with the planting of Chriftianity among the Saxons, by Auguftine, the monk, about the end of the fixth century. But the firft mention of them, which he has met with in any written Englifh law, is in a conftitutional decree, made in a fynod held (as he fays) A. D. 786, in which the payment of tithes in general is ftrongly enjoined. This canon or decree, which did not at firft bind the laity, was effectually confirmed by two kingdoms of the heptarchy, in their parlia-

parliamentary conventions of eftates, refpectively confifting of the kings of Mercia and Northumberland, the bifhops, dukes, fenators, and people. This was a few years later than the time when Charlemagne eftablifhed the payment of them in France, A.D. 778, and made the famous divifion of them into four parts; one to maintain the edifice of the church, the fecond to fupport the poor, the third the bifhop, and the fourth the parochial clergy.

The next authentic mention of them is in the Fœdus Edwardi et Guthruni, or the laws agreed upon between king Guthrun, the Dane, and Alfred and his fon Edward the Elder, fucceffive kings of England, about the year 900. This treaty may be found at large in the Anglo-Saxon laws, and it not only enjoins the payment of tithes, but adds a penalty upon non-obfervance; which law is feconded by the laws of Athelftan, cap. i. about the year 930. This, he fays, is as much as can be certainly traced out, with regard to their legal original. Blackft. Com. b. ii. c. iii. fect 2. Burn's Eccl. Law, vol. iii. article *Tithes.*

The cuftom of paying tithes, or of offering a tenth of what a man enjoys, or of what he reaps from it, has not only been practifed under the old and the new law, but we alfo find fomething like it among the heathens.

Xenophon, in the fifth book of the expedition of Cyrus, gives us an infcription upon a column, near the temple of Diana, by which the people were warned to offer the tenth part of their revenues every year to that goddefs.

The Babylonians and Egyptians gave their kings a tenth of their revenues: fee Ariftotle in his Oeconomics, lib. ii. Diodorus Siculus, lib. v. and Strabo, lib. xv.

Afterwards the Romans exacted of the Sicilians a tenth of the corn they reaped; and Appian tells us, that thofe who broke up, or tilled any new grounds, were obliged to carry a tenth of their produce to the treafury.

The Romans offered a tenth of all they took from their enemies to the gods; whence the name of Jupiter Prædator: the Gauls, in like manner, gave a tenth to their god Mars, as we learn in the Commentaries of Cæfar.—And Feftus, de Verb. Signif. affures us, that the ancients ufed to give tithe of every thing to their gods: "Decima quæque veteres diis fuis offerebant."

Authors have been ftrangely perplexed to find the original of a cuftom eftablifhed among fo many people of different manners and religions to give a tenth to their kings, their gods, or their minifters of religion. Grotius takes it to arife hence, that the number ten is the moft known, and the moft common among all nations; by reafon of the number of fingers, which is ten. On this account he thinks it is, that the commandments of God were reduced to ten, for people to retain them with greater eafe; that the philofophers eftablifhed ten categories, &c.

Tithes, *Extra-parochial*, denote tithes which are not within the compafs of any diftinct parifh. By the canon law, thefe were to be difpofed of at the difcretion of the bifhop; but by the law of England, all extra-parochial tithes, as in feveral forefts, belong to the king, and may be granted to whom he pleafes. Accordingly they have been adjudged to him, not only by feveral refolutions of law, but alfo in parliament 18th Edw. I. But extra-parochial waftes and marfh lands, when improved and drained, are by 17th Geo. II. c. 37, to be affeffed to all parochial rates in the parifh next adjoining.

Tithes, *impropriated and appropriated*, called alfo *infeodated tithes*, are thofe alienated to fome temporal or ecclefiaftical lord, united to their fee, and poffeffed as fecular goods. See Appropriation and Impropriation.

By the council of Lateran, held under Alexander III. in 1179, the alienation or infeodation of tithes is prohibited for the future: whence all infeodations made fince that time are generally held, by the canonifts, illegal.

Some attribute the original of thefe impropriated tithes to Charles Martel; and hold him damned for firft giving the revenues of benefices to fecular nobles. But Baronius will have this to be a fable, and refers their origin to the wars in the Holy Land; which is alfo the opinion of Pafquier.

The tribute, it feems, which the Romans impofed on all the provinces of their empire, was a tenth part of all the fruits: hence feveral authors obferve, that the Franks, having conquered the Gauls, and finding the impofition eftablifhed, they kept it on foot, and gave thofe tithes in fee to their foldiers; and this, fay they, was the origin of infeoffed or impropriated or appropriated tithes. But the truth is, they are not fo ancient; nor do we find any mention of them before the reign of Hugh Capet; even the very council of Clermont, held in 1097, as hot as it was in the intereft of the church, does not fay one word of them; which yet would undoubtedly have made loud complaints of fuch an ufurpation, had it been then known.

Tithes, *Portion of*, denotes tithes which the parfon of one parifh hath a right to claim in the parifh of another. Thefe portions, which might probably, at leaft in part, have been owing to the lord of a manor's eftate, extending into diftricts which are now apportioned into diftinct parifhes, are in law fo diftinct from the rectory, that if one who has them purchafes the rectory, the portion is not extinct, but remaineth grantable. The cognizance of thefe belongs, like that of other tithes, to the ecclefiaftical court.

Tithes, *as Obftructions to Agriculture*, the impediments and hindrances which they throw in the way of the progrefs and improvement of the land and its cultivation and amendment. It has been faid to be the inftruction of natural as well as revealed religion, that a portion of our property is due for the maintenance and fupport of the worfhip of God, and that "thofe who ferve at the altar, fhould live by the altar;" but that whether a fpecial proportion of one-tenth of our yearly income from land is due to the clergy by divine and unalterable right, is a point which has been warmly agitated, and much controverted. Under the Jewifh government, it is well known that tithes were directed to be paid by divine appointment. And it has been ftated by bifhop Butler, that under the Mofaic difpenfation, God himfelf affigned to the priefts and Levites, tithes and other poffeffions, and that in thefe poffeffions they had a divine right; a property quite fuperior to all human laws, ecclefiaftical as well as civil. But that every donation to the Chriftian church is that of a human donation, and no more; and therefore cannot give a divine right, but fuch a right only as muft be fubject, in common with all other property, to the regulation of human laws. How far the claim to tithes on the principle of divine right remains ftill eftablifhed in Catholic countries, is not well known; but this fort of claim to tithes has long fince ceafed in this country. And it is remarked by a late writer, that the conduct of Henry VIII. of England, and of Charles I. of Scotland, furnifhes indubitable proofs of their holding a different opinion; as thofe kings, on the abolition of popery, in place of transferring the tithes from the Roman Catholic clergy to their fucceffors in office, affumed the right of granting the greateft part of them to the nobility and great laymen of the time; and in the latter kingdom in particular, with the burden only of reafonable ftipends to the Proteftant clergy. And further, that the grants of

tithes

tithes made by thefe kings and their fucceffors having been either directly and indirectly ratified by parliament, are now to all intents and purpofes the property of the fucceffors of thefe original grantees.

The hiftorian Gibbon has ftated that tithes appear to have been common in all ages. That the firft Chriftian emperor, Conftantine the Great, was very liberal to the church; and in the year 321, publifhed an edict, granting his fubjects full liberty to bequeath any extent of property they chofe to the clergy. But that this, in place of proving that a tenth of the produce was payable to the clergy in the early ages of Chriftianity, fhews, it is thought, the direct contrary;—that the clergy, inftead of having any legal right to tithes, were fupported by charitable or gratuitous donations, and not by affeffments made either under divine or human laws. The period or time, however, when the payment of tithes was eftablifhed by law, is noticed by Montefquieu, in his Spirit of Laws, who ftates that no one queftions but the clergy opened the bible before the time of Charlemagne, and preached the gifts and offerings of the Leviticus. But that he dares fay, before that prince's reign, though the tithes might have been preached up, they were never eftablifhed. And the above hiftorian not only fixes this period, but the reafon of it too, in the manner below: the fynod of Frankfort, held under Charlemagne in the year 794, furnifhed, it is faid, a cogent motive to pay the tithes. A capitulary (ftatute) was made in it, wherein it is faid, that in the laft famine the ears of corn were found to contain no feed, the infernal fpirits having devoured it all; and that thofe fpirits had been heard to reproach the people with not having paid tithes; in confequence of which it was ordained, that all thofe who were feifed of church-lands fhould pay the tithes; and the next confequence was, the obligation extended to all.

The writer of a late agricultural report has ftated, that in this country, tithes, or a tenth of the produce of the fruits of the earth, as well as of cattle, have been fo long eftablifhed, that without afferting their divine right, it may be maintained, that every eftate in the kingdom was once fubject to them, and that every exoneration has arifen either from encroachment, from royal grant on the diffolution of the abbeys, or from impolitic conceffion, by accepting a fpecific fum of money in lieu of them, which, as it does not vary with the times, has left the clergy in many parifhes and diftricts of the kingdom without any adequate provifion. All modufes and compofitions real, are, it is faid, of this nature; but that, as many of thefe are fixed and irrevocable, it muft be left to the difcretion of the patrons, or the interference of the legiflature, to rectify the evils which they have produced, and to fulfil the fcripture maxim, that "the labourer is worthy of his hire."

And that when it is confidered, that the title by which a tenth of the produce of agriculture is appropriated to the church, is far more ancient and better afcertained than that to the other nine parts, it will appear furprifing that the dues of the clergy fhould in general be paid with reluctance, and that lay proprietors, on the contrary, fhould find little difficulty, either in obtaining a fair rent for their lands, or a reafonable compofition for their tithes. Yet the fact is indifputable, it is faid, that incumbents, however moderate in their demands, can feldom advance the compofition for their tithes in any proportion to their value, without expofing themfelves to obloquy and oppofition; or if they take their tithes up, are frequently fubject to expences and inconveniences, befides producing an unfavourable effect on agricultural improvement, to encourage which ought to be no lefs the object of private than of public policy.

That the farmer, when he takes a bargain of the farm kind, which is fubject to tithes, will undoubtedly eftimate the proportion he is to pay to the incumbent, not according to what may have been demanded twenty or thirty years ago, but what it is actually worth at the prefent moment; and that if, by the lenity or forbearance of the rector or vicar of his parifh, he may pay lefs, he ought to confider it as a facrifice that often can be ill afforded, and as laying him under an obligation which he fhould endeavour to return by every means in his power. Were this the cafe, that harmony which the good of religion, and the intereft of the parties require, would, it is thought, be preferved inviolate; and that none but the extortionate incumbent would be the object of deferved enmity and reproach. The writer too has feen many good effects refulting from the proprietors of titheable land becoming perfonally refponfible to the clergyman, and letting their eftates, efpecially when there are no leafes, tithe-free. The advantage is mutual; and it prevents mifunderftandings as well as an oppofition of interefts, which frequently arife, when the tenant and the incumbent are left to themfelves.

That, upon the whole, the rights of the clergy are exacted with extreme moderation, fmall as many of their livings are, in moft parts of this portion of the country. That no very great part of their tithes is taken in kind, in many places; yet that notwithftanding, complaints exift of the hardfhip of tithes from the farmer, and of the unpleafant fituation in which the incumbent is fometimes placed, by trying to raife his humble benefice to two-thirds, or even one-half of its real worth. Hence, it is conceived, there muft be fomething radically wrong in a fyftem, which excites prejudices in the moft liberal and enlightened minds, and which equally militates againft the interefts of religion and thofe of agriculture.

Having thus briefly ftated the nature of the origin of tithes, and the difficulties which attend them, as they refpect the clergyman and farmer, it may be proper and neceffary to inquire to what ufes they were applied, after a legal right to demand them had been obtained, and how far the clergy of the prefent day follow out in practice the principle on which they were originally made payable. It has been remarked by the writer of the work on Modern Agriculture, that in regard to the queftion, whether the tithes in this part of this country be now appropriated to the ufes for which they were at firft paid, whether voluntarily or by compulfion? it will be neceffary to go back to the firft introduction of the tithing fyftem into the country. Bede ftates, it is faid, that about the year 597, Gregory the Great, then pope, fent a monk of the name of Auftin into England, to propagate the gofpel, and to introduce a fyftem of church-government among the people. Auftin having fucceeded to the utmoft of his wifhes, and having received a grant of land from the then king of Kent, befides donations from private individuals, for the fupport of himfelf and the priefts whom he had brought along with him, found it neceffary to apply to the pope for directions in regard to the manner in which thefe royal and private donations fhould be applied. Gregory folved the monk's queftion, by replying, that it was the cuftom of the church to divide fuch voluntary gifts as Chriftians were pleafed to beftow in four parts: to give one to the bifhop, another to the inferior clergy, a third to the poor, and to fet afide the fourth for erecting and upholding churches or places of worfhip. And in confirmation of this, it may be noticed, that Blackftone has remarked, that at the firft eftablifhment of parochial clergy, the tithes of the parifh were diftributed in a fourfold divifion; one for the ufe of the bifhop, another

 for

for maintaining the fabric of the church, a third for the poor, and the fourth to provide for the incumbent: but that when the fees of the bifhops became otherwife amply endowed, the bifhops were prohibited from demanding their ufual fhare of thefe tithes, and the divifion was in three parts only. In confidering the ftate of tithes in the fourteenth century, he likewife takes notice of an act of Richard II. enjoining the bifhops to allocate a proper fum out of the tithes of each diocefe, for the fuftenance of poor parifhioners; remarking, in addition, that it feems the people were frequently fufferers by withholding of thofe alms, for which, among other purpofes, the payment of tithes was originally impofed.

The firft of the above two writers obferves farther, that at what period the fuperior clergy of England firft poffeffed themfelves of the tithes, in defiance of the original deftination, and of many ftatutes made to enforce an application of them to the ufes for which they were firft made payable, it is unneceffary to inquire. It will not be denied, however, it is thought, by the keeneft ftickler for the prerogatives of the church, that in place of one-third of them being applied for the ufe of the officiating clergy, one-third for the fupport of the poor, and the remaining third for the repairs of the churches, which, when the bifhops had acquired land in mortmain, or free alms, fufficient to fupport their dignity, was the deftination originally intended; the tithes payable in England are now very differently, although not, it is faid, fo legally, appropriated. Thofe people, fays the writer, who are moft difpofed to cry out "the church is in danger," when the real or fuppofed rights of the clergy are invaded by the flighteft attempts to alienate the tithes, ought to reflect that the third of all the tithes in England, whether in poffeffion of the church or of the laity, ought to be allowed for the fupport of the poor; that another third ought to be expended in the repairs of the churches, the expence of which is now defrayed, in almoft every inftance, by an affeffment on the parifhioners; and that the laft third ought to fall to the officiating clergymen, many of whom are the moft miferable of the fons of men.

But it is not by any means, it is faid, intended to cenfure the prefent members of the church of England for alienations of rights that took place centuries ago; far lefs to infinuate that that refpectable body have not an unqueftionable right to the value of fuch a proportion of the produce of the foil, as will enable them to fill the ftations in which they are placed with dignity and honour. The object which is here aimed at, is the giving a fuccinct account of the particulars and circumftances in which the payment of tithes in kind operates againft the introduction of improvements in agriculture, and the advancement of religion; and by fhewing the manner in which the alteration in the tithing fyftem was effected in Scotland, to endeavour to point out a way in which the future payment of tithes in England may be arranged, fo as to meet the purpofes, and moft effectually promote the interefts of agriculture, without in the fmalleft degree infringing on the rights of the individuals concerned in paying or receiving them.

There are many different ways in which the payment of tithes in kind operates unfavourably to the general advancement and profperity of the hufbandry of this country. According to the writer of the Effays on rural affairs, it is univerfally confidered as a grievance; there being, it is faid, fcarcely an agricultural furvey of a county, in which it is not ftated as an evil that ought to be removed. And this the author thinks no wonder, as the drawing of tithes in kind, when it is examined with attention, will be found to operate directly, in the ftricteft fenfe of the word, as a tax on induftry; and to be, at the fame time, more vexatious in the mode of collecting than perhaps any tax that has ever been adopted, or had recourfe to, on any occafion.

It is conceived to be a meafure that has an injurious and unfavourable effect on four different defcriptions of fociety, as the farmer, the landholder, the clergyman or impropriator of the tithe, and the public.

As to the firft, or the farmer, he is more or lefs affected, according to the differences of the nature, circumftances, and fituation of the land which he may hold. The intelligent writer on Modern Agriculture, noticed above, confiders it unfortunate, though certainly the cafe, that the payment of tithes in kind operates more againft the fpirited improver than againft the flovenly and indolent; and that tithes, as the law now ftands, cannot be confidered fo much the tenth of the natural produce of the foil, as a tenth of the capital employed by the farmer in its cultivation and improvement. For inftance, if a farmer pays his ploughman ten pounds a year of wages, his labourer ten-pence a day for his labour, or the landlord a hundred pounds of rent, he muft confider himfelf as advancing one-tenth part of thefe fums for the purpofe of promoting the intereft of the tithe-owner, who not only receives annually a fum equivalent to the tenth part of this capital, but that tenth improved to the higheft degree which the unremitting exertion of the tenant is able to effect. Mr. Locke, it is continued, in his Treatife on Civil Government, remarks, that it is labour which puts the greateft part of the value upon land, without which it would fcarcely be worth any thing. That it is to that we owe the greateft part of all its ufeful products; for all that the produce of an acre of wheat is more worth than the produce of an acre of as good land which lies wafte, is the effect of labour. Hence, it is thought, the farmer furnifhes a fund to purchafe the neceffary labour, whereby an acre of land is rendered fo productive as to afford fix, or eight, or ten fhillings yearly of clear revenue to the tithe-owner, which, but for the application of that labour, would have remained unproductive for ever, in fo far at leaft as he was concerned. So much is this the cafe, it is faid, that if a farmer expends one hundred pounds on the purchafe of manure, the improvement and cultivation of his farm, and the payment of the rent; and if the value of the crop, when fold, amounts to one hundred and ten pounds, he is actually a lofer to the extent of five pounds, or what may be the intereft of one hundred pounds for a year. He indeed gets his capital of one hundred pounds returned, but the tithe-owner draws the ten pounds, or rather more, or, which is the fame thing, the value; fo that the farmer has employed his capital to enable the tithe-owner to draw a dividend of 10 *per cent.* on that capital; whereas had he lent it on mortgage, or placed it in the funds, he would have benefited himfelf and his family to the extent of the intereft or the dividend which he, in either of thefe cafes, would have himfelf received. So much, it is faid, for the abfurdity of attempting to improve lands under fuch circumftances. The able writer of the above named Effays likewife, after ftating different ways in which tithes operate againft the tillage or corn-farmer, ftrongly remarks, that in this country, befides commons and waftes, much very fine land is allowed to remain in grafs in a very unproductive ftate, which, with a very little or moderate degree of induftry and outlay of money upon it, might be made to yield abundant crops of corn: and the reafon affigned for this difgraceful ftate of management and want of production, which is fo called, becaufe, were it altered, even the grafs-land might be eafily made twice as productive

tive as it is by a judicious ufe of the plough, is, that the tithe of corn-land is fo very heavy, as deters the farmer from having recourfe to the plough: whereas in Scotland, where the corn-tithe is never drawn in kind, immenfe tracts of country, which thirty years ago were covered with heath, and totally unproductive even of grafs itfelf, are now converted into fertile fields that yield abundant crops of corn and grafs; and which, if the tithe-laws had there exifted, muft, in all probability, have continued unproductive until the end of time. This is a contraft that is very ftriking to every one, it is faid, who travels through thefe parts of that country; and that it brings forward a practical fact, which ought, it is thought, to outweigh a million of fpeculative arguments.

The intelligent author of the Prefent State of Hufbandry in Great Britain ftates, that another grievance to which farmers are fubjected, in the payment of tithes in kind, arifes from the harfh and oppreffive manner in which the payments are fometimes exacted. The nature and extent of this grievance may, it is faid, be learned by a perufal of the extract which is given below, from the fame writer's Agricultural Report of the County of Northampton; where it is ftated, that it has happened, (though, to the credit of the tithe-owners be it faid, the inftances are very few or rare,) where, when the tithes have been let for the purpofe of oppreffion, the tithing-man has been known to exert that authority with which he was invefted; that he has not only taken the tenth fhock of corn, and the tenth cole of hay, but alfo the tenth lamb, pig, hen, egg, &c.; nay, has even gone into the garden, and taken not only the tenth part of the fruit, but likewife the tenth of the produce of the kitchen-garden. Under fuch circumftances as thefe, it may be afked, who is the farmer that would not feel himfelf aggrieved? From this it muft appear, it is thought, obvious, that whether the farmer's intereft or happinefs be confidered, it muft be equally his defire that fome arrangement fhould be effected, whereby the payment of tithes in kind fhould for ever be abolifhed; for, as the writer of the Agricultural Report of the County of Buckingham very juftly, it is faid, obferves, it may be laid down as a propofition, that whatever profit arifes to the cultivator of the foil, by the force of fuperior ingenuity and induftry, fhould be held facred by the church and government. If it be otherwife, it difcourages the improvement of the foil; and thereby the church prevents the future increafe of her tithes, and the government the future increafe of its taxes.

It has been ably contended by the writer of the Effays on rural fubjects, already noticed, that though the tithe-laws are hurtful to the farmer, they are perhaps ftill more fo to the proprietor or land-holder. Whatever checks, it is faid, the induftry of the farmer, muft, in a direct manner, diminifh the income of the landlord; and as the energy of a farmer, when once excited, is well known to augment in proportion to the advances he has made, whatever checks that energy in the bud, occafions in time a diminution of income to the proprietor, much greater than can be eafily conceived. And that, as it is fuppofed the proportion of rent which can be afforded for arable land, increafes with the productivenefs of that land in a much higher degree than in the ratio of the quantum of the crop; whatever tends to render land permanently more productive than before, if no deduction be made from it, tends, at the fame time, to augment the income of the proprietor in a ftill higher degree than that of its produce. But as it is obvious that the tithe operates as a dead bar to the commencement of improvements in agriculture upon any foil of no great degree of fertility, fo as to prevent the beginning of that motion, from the acceleration of which alone the proprietor can hope to derive confiderable increafe of rent; in all cafes his rent is diminifhed in a much higher ratio than one-tenth, as it might feem to do by thofe who take only a flight view of the matter. It is added, that fhould the proprietor of poor lands, feeing the impoffibility of the tenant's improving them, attempt to render thefe more permanently fertile by the outlay of ftock upon them, that he never expected to draw back; but would content himfelf with a reafonable return of intereft on the capital in the name of rent, he would not find the cafe much altered. He fets out, it may be fuppofed, with this principle, that if he can fecure a permanent rent, equal to 5 *per cent.* on the money expended upon them, he will be very well fatisfied with it. Let us fay, then, that twelve bufhels of grain were the neat expence of culture, &c. which, on an average of all forts of corn, was valued at 4*s.* the bufhel; and that he had expended 20*l.* the acre, the intereft of which, at 5 *per cent.*, is 20*s.* or in other words, five bufhels. But that before he can draw this rent free of tithe, the average produce muft be, at leaft, eighteen bufhels, out of which muft be taken one bufhel and nine-tenths, fo that inftead of five, his rent will be reduced to 3 *per cent.* nearly; while the tithe-owner will be entitled to draw nearly 2 *per cent.* for ever, on the capital which the improver had thus expended. It is almoft needlefs to add, it is faid, that under fuch circumftances it is vain to look for a general fpirit of agriculture, either among proprietors or tenants, to both of which defcriptions of perfons the operation of the tithe-laws are, it is contended, highly oppreffive.

And another inftance is ftated of very material importance, in which tithe becomes fingularly pernicious and prejudicial to proprietors of land. The importance of keeping and preferving the whole produce of the ground upon the farm where it was raifed, for the purpofe of making manure, feems, it is faid, to be very generally underftood; as a claufe to that effect is univerfally found inferted in the leafes in every county of England, wherever leafes are granted at all. What punifhment, it is afked, would the proprietors of thefe lands deem adequate to the crime of felling off the whole produce of the farm every tenth year? Yet great as this crime would be, it would not be adequate, in point of damage to them, to the right of drawing tithe in kind from their arable lands; becaufe the farmer who fold the produce would, at leaft, become poffeffed of money to replace, in fome degree, by means of extraneous manures, the lofs he had incurred by the abftraction of the home-dung. Thofe who are entitled to draw the tithe in kind are, in fact, by this means, vefted with a power of enriching themfelves, or their own private property, if they be fo inclined, at the expence of every other proprietor around them. In this point of view, therefore, tithes are fingularly pernicious to proprietors of land. This is unqueftionably an objection to the drawing of tithes in kind that can probably never be well got over by any of thofe who are fo favourable to the prefent tithing fyftem. It ftrikes at the very vitals of all our improvements in hufbandry and rural bufinefs.

Befides, the writer of the work on modern hufbandry confiders that infomuch as the fpirit of improvement is depreffed and checked, the land-holder muft be injured; and that as there are no regulations or laws exifting in this country which have fuch a tendency to impede the introduction of new or improved modes of hufbandry as thofe of exacting the payment of tithes in kind, there are, of courfe, none that operate fo decidedly againft the landed intereft of the kingdom. If, it is faid, the farmer be reftrained from inclofing, draining, purchafing manure, in fhort, from cultivating

tivating and improving his land to the higheft degree, who will deny that the intereft of the owner is affected? And that this is the cafe in a variety of inftances, from the operation of the tithe-laws, is admitted by every one who is perfectly acquainted with the prefent ftate of agriculture in this country.

In refpect to the impropriators of tithes, it may be noticed that, if the interefts of religion and the clergy be confidered, it will be found that the fyftem of taking the tithes in kind is equally productive of bad confequences. It will be difcovered to difturb the harmony of fociety, and to be often the means of creating fuch difputes and divifions between the clergyman and his parifhioners, as renders the religious inftructions of the former of little avail. Among the many inftances which might be mentioned of the teafing and vexatious circumftances of this nature that occur to infringe the harmony which ought to fubfift between the clergyman and his parifhioners, that which is given below, from the Agricultural Report of the County of Hants, may be fufficient. In this cafe the clergyman and the farmer were at variance; and the farmer, determined to be even with the clergyman, gave him notice that he was going to draw a field of turnips on a certain day. The clergyman accordingly fent his team and fervant at the time appointed, when the farmer drew ten turnips, and defired the other to take one of them; faying he fhould not draw any more that day, but would let him know when he did. This fully fhews the vexatioufnefs of the practice of tithing in this manner.

Further, that in a political point of view it is alfo injurious, as tending to loofen that chain of intercourfe and connection which, it is conceived, is of fo much importance to keep united. The intereft of the clergy would likewife be greatly promoted, were they to receive an equitable compenfation for their tithes, in place of drawing them in kind, or of making annual arrangements with the farmers.

But it is the lay proprietors, it is faid, that are the moft blameable in refpect to the rigorous manner in which the tithes are collected. It is faid that clergymen, who act up to the character in which they ftand in the fcale of fociety, (and the moft violent declaimer againft them will not pretend that a very great majority of that refpectable body do not fo act,) very generally facrifice fo great a portion of their juft demands for the fake of peace and quiet, that, if the expence of collecting be added, there is fcarcely any compofition that can be propofed which it would not be for their intereft to accept. Some inftances there no doubt are, where the clergyman, being of a turbulent, avaricious difpofition, lays hold of every advantage, and collects his tithes to the value of the uttermoft farthing: but it ought to be remembered, that a clergyman who does fo, nay, that a clergyman who fubmits to the drudgery of collecting tithes in kind, muft lofe, in the opinion of the parifhioners, a great fhare of that refpectablility of character, which it is his indifpenfable duty to fupport and keep up.

And in relation to the public, the effect which this injudicious regulation has, is equally prejudicial and mifchievous. It comes in, according to the author of Modern Agriculture, for its fhare of the lofs arifing from the effect which the tithe-laws have on the hufbandry of the country, as, by their operation, the quantity of corn that might be cultivated, did not fuch laws exift, is diminifhed to an immenfe degree, and other branches of the art of farming are greatly impeded. Befides, they check induftry, by depreffing the farmer's fpirit, and by preventing the circulation of money that would be expended in improvements, and in the purchafe of the manufactures of the country. Were no fuch laws in force, the proprietors and farmers, in confequence of the fuccefs of the improvements which in that event would be undertaken, would be enabled to purchafe more of the manufactures of the country, pay a greater fhare of the taxes for the fupport of the ftate, and after all, live in a greater ftate of eafe and comfort, than under the exifting circumftances they are able to do. In fhort, it is confidered that the abolition of thefe laws is the only meafure that can be adopted with any probability of fuccefs, at leaft the firft one that ought to be attended to, with a view of again bringing the corn-trade to turn once more in favour of this country. When all thefe various circumftances are conjoined; and when it is further confidered that, except in Spain and Portugal, there is fcarcely a civilized nation in the world where this fyftem of church-flavery is allowed to exift; and that even in Ruffia tithes are abolifhed; it may be reafonably hoped that the period is not far diftant when England will be relieved by legal and conftitutional means, and in confequence of arrangements made on liberal principles, from this almoft Egyptian bondage.

It further likewife appears, from the accounts given by different writers on the fubject of tithes, that they were paid in the latter end and ages of the Romifh church with great reluctance; and even in this country during the reign of Henry VIII. Therefore it is faid, that if, when improvements in agriculture were in their infancy, and at a period too when men's minds were held in flavifh fervitude by the clergy, the payment of tithes in kind could hardly be enforced, can it be fuppofed wonderful, that in thefe enlightened days it fhould be confidered as a grievance? At a period when the principles of religion and of real genuine liberty are better afcertained, and more generally known, than in any former age, it is not furprifing that laws compelling the payment of tithes in kind, laws which originated in edicts iffued by bigotted kings under the influence of defigning priefts, fhould now be found inimical to the beft interefts of the country, and to the happinefs of fo many thoufands. That this is the cafe, every inhabitant of this ifland has ample opportunities of fatisfying himfelf by a perufal of the agricultural reports of the different counties of England and Wales, which have been lately publifhed. And that as thefe reports, after having been circulated among the proprietors of land and farmers for their correction and amendment, ftill contain, in their republication, the fame or fimilar complaints in refpect to the hardfhips which the farmers are fubjected to, and the injury which agriculture fuftains, by the continuance of the payment of tithes in kind, fuch complaints may juftly be deemed the voice of the people proclaimed in a conftitutional way; and as fuch, merit the moft ferious and fpeedy attention of the legiflature and of the clergy.

A few of the injurious effects of the practice of paying tithes in kind have been noticed above, and many more of the hardfhips proceeding from it are recorded in the different agricultural county furveys and other works which have been only flightly touched upon in what has been already faid upon the fubject. And the neceffity of fomething effectual being done, in order to the removal of fo inconvenient and oppreffive a regulation, has been ftrongly fhewn in the writings of the various advocates of the improvements of Britifh hufbandry and farming, as well as by many other able and intelligent writers on matters connected with them, but which, for want of room, cannot be confidered here.

As, therefore, fome reform in the mode of paying tithes in this country muft be admitted to be indifpenfably neceffary,

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fary, it is to be wifhed that the legiflature, efpecially at the prefent time, would devote that attention and confideration to the fubject which its importance and neceffity demand, and the clergy come forward with fuch reafonable propofitions for the adjuftment of the bufinefs as may be fuitable, as by fuch means the matter might, and no doubt would, be foon eafily fettled to the fatisfaction of all the parties concerned.

In the view of affording a proper knowledge of the moft fuitable means of effecting fo important an alteration, the author of the "Prefent State of Hufbandry" in this ifland, gives the following clear account of the beneficial arrangement which took place in refpect to tithes in Scotland, and of the circumftances which led to it. It is ftated, on the authority of Erfkine's "Inftitutes of the Law of Scotland," that the payment of tithes in kind was continued for many ages in that kingdom; and that, owing to the precarioufnefs of the climate, it was attended with more grievous hardfhips than could have taken place in the fouthern part of the ifland. Every Scotch proprietor or farmer, who prefumed, after reaping their corns, to carry off any part of them from the field, until the perfon having right to the tithe had drawn his fhare, were, from the firft eftablifhment of this right, fubject to fevere penalties. The tithe-owner, on the contrary, either from indolence, a defire to opprefs, or with a view of compelling the proprietor or farmer to purchafe his tithes annually at a high price, frequently delayed drawing his fhare until a great part of the crop or produce was rotten. Notwithftanding feveral ftatutes were enacted with a view of checking the oppreffive difpofition which fo often evinced itfelf in the conduct of the clergy in this refpect, yet thefe grievances continued to exift, more or lefs, until the year 1633: when a decree-arbitral, paffed by Charles I. in 1629, for arranging and determining a mode, to be afterwards adopted, for the payment of tithes, was ratified by parliament.

That during the ftruggle for the eftablifhment of this or that form of church-government, great alterations had taken place, both in regard to thofe having right to the tithes, and to the manner in which they were exacted. On the Reformation, the benefices of the church fell to the crown, and were, at different periods, gifted for fervices, or other confiderations; fuch as for fupporting univerfities, hofpitals, &c.; and the perfons obtaining them were denominated lords of erection, and fometimes called by other names. They likewife got, or affumed, the right of nominating officiating clergy on all vacancies. Thefe alienations were, by act of parliament, 1587, put a ftop to; and fuch tithes as had not been previoufly difpofed of, remained with the crown unalienably. The tithes, which were then annexed to the crown, may be valued and leafed by the proprietor of the lands, but cannot be purchafed. The officers of the crown are in ufe to grant leafes of this defcription of tithes for nineteen years, and which are renewed as matters of courfe on paying a reafonable fum on fuch renewal. The fum demanded is regulated by the yearly value of the tithes; fo that a capital equal to between five and fix years' amount of the tithes, laid out at the commencement of the leafe, and improved by compound intereft, is fufficient to produce fuch a fum at the expiry as will obtain renewals to perpetuity.

Some of the clergy remained, it is faid, in poffeffion of their benefices after the Reformation; and the vacancies that happened in fuch benefices were filled up by thofe who affumed the right of prefentation. An act of parliament was foon afterwards paffed, whereby the patrons were deprived of the right of patronage: but in compenfation for this fuppofed hardfhip, it was enacted, that the right of all tithes, fo poffeffed by the clergy, fhould be vefted in thofe who had exercifed the right of patronage. Patrons having acquired tithes in this way, are compelled by law to fell them at nine years' purchafe of the yearly value of the tithes.

The fyftem of tithes and tithing having, however, got into great confufion, in confequence of the various alterations that took place in the government of the church of Scotland, thofe interefted found it neceffary to fubmit their feveral rights and claims to the determination and final award of Charles I., who, on the 2d of September, 1629, pronounced two decrees-arbitral, or judgments, which laid the foundation of that arrangement refpecting tithes, and the payment of the eftablifhed clergy in Scotland, which has been productive of fo many good confequences.

The moft important article in thefe two decrees-arbitral, is that which directs the valuation and fale of tithes; after which, the land-holder is entitled to the whole crop upon payment to the proprietor of the tithes of a yearly rent, or to purchafe them at an eafy rate, fubject to a reafonable provifion to the clergy. The words of this famous decree are, it is faid, that "the rule of all tithes, where they are valued jointly with the ftock, fhall be a fifth part of the conftant yearly rent that is paid for the lands." Another material circumftance in the valuation of tithes in Scotland is, that the rents of mills, thofe arifing from recent improvements, and fome others of lefs importance, are deducted from the grofs amount.

By thefe decrees, which were ratified in parliament in 1633, the proprietors of land not having right to the tithes, were not only found entitled to fue the titular in an action at law to afcertain their value, but, unlefs vefted in the crown, to obtain a purchafe of them on eftablifhed terms, as mentioned above. Thus, ever fince 1633, every landholder in Scotland has had it in his power to acquire right to his own tithes, either by purchafe, or leafe, fo that they fhould be no longer payable in kind. Neverthelefs, thofe who neglect to fue for a valuation may ftill be fubjected to all the inconveniencies of the former law; as under fuch circumftances, thofe having right to the tithes may draw them in the manner commonly practifed in England. The remedy is, however, fo eafy, that he muft be a fool indeed who would fubject himfelf or his tenants to fuch a flavifh fervitude, while he has it in his power, by a fimple application to the fupreme court of the country, to abolifh it for ever.

Some inftances are, however, recollected, where proprietors in the north of Scotland, having a right to the tithes, and being unwilling to forego all the power of haraffing their tenants, which attached itfelf to the ancient feudal barons, ftill continued to draw the tithes for fome time. But they at laft became afhamed of fuch conduct; and there is not now, it is faid, one inftance where tithes are paid in kind, or where the tenants have any concern, either directly or indirectly, with or in the payment of tithes on the north fide of the Tweed. How then, it may be afked, are the Scotch clergy provided for? The anfwer is, it is faid, eafy; the ftipends provided by law for the maintenance of the Scotch clergy are ftill payable out of the tithes. The judges of the court of feffions, who act as commiffioners for the arrangement of tithes, have a right to modify reafonable ftipends to the parochial clergy. And accordingly, in all fuch cafes, where the clergyman can fhew that the parifh is a place of more than ordinary refort, that the cure is burdenfome, or that the neceffaries of life give a high price in that part of the country, or that the

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fcanty allowance of ftipend in that parifh bears too fmall a proportion to the weight of the charge, provided there are free and unappropriated tithes in the parifh, the commiffioners, on the application of the clergyman, grant an additional ftipend, either in money, but more generally, where practicable, in grain, as being lefs fluctuating in value than money. But that owing to the free tithe in the parifh having been previoufly affigned to the clergyman, fome inftances do occur, where the commiffioners have it not in their power to augment his ftipend, although it be too fmall for the decent maintenance of a numerous family. In all fuch cafes it would, it is thought, be highly proper to apply part of the bifhop's tithes, fuch as are now payable to the crown, to the purpofe of rendering the fituation of thefe clergymen, who are fo unfortunately fituated, more decent and refpectable.

In order to the introduction of a fuitable arrangement in regard to tithes in this part of the country, it is remarked, that the queftion has been for fome time paft very popular, and much agitated; and that many difficulties have been ftarted, apparently for the purpofe of rendering it more perplexed and complicated than it is in reality. Holding it as a facred and inviolable principle, that tithes, as now payable in England, were formerly appropriated for particular purpofes, and that although in many inftances alienations were made at different periods; yet that as thefe are exprefsly or virtually confirmed by thofe laws which protect national and individual property; therefore tithes, as now payable in the fouthern part of the ifland, are payable in conformity to the laws of the country. This being granted, no man who has a regard for juftice, who venerates the conftitution, or who would not wifh to fee the rights of property invaded, but muft be fatisfied, that if the prefent mode of paying tithes is abolifhed, the clergy and the lay-proprietors of tithes are, in law, juftice, and equity, entitled to an equivalent. What that equivalent ought to be, and in what manner afcertained, becomes the queftion. It is obferved, that it is not by appeals to quarter-feffions, nor by fpecial acts of parliament for this or that particular diocefe or parifh, that this great national queftion can be determined with propriety: it is only by a fubmiffion of all rights and claims of both parties to the determination of fome one refpectable individual, that the matter can be amicably or equitably decided. And it is thought, that the moft proper individual to be made choice of is the fovereign, or perfon holding the government of the country.

The clergy, it is faid, need not be afraid to appeal to fuch an arbiter, as in the courfe of a great length of time there has been no inftance of any degree of infringement of or upon their rights. The land-holders and lay tithe-owners may keep their minds at eafe, as though the moft facred regard for religion has been evinced, yet it has been divefted of fuperftition or bigotry. If, it is continued, Charles I. during the anarchy of church-government that prevailed in his time, found no difficulty in paffing a decree in a fimilar cafe, which, having received the fanction of parliament as a matter of courfe, laid the foundation for a juft and equitable arrangement of the tithes, the bufinefs may unqueftionably be accomplifhed with much lefs difficulty at the prefent period. The probable confequences of fuch a fubmiffion would, it is thought, be, that the arbiter would no doubt appoint commiffioners to examine and afcertain the yearly value of all the landed property in England, the produce of which is fubject to the payment of tithes. Were the yearly value of the lands afcertained by a corn-rent in place of one in money, and which, it is fuppofed, might be eafily done by taking the average price of corn for the feven or ten years or more laft paft, with the exception, however, of 1795, and fome other fcarce and dear years, the clergy could fuftain no lofs, nor would after valuations in confequence of the depreciation in the value of money, be rendered neceffary.

This being done, a fifth, a fixth, or any other given proportion of the free rent, after the payment of parliamentary taxes affecting land, would be declared due to the tithe-owner in lieu of the payment of tithes in kind. One claufe of the decree would probably, it is thought, be, to compel every lay-owner of tithes to fell his right to the land-holder, at a fair and equitable, but regulated price; and another would moft likely be, declaring the clergy entitled for ever to a fifth or fixth, or fome other determinate proportion of the prefent real free rent of all titheable lands, to which they may have right, and fubjecting the proprietors to the regular payment thereof. Thus at once would, it is faid, a load which has for many ages preffed down the fpirit of the Englifh farmers, be removed, and that while all ranks and degrees muft applaud the equity and the propriety of the arrangement, a fpirit for agricultural improvements would evince itfelf fuperior, it is thought, to any of which the records of this country make mention.

It is fuppofed that this mode is the lefs exceptionable, as it is almoft fimilar to that adopted when acts of parliament are paffed for enclofing particular parifhes. At the firft meeting of the commiffioners named in fuch acts, they direct, that all having intereft may deliver in their claims, and the rights or grounds on which they claim, againft a certain day. Thofe being afterwards examined by the commiffioners, who are neither more nor lefs than arbiters appointed by the legiflature, their decifion conftitutes the law in regard to the right by which the individual proprietors hold the lands, which by the arbiter's award is affigned to them. In place, therefore, of multiplying acts of parliament refpecting the adjuftment of tithes *ad infinitum*, one only, and that a very fhort one, feems neceffary, authorizing the governing perfon to arbitrate between the owners of the tithes and the land-holders; and whofe award, like that of the commiffioners appointed under acts of parliament for enclofures, fhould be final, and have the effect of law. Having thus laid down the general principle, it will not be expected that any attempt will be made to combat the little difficulties that may be ftarted againft the practicability of carrying the meafures founded thereon into effect. Thefe the wifdom of the arbitrator will be fully fufficient to obviate and direct. One thing is certain, it is fuppofed, namely, that a decree-arbitral or judgment, pronounced by fuch high authority, and founded on thefe principles, would give univerfal fatisfaction to every party concerned.

On a matter which is fo very interefting and important to the Englifh land-holder and farmer, it will be neceffary and ufeful to bring to the inquirer's notice and attention a few of the different other modes and plans which have been fuggefted at different times by different writers for effecting the bufinefs and adjuftment of the matter of tithes.

The intelligent writer of the Effays ou rural affairs has fuppofed, that the tithes of or in England and Wales fhould be converted, fo as to make a payment in money be univerfally received in lieu of the payments in kind that are at prefent exigeable; but under fuch modifications as to prevent the poffibility of thofe who are entitled to draw the tithes from fuffering by the depreciation in the value of money, which we have feen for a long time paft has been going on in a regular progreffion; and which may be expected to continue; or may, perhaps, as at this time in a neighbouring country, be funk almoft to nothing by fome political fhock

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that cannot at prefent be forefeen. With thefe views, might not, it is afked, a law be obtained, authorizing the valuation of tithes, in every cafe where either of the parties interefted in it fhould fo incline? This might be done, it is faid, by a fummons raifed againft all the parties concerned, either before the fheriff of the county where the property lay, or before any other judge that fhould be thought more proper for executing the office; who, after hearing the parties, fhould proceed to make a legal inqueft to obtain a clear proof what had been the amount of the tithes, actually paid and drawn, for five, ten, fifteen, or twenty years laft paft, as fhould be judged the moft proper, out of the feveral lands in queftion; fpecifying diftinctly the quantity of each denomination of grain, or other titheable produce. But as it may eafily be forefeen, that it would be a matter of great difficulty, in many cafes, to get at thefe facts with precifion, might it not be put in the power of the judge, if the parties could not agree as to that particular, to appoint two or more perfons of good character in the neighbourhood, to gather up the tithes in kind themfelves, fairly and honeftly, for five years next to come, without favour to any perfon; the amount to be delivered to the perfons having a right to receive them, after the quantities had been refpectively afcertained, fo as to admit of the collectors making up an account of the whole, upon oath, to be delivered to the judge; who, from that account fo made up, fhould caufe an average to be ftruck of the quantities of each particular article; which average quantities, after deducting a juft proportion for the expence of collecting, and taxes affecting the tithe, fhould be declared by him to be the legal tithe exigeable from the land in queftion in all time to come? But as there is room to fufpect that the money prices of corn, wool, &c. of different denominations, may rife to be much higher in fome future period than it was at that time; inftead of then afcertaining the price of thefe articles, let it be declared, that the quantities of grain and other articles refulting from the averages refpectively, are payable out of the refpective lands, leaving the average prices of fuch grain, &c. to be fettled and afcertained each year, as is fpecified below; declaring that the money which fhall arife from the average prices thus afcertained, fhould be in lieu of the whole tithe that could be exacted each year; the time of payment too to be fpecified. And, in order to prevent all difputes as to the average prices of thefe articles in time to come, let the fheriff of each county be authorized and required to make an inqueft at a certain period each year of what has been the actual ready money felling price of corn of the preceding year's crop, from the time the crops were reaped till this time, and of wool, as well as of all other titheable articles for the former year, by examining witneffes before a jury to be appointed for that purpofe, which prices, after being thus afcertained, fhould be publifhed and declared to be thofe by which the quantity of tithe-corn of each particular defcription, and other titheable articles, contained in any degree of valuation, fhould be payable for the crop of the preceding year. Thus, it is faid, would the tithe-owner be entitled to receive payment of his tithes, without any extraordinary expence or trouble, or unjuft deduction or difpute whatever: the farmer would be allowed to carry on his operations uncramped by thofe galling reftraints which the tithe-laws at prefent perpetually throw in his way: the proprietor would be at liberty to apply fuch part of his capital as he might incline, towards promoting agricultural improvements, with a reafonable profpect of being benefited by his exertion: and the public would become poffeffed of a quantity of furplus produce of land, which it can have no profpect of ever otherwife enjoying, which would be the means of diffufing a perpetual plenty through every corner of the land.

Mr. Pitt too, in his account of the agriculture of a midland diftrict, fuggefts, that the mode or fcheme to be adopted as the outline of an exchange of tithes, fhould be for land, in the manner directed below, as land will always bear a value proportionate to that of its produce, and that even the price or value of labour is meafured by the fame ftandard. This is, that an act of parliament fhould appoint, in every diocefe, an equal number of the moft refpectable clergy and country gentlemen commiffioners and truftees, with a power of nominating furveyors, to value all the tithes belonging either to the clergy or laity within the diocefe; and that this act fhould be let give an option to the land-owners of purchafing their refpective tithes, at the valuation fixed on them by fuch commiffioners and furveyors; the money arifing from fuch redemption being invefted in the funds, or other more proper fecurities, until a fuitable opportunity fhould offer of laying it out in the purchafe of land; and that, where the land-owners fhould refufe to purchafe fuch tithes, the commiffioners fhould have the power of mortgaging them, or of taking up money on their fecurity, to be invefted in the fame way with that arifing from the tithes actually fold; or after a given time, the truftees might be impowered to fet apart an allotment of the land of thofe owners who refufe to purchafe, and which, if conveniently fituated for the former tithe-owner, might be fo applied, otherwife fold; and the money arifing from fuch fale invefted as before, until it could be laid out in the purchafe of land. The execution of fome fuch plan or mode as this, would, it is fuppofed, be attended with infinitely lefs trouble and expence than now incurred by the annual valuation of tithes; as, fhould fuch a regulation be once effected, the bufinefs would be fettled for ever: while under the prefent fyftem, the furveyor or valuer's bufinefs is never done, but continued from year to year; and, if it fhould remain, will be from generation to generation. An equivalent in land muft certainly, it is thought, be a more folid property than tithes. Land too may be improved in any degree by good management and induftry: tithes fluctuate or fink in value at the will of the cultivator. Some fuch commutation as this may, it is thought, be readily and eafily effected, and that all parties would be pleafed with the alteration.

The concluding remarks and fuggeftions on this greatly interefting matter, are the refult of the inveftigations and enquiries of two clergymen, who have been lately engaged in drawing up accounts of the ftate of the agriculture of two large counties of the kingdom; thofe of Hereford and Berks. The former ftates, that of the various modes propofed to effect the defirable object of a general commutation of tithes, that of a corn-rent feems to have met lefs objection than moft others which have been yet propofed; ftill, however, nothing has been ferioufly attempted, and the matter remains open to further difcuffion. It has not, perhaps, it is faid, occurred to every one, that tithes, in their prefent form, have a direct and powerful tendency towards increafing the prices of wheat and of every other grain, by creating obftacles to its culture, and thus diminifhing the quantity which would otherwife be grown. But that the fingle fact, that an acre of land under the culture of wheat, is liable to a deduction on account of tithes, in nearly a ten-fold proportion to that of an acre of land grazed by cattle or fheep, is furely fufficient evidence that tithes muft operate unfavourably to the culture of grain, and confequently to its abundance and cheapnefs. How defirable then is, it is faid, fuch a commutation as would render this payment equally heavy on every acre of land, according to its value, whether it it be applied to the culture of grain, or to the production of animal food. Under this impreffion it is here propofed, that in lieu of tithe, a tax be impofed, on the principle of an equal land-tax, upon every eftate, according to its value, for the fupport of the clergy. The wifdom of parliament would, it is fuppofed, eafily determine how many fhillings in every pound of rent would be equal to the revenues to which the clergy have a claim, and that the meafure would be greatly facilitated by the inveftigations occafioned by the income or property act lately in force. The tenant might be made liable in the firft inftance to the payment of the duty propofed as a fubftitute for the tithe, but in cafe of his defalcation, the landlord might be made ultimately refponfible.

In this mode of arrangement, the clergy, it is fuppofed, would receive what is their due, a full equivalent for tithes in its prefent ftate; the fecurity would ftill attach to the foil itfelf, and their revenues would ftill increafe with the increafe of the value of land and its produce. Encouragement would thus be afforded to increafe the culture of grain; the induftrious farmer would not have to contribute more than is juft proportion; the tithe-owners too would obtain the fair value of their property; the clergy of the church of England would acquire that degree of refpect and efteem to which few will deny that they are, in the aggregate, entitled; and, above all, they would be enabled to fulfil the valuable purpofe of their inftitution: while at prefent, the clergyman who demands but the fair value of his property, becomes hated, and often infulted; and, to ufe the ftrong language of fome, his "integrity becomes fufpected; his every action is feen through a falfe medium; and the paftor is loft in the collector of tithes!" If it fhould be objected, that under this or any other mode of commutation, the farmer would not eventually be benefited, becaufe the landlord would then receive what is now paid to the tithe-owner; and that the farmer has no juft ground of complaint, as he engaged his farm fubject to the deduction or payment of tithes: let it be underftood that the intereft of the community at large, not of any one branch of it, is here contended for.

The writer maintains, that the great object of a commutation of tithes, beyond a religious view of it, is the relief of the corn-field, and not the farmer. Perhaps, it is faid, if the fubject be well confidered, the farmer would gain lefs in a commutation than any one clafs of fociety. Tithes, in their prefent form, may check his improvements, may contract his fyftem of farming and his capital, may harafs his mind, and lead to perfonal animofities and expenfive litigations; but probably his mere payments in lieu of tithe would, on the whole, be as heavy under any commutation, as thofe to which he is now liable. The public, it is faid, muft give that price for grain, at which it will anfwer the farmer to raife it; and that fuppofing it poffible that the farmers throughout the ifland were to engage in a combination, to convert fo much of their prefent tillage into pafture, as would leave only half the ufual number of acres under corn, the inevitable confequence would be, that grain would fell at an enormous price, and the farmer would receive that increafed price, at a time when his expences were diminifhed in the proportion of his tillage. Thus the confumer, which is the public, and not the farmer, would fuffer; and if a tax, fuch as tithes, added to the increafed price of timber, iron-work, and labour, fhould induce the farmer gradually but materially to contract his tillage, there could be no hope that grain would be fold during any confiderable period at a moderate price; nor could there be an adequate fupply for the wants of the country, without the aid of large importations, which are always precarious, and fometimes impoffible: and as animal food invariably rifes in value with the increafed value of grain, the farmer might thus be enriched at the expence of every other branch of the community. The plan or mode here propofed for a commutation would, it is prefumed, counteract or prevent thefe ferious evils; encouragement would be given to an extended culture of grain; and a new motive to induftry and exertion would be found in the confideration, that the moft indolent farmer muft contribute an equal fum with the moft active and fuccefsful cultivator.

The latter of thefe clergymen thinks, that in regard to tithes in fecular hands, though the church may fuffer in the amount of its income, it derives a confiderable degree of fecurity for what it ftill poffeffes, from this very circumftance; and confequently only touches on the fubject fo far as to propofe that they fhould be commuted for land, according to their value. To this no reafonable objection is feen, or any infuperable difficulty, if a legiflative plan were once chalked out for its accomplifhment. But as for tithes in the hands of the clergy, whether great or fmall, it is fuppofed they might be beneficially commuted, by firft taking their fair valuation by two competent fworn commiffioners, one of whom fhould be named by the incumbent, and thus fixing a fum to be paid according to the combined prices of *corn*, *meat*, as mutton and beef, and *malt*, to be taken on the average of the feven preceding years, and to vary with the times every fubfequent feven years. And in order to prevent any thing perfonal between the incumbent and his parifhioners, except in the duties of his vocation, the overfeers and churchwardens to be made the refponfible agents in collecting and paying the fum to be raifed, with certain provifoes and fecurities againft mifapplication and lofs. A corn-rent alone is, it is faid, found to be an inadequate mode of commutation; but that taking the three great articles of life in every family, *bread*, *meat*, and *malt*, the clergyman would be fecure from injury, and the farmer, paying only in proportion to the value of his produce, would have no reafon to complain. It is to be obferved, however, that it is wifhed for the laws to act uniformly for the benefit and fecurity of the parochial minifter, without fubjecting him to the neceffity of coming forward in a perfonal and partial light. By thefe means, what he might lofe in the influence of fear, would, it is thought, be amply compenfated for on the principle of love; without which he can feldom be happy himfelf, or difcharge the duties of his facred office with effect and fatisfaction.

Where lands have been exonerated from tithes by an act of parliament, and an allotment made in land in lieu of them, even where an adequate value has been given, which in no inftance that has fallen under the writer's notice is, it is faid, really the cafe, it is throwing too much land into mortmain, it is fubjecting the incumbent to all the cares and incumbrances of landed property, and driving him to the neceffity of becoming a farmer, for which he is often ill qualified, or of letting lands, according to the exifting laws, on fuch conditions, that improvement muft be checked, and induftry languifh.

In order, however, to obviate fome of the evils refulting from a practice that has already, it is faid, become too general, it is propofed, that after having referved a fufficient glebe, which in every inftance fhould be done, with a due regard to the value of the living, the incumbent fhould be allowed to leafe the remainder, at the full value, with the confent of the patron and the bifhop, on a running leafe, determinable every three or feven years, at the option of either of the two principal contracting parties. A new incumbent

cumbent would thus, it is fuppofed, without waiting too long, have an opportunity of improving his property, if he thought it capable of being fo; and the tenant, having a fair profpect of occupying the land under any change, would feel himfelf equally fafe in making improvements, as if he rented of a layman. All dilapidations and repairs on the farm, however, fhould fall on the tenant; who ought not only to be bound in proper covenants, but be obliged to give due fecurity for their performance, as well as the payment of the rent.

Or, to land belonging to the clergy, the *corn*, *meat*, and *malt* rents might, it is faid, be applied as well as to tithes with leafes for twenty-one years certain, which would probably be the moft eligible mode, as it would give uniformity to the plan of clerical provifion, and would always afford an income according to the times.

Upon the whole confideration of the fubject, there cannot be any doubt but that great advantage and improvement would arife to agriculture, from fome meafure of this nature being had recourfe to and carried into execution; and though the farmer might not perhaps, on the whole, experience any great diminution in the quantity of money which he would have to pay, he would be wholly freed from the anxiety, trouble, and vexation, which conftantly attend the taking of tithes in kind, and at the fame time, which is much more important and material, be left at full liberty to exert his utmoft endeavours to promote all kinds of improvements, which the nature of his farm may with propriety admit. And in this way, and by fuch means, the art of agriculture would be carried forward to fuch a ftate of improvement and perfection as cannot be eafily conceived. Befides, fuch a meafure might have a confiderable effect in promoting the inclofure and cultivation of much land ftill in the difgraceful fituation of wafte, all which are defirable objects on various accounts in the prefent ftate of the country.

TITHE-*Rate*. See RATE-*Tithe*.

TITHES, *Subtraction of*. See SUBTRACTION.

TITHING, DECENNA, or *Decury*, a number or company of ten men, with their families, knit together in a kind of fociety, and all bound to the king, for the peaceable behaviour of each other.

Anciently no man was fuffered to abide in England above forty days, unlefs he were enrolled in fome tithing.—One of the principal inhabitants of the tithing is annually appointed to prefide over the reft, being called the *tithing-man*, the head-borough, and in fome countries the borfholder, or borough's elder, being fuppofed the difcreeteft man in the borough, town, or tithing. The diftribution of England into tithings and hundreds is owing to king Alfred. See DECINERS, FRANK-*Pledge*, and FRIBURGH.

TITHONIA, in *Botany*, was fo named by profeffor Desfontaines, in allufion to the glowing light-orange tint of its flowers, which the French call *couleur aurore*. The fabled favourite of Aurora, Tithonus, is therefore here meant to be commemorated. The allufion would have been ftill more happy, had the flower been one of the everlafting kind.—Desfont. Ann. du Muf. v. 1. 49. Willd. Sp. Pl. v. 3. 2246. Juff. 189. Lamarck Illuftr. t. 708. Poiret in Lam. Dict. v. 7. 690.—Clafs and order, *Syngenefia Polygamia-fruftranea*. Nat. Ord. *Compofitæ oppofitifoliæ*, Linn. *Corymbiferæ*, Juff.

Gen. Ch. *Common Calyx* cylindrical, of a double row of ovate-oblong, acute, flat, nearly equal, erect fcales. *Cor.* compound, radiated. Florets of the difk numerous, all perfect, level-topped, tubular; limb five-toothed; tube inflated near the bafe. Thofe of the radius female but abortive, about twelve; limb elliptic-lanceolate, acute, entire, horizontal, flat. *Stam.* in the difk only, Filaments five, capillary, fhorter than the tube; anthers united into a cylinder of the fame length. *Pift.* in the difk, Germen oblong, flender; ftyle thread-fhaped, the length of the partial corolla; ftigmas two, recurved, obtufe; in the radius, germen very fmall; ftyle fcarcely any. *Peric.* none, except the unchanged calyx. *Seeds* in the florets of the difk only, folitary, ovate, fmooth; their crown of five fhort, acute, erect, membranous fcales. *Recept.* convex, chaffy, its fcales concave, acute, rather taller than the feeds.

Eff. Ch. Receptacle chaffy, convex. Seed-crown of five chaffy fcales. Calyx cylindrical; its fcales equal, converging, in two rows. Florets of the difk inflated at the bafe; thofe of the radius elliptic-lanceolate.

1. T. *tagetiflora*. Marigold Tithonia. Desfont. as above, t. 4. Willd. n. 1.—Native of Vera Cruz. *Root* annual. *Stem* erect, alternately branched, leafy, a foot high. *Leaves* alternate, on long ftalks, downy, crenate, reticulated with veins, triple-ribbed; the lower ones deeply three-lobed; upper undivided, ovate, or fomewhat heart-fhaped, acute. *Flowers* on long folitary ftalks, at the end of each branch, orange-coloured, about the fize of a French marigold.

TITHOREA, in *Ancient Geography*, a town of Greece, in the Phocide, on mount Parnaffus, 80 ftadia from Delphi. This place was famous for its facred grove dedicated to Minerva, a temple with the ftatue of this goddefs, and the tomb of Antiopê and Phocus. The temple of Efculapius Archagetes was fituated 70 ftadia from Tithorea. The inclofure which contained the chapel of Ifis was 40 ftadia farther diftant than the temple of Efculapius.

TITHRASUS, a town of Africa, in Libya, bordered by a river of the fame name.

TITHRONIUM, a town of Greece, in the Phocide, in which was a grove facred to Apollo, with fome altars and a temple, but without a ftatue. This town was fituated 15 ftadia from Amphicea and 20 from Drymea, near the river Cephiffus. Paufanias.

TITHYMALOIDES, in *Botany*, fo called from its affinity to *Tithymalus*, the *Euphorbia* of modern botanifts, differs from that indeed merely in having the calyx gibbous on one fide at the bafe.—Tourn. Inft. 654.—Two or three Weft Indian fpecies of *Euphorbia* come under this defcription.

TITHYMALUS, τιθυμαλος of Diofcorides, fuppofed to be derived from τιτθος, *the breaft*, in allufion to the milkinefs of the plant. Tourn. t. 18. See EUPHORBIA.

TITI, SANTI DI, in *Biography*, was born at Citta S. Sepolcro, in the Florentine ftate, in 1538. He firft acquired a knowledge of painting under the tuition of A. Bronzino, and afterwards of Bandinelli, but owes the greater part of his fame to his ftudies at Rome, where he long refided, and from whence, as Lanzi obferves, he carried back to his native country a graceful and fcientific ftyle of art, not fupported by much ideal beauty, but chiefly characterized by the truth and frefhnefs of nature; and in expreffion he had few fuperiors in any fchool, none in his own. He adorned his pictures with pieces of architecture, which fcience he in a meafure profeffed, and by its means gave great relief to his figures, and increafed the dignity and beauty of his compofitions. His principal works are, the Supper at Emmaus, painted for the church of St. Croce, at Florence; the Refurrection of Lazarus, in the Duomo di Volterra; and the Defcent of the Holy Spirit, painted for a convent at Citta di Caftello. He died at Florence in 1603, aged 65, leaving a fon, *Tiberio Titi*, born at Florence in 1578, who followed the fame art with his father, but not with equal fuccefs. In general he painted ſmall portraits very ſkilfully, and made drawings in black-lead; of which there is a large collection in the Florentine gallery, made originally for the cardinal Leopold de Medici. He died in 1637.

TITIAN, the name by which we are acquainted with that great maſter, who is univerſally regarded as the head of the Venetian ſchool of painting, Tiziano Vecelli da Cadore. This juſtly diſtinguiſhed artiſt was born of noble parents at the caſtle of Cadore, in Friuli, in 1480, according to Vaſari and Sandrart; though Ridolfi, and others after him, place the date of his birth three years earlier, in 1477: but as Giorgione was confeſſedly older than he, and was born in 1478, we have preferred the authority of the former, as moſt likely to be correct. The education he received, firſt from Sebaſtiano Zuccati of Trevigi, and afterwards from Giovanni Bellini at Venice, rendered him a diligent and ſubtle obſerver of nature. His early works exhibit the greateſt correctneſs of imitation, but in a laboured and minute ſtyle, with a finiſh ſo highly wrought, that when, at a maturer age, he painted a picture for Ferrara of the tribute-money, in competition with Albert Durer, he excelled in nicety of pencilling that maſter of minuteneſs; with this difference, that his finiſh did not, like the German's, obtrude itſelf, and impede the general effect, but obtained grandeur by diſtance. This picture, to which he made no companion, as he ſoon after changed his ſtyle, now adorns the gallery of Dreſden, and remains a proof of the ſenſe this great artiſt entertained of the falſity of that taſte, which ſeeks for gratification in mere finiſh, and which he deſerted for the adoption of a ſtyle conveying general character inſtead of identity. It was from the better taſte of his fellow pupil, Giorgione, that Titian imbibed a more exalted view of art, and was induced to quit the meaner and more confined ſtyle with which he commenced his practice; and ſome portraits which he painted about this time are ſcarcely to be diſtinguiſhed from thoſe of Giorgione himſelf. But he ſeems to have found it not exactly to his mind, and ſoon diſcovered a variety of ſtyle more congenial to his own feelings; leſs ſoftened, and perhaps leſs grand, but more agreeable; a ſtyle which delights the ſpectator leſs by novelty of effect, than by the exactneſs of truth. His firſt work in this ſtyle, which is entirely his own, and may be denominated Tizianeſque, is the archangel Raphael leading Tobiah, painted in his thirtieth year for the ſacriſty of S. Marciale; and ſoon after he painted the Preſentation of the Virgin, at the Carita; one of the richeſt and moſt numerous of his compoſitions remaining.

When only eighteen years of age, he had painted a portrait of the head of the Barbarigo family, which excited univerſal admiration; and he was ſoon afterwards employed, in concert, or rather in rivalry, with Giorgione, to paint one of the fronts of the Fondaco de Tedeſchi, when unhappily the jealouſy already ſubſiſting between theſe great artiſts was ſtrengthened by the ſuperior encomiums beſtowed upon Titian. On the death of Giorgione in 1511, Titian ſucceeded him in ſeveral important commiſſions, and continuing to increaſe in renown, was invited to the court of Alfonſo, duke of Ferrara, for whom he painted the celebrated picture of Bacchus and Ariadne, now in England. Here he became acquainted with the poet Arioſto, whoſe portrait he painted, and in return was celebrated by him in his Orlando Furioſo.

About 1523, Titian produced the work which, above all others, elevates him in the ſcale of merit among painters; *viz.* the celebrated picture of the Death of St. Peter the Martyr, for the church of S. Giovanni and S. Paolo at Venice, which has by almoſt all artiſts and connoiſſeurs been conſidered his chef-d'œuvre in hiſtory. This extraordinary picture was one of the firſt objects of French ſpoliation at Venice. It was painted originally on wood, but was transferred to canvas in France, in conſequence of its having been much bliſtered from the wood by the effect of ſea-water in its voyage to Marſeilles; and it is now returned to its original ſtation in a more agreeable, if not more perfect condition, than when it was firſt removed. The excellence of this picture procured him, according to Vaſari, a commiſſion from the ſenate to paint the battle of Cadore between the Venetians and the Imperialiſts, or the rout of Giaradadda, in which the action proceeded during a tremendous ſtorm of rain. This grand work was deſtroyed by fire, but the compoſition is preſerved to us by the print engraved by Fontana. Beſides theſe, he painted ſeveral other public works, which, together with the friendly aſſiſtance of Pietro Aretino, whoſe pen delighted to dwell upon the powers of this great artiſt's pencil, ſpread his fame in every direction, and he was honoured with a ſuperabundance of employment. In 1530, when Charles V. came to Bologna to be crowned by pope Clement VII. Titian was ſent for by the cardinal Hippolito de Medici to paint the portrait of the monarch, which he did on horſeback and in armour; which ſo pleaſed Charles, that he gave the painter 1000 crowns of gold, and declared he would never be painted by any body elſe. When Titian returned to Venice, he found Pordenone much employed and ſupported by ſeveral of the principal perſons; but his great ſuperiority ſoon became too manifeſt to be reſiſted, and he was more than ever employed, both publicly and in private.

In 1541 the emperor returned to Bologna, to hold a conference with the pope, and was again painted by Titian, as was alſo the cardinal Hippolito de Medici in a Hungarian dreſs. He alſo painted his friend P. Aretino, who about this time introduced him to Fred. Gonzaga, duke of Mantua, whom he painted, and alſo, for him, a ſeries of the twelve Cæſars for a ſaloon in the palace; underneath each of which, Julio Romano afterwards painted a ſubject from each of their hiſtories.

Titian had ſoon after the honour of painting pope Paul III., when he viſited Ferrara in 1543, and was invited by that pontiff to Rome; but he excuſed himſelf at that time on account of an engagement with the duke of Urbino, whoſe portrait he painted with ſo much fire and truth, that Aretino honoured it with a ſonnet, comparing it with that of Alexander by Apelles. He painted alſo ſeveral other pictures for the ſame duke of Urbino (Franceſco Maria), and when he had completed his engagement there, accepted another invitation to Rome, ſent by the pope, through the medium of cardinal Bembo.

He arrived there in 1546, according to Vaſari, who was already known to Titian, having ſeen him at Venice, and was on this occaſion honoured by the cardinal's appointing him Cicerone to this great painter; to conduct him through the city, and to ſhew him its beauties. Nothing could be more flattering than his reception by the pope, who immediately upon his arrival aſſigned him apartments in the Palazzo Belvidere, and employed him in painting his portrait at whole length, and thoſe of the cardinal and the duke Ottavia, which gave univerſal ſatisfaction; but an Ecce Homo, which he painted as a preſent to the pope, was not eſteemed by the Roman artiſts, whoſe minds were accuſtomed to the works of Raphael and M. Angelo. The latter is ſaid to have remarked to Vaſari, after ſeeing Titian at work on his Danäe, that it was a great pity the Venetian painters applied themſelves ſo little to deſign, and had not a better mode of ſtudy, ftudy, being fo perfectly fkilful in colour and imitation. Adding, " if this man were as much aided by art in defign as he is by nature, and moft particularly fo in giving juft refemblance of natural objects, he would be perfect; as he has a noble fpirit, and a beautiful and lively manner."

He did not remain long in Rome, but on his return to Venice vifited Florence, where he beheld with delight the great works of art with which it is adorned, and vifited the grand duke Cofmo, who declined his offer to paint his portrait, perhaps, as Vafari obferves, that he might not give umbrage to the ingenious artifts of his own city and dominions.

Immediately upon his arrival at Florence, he received an invitation from his patron, Charles V., to vifit Spain, and accordingly went to Madrid, where he arrived in 1550. He remained there three years, during which time he painted a great number of portraits and hiftorical pictures. For the portrait which he painted of the emperor, he received 1000 crowns of gold, and was created a knight of the order of St. Jago, and a count palatine of the empire, with a ftipend from the treafury of Naples of 200 crowns annually; and to this, Philip II. added afterwards 200 more, befides paying him munificently for each of his productions. When Charles had devoted his life to the aufterities of a convent, he commiffioned him to paint a large picture of the Trinity, accompanied by the Holy Virgin, and furrounded by faints and angels, in which the emperor, and the emprefs his wife, were reprefented elevated to the heavens, and in the act of adoration. There is a fketch of it in England, and a print has been engraven from the picture, by which it appears to have been a very grand work.

Though Titian had returned to his native place before Philip II. came into poffeffion of the throne, and was as much engaged as he could be, yet that monarch, when he had built the Efcurial, and conceived the idea of enriching it with the moft fplendid materials, reforted to his father's favourite painter to affift him in perfecting it; and though it does not appear that Titian returned to Spain, yet he muft have employed his pencil very affiduoufly in its fervice from the very great number of his pictures which are to be found there, many of them among his very fineft productions. Several of thefe have been withdrawn by the fcruples of bigotry from public view; and among them his picture of a fleeping Venus, which was prefented by Philip IV. to our Charles I., when prince of Wales, on his vifit to Spain, and which after his death was purchafed by the Spanifh ambaffador, then refident here.

Titian was invited by Henry VIII. to England, but his numerous engagements on the continent prevented him from coming. He painted, however, two pictures for Henry, which now adorn Cleveland Houfe (the marquis of Stafford's). Their fubjects are the Bath of Diana, with the unfortunate intrufion of Acteon, and the Difcovery of the crime of Califta, and both are exquifite performances, and in tolerably good prefervation. They continued in the royal collection till it was difperfed on the death of Charles I., and found their way into the gallery of the duke of Orleans; and on the purchafe of the Italian part of that collection being effected by the duke of Bridgewater, the earl of Carlifle, and lord Gower, thefe pictures fell to the lot of the former of thefe noblemen.

This great painter is one of the happy few, for whom nature and circumftances have combined in fortunate conjunction. " For him," as Vafari juftly obferves, " health and fortune laboured, and he received of heaven only happinefs and bleffings." By him the higheft among men, the moft learned, and the moft beautiful, were proud to have their portraits tranfmitted to pofterity. He was handfome in perfon and graceful in manners, and lived in a ftyle worthy of one fo honoured and beloved. Thefe bleffings he was permitted to enjoy through a very uncommon portion of human exiftence, which was at length interrupted by the plague in his 96th year. He appears to have been able to purfue his delightful art to a very advanced period, for Vafari found him painting in 1566, when he vifited him at Venice, and fpeaks of it with pleafure; and though it may well be imagined that the latter productions of his pencil exhibit the ftrong hand of time, yet they are free and mafterly in every thing in which a perfect knowledge of the principles of the art are concerned, and weak only in the execution.

Had Giorgione lived but to one-half of the lengthened years of his great rival, Titian might not perhaps have ftood fo completely at the head of the Venetian fchool of painting, as from his numerous excellent productions he now does. That noble work, the death of S. Pietro Martire, alone fully entitles him to this diftinction and honour: perhaps no other production of the pencil is fo perfect in the combination of every requifite quality of a fine painting; compofition, defign, action, expreffion, chiaro-fcuro, and colour. The choice of the fcene, and the accompaniments, are every way adapted to affift in creating alarm and difmay; the tone of evening or twilight fpread over the whole, and contrafted to the brilliant ray of heavenly light from above, aids the impreffion; and the execution is in every part correfpondent to the grandeur of form felected. This picture he painted, as we have faid, in the prime of his life, when he was about forty-three; and he continued long after to work in the fame ftyle, which is of his own creation, and totally different from both his former laboured one, and his latter loofe and vague manner. In this picture, every part is wrought to an exact character of reprefentation, though without minutenefs, or in any degree trefpaffing upon the heroic nature of the tragic fubject; and there is no introduction of heterogeneous matter, as is too frequently to be found in his hiftoric productions. Here he appears to have caught a glimpfe of the grandeur of Michael Angelo's ftyle, and to have employed it more effectually than in any other of his works, except perhaps in the figures on the ceiling of the Salute at Venice, and the martyrdom of St. Laurence in the Jefuits'. In general, his felection of form is but little improved upon his model; his male figures being too flefhy for character or action, and his females too full for elegance.

The mind of Titian appears to have been of a fedate and rather ferious character. There is, as fir Jofhua Reynolds has obferved, " a fenatorial dignity about him," which diftinguifhes him from his compeers of the Venetian fchool. All his compofitions are arranged with gravity; even the gay and fometimes licentious fubjects which he now and then amufed himfelf with, are conducted with fuch a fcale of chiaro-fcuro and colour, as gives an air of morality to their effect, which impofes upon the fpectator a tone of fobriety, and induces him to difcard thofe loofe thoughts which the gay luxuriance of the ftyle of Rubens, treating the fame compofitions, would inevitably excite.

Colouring appears to have been the grand foundation of the fuccefs of Titian. He knew better than any other painter the juft power of each colour of his pallette; and by this knowledge, produced a fpecies of chiaro-fcuro independent of light and fhade, and perfectly diftinct from that of Corregio and Lionardo da Vinci, and more immediately imitative of the general effects of nature. Mafter of the

 means

means of imitating the moſt ſubtle combinations of colour in viſible objects, and fully comprehending the degrees of purity or of tone with which colours might be employed individually or collectively, to aſſiſt in projecting or withdrawing the various parts of a picture, he never fails to gratify the eye with a full and true relief, correſpondent with the nature of the ſubject. In this quality he was as much ideal, as the Greeks and Florentines were in form; for though the harmony and richneſs which he produced are to be found occaſionally in nature, it is neither her every day attire, nor is it to be comprehended by ſuperficial obſervers. There is a ſcience of exceeding import to painting in the arrangements of colours, by which a ſkilful artiſt will create attraction or diſguſt, as it pleaſes him. Change the poſition of the colours of that moſt beautiful of nature's works, the rainbow; let the blue and the green occupy the centre, and the red and yellow the edges of it; and judge how far it will decreaſe in its power of attraction. Of this ſcience, Titian was the firſt great poſſeſſor; and as he poſſeſſed the knowledge of the value of colours, ſo alſo did he that of the nature of ſhade; that colour (to the painter at leaſt, though it be the abſence of it to the philoſopher) which deſtroys all colours, and renders all alike obſcure; and which is the moſt difficult of attainment in all that relates to the art of colouring. The tone of ſhade that Titian employed, whatever be the ſubſtance which produced it, was uſed by no other ſo ſucceſsfully, except Tintoretto. It ſeems, in its union with the local colours of objects, to have produced the half teints without further labour; or at leaſt to have laid ſuch a foundation, as to have made that of the ſubſequent tinting very trifling; and doubtleſs this mode of proceeding rendered him able to produce ſuch an infinity of works as appear to have iſſued from his pencil. His errors flowed naturally, from the eaſe with which he produced the beauties of his ſtyle; and as the mind was filled with gratification by the delightful harmony and richneſs of colour his works preſented, ſo it ſought the leſs for the qualities of expreſſion, and appropriate dreſs and action in the figures; and would not condemn too rudely the frequent admiſſion of heterogeneous matter.

To the accuſations of exhibiting defects like theſe, the works of Titian are far leſs juſtly ſubject than thoſe of his imitators and ſucceſſors in the Venetian ſchool of painting; none of whom poſſeſſed the taſte and judgment of this great maſter, though many were eminently ſkilful in their reſpective departments.

TITIANO, Girolamo Dante, called *Il.* According to Ridolfi, he was brought up in the ſchool of Titian, and was employed by that maſter to aſſiſt him in ſeveral of his works. By frequently painting in conjunction with him, and ſometimes copying his works, ſome of his pictures, retouched by Titian, have paſſed for originals by that maſter. He ſometimes painted from his own deſigns, and his picture in the church of St. Giovanni at Venice, repreſenting S. S. Coſmo and Damiano, is worthy of the ſchool in which he was educated. Bryan's Dict.

TITICACA, or Chucuito, in *Geography*, a lake of South America, in the viceroyalty of Buenos Ayres, dioceſe of La Paz, and juriſdiction of Chucuito, the figure of which is oval, inclining nearly from N.W. to S.E., its circumference being about 80 leagues, and depth near the ſhore from four to ſix fathoms, and towards the middle forty or fifty, without any ſhoals. Ten or twelve large rivers, beſide a great number of ſmaller ſtreams, diſcharge themſelves into it. The water, though neither bitter nor brackiſh, is ſomewhat turbid, and its taſte is ſo nauſeous that it cannot be drank. It abounds with fiſh of two very different kinds; one large and palatable, called by the Indians Suchis, and the other ſmall, inſipid and bony, long ſince called by the Spaniards Boyas. It has alſo a great number of geeſe, and other wild fowl, and the ſhores are covered with flags and ruſhes, the materials of which the bridges are made. The weſtern borders of this lake are called Chucuito, and thoſe on the E. are denominated Omaſcuyo. It contains ſeveral iſlands, from one to another of which the Indians paſs on their balſas, a kind of rafts, ſupported by inflated ſkins. One of theſe iſlands is very large, and was anciently one mountain, ſince levelled by order of the Incas: this gave to the lake its own name of Titicaca, which, in the Indian language, ſignifies a mountain of lead. In this iſland the firſt Inca, Mancho-Capac, the illuſtrious founder of the empire of Peru, invented his political fable, that the ſun, his father, had placed him, together with his ſiſter and conſort Mama Oello Huaco, there, enjoining them to draw the neighbouring people from the ignorance, rudeneſs, and barbarity in which they lived, and humanize them by cuſtoms, laws, and religious rites dictated by himſelf; and in return for the benefits reſulting from this artful ſtratagem, the iſland has, by all the Indians, been conſidered as ſacred; and the Incas, determining to erect on it a temple to the ſun, cauſed it to be levelled, that the ſituation might be more delightful and commodious.

This was one of the moſt ſplendid temples in the whole empire. Beſides the plates of gold and ſilver with which its walls were magnificently adorned, it contained an immenſe collection of riches, all the inhabitants of provinces which depended on the empire, being under an indiſpenſible obligation of viſiting it once a year, and offering ſome gift. Accordingly, they always brought in proportion to their zeal or ability, gold, ſilver, or jewels. This immenſe maſs of riches, the Indians, on ſeeing the rapacious violence of the Spaniards, are thought to have thrown into the lake; as it is certainly known they did with regard to a great part of thoſe at Cuſco, among which was the famous golden chain made by order of the Inca Huayna-Capac, to celebrate the feſtival of giving name to his eldeſt ſon. But theſe valuable effects were thrown into another lake, ſix leagues S. of Cuſco, in the valley of Orcos: and though numbers of Spaniards, animated with the flattering hopes of ſuch immenſe treaſures, made frequent attempts to recover them, the great depth of the water, and the bottom being covered with ſlime and mud, rendered all their endeavours abortive. For notwithſtanding the circuit is not above half a league, yet the depth of water is in moſt places not leſs than twenty-three or twenty-four fathoms.

Towards the S. part of the lake Titicaca, the banks approach each other, ſo as to form a kind of bay, which terminates in a river called El Deſaguadero, or the drain, and afterwards forms the lake of Paria, which has no viſible outlet; but the many whirl-pools ſufficiently indicate that the water iſſues by a ſubterraneous paſſage. Over the river Deſaguadero is ſtill remaining the bridge of ruſhes, invented by Capac Yupanqui, the fifth Inca, for tranſporting his army to the other ſide, in order to conquer the provinces of Collaſuyo. S. lat. 16° 10′. W. long. 69° 56′.

TITILLARES Venæ, a name given by ſome authors to the iliac veins.

TITILLATION, Titillatio, the act of tickling, *i. e.* exciting a ſort of pleaſurable idea, by a gentle application of ſome ſoft body, upon a nervous part; and which uſually tends to produce laughter.

TITILLICUM, a word uſed by ſome anatomical writers for the arm-pit.

TITIN Ara, in *Geography*, a mountain of Ruſſia, in the

the government of Upha. N. lat. 52° 25'. E. long. 61° 14'.

TITIOPOLIS, in *Ancient Geography*, a town of Asia, in Isauria, or the second Cilicia, one of the twenty-three towns, which, according to the Notitia of Hierocles, were under the metropolis of Seleucia; named Titopolis by William of Tyre.

TITISNESS, in *Geography*, a small island near the coast of Lapland, at the entrance of a bay called Titsfiord. N. lat. 67° 36'.

TITIUM FLAVUM, in *Ancient Geography*, a river of Illyria, which discharged itself into the sea at Scardona, and served as a boundary between Liburnia and Dalmatia. Pliny. It is named Titus by Ptolemy.

TITIZIGHE, in *Geography*, a seaport town of the principality of Guriel, with a good harbour, on the Black sea. This place is also called Pghino; 10 miles S. of Puti.

TITLARK, in *Ornithology*. See ALAUDA *Pratensis*.

TITLE, TITULUS, an inscription put over any thing, to make it known.

The word is more particularly used for the inscription in the first page of a book, expressing the subject of it, the author's name, &c.

What tortures abundance of authors, is to find specious titles for their books: a title should be simple, and yet clear: these are the two genuine characters of this kind of composition. Assuming titles are prepossession against the authors.

TITLE, *Titulus*, in the *Civil* and *Canon Law*, denotes a chapter or division of a book.

A title is subdivided into paragraphs, &c.—Each of the fifty books of the Digest consists of a number of titles; some of more, others of less.

TITLE is also an appellation of dignity, distinction, or pre-eminence, given to persons possessed of the same.

The titles of order or dignity, Loyseau observes, should always come immediately after the name, and before the titles of office.

The king of Spain has a whole page of titles, to express the several kingdoms and signories of which he is master. The king of England takes the title of *king of Great Britain and Ireland:* the king of France, the title of *king of France and Navarre:* the king of Sweden intitles himself *king of the Swedes and Goths:* the king of Denmark, *king of Denmark and Norway:* the king of Sardinia, among his titles, takes that of *king of Cyprus and Jerusalem:* the duke of Lorrain, the title of *king of Jerusalem, Sicily*, &c.

The cardinals take titles from the names of some churches in Rome: as of St. Cecilia, St. Sabina, &c. and they are called cardinals of the title of *St. Cecilia*, &c.

The emperor can confer the title of prince, or count of the empire; but the right of suffrage in assemblies of the empire depends on the consent of the estates.

The Romans gave the titles of Africanus, Asiaticus, Macedonicus, Numidicus, Creticus, Parthicus, Dacicus, &c. in memory of the victories obtained over the people of those countries. The king of Spain, after the like manner, gives honourable titles to his cities, in recompence for their services, or their fidelity.

TITLE expresses also a certain quality ascribed by way of respect to certain princes, &c.

The pope has the title of *holiness;* a cardinal prince of the blood, that of *royal highness*, or *most serene highness*, according to his nearness to the throne; other cardinal princes, *most eminent highness;* an archbishop, *grace* and *most reverend;* a bishop, *right reverend;* abbots, priests, religious, &c. *reverend.*

As to secular powers, to the emperor is given the title of *imperial majesty;* to king, *majesty;* to the king of France, *most christian majesty;* to the king of Spain, *catholic majesty;* to the king of England, that of *defender of the faith;* to the Turks, *grand signor* and *highness;* to the prince of Wales, *royal highness;* to the dauphin of France, *serene highness;* to electors, *electoral highness;* to the grand duke, *most serene highness;* to the other princes of Italy and Germany, *highness;* to the doge of Venice, *most serene prince;* to the republic or senate of Venice, *signory;* to the grand-master of Malta, *eminence;* to nuncios, and to ambassadors of crowned heads, *excellency.*

The emperor of China, among his titles, takes that of *tiensu*, son of heaven. The Orientals, it is observed, are exceedingly fond of titles: the simple governor of Schiras, for instance, after a pompous enumeration of qualities, lordships, &c. adds the titles of *flower of courtesy, nutmeg of consolation*, and *rose of delight.*

TITLE, in *Law*, denotes a right which a person has to the possession of any thing.

A title to lands is thus defined by sir Edward Coke: *titulus est justa causa possidendi id quod nostrum est*, or it is the means by which the owner of lands hath the just possession of his property. There are several stages or degrees requisite to form a complete title to lands and tenements. The lowest and most imperfect degree of title consists in the mere naked possession, or actual occupation of the estate, without any apparent right, or any shadow or pretence of right, to hold and continue such possession. See DISSEISIN.

The next step to a good and perfect title is the right of possession, which may reside in one man, while the actual possession is either in himself or another. The third circumstance attending a title is the mere right of property, the *jus proprietatis*, without either possession or even the right of possession. It is possible that one man may have the possession, another the right of possession, and a third the right of property. But in the union of these three qualifications consists a complete title to lands, tenements, and hereditaments. For it is an ancient maxim of the law, that no title is completely good, unless the right of possession be joined with the right of property; which right is then denominated a double right, *jus duplicatum*, or *droit droit.* And when to this double right the actual possession is also united, when there is, according to the expression of Fleta, *juris et seisinæ conjunctio*, then, and then only, is the title completely legal.

The statute 32 Hen. VIII. c. 9, hath provided, that no one shall sell or purchase any presented right or title to land, unless the vendor hath received the profits thereof for one whole year before such grant, or hath been in actual possession of the land, or the reversion or remainder; on pain that both the purchaser and vendor shall each forfeit the value of such land to the king and the prosecutor.

A title to things personal may be acquired or lost by occupancy, by prerogative, by forfeiture, by custom, by succession, by marriage, by judgment, by gift, by contract, by bankruptcy, by testimony, and by administration. Blackst. Com. b. ii. See POSSESSION and PROPERTY.

Title is also an authentic instrument, by which a man can prove and make appear his right.

There must be at least colourable title to come into possession of a benefice, otherwise the person is deemed an intruder. For prescription with title, see PRESCRIPTION.

TITLE, in the *Canon Law*, is that by virtue of which a beneficiary holds a benefice: such is the collation of an ordinary, or a provision in the court of Rome, founded on a resignation, permutation, or other legal cause. The title of of a benefice, or beneficiary, is either a true or a colourable one. A *true* or *valid* title is that which gives a right to the benefice: such is that received from a collator who has a right to confer the benefice on a person capable of it, the usual solemnities being observed. See COLLATION, &c.

Colourable title is a seeming one; *i. e.* such an one as appears valid, and is not. Such would that be founded on the collation of a bishop, in case the benefice in question were not in his collation.

By the canons, a colourable title, though false, produces two very considerable effects. 1. That, after peaceable possession for three years, the incumbent may defend himself by the rule *de triennali possessione*, against such as would dispute the benefice with him. 2. That in case he be prosecuted within three years, and obliged to surrender the benefice, he shall not be obliged to restore the produce of it, during the time he possessed it.

TITLE is also used, in several ancient synods and councils, for the church to which a priest was ordained, and where he was constantly to reside.

"Nullus in presbyterum, nullus in diaconum, nisi ad certum titulum ordinetur." Concil. Londin. ann. 1125.

There are many reasons why a church might be called *titulus*, title: the most probable Cowel takes to be this, that in ancient days the name of the saint to whom the church was dedicated was engraved on the porch, as a token that the saint had a title to that church: whence the church itself became afterwards to be called *titulus*.

TITLES, or *Titular Churches*, M. Fleury observes, were formerly the denomination of a particular kind of churches at Rome.

In the sixth and seventh centuries, there were four sorts of churches in that metropolis; *viz. patriarchal*, *titular*, *diaconal*, and *oratorial*. The *tituli*, *titular*, were, as it were, parishes, each assigned to a cardinal-priest, with a certain district or quarter depending on them, and a font for the administration of baptism in case of necessity.

TITLE, *Clerical* or *Sacerdotal*, denotes a yearly revenue or income of the value of fifty crowns, which the candidates for priesthood were anciently obliged to have of their own, that they might be assured of a subsistence.

By the ancient discipline there were no clerks made, but in proportion as they were wanted for the service of the church, which is still observed with regard to bishops; none being consecrated, but to fill some vacant see.

But for priests, and other clerks, they began to make vague ordinations in the East as early as in the fifth century: this occasioned the council of Chalcedon to declare all vague and absolute ordinations null.

Accordingly the discipline was pretty well observed till towards the end of the eleventh century; but then it began to relax, and the number of priests was exceedingly increased; either because the people became desirous of the privileges of the clericate, or because the bishops sought to extend their jurisdiction.

One of the great inconveniences of these vague ordinations was poverty, which frequently reduced the priests to sordid occupations, and even to a shameful begging. To remedy this, the council of Lateran laid it on the bishops to provide for the subsistence of such as they should ordain without title, till such time as they had got a place in the church that would afford them a settled maintenance.

There was also another expedient found out to elude the canon of the council of Chalcedon; and it was appointed, that a priest might be ordained on the title of his patrimony; that is, it was not necessary he had any certain place in the church, provided he had a patrimony sufficient for a creditable subsistence.

The council of Trent retrieved the ancient discipline in this respect, forbidding all ordination, where the candidate was not in peaceable possession of a benefice sufficient to subsist him; and allowing nobody to be ordained on patrimony or pension, unless where the bishop declares it to be expedient for the good of the church: so that the benefice is the rule, and the patrimony the exception. See ORDINATION.

But this rule is not regarded, even in some Catholic countries, particularly France, where the patrimonial title is the most frequent; and the title is even fixed to a very moderate sum.

As to religious, the profession they make in a monastery serves them for a title, in regard no convent is obliged to maintain them: and as to mendicants, they are maintained upon the *title of poverty*.

Those of the house and society of the Sorbonne are also ordained without any patrimonial title, and on the sole title of poverty; it being supposed a doctor of the Sorbonne can never want a benefice.

TITLE *for Orders*. See DEACON, ORDINATION, and PRIEST.

TITLIS, in *Geography*, a mountain of Switzerland, in the canton of Uri, the most elevated in those parts, and scarcely inferior to the Schreekhorn and Jungfrauhorn: it was for a long time considered as inaccessible. The summit of this mountain is called Nollen, and commands a very picturesque scene of mountains and vallies; 11 miles S.S.W. of Altorff.

TITMEG, a lake of North America. N. lat. 62° 15'. W. long. 99°.

TITMOUSE, in *Ornithology*. See PARUS.

TITOLO, in *Geography*, a town of Naples, in the province of Basilicata; 6 miles S.W. of Potenza.

TITONEUS, in *Ancient Geography*, a mountain situated on the confines of Thrace and Macedonia.

TITOVO, in *Geography*, a town of Russia, in the government of Kaluga; 40 miles E.S.E. of Kaluga.

TITSCHEIN, NEW, or *Nowi Giezi*, a town of Moravia, in the circle of Prerau, well built and defended by walls; 24 miles E.N.E. of Prerau. N. lat. 49° 32'. E. long. 18° 10'.

TITSCHEIN, *Alt*, a town of Moravia; 2 miles S.W. of New Titschein.

TITSCHIN, a town of Moravia, in the circle of Olmutz; 16 miles S. of Olmutz.—Also, a town of Moravia, in the circle of Prerau; 8 miles S.W. of Freyberg.

TITTERIE, a southern province of Algiers, which extends from the river Masaffran, on the W., to the river Booberak, on the E.: northward it is bounded by the Mediterranean, and southward by Sahara; about 60 miles long and 40 broad.

TITTERIE *Gewle*, a lake of Algiers, situated near mountains; 60 miles S. of Algiers.

TITTERIE *Dosh*, or *Hadjar Titterie*, a ridge of precipices in Algiers: on the summit is a large plain, with only one narrow road leading up to it, where a tribe of Arabs keep their granaries; 50 miles S. of Algiers.

TITTING, or DIETTING, a town of Bavaria, in the bishopric of Aichstatt; 5 miles N. of Aichstatt.

TITTIUS, in *Botany*, a name given by Rumphius, Amboyn. v. 3. t. 19, and t. 20, to two very different kinds of trees, the latter of which is supposed by Jussieu to be a CORNUTIA. See that article.

TITTMANING, or DITTMANING, in *Geography*, a town

town of the archbiſhopric of Salzburg, on the Salza. In the year 1310, a peſtilential diſeaſe made ſuch ravages in this town, that 1300 perſons died between the 11th of November and the 2d of February following. In the year 1571, almoſt the whole town was burned down by lightning; 20 miles N.N.W. of Salzburg. N. lat. 48° 1′. E. long. 12° 44′.

TITTUA, in *Ancient Geography*, a town of India, on this ſide of the Ganges, which belonged to the Carœans. Ptol.

TITUBATION, in *Aſtronomy*. See TREPIDATION.

TITUL, in *Geography*, a town of Hungary, on the Theyſſe. This town has often been taken and retaken by the Imperialiſts and Turks; 24 miles E.S.E. of Peter Warden.

TITULAR, or TITULARY, denotes a perſon inveſted with a title, in virtue of which he holds an office or benefice, whether he performs the functions of it or not. In this ſenſe the term is uſed in oppoſition to ſurvivor, and to a perſon only acting by procuration, or commiſſion. An officer is always reputed titular till he hath reſigned his office, and the reſignation hath been admitted.

TITULAR is alſo ſometimes applied adjectively to a perſon who has the title and right of an office or dignity, but without having poſſeſſion, or diſcharging the function of it.

It is ſometimes alſo uſed abuſively for a perſon who aſſumes and pretends a title to a thing, without either a right to it, or a poſſeſſion of it.

TITULAR *Churches*. See TITLES.

TITULARS *of Tithes*, a term ſometimes applied to perſons who had the poſſeſſion of tithes under the crown in Scotland. They had alſo other names or titles applied to them in ſome caſes. See TITHES.

TITULCIA, in *Ancient Geography*, a town of Hiſpania Citerior, between Mantua to the N.E. and Toletum to the S.W.; marked in Anton. Itin. on the route from Saragoſſa to Emerita.

TITUS, in *Scripture Biography*, a diſciple and companion of the apoſtle Paul, who attended him in many peregrinations to Jeruſalem, Epheſus, and Crete, and who was deputed by him on ſeveral important ſervices. For an account of the epiſtle addreſſed to him by St. Paul, ſee EPISTLE.

TITUS VESPASIANUS, in *Biography*, a Roman emperor, was the eldeſt ſon of Veſpaſian, and born A.D. 40. In the courſe of his education at the court of Nero, he made a great proficiency in the ſtudy of eloquence and poetry. In his military ſervice he firſt ranked as tribune in Germany, and afterwards in Britain; and by his valour and ſkill, as well as by the graces of his perſon and manners, obtained great applauſe. On his return to Rome, he acquired reputation in the forum as a ſucceſsful pleader. His firſt wife was the daughter of a Roman knight, and after her death he married a lady of illuſtrious deſcent, whom he divorced after ſhe had borne him one daughter. Having diſtinguiſhed himſelf as quæſtor, he ſerved as lieutenant under his father in the war of Judea, during which he gained renown, not only by his military enterpriſes, but by the mildneſs and generoſity of his temper; and though he did not abſtain from the indulgences of youthful propenſities, he did not neglect ſerious occupations. When Veſpaſian, after the death of Otho, was deliberating about aſſuming the purple, he acted as mediator in the confederacy between him and Marianus, the governor of Syria; and when Veſpaſian marched to Italy, Titus was entruſted with the proſecution of the war in Judæa. When his father took poſſeſſion of the imperial authority, he declared Titus his colleague in the conſulate, A.D. 70. In that year Jeruſalem was taken after a calamitous ſiege, and the deſtruction of the temple, which Titus wiſhed to have preſerved. After the reduction of Jeruſalem, he went to Alexandria, and took part in the ſuperſtitious conſecration of the ox Apis; and after having given audience to the ambaſſadors of the king of Parthia, he haſtened to Rome with a view of counteracting ſome unfavourable rumours, and was honoured with a magnificent triumph. Veſpaſian admitted him to a participation of the empire, and they continued to co-operate in the exerciſe of the imperial power, and lived together in amicable intercourſe. Suetonius, however, intimates that Titus's conduct was in a variety of reſpects very far from being irreproachable, either in private life or in his public character. During the war in Judæa, he had indulged a violent paſſion for Berenice, daughter of Agrippa I. king of the Jews, and widow of Herod, king of Chalcis; and as ſhe followed him to Rome, he gave offence to the people by his attachment to a foreign queen of doubtful reputation; and, as Suetonius ſays, ſuſpicions were entertained that Titus would eventually prove a ſecond Nero.

Upon the death of Veſpaſian, A.D. 79, Titus immediately ſucceeded him; and by his conduct towards his rival Domitian, and to thoſe who adhered to his intereſt, he gained the affection of the people, and eſtabliſhed a character, which has cauſed him to be recorded under the glorious title of "The Delight of the Human Race." Although his reign was ſhort, it was diſtinguiſhed by a ſeries of beneficent actions; not always, perhaps, equally liberal in the principle from which they originated. This courſe of beneficence was commenced by a confirmation of all the grants and donations made by his predeceſſors. And he thus eſtabliſhed a precedent, which governed the conduct of his ſucceſſors. Upon aſſuming the office of chief pontiff, he avowed it to be a ſolemn engagement not to ſhed the blood of a citizen, and to this reſolution he adhered in a conſpiracy againſt himſelf. In the caſe of one of the two patricians implicated in this crime, he calmed the anxiety of his mother by deputing a ſpecial meſſenger to aſſure her that her ſon's life was in no danger. Beſides, he abrogated the law of high-treaſon with reſpect to all convictions for words or writings againſt the perſon or dignity of the emperor.

It was one of his maxims, "that no one ought to depart diſcontented from the perſon of his prince;" and on this he founded his practice of giving hopes to petitioners when he thought it neceſſary to refuſe their requeſts. If we connect this maxim with his well-known exclamation at the cloſe of a day on which he had conferred no benefit, "My friends I have loſt a day," we cannot forbear ſuſpecting that the benefits to which he referred were rather acts of private bounty to courtiers or importunate ſuitors, than the performance of public duties. Many inſtances occur of his love of popularity, and of the exceſs in which he indulged it. The public calamities that happened during his reign gave occaſion for the exerciſe and diſplay of his compaſſion and bounty; ſuch were the great eruption of mount Veſuvius, which deſtroyed Herculaneum, Pompeii, and other towns: and the conflagration of Rome, which was followed by a fatal epidemic diſorder. His general conduct entitled him to the affection of his ſubjects; nor does he ſeem to have deſerved reproach for any act of injuſtice or oppreſſion. Whilſt he was on a journey to the country of the Sabines, he was ſeized with a fever, which terminated fatally, on the 13th of September, A.D. 81, in the 41ſt year of his age, and after a reign of two years and leſs than three months. Apprehending his diſſolution, he lamented his early and premature doom; and yet, though his death was deplored at Rome as a general calamity, it was perhaps, conſidering the flexibility of his diſpoſition, and his inclination to profuſe expen-

expenditure, favourable to his own reputation and to the public profperity and happinefs. Suetonius. Anc. Un. Hift. Crevier's Rom. Emp.

TITWALLA, in *Geography*, a town of Hindooftan, in Baglana; 28 miles E. of Baffeen.

TITYRUS Mons, in *Ancient Geography*, a mountain in the weftern part of the ifle of Crete, in the country named Cydonia, according to Strabo. On this mountain was a temple named Dictynnæum Templum. In fome copies of Strabo, this mountain and temple are placed in the town of Cydonia.

TITZ, in *Geography*, a town of France, in the department of the Roer; 4 miles N.N.E. of Juliers.

TITZLA, a town of Afiatic Turkey, in Caramania, on a falt lake; 60 miles S.W. of Kirfhehr.

TIVA, a town of the Arabian Irak; 130 miles W. of Bafforah.

TIVER, in *Rural Economy*, the provincial name of a fubftance of the colouring ochre kind, ufed for marking fheep in fome places.

TIVERING, a term applied to the act or operation of marking fheep and lambs in different ways, with the material of the tiver kind, in fome diftricts and places, for particular ufes and purpofes. Thus, it is a practice with fome correct fheep-farmers to have their fheep tivered fo as to afcertain different points in their management with great exactnefs. The bows or breafts of the rams are tivered every two or three days in the tupping or riding feafon, and the ewes which are put to them, the firft week, marked with one ftroke of tiver, thofe of the fecond week, with two ftrokes, and fo on. The tivering of fheep is alfo ufeful on many other occafions for marking and diftinguifhing the objects and views of the fheep-farmer. The practice of it is very common in the Romney-marfh fyftem of fheep-grazing. See Sheep.

TIVERTON, in *Geography*, anciently called *Twyford-town*, a borough and market-town in the hundred of the fame name, and county of Devon, England; is fituated on the flope of a hill between the rivers Exe and Loman, 14 miles N. by E. from Exeter, and 163 miles W. by S. from London. In the time of Alfred it was only a village, but had twelve tithings belonging to it, and was governed by a portreve. Henry I. granted the manor and lordfhip to Richard Rivers, afterwards earl of Devon, by whom a caftle was erected here about the year 1106, which continued to be the baronial refidence for a confiderable number of years. The attractions of the caftle occafioned a great increafe in the buildings and population of Tiverton; and by the favour of the lords, it was invefted with the privilege of a market as early as the year 1200. About fifty years afterwards, the ftream of water, now called the Town-Leat, was conducted from the diftance of five miles to fupply the inhabitants; and a piece of wafte land, called Elmore Common, was given for the benefit of the poorer claffes, either for pafturage or for cultivation. Thefe advantages continued to attract new fettlers; but the moft rapid augmentation of the town took place on the final eftablifhment of the woollen manufacture about the year 1500. Towards the clofe of Elizabeth's reign, Tiverton was the principal place in the county for the manufacture of woollen goods; particularly kerfeys, which ftill continue to be the chief article made here. About this period, the profperity of the town received a temporary check: in 1591 it was vifited by the plague, to which 550 perfons fell victims; numbers fled for fafety; and the inhabitants were fo thinned, that the growing of grafs in the ftreets is particularly recorded. Scarcely had the town recovered, when it was nearly deftroyed by fire, April 3, 1598, when more than four hundred houfes were confumed, and thirty-three perfons perifhed in the flames: the value of the property deftroyed was eftimated at 150,000*l.* In about a dozen years from that time, Tiverton was again efteemed a town of great importance, and called the chief market-town of the Weft. Many rich clothiers and merchants lived in it, and 8000 people were conftantly employed in its woollen manufactures. The buildings were increafing in number and refpectability, and Tiverton would have probably become one of the greateft manufacturing towns in the kingdom, but for a fecond conflagration, which deftroyed nearly all the property of the inhabitants, and wholly blafted their flourifhing expectation. In this fire, which happened Auguft 5, 1612, fix hundred houfes were deftroyed, with goods and merchandize to the amount of 200,000*l.*; and the inhabitants of every defcription were reduced to the greateft diftrefs. The poor manufacturers were diftributed in different towns, by which means the advantages of the clothing trade that had hitherto been exclufively enjoyed by Tiverton, were extended to other parts of the county. In the year 1615, Tiverton received its firft charter of incorporation from king James; and its government was vefted in a mayor, twelve capital burgeffes, and twelve affiftant burgeffes. The right of returning two members to parliament was alfo granted to the fame perfons. This charter continued in force till 1723, when it was forfeited by neglect, and a new one, exactly fimilar, was granted by George I. In 1731, a third deftructive fire occurred, which again nearly laid wafte the town. During the 17th century, the trade and population progreffively increafed: but in the following century, rapidly declined: a favourable alteration has recently taken place, and the general trade of the town is now on a refpectable bafis. By the parliamentary return of the year 1811, the number of houfes is ftated to be 1303, the inhabitants 6732. A weekly market is held on Tuefdays, and two fairs annually. The fpot of ground on which Tiverton is built, partakes of a triangular form, from the courfe of the rivers by which it is bounded. Its greateft length is nearly one mile; its breadth exactly three quarters. The four principal ftreets form a quandrangle, inclofing an area of gardens, in the centre of which is a bowling-green. Moft of the houfes are of red brick, or of ftone, and are generally covered with blue flate. Thofe on the outfkirts of the town, and at the ends of the ftreets, which efcaped the fire of 1731, are of earth or cobb, covered with thatch. The principal buildings are the caftle, the church, and the free grammar-fchool. The caftle, from the prefent remains, appears to have been nearly of a quadrangular form, inclofing an area of about an acre, and furrounded by ftrong walls, from twenty to twenty-five feet in height. At the angles were embattled towers, about thirty-five feet high. This fortrefs was fecured from attack on the W. fide by a fteep declivity of about fixty feet, on the edge of which a lofty wall was built. Two wide and deep moats, filled with water from the Town-Leat, defended the whole of the N. and S. walls to each fide of the caufeway leading to the gate on the E. This caftle has been frequently expofed to fieges: during the reign of Stephen, and in the conteft between the houfes of York and Lancafter, it was feveral times fubject to the affaults of the contending parties; and in the civil war of Charles I. being garrifoned for the king, it was befieged and taken by the parliamentary forces. From this period the caftle has been failing to decay; and feveral of the ancient buildings have been converted into the offices of a farm. Great part of the S. and W. walls, with parts of the towers at the angles, are ftill ftanding. The moat at the S. fide is converted into a good kitchen garden;

garden; that on the N. ſide is filled up, and made part of a court-yard. The church is ſituated on an eminence, at a ſhort diſtance from the caſtle; and though the work of different ages, is more regular than might have been expected. The S. ſide is ornamented with much curious ſculpture. The tower is a plain ſtone ſtructure, ornamented with battlements and pinnacles: the height is 116 feet. The interior of the church is ſpacious, and its chancel is ſeparated from the body of the church by a ſcreen, ornamented with elegant tracery. The church being too ſmall for the reception of the inhabitants of the town, a chapel of eaſe was erected about the year 1733; and here are alſo ſeveral meeting-houſes for diſſenters of various denominations. A free grammar-ſchool was erected about the year 1604, purſuant to the will of Peter Blundell, a native, and eminent clothier of this town; who, from a very low origin, by a long life of ſucceſsful induſtry acquired an ample fortune; and bequeathed 40,000*l.* to various charitable purpoſes. In this ſchool he provided for the inſtruction of 150 boys: with maintenance for three ſcholars in each of the univerſities of Oxford and Cambridge, to be choſen out of his ſchool. Here are alſo a charity-ſchool, a free Engliſh ſchool, ſeveral alms-houſes, and other endowments for the benefit of the poor inhabitants. The other public buildings are: the town-houſe, a ſpacious edifice, appropriated to the meetings of the corporation, grand juries, and other public bodies; the market-houſe, a large quadrangular fabric, for the ſtanding and ſale of corn; and the hoſpital or poor-houſe, an extenſive ſtructure, erected in 1704, and containing various workſhops for the employment of thoſe whom indigence or misfortune may oblige to have recourſe to it. The pariſh of Tiverton is upwards of nine miles in length, and about eight miles in breadth.

At a ſhort diſtance to the ſouth of Tiverton is Colliprieſt Houſe, formerly the ſeat of the Blundell family, but now the property of Thomas Winſlow, eſq. who recently rebuilt and enlarged the manſion. It ſtands on the ſide of an eminence near the river Exe, having a ſloping lawn in front, and a hanging wood behind.—Hiſtorical Memoirs of the Town and Pariſh of Tiverton, &c.; by Martin Dunsford, Exeter, 4to. 1790. Beauties of England and Wales, vol. iv. Devonſhire; by J. Britton and E. W. Brayley, 1803.

Tiverton, a town of Rhode iſland, in the county of Newport, containing 2837 inhabitants, ſituated on the Taunton river; 15 miles S.E. of Providence.

TIUHOLM, a ſmall iſland of Denmark, in the Cattegat; 4 miles N.N.E. of Fladſtrand.

TIVIÇA, a town of Spain, in Catalonia; 15 miles N.N.E. of Tortoſa.

TIVIOT, a river of Scotland, which riſes about 12 miles S.W. from Hawick, and runs into the Tweed, at Kelſoe. The valley which it waters is called *Tiviotdale.*

TIUKI-KARAGAN, a cape on the E. ſide of the Caſpian ſea; 156 miles S.E. of Aſtrachan. N. lat. 44° 20′. E. long. 50° 14′.

TIULIT, a town of Africa, in the kingdom of Fez; 12 miles S.W. of Fez.

TIUMEN, a town of Ruſſia, in the government of Toboſk, at the union of the Piſchma and the Tura. This town is not built parallel to the river Tura, but at right angles with it; and the little river Piſchma runs through the town, and falls into the Tura at the extremity of it. Over the river is a bridge of eighty-three fathoms in length; and a little below it ſtands a fort, built with ſtone, in which is a church of the ſame materials. Without this fortification, and towards the lower bank of the Tura, are ſix wooden churches, a convent of nuns, with a church, and 500 dwelling-houſes. At the lower end of the town is an oſtrog. Beyond the Tumenka lies the Yamſkaia ſloboda, or ſuburb, conſiſting of 250 houſes, inhabited by people of all ranks and profeſſions; and at the extremity of this ſuburb ſtands a monaſtery: it has likewiſe three churches, built with ſtone. Another ſuburb lies oppoſite to Tiumen, on the N. ſide of the Tura, which is inhabited by Ruſſians, Mahometan Tartars, and Bucharians; 112 miles W.S.W. of Toboſk. N. lat. 57°. E. long. 65° 14′.

TIVOLI, anciently called *Tibur*, a town of the Popedom, in the Campagna di Roma, ſituated on a rocky mountain, planted with olive-trees, which are ſaid to yield the beſt oil in Italy; the ſee of a biſhop held immediately under the pope. The town itſelf is mean, and contains a great number of forges. The cathedral is built on the ruins of a temple of Hercules. In the market-place are two images of Oriental granite, repreſenting Iſis, the Egyptian deity. The principal beauty of this place ariſes from the river Teverone, which falling headlong about fifty feet down the rock, forms a noble caſcade, and ſeveral leſſer ones, called Le Caſcadelle. The latter are extremely picturesque; as is alſo a deep ravine in the hill, called La Grotta di Nettuno, into which the great caſcade falls. To enrich the view, here are ſome remains of ancient buildings, as the villa of Mæcenas, and particularly the little round temple of the Sibyl, as it is commonly called, but rather of Veſta; one of the moſt elegant remains of the Grecian architecture. The naturaliſt will here take pleaſure in obſerving the continual formation of new Tiburtine ſtone from the depoſit of water deſcending from the calcareous Apennines; 15 miles E.N.E. of Rome. N. lat. 41° 58′. E. long. 12° 46′.

TIURANEN, a ſmall iſland on the E. ſide of the gulf of Bothnia. N. lat. 65° 38′. E. long. 24° 46′.

TIUTERS, an iſland of Ruſſia, in the gulf of Finland; 80 miles E.N.E. of Revel. N. lat. 59° 40′. E. long. 27° 14′.

TIVY, a river of South Wales, which riſes about 5 miles N. from Tregaron, and runs into the ſea about 5 miles below Cardigan.

TIXIER, John, (Lat. *Raviſius Textor*), in *Biography*, a perſon of literary character in France, was lord of Raviſy in the Nivernois, and educated in the college of Navarre at Paris, where he taught the belles-lettres, and whence iſſued many of his publications for the uſe of his ſtudents. In 1500 he was appointed rector of the univerſity of Paris, and he died, as ſome ſay in the hoſpital, in 1522. His works are, "A Collection of Latin Letters," "Dialogues," "Poems," "Epigrams," "Orations," &c. in Latin, written in good ſtyle; "Officina, ſeu potius Naturæ Hiſtoria, &c." ſeveral times reprinted; "De Memorabilibus et claris Mulieribus, aliquot diverſorum Scriptorum Opera," to which he has annexed the life of Joan of France, written by himſelf. Moreri.

TIZ, in *Geography*. See Tiiz.

TIZRI, in *Chronology*. See Tisri.

TIZZANO, in *Geography*, a town of the duchy of Parma; 13 miles S. of Parma.

TIZZONAIOS, in the *Glaſs Art*, are two apertures, one on each ſide of the working-furnace, by which a ſervitor night and day puts on coals to maintain the fire.

TLACOOZELOTL, in *Zoology*. See Ocelot.

TLAM, or Slam, in the *Alum-Works*, a word uſed by the workmen to expreſs a ſort of mud or foulneſs which does great hurt to the alum, rendering it foul and coarſe. The ſlam is a muddy ſubſtance ſettling to the bottom of the

the veſſels; but in the boiling of the liquor it gives a reddiſh colour, and diſorders the whole works when in any great quantity. They always paſs their liquor over four parcels of the alum-rock, and the laſt, if not carefully calcined, generally gives it this diſadvantageous mixture. Phil. Tranſ. N° 142.

TLANHQUACHUL, in *Ornithology*, the name of a Braſilian bird, very much approaching to the nature of the European platea, or ſpoonbill.

It is a very voracious bird, and feeds on live fiſh, but will not take or meddle with dead ones, and is all over of a beautiful red. It has a black ring round the upper part of its neck, and is common about the ſhores of the ſea and rivers.

TLAQUACUM, in *Zoology*, the name given by the Spaniards, and ſome others, to a very remarkable animal in America, commonly known among us by the name of the poſſum or opoſſum.

TLAQUATZIN, a name by which the natives in ſome parts of America call the opoſſum.

Tlaquatzin *Spinoſum*, the name by which Hernandez has called the cuanda, a ſort of Braſilian porcupine.

TLASCALA, in *Geography*, a province of North America, in the government of Mexico; bounded on the N. by Guaſteca, on the E. by the gulf of Mexico and the province of Guaxaca, on the S. by the Pacific ocean, and on the W. by the province of Mexico Proper; about 320 miles in length, and from 40 to 120 in breadth. The climate, ſoil, and produce, are much the ſame with thoſe of Mexico Proper. On the W. ſide there is a chain of mountains for the ſpace of eighteen leagues, very well cultivated; and on the N. is alſo a great ridge of mountains, covered with perpetual ſnow, the neighbourhood of which expoſes it to horrid tempeſts, hurricanes, and frequent inundations, whereby houſes, even on the top of eminences, are ſometimes endangered. Yet this is allowed to be the moſt populous country of all America: and this is partly aſcribed to its having been originally an ally to Cortez, in the conqueſt of Mexico, who obtained a grant of it from the emperor Charles VI. alſo king of Spain, by which it is ſtill exempt from any ſervice or duty whatſoever to that crown, only paying the king of Spain a handful of maize for each head, as an acknowledgment; which inconſiderable parcels were ſaid, upwards of fifty years ago, to make up 13,000 buſhels; for it produces ſo much of the Indian corn, that hence it had the name of Tlaſcala, that is, the Land of Bread. By this means the towns and villages ſwarm with Indians. This province was anciently a monarchy, till civil wars ariſing among the inhabitants, they formed themſelves into an ariſtocracy of many princes, in order to get rid of one. They divided their towns into different diſtricts; each of them nominated one of their chiefs to reſide in the court of Tlaſcala, where they formed a ſenate, whoſe reſolutions were a law to the whole. Under this form of government they maintained themſelves a long while againſt the kings of Mexico, and continued in it till the reception of the Spaniards under Cortez.

Tlascala, a town of North America, and anciently the capital of a province to which it gives name, ſituated on a river, which runs into the Pacific ocean. When the Spaniards firſt arrived here, it is ſaid to have contained 300,000 inhabitants: and Acoſta affirms, that it had a market-place large enough to hold 30,000 buyers and ſellers; that in the ſhambles were ſeldom leſs than 1500 ſheep, 4000 oxen, and 2000 hogs. But matters were ſo much altered, that Gemelli, who was here in 1698, ſays it was then become an ordinary village, with a pariſh-church, in which hangs up a picture of the ſhip which brought Cortez to La Vera Cruz. The inhabitants formerly offered up human ſacrifices, and when the Spaniards firſt arrived here, we are told by Diaz del Caſtillo, that they found wooden cages, in which priſoners were confined to be fatted for victims; 20 miles N. of Puebla de los Angelos. N. lat. 19° 45′. W. long. 98° 30′.

TLAYOTIC, in *Natural Hiſtory*. See Colic-*Stone*.

TLEMSAM, or Telemsen, in *Geography*. See Tremecen.

TLETSCH, a town of Ruſſia, in the government of Tobolſk, on the Irtiſch; 72 miles E.S.E. of Tobolſk.

TLEUQUECHOLTOTOTL, in *Ornithology*, the Mexican name of a bird of the wood-pecker kind, deſcribed by Nieremberg under the name of the *avis ſalutiferus*; the feathers of a red creſt it carries on its head being ſuppoſed a remedy for head-aches.

TLOS, in *Ancient Geography*, a town of Aſia Minor, in Lycia, at the paſs of a mountain, on the ſide of Cybara, according to Strabo. It is placed by Ptolemy in the number of the interior towns of Lycia, in the vicinity of mount Cragas.—Alſo, a town of Aſia, in Piſidia.

TLUMACZOW, in *Geography*, a town of Moravia, in the circle of Hradiſch; 15 miles N. of Hradiſch.

TMAIE′, a town of Egypt; 12 miles S.E. of anſora.

TMARUS, in *Ancient Geography*, a mountain of Epirus, in Theſprotia, at the foot of which was a temple. Strabo. It was alſo called Tamarus and Tomarus.

TMATARACAN, or Tamatercan, literally denoting the "ſwarm of beetles," called in Theodoſius's Itinerary "Tamatarce," a name anciently given to the city of Taman, over the ſuburbs of which extend all the ruins of the ancient city of Phanogoria. The diſtance acroſs the Boſphorus from Tmataracan to Kertchy, *i. e.* from Phanogoria to Panticapæum, is found to correſpond with the actual diſtance from Taman to Kertchy. Among other antiquities of Taman, one of the moſt remarkable is the Naumachia, or amphitheatre for naval combats, not leſs than 1000 paces in diameter, with its whole area paved. The ſubterraneous conduits for conveying water ſtill remain, but are applied to other uſes. The materials of the ruined buildings do not exiſt in the iſle of Taman, but muſt have been brought from the Crimea, from Greece, or in later ages, by the Genoeſe from Italy. The diſtance from Taman to Yenikele, on the oppoſite ſhore, is about 12 miles. Clarke's Travels, vol. ii.

TMESCHEDE, or Muschede, a town of Germany, in the county of Arenſberg, on the left ſide of the Roer; 3 miles N.W. of Arenſberg.

TMESIPTERIS, in *Botany*, an uncouth, however learned, name, compoſed of τμησις, *a notch*, or *inciſion*, and πτερις, *a fern*, becauſe the capſules are ſeated in the notches of the frond.—Bernhardi in Schrad. Journ. for 1800, 131. t. 2. f. 5. Willd. Sp. Pl. v. 5. 56. Swartz Fil. 187. Labill. Nov. Holl. v. 2. 105. t. 252. This fern is referred by Mr. Brown to Psilotum. (See that article.) We ought there to have noticed Mr. Brown's remark, that the plant of Forſter differs from Labillardiere's, in not having abrupt *leaves*, and that it was found in New Zeeland, not in the iſle of Tanna. Willdenow has juſtly obſerved the difference between Bernhardi's figure, and that of Labillardiere. Mr. Brown ſays both theſe ſpecies are paraſitical, on the ſtems of arboreſcent ferns.

TMESIS, τμησις, formed from τεμνω, *I cut*, in *Grammar*, a figure by which a compound word is ſeparated into two parts, and one or more words interpoſed between them.

Thus,

Thus, when Terence ſays, " quæ meo cunque animo libitum eſt facere," there is a tmeſis ; the word *quæcunque* being divided by the interpoſition of *meo*.

Lucretius abounds in tmeſes ; as " ſæpe ſalutantum tactu præterque meantum ;" or " diſſidio potis eſt ſcjungi, ſeque gregari ;" and " diſpectis diſque gregatis."

TMOLUS Mons, in *Ancient Geography*, a mountain of Aſia Minor, in Lydia. Strabo ſays that the town of Sardis was commanded by the Tmolus, a rich mountain, on the ſummit of which the Perſians had erected a turret, from which might be ſeen all the adjacent fields, which were watered by the Cnyſtrus. According to Homer it obtained, from its extraordinary elevation, the name of Ventoſe, or windy. From Pliny we learn that the Pactolus, Chryſorrhoas, and the fountain Tarne, had their ſources in this mountain, and that it produced excellent wine, highly commended by Pliny and Vitruvius. The ſummit is repreſented as always covered with ſnow. It was ſometimes denominated Timolis, as by Ovid,

" Deſernere ſibi Nymphæ ? . . . Timoli."

According to the mythologiſts, it was in this mountain that Apollo puniſhed Midas, king of Phrygia, by giving him aſſes' ears.

Tmolus, a town of Aſia Minor, in Lydia, on mount Tmolus. According to Tacitus, Tmolus was one of the twelve towns overthrown by an earthquake, in the fifth year of the reign of Tiberius, A.D. 117, and it was rebuilt by this prince.

TMORUS, the name of one of the ſummits of the Ceraunian mountains, in Epirus.

TMULGA, in *Geography*, a town of Algiers ; 10 miles E. of Sinaab.

TNYSSUS, in *Ancient Geography*, a town of Aſia Minor, in Caria.

TOA, in *Geography*, a river of the iſland of Porto Rico, which runs into the harbour of Porto Rico.

TOAD, *Rubeta*, *Rana Bufo* of Linnæus, in *Zoology*, a creature ſufficiently known. See Rana.

The toad has been generally conſidered as a poiſonous animal, but Mr. Pennant apprehends without ſufficient reaſon. They have been taken up in the naked hand without the leaſt injury, and quacks have even eaten them, and drank their juices without damage. Beſides, they are common food to many animals, as buzzards, owls, Norfolk plovers, ducks, and ſnakes ; of late, indeed, live toads have been applied to cancers, with a view of curing them : facts have been alleged in proof of their efficacy for this purpoſe. The mode of applying them has been to put the animal into a linen bag, and to hold its head, preſſing out of the bag, to the part, which it has ſoon laid hold of and ſucked with greedineſs till it dropped off dead. The creature has ſwelled and appeared to be in great pain ; often ſweats much and turns pale ; and ſometimes diſgorges, recovers, and becomes lively again. For other particulars, we muſt refer to Mr. Pennant's appendix *ubi infra*. The time when toads propagate is early in the ſpring ; at which ſeaſon the females are ſeen crawling about oppreſſed by the males, who continue on them for ſome hours, and adhere ſo faſt as to tear the ſkin from the part to which they ſtick. They impregnate the ſpawn as it is drawn out in long ſtrings, like a necklace. And the female is aſſiſted by the male, in diſcharging the ſpawn, who with his hinder feet pulls out the eggs, whilſt his fore-feet embraces her breaſt. The eggs are included each in a membranous coat that is very firm, in which is contained the embryo, and theſe eggs, faſtened to one another by a ſhort but ſtrong cord, form a kind of chaplet, the beads of which are diſtant from each other about half their length. The male, by drawing this cord with his paw, performs the functions of a midwife, and acquits himſelf in it, it is ſaid, with a dexterity which could not be expected from ſo lumpiſh an animal. Pennant's Brit. Zool. vol. iii. p. 14. p. 385, &c.

The toad of Surinam, or *rana pipa* of Linnæus, has long been an object of attention to the curious, on account of its enormous bulk and ugly form. Dr. Fermin, in his " Traité des Maladies les plus fréquentes à Surinam," &c. publiſhed at Maeſtricht in 1764, has given ſome remarks on its mode of generation. Having put three males and a female into an open veſſel of water, he obſerved that one of them had ſeveral ſpots on its back, which were eggs, each containing an embryo. At the end of three weeks, the animal ſeemed much agitated, and one of the cells on his back burſting open, a young one crept out of it. In five days no leſs than thirty-five of theſe cells opened in the ſame manner and produced as many animals. On the back of one of theſe which was diſſected, there were no leſs than one hundred and twenty of theſe cells, each of which he conſiders as a real matrix, in which its eggs are lodged and fecundated ; and, indeed, in one of them he diſcovered an embryo completely formed, enveloped in a kind of placenta, accompanied by two thin tranſparent membranes, ſeemingly analogous to the chorion and amnios in other animals. For other ſpecies of toad, ſee Rana.

Toad-*Fiſh*, *Rana piſcatrix*, in *Ichthyology*. See Lophius *Piſcatrix*, and Sea-*Devil*.

Toad-*Flax*, in *Botany*. Antirrhinum.

Toad-*Stone*, in *Mineralogy*, a variety of trap-rock. (See Trap.) The toad-ſtone of Derbyſhire is generally a dark-brown baſaltic amygdaloid, compoſed of an intimate intermixture of baſalt and green earth, and containing oblong cavities, principally filled with calcareous ſpar. It ſometimes aſſumes the form and texture of a compact baſalt, and is alſo found in a decompoſing ſoft ſtate, approaching to clay. In compoſition and appearance it bears a ſtrong reſemblance to ſome volcanic rocks ; and there are certain peculiarities in the geological poſition of this rock, which have excited conſiderable attention. Mr. Whitehurſt, in his Theory of the Earth, has given a particular account of the Derbyſhire toad-ſtone ; and has ſtated the number of beds, and the thickneſs of each, with that of the mountain lime-ſtone, with which it alternates, as under :

Firſt lime-ſtone	-	50 yards.
Firſt toad-ſtone	-	16
Second lime-ſtone	-	50
Second toad-ſtone	-	46
Third lime-ſtone	-	60
Third toad-ſtone	-	22
Fourth lime-ſtone	-	not cut through.

It appears, however, that the thickneſs and extent of the toad-ſtone beds are by no means ſo regular as thoſe of the other ſtrata, in the ſame diſtrict.

In ſome ſituations, one or more of the beds will become very thin, or be entirely wanting ; in other ſituations, a ſingle bed will be found of vaſt thickneſs : and maſſes of this ſubſtance, which cannot be referred to any of the three beds, will be found interpoſed in the lime-ſtone ſtrata. In ſome inſtances, particularly near Aſhover, nodules of lime-ſtone may be ſeen imbedded in toad-ſtone. Farey's Derbyſhire Report, vol. i. p. 276.

The moſt remarkable phenomenon which the beds of toad-ſtone preſent in Derbyſhire, is the complete ſeparation of the metallic veins which they generally occaſion. The mountain lime-

lime-ſtone of that diſtrict is interſected by numerous perpendicular metallic veins, which riſe from the loweſt lime-ſtone to the uppermoſt; but on ſinking through the vein in the firſt lime-ſtone, down to the firſt toad-ſtone, the vein will entirely diſappear, but on perforating through the toad-ſtone, it will be found again in the ſecond lime-ſtone; and the ſame appearances will be preſented on piercing through the ſecond and third beds of lime-ſtone, and the ſecond and third beds of toad-ſtone. See *Plate* IV. *Geology*, *fig.* 1. where 1, 2, 3, 4, repreſent the four beds of lime-ſtone; *b*, *b*, *b*, the three beds of toad-ſtone; and *v*, *v*, *v*, *v*, the metallic vein paſſing through the different lime-ſtone beds, but completely cut off or ſeparated by the intervening beds of toad-ſtone. To account for this interruption of the vein at *v*, *v*, *v*, Mr. Whitehurſt ſuppoſes that the toad-ſtone, in a ſtate of igneous fuſion, has burſt through the lower ſtrata, and has forced itſelf between the ſtrata of lime-ſtone by a lateral motion. Were this the caſe, we muſt admit that the toad-ſtone had riſen through fiſſures or dikes, ſimilar to what exiſt in many of the northern parts of Britain, and are called whin-dikes. The whin-ſtone, or baſalt, bearing a cloſe reſemblance to toad-ſtone, and the ſtrata in the peak of Derbyſhire being much fractured, we ſhould feel little difficulty in admitting the probability of Mr. Whitehurſt's theory, did it apply to the different phenomena which theſe beds of toad-ſtone preſent. According to this theory, the beds of toad-ſtone muſt have been interpoſed ſubſequently to the formation of the metallic veins. There are, however, inſtances, in which very large veins extend from the lime-ſtone to ſome depth in the toad-ſtone, and terminate in ſmall ſtrings of ore; in other inſtances, though the ore is not continued through the toad-ſtone, a ſmall vein filled with ſpar may be traced from No. 1. the firſt lime-ſtone, through *b*, to No. 2. the ſecond lime-ſtone. Such inſtances prove, in the moſt deciſive manner, that the formation of the veins was poſterior to that of the toad-ſtone. Hence we are led to ſeek for ſome other cauſe which may explain the abſence of metallic ores in the beds of toad-ſtone. This ſubject will be conſidered when we treat of metallic veins. See Trap, and Veins, *Mineral* and *Metallic*.

From the experiments of Dr. Withering on this ſtone with different acids, alkalies, and by fuſion, it appears that one hundred parts of it conſiſt of 63½ parts of ſiliceous earth, 16 of calciform iron, 7½ of calcareous earth, and 14⅔ of earth of alum. The aggregate of theſe ingredients is found to weigh 1⅔ parts more than the original maſs, which is aſcribed to the ſubſtance capable of uniting with fixable air, not having been fully ſaturated with it, as they would be after their precipitation by the earth of alum. (Phil. Tranſ. vol. lxxii. part ii. p. 353.) This ſubſtance differs little from baſaltes: it is ſofter, contains a ſmaller proportion of iron, and a larger of ſilex.

TOAGAMALLY, in *Geography*, a town of Hindooſtan, in the Carnatic; 17 miles W.S.W. of Tritchinopoly.

TOAHOUTA, one of the ſmaller Society iſlands, near Otaha.

TOAIREH, a town of Egypt, on the coaſt of the Red ſea, where the water is ſalt; 3 miles N. of Kolzum.

TOALDO, Joseph, in *Biography*, a diſtinguiſhed philoſopher, was born in 1719 at a ſmall village near Maroſtica, in the valley of Vicenza, at the foot of the Alps, and ſent, in the year 1733, to the ſeminary of Padua, where he ſtudied Latin, rhetoric, philoſophy, theology, and particularly mathematics. In this ſeminary he afterwards became a teacher of grammar, rhetoric, philoſophy, and mathematics. His firſt literary work was a new edition of the writings of Galileo, to which he added ſeveral fragments never before publiſhed, with a preface and notes. For his ſervices to the above-mentioned ſeminary he was recompenſed with the benefice of Montegalda, which he enjoyed for 14 years, and which he exchanged for another more convenient, after his appointment by the ſenate of Venice, in 1762, to the profeſſorſhip of aſtronomy and meteorology in the univerſity of Padua. Here he conſtructed an obſervatory, begun in 1767 and completed in 1774. In 1769 he publiſhed at Padua a ſhort view of plane and ſpherical trigonometry, entitled "Tavole Trigonometriche, &c." which was reprinted and uſed in many of the Italian ſeminaries. He next publiſhed a treatiſe on the influence of the heavenly bodies on the weather and atmoſphere, containing the reſult of a long ſeries of meteorological obſervations. This work, printed at Padua in 1770, 4to., was tranſlated into different languages, and ſo well received, that he was admitted into various learned ſocieties. About the ſame time he preſented to the public eſſays in favour of electrical conductors, which cauſed them to be erected in the Venetian territories; alſo a chronological view of uncommon changes in the weather, with tables of the ſtate of the barometer, and the flux and reflux of the ſea. His meteorological journal was begun in 1773, and continued till his death. His celebrity was augmented in 1774 by an anſwer to a prize queſtion, propoſed by the academical ſociety of Montpelier, on meteorology applied to agriculture; and after this time he laboured inceſſantly in diffuſing meteorological ſcience. In 1777 he tranſlated Lalande's Aſtronomical Tables, and his "Abrégé de l'Aſtronomie;" and ſome time after, his "Aſtronomie des Dames;" erecting alſo in his obſervatory a marble buſt of that eminent aſtronomer. From this time he almoſt reſtricted his attention to aſtronomy and meteorology, endeavouring to confirm his hypotheſis of the influence of the moon on the different changes of the weather. He alſo publiſhed an hiſtorical view of the ſervices rendered by the Venetian ſchools to aſtronomy, geography, and navigation. In 1783 he obtained, in conjunction with his nephew Chiminello, who was his aſſiſtant in the obſervatory, the prize offered for the beſt treatiſe on the conſtruction of a comparative hygrometer; and in 1784 he publiſhed a ſmall work on the longitude, which was well received. He proceeded regularly with his journal till the year 1787, when a ſmall work in two ſheets was printed at Venice; and in the following year his Tables of Vitality appeared at Venice and Padua. Of his travels in 1780 and in 1788, in the courſe of which he examined the place where Hannibal croſſed the Alps, the reſult was inſerted in his diſſertation on the ſubject, printed in the fourth volume of the Tranſactions of the Academy of Padua. But our limits will not allow us to give even the titles of the numerous eſſays and papers which he publiſhed on various ſubjects, relating principally to meteorology. The journals of the period in which he lived contain many curious pieces contributed by this induſtrious inquirer into the operations and phenomena of nature. Beſides his publications, he left in MS. ſeveral papers, and particularly obſervations on the travels of Marco Polo, and on the real epoch of the Chineſe wall. The termination of Toaldo's life was accelerated by the chagrin which he felt, in conſequence of a fruitleſs attempt to ſerve a young man who had been deprived of his office. This irritation affected his health, ſo that in November, 1797, he was attacked by a nervous affection, which in a few days proved fatal, in the 79th year of his age.

"Toaldo," ſays his biographer, "was of ſmall ſtature; but, in general, had an engaging appearance that inſpired confidence

confidence and refpect. His deportment was eafy, and in his converfation, which was lively, he difplayed great knowledge, and an extenfive acquaintance with various branches of fcience. Simple in his manners, open and fincere, he indulged only the milder paffions; and feemed to have no other ambition than that of being ufeful. He was fteady in his friendfhip; always ready to do good offices in the moft difinterefted manner, and indulgent towards every one around him. To the talents of a literary man, he added the virtues of the citizen; and therefore was univerfally efteemed, but particularly by thofe who enjoyed his more intimate acquaintance." Phil. Mag.

TOALOOR, in *Geography*, a town of Hindooftan, in Baramaul; 3 miles S.E. of Wombinellore.

TOAMENSING, a townfhip of Pennfylvania; 50 miles N. of Philadelphia.—Alfo, a townfhip of Pennfylvania; 15 miles N. of Philadelphia.

TOANA, in *Ancient Geography*, a town of India, on this fide of the Ganges, eaft of this river, among the people called Nanichæ. Ptol.

TOANI, a people of Arabia Felix, in the environs of the ftrait of the Arabic gulf. Pliny.

TOB, or Tubia, a country on the other fide of Jordan, in the northern part of the tribe of Manaffeh. It was the country into which Jephtha retired, as we read in the book of Judges.

TOBA, in *Geography*, a fmall ifland in the Eaft Indian fea, near the weft coaft of Aroo. S. lat. 5° 8'. E. long. 135° 9'.

TOBACCO, Nicotiana, in *Botany*. See Nicotiana.

Tobacco, *Culture and Preparation of*. See Nicotiana.

Tobacco, *Hiftory of*. Tobacco was not known in Europe till after the difcovery of America by the Spaniards, and firft imported about the year 1560, as fome fay by fir Francis Drake.

The Americans of the continent call it *petun*, thofe of the iflands *yoli*. The Spaniards, who gave it the name *tobacco*, took it from Tabaco, a province of Yucatan, where they firft found it, and firft learned its ufe; or, as fome fay, it derived its name from the ifland of Tabago, or Tobago.

The French, at its firft introduction among them, gave it various names; as *Nicotiana*, or the *ambaffador's herb*, from John Nicot, then ambaffador of Francis II. in Portugal; who brought fome of it with him from Lifbon, and prefented it to a grand prior of the houfe of Lorrain, and to queen Catherine de Medicis; whence it was alfo called *queen's herb*, and *grand prior's herb*. They alfo gave it other names, which are now all reduced to the original name of *tobaco*, or *tobacco*, from *Tabaco*, given it by Hernandez de Toledo, who firft fent it into Spain and Portugal.

It appears from Lobel, that this plant was cultivated in Britain before the year 1570; and the introduction of the practice of fmoking it in England has been commonly afcribed to fir Walter Raleigh, about the year 1584. The cultivation of it is now common in various parts of the globe; and though prohibited by the laws of this country, the manufacture of it forms no inconfiderable branch of commerce.

Tobacco might be cultivated with advantage through the greater part of Europe; but almoft in every part of Europe it has become a principal fubject of taxation; and it has been fuppofed, that it would be more difficult to collect a tax from every farm where this plant might happen to be cultivated, than to levy one upon its importation at the cuftom-houfe. The cultivation of tobacco has been, upon this account, moft abfurdly, (fays Mr. Smith, Wealth of Nations,) prohibited through the greater part of Europe, which neceffarily gives a fort of monopoly to the countries where it is allowed; and as Virginia and Maryland produce the greateft quantity of it, they fhare largely, though not without fome competitors, in the advantage of this monopoly: the cultivation of it, however, is faid to be lefs profitable than that of fugar. At the time when the author publifhed his work above cited, about ninety-fix thoufand hogfheads of tobacco were annually purchafed in Virginia and Maryland, with a part of the furplus produce of Britifh induftry; but the demand of Great Britain does not require, perhaps, more than fourteen thoufand. If the remaining eighty-two thoufand, therefore, could not be fent abroad and exchanged for fomething more in demand at home, the importation of them muft ceafe immediately, and with it the productive labour of all thofe inhabitants of Great Britain, who are at prefent employed in preparing the goods with which thefe eighty-two thoufand hogfheads are annually purchafed. Thofe goods, which are part of the produce of the land and labour of Great Britain, having no market at home, and being deprived of that which they had abroad, muft ceafe to be produced. The moft round-about foreign trade of confumption, therefore, may, upon fome occafions, be as neceffary for fupporting the productive labour of the country, and the value of its annual produce, as the moft direct. In order to facilitate the great exportation which was neceffary, for getting rid of that which remained after the home confumption, the whole duties were drawn back, provided the exportation took place within three years.

The principal kinds of tobacco imported into England are, as we have already obferved, the Maryland, called Oroonoko, and the Virginia-tobacco. The former is not fo agreeable to the Britifh tafte as the fweet-fcented tobacco of the latter country; but the northern nations of Europe are faid to like it better.

Befides the tobacco of the Weft Indies, there are confiderable quantities cultivated in the Levant, the coafts of Greece, and the Archipelago, the ifland of Malta, and Italy. The marks of good twift tobacco are a fine fhining cut, an agreeable fmell, and that it has been well kept.

In the ifland of Ceylon, there are two kinds of tobacco cultivated for profit. They call both kinds *dunkol*, which fignifies a leaf, the ufe of which is to be fmoked. The one kind they call *hingele dunkol* or *fingele dunkol*, for they make no difference between the letter S and H in their pronunciation; the other they call *dunkol kappada; kappada* fignifies gelding, and is a word of Portuguefe origin. This *kappada* tobacco is much ftronger and more intoxicating than the other; but both kinds are the produce of the fame plant; only the fingle tobacco has very little care taken of it, being, after the fowing, in a manner left to itfelf; while the other has great pains beftowed upon it during the whole time of its growth, and till it is fit for ufe.

Some of the Ceylonefe chew this ftrong tobacco with their betel; and fome, who fmoke it alone, ufe no pipe, but, taking a long leaf of it, they roll it up into a long form, and cover it with the leaf of the wattukan-tree; they then light one end of it, and fmoke by the other, till the whole is confumed. Phil. Tranf. N° 278, p. 1143.

Although in Ruffia tobacco is not confidered as one of the general neceffaries of the lower claffes of the people, the practice of fmoking having been held as a fin to the end of the 17th century; neverthelefs the confumption of it is by no means fmall, and of courfe the importation always much overbalances the exports. In 1793, the former at St. Peterfburg

Peterſburg alone amounted to upwards of 47,000 rubles; and the latter, from all parts of the empire, barely to 20,000: however, the conſumption muſt have increaſed, as the exportation in 1768 is ſtated by Guldenſtædt at 21,000, and the whole of the importation at 108,000 rubles. The culture has been profitably carried on, ſince the year 1763, in various diſtricts of the empire. Moſt of it is obtained in the Malo-Ruſſian governments, where the cultivation was firſt encouraged; but it has been much cultivated in other regions, *e. g.* about the Volga and the Samara, and particularly by the Coſſacks on the Orenburg and Siberian lines. The greater part of the Ruſſian tobacco is derived from American, and ſome Turkiſh and Perſian ſeed. In the generality of the ſouthern governments, theſe plantations admit of being greatly multiplied. The different ſorts of tobacco and ſnuffs prepared from it, which are now in uſe, are to be attributed to the difference of the climate and ſoil in which it grows, and the peculiar mode of managing and manufacturing the plant, rather than to any eſſential difference in its qualities.

Tobacco, in the *Materia Medica*, *&c.* This is a well-known drug of a narcotic quality, which it diſcovers in all perſons, even in ſmall quantity, when firſt applied to them; and when uſed in large quantities, its effects have ſometimes been more violent, ſo as to have proved a mortal poiſon. Beſides its narcotic qualities, it poſſeſſes alſo a ſtrongly ſtimulant power, perhaps, as Dr. Cullen obſerves, with reſpect to the whole ſyſtem, but eſpecially with reſpect to the ſtomach and inteſtines; ſo as readily, even in no great doſes, to prove emetic and purgative.

The leaves of tobacco have a ſtrong diſagreeable ſmell, and a very acrid burning taſte: diſtilled in a retort, without addition, they yield an acrid, empyreumatic, poiſonous oil. They give out their acrid, matter both to water and ſpirit, but moſt perfectly to the latter: the aqueous infuſions are of a yellow or brown colour, the ſpirituous of a deep green. The ſeveral ſorts of tobacco imported from abroad are ſtronger in taſte than that of our own growth, and the extracts made from them much more fiery, but in leſs quantity.

Tobacco has been employed, in ordinary uſe, by ſnuffing, ſmoking, and chewing; and theſe practices have been common for more than 200 years to all Europe, and they have more or leſs prevailed in other parts of the globe. Like other narcotics, the uſe of it may be introduced by degrees; and its peculiar effects may hardly at all be manifeſted; but beyond certain limits, violent effects have been ſometimes produced on thoſe who have been accuſtomed to the uſe of it. The power of habit is often unequal, even among thoſe who have been addicted to this practice. Dr. Cullen mentions a lady, who had been for more than twenty years accuſtomed to take ſnuff at all times of the day; but ſhe found at length that indulging much in the uſe of ſnuff before dinner took away her appetite; and in proceſs of time, that a ſingle pinch, taken any time before dinner, palled her appetite for that meal. But when ſhe abſtained from the uſe of it, her appetite returned; and after dinner, for the reſt of the day, ſhe took ſnuff freely without inconvenience. When ſnuff, that is, tobacco in powder, is firſt applied to the noſe, it proves a ſtimulus, and excites ſneezing; but by repetition, that effect entirely ceaſes.

Snuff, when firſt employed, if it be not taken in ſmall quantity, and if it be not thrown out immediately by ſneezing, occaſions ſome giddineſs and confuſion of head: but theſe effects do not occur when perſons are habituated to the uſe of it. But ſuch perſons, if it be taken beyond the uſual quantity, experience the ſame conſequences; and the effect is manifeſt, not only on the ſenſorium, but on other parts of the ſyſtem, particularly the ſtomach, occaſioning a loſs of appetite, and other ſymptoms of a weakened tone in that organ. Dr. Cullen ſays, that he has obſerved ſeveral inſtances of perſons who take ſnuff to exceſs, ſuffering from it by a loſs of memory, by a fatuity, and by other ſymptoms of the weakened or ſenile ſtate of the nervous ſyſtem, induced before the uſual period. He has alſo found ſymptoms of dyſpepſia, and pains of the ſtomach, occurring every day, in conſequence of exceſs in the practice of taking ſnuff. Theſe ſymptoms have ſubſided, when the uſe of ſnuff has been diſcontinued. A ſpecial effect of ſnuffing, he ſays, is its exciting a conſiderable diſcharge of mucus from the noſe; and there have been ſeveral inſtances of head-aches, tooth-aches, and ophthalmias thus relieved: and when this diſcharge of mucus is conſiderable, the ceaſing or ſuppreſſion of it, by abſtaining from ſnuff, is apt to occaſion thoſe diſorders which it had formerly relieved. Another effect of taking ſnuff is this, that as a part of the ſnuff is often carried back into the fauces, ſo a part of this is carried down into the ſtomach, and then more certainly produces the above-mentioned dyſpeptic ſymptoms.

Smoking, when firſt practiſed, ſhews very ſtrongly the narcotic, vomiting, and even purging powers of tobacco, and it is very often uſeful as an anodyne; but by repetition theſe effects diſappear, or only ſhew themſelves when the quantity ſmoked is beyond what habit had before admitted of; and even in perſons much accuſtomed to it, it may be carried ſo far as to prove a mortal poiſon. From much ſmoking, all the ſame effects may ariſe which we ſaid might ariſe from the exceſs in ſnuffing.

With reſpect to the evacuation of mucus which is produced by ſnuffing, there are analogous effects produced by ſmoking, which commonly ſtimulate the mucous follicles of the mouth and fauces, and particularly the excretories of the ſalivary glands. By the evacuation from both ſources, with the concurrence of the narcotic power, the tooth-ache is often greatly relieved by it; but we have not found the ſmoking relieve head-aches and ophthalmias ſo much as ſnuffing often does. Sometimes ſmoking dries the mouth and fauces, and occaſions a demand for drink; but, as commonly the ſtimulus it applies to the mucous follicles and ſalivary glands draws forth their liquids, it occaſions on the other hand a frequent ſpitting.

So far as this is of the proper ſaliva, it occaſions a waſte of that liquid ſo neceſſary in the buſineſs of digeſtion; and both by this waſte, and by the narcotic power at the ſame time applied, the tone of the ſtomach is often weakened, and every kind of dyſpeptic ſymptoms is produced. Though in ſmoking a great part of the ſmoke is again blown out of the mouth, ſtill a part of it muſt neceſſarily paſs into the lungs, and its narcotic power applied there often relieves ſpaſmodic aſthma; and by its ſtimulant power it there alſo ſometimes promotes expectoration, and proves uſeful in the catarrhal or pituitous difficulty of breathing.

Smoking has been frequently mentioned as a means of guarding men againſt contagion. In the caſe of the plague, the teſtimony of Diemerbroek is very ſtrong; but Rivinus and others give us many facts which contradict this; and Chenot gives a remarkable inſtance of its inutility. We cannot indeed ſuppoſe that tobacco contains an antidote of any contagion, or that in general it has any antiſeptic power; and therefore we cannot allow that it has any ſpecial uſe in this caſe: but it is very probable that this and other narcotics, by diminiſhing ſenſibility, may render men leſs liable to contagion; and by rendering the mind leſs active and anxious, it may alſo render men leſs liable to fear, which has

has ſo often the power of exciting the activity of the contagion. The antiloimic powers of tobacco are therefore on the ſame footing with thoſe of wine, brandy, and opium.

The third mode of uſing tobacco is that of chewing it, when it ſhews its narcotic qualities as ſtrongly as in any other way of applying it; though the nauſeous taſte of it commonly prevents its being carried far in the firſt practice. When the practice, however, is continued, as it is very difficult to avoid ſome part of it diſſolved in the ſaliva from going down into the ſtomach, ſo this, with the nauſea excited by the taſte, makes vomiting more readily occaſioned by this than the other modes of applying it. They are the ſtrong, and even diſagreeable impreſſions repeated, that give the moſt durable and tenacious habits; and therefore the chewing of tobacco is apt to become one of theſe: and it is therefore in this way that it is ready to be carried to the greateſt exceſs, and to ſhew all the effects of the frequent and large uſe of narcotics. As it commonly produces a conſiderable evacuation from the mouth and fauces, ſo it is the moſt powerful in relieving the rheumatic affection of tooth-ache. This practice is alſo the occaſion of the greateſt waſte of ſaliva; and the effects of this in weakening digeſtion, and perhaps from thence eſpecially, its noted effect of producing emaciation, may appear.

The effects already recited of the different modes of employing tobacco depend eſpecially upon its narcotic power, and certain circumſtances accidentally attending its application to the noſe and mouth: but as we have obſerved before, that beſide its narcotic, it poſſeſſes alſo a ſtimulant power, particularly with reſpect to the alimentary canal: by this it is frequently employed as a medicine for exciting either vomiting or purging, which it does as it happens to be more immediately applied to the ſtomach or to the inteſtines.

An infuſion of from half a drachm to a drachm of the dried leaves, or of theſe as they are commonly prepared for chewing, for an hour or two, in four ounces of boiling water, affords an emetic which has been employed by ſome practitioners, but more commonly by the vulgar only. As it has no peculiar qualities as an emetic, and its operation is commonly attended with ſevere ſickneſs, it has not been, nor is it likely ever to come into common practice with phyſicians.

By long boiling in water, its deleterious power is ſaid to be abated, and at length deſtroyed: an extract made by long coction, is recommended by Stahl and other German phyſicians, as the moſt effectual and ſafe aperient, detergent, expectorant, diuretic, &c.; but the medicine muſt neceſſarily be precarious in ſtrength, and has never come into uſe among us. Lewis Mat. Med.

It is more commonly employed as a purgative in glyſters; and, as generally very effectual, it is employed in all caſes of more obſtinate coſtiveneſs; and its powers have been celebrated by many authors. Dr. Cullen has known it to be in frequent uſe with ſome practitioners: and he adds, it is indeed a very effectual medicine, but attended with this inconvenience, that when the doſe happens to be in any exceſs, it occaſions ſevere ſickneſs at the ſtomach, and it has been known to frequently occaſion vomiting.

A ſtrong decoction of tobacco, with proper carminatives and cathartics, given glyſter-wiſe, ſometimes proves of good effect in what is uſually called the ſtone colic, and alſo in the iliac paſſion.

It is well known, that in caſes of obſtinate coſtiveneſs, in ileus and incarcerated hernia, the ſmoke of burning tobacco has been thrown into the anus with great advantage. The ſmoke operates here by the ſame qualities that are in the infuſions of it above-mentioned: but as the ſmoke reaches much farther into the inteſtines than injections can commonly do, it is thereby applied to a larger ſurface, and may therefore be a more powerful medicine than the infuſions. In ſeveral inſtances, however, ſays Dr. Cullen, I have been diſappointed of its effects, and have been obliged to have recourſe to other means.

Bates and Fuller give ſome receipts, in which tobacco is an ingredient, with mighty encomiums, in aſthmatic caſes.

Hoffman obſerves, that horſes have been often relieved by this remedy, but in human ſubjects it has been rarely tried; and ſays he has known ſome of the common people, who laboured under excruciating pains of the inteſtines, freed in an inſtant from all pain by ſwallowing the ſmoke. Both the decoction and the ſmoke have not unfrequently been injected in caſes of incarcerated herniæ, and often with ſucceſs. The ſmoke thus applied is recommended as one of the principal means for the revival of perſons apparently dead from drowning or other ſudden cauſes; but ſome ſuſpect the narcotic power of tobacco as unfavourable in theſe caſes.

The infuſion of tobacco, when it is carried into the blood-veſſels, has ſometimes ſhewn its ſtimulant powers exerted in the kidneys; and very lately we have had it recommended to us as a powerful diuretic of great ſervice in dropſy. Upon the faith of theſe recommendations we have now employed this remedy in various caſes of dropſy, but with very little ſucceſs. From the ſmall doſes that are proper to begin with, we have hardly obſerved any diuretic effects; and though from larger doſes they have in ſome meaſure appeared, we have ſeldom found them conſiderable: and when, to obtain theſe in a greater degree, we have gone on increaſing the doſes, we have been conſtantly reſtrained by the ſevere ſickneſs at ſtomach, and even vomiting, which they occaſioned: ſo that we have not yet learned the adminiſtration of this remedy, ſo as to render it a certain or convenient remedy in any caſes of dropſy.

Tobacco is ſometimes employed externally in unguents and lotions, for cleanſing foul ulcers, deſtroying cutaneous inſects, and other like purpoſes: it appears to be deſtructive to almoſt all kinds of inſects, to thoſe produced on vegetables as well as on animals. Lewis.

A ſtrong decoction of the ſtalks, with ſharp-pointed dock, and alum, is ſaid to be of good ſervice, uſed externally, in cutaneous diſtempers, eſpecially the itch: ſome boil them for that purpoſe in urine. The ſame decoction is ſaid to be infallible in curing the mange in dogs.

Tobacco beat into a maſh with vinegar or brandy, and laid on the ſtomach, has ſometimes good effects in removing hard tumours of the hypochondria. We have the hiſtory of two cures made by ſuch applications in the Med. Eſſ. Edinb. vol. ii. p. 41.

The juice of this plant is ſaid to be good againſt ulcers and mortifications. Boyle's Works, Abr. vol. i. p. 56.

Some caution, however, Dr. Lewis obſerves, is requiſite even in the external uſes of tobacco, particularly in ſolutions of continuity: there are inſtances of its being thus tranſmitted into the blood, ſo as to produces violent effects.

A drop or two of the chemical oil of tobacco being put on the tongue of a cat, produces violent convulſions, and death itſelf in the ſpace of a minute; yet the ſame oil uſed in lint, and applied to the teeth, has been found of ſervice in the tooth-ache; though it muſt be to thoſe that have been uſed to the taking of tobacco, otherwiſe great ſickneſs, retching, vomiting, &c. happen; and even in no caſe is the internal uſe of it warranted by ordinary practice. See experiments on the effects of oil of tobacco on pigeons, by M. Fontana, in which he found vomiting to be a conſtant effect of this poiſon, as he calls it, and the loſs of motion in in the part to which it is applied an occafional or accidental effect, in Phil. Tranf. vol. lxx. part i. append. p. 38, or Fontana fur les Poifons, &c. Florence, quarto.

In cafes of obftinate ulcers, the infufion has been employed as a lotion with advantage; but the many inftances of its being abforbed, and thus proving a violent poifon, diffuade from the practice; efpecially as there are other medicines of greater efficacy, that may be ufed more fafely. Bergius recommends it to be employed as a fomentation in the paraphymofis.

Sim. Paulli, phyfician to the king of Denmark, in an exprefs treatife on tobacco, obferves, that the merchants frequently lay it in bog-houfes, to the end that, becoming impregnated with the volatile falt of the excrements, it may be rendered the brifker, more fetid, and ftronger.

Amurath IV. emperor of the Turks, the grand duke of Mufcovy, and the emperor of Perfia, have prohibited the ufe of tobacco in their ftates. Our king James I. wrote a treatife exprefsly againft it, entitled "A Counterblaft to Tobacco." By a bull of pope Urban VIII. fuch are excommunicated as take tobacco in churches.

Tobacco, *Laws and Regulations concerning.*—Tobacco is not to be planted in England, on forfeiture of 40*s.* for every rod of ground thus planted; but this fhall not extend to hinder the planting of tobacco in phyfic gardens, in quantities not exceeding half a pole of ground, and alfo on forfeiture of 10*l.* for every rod. (15 Car. II. c. 7. 12 Car. II. c. 34.) And juftices of peace have power to iffue warrants to conftables, to fearch after and examine whether any tobacco be fown or planted, and to deftroy the fame, which they are to do under penalties, &c. 22 & 23 Car. II. c. 26. 5 Geo. c. 11.

The act of 29 Geo. III. c. 68. regulating the importation, exportation, and manufacture of tobacco and fnuff, and alfo that of 30 Geo. III. c. 40. made to explain and amend the former, are fo extended, and comprehend fo great a variety of particular regulations, as not to admit of minute recital in this place. The former repeals a confiderable number of preceding ftatutes. By 49 Geo. III. c. 68. and c. 69. all duties under the refpective departments of Cuftoms and Excife are repealed, and other duties are granted in lieu of them. Tobacco and fnuff are alfo fubject to annual duties by the act for continuing the duties on penfions, offices, &c.; and certain drawbacks are allowed upon the exportation of them: which duties are to be under the management of the commiffioners of the cuftoms and excife. 43 Geo. III. c. 68. and c. 69.

No tobacco fhall be imported but from America, on pain of forfeiture, with the veffel and its contents; except from Spain, Portugal, and Ireland, from which it may be imported under certain regulations. (29 Geo. III. c. 68.) But tobacco of the territories of Ruffia or Turkey may be imported from thence in Britifh-built fhips, and warehoufed, and may be exported or entered for home confumption, on payment of the like duties as tobacco of the United States of America; and on its being manufactured in Great Britain and exported fhall be entitled to the drawbacks. (43 Geo. III. c. 68.) By 45 Geo. III. c. 57. tobacco, the production of the Weft Indies or the continent of America, belonging to any foreign European ftate, may be imported into certain ports fpecified in the act, and exported to any port of the united kingdom, fubject to the regulations of the act; and fuch tobacco fhall pay the fame duties as that which is the growth of the Britifh Weft Indies, or of the United States of America. By 49 Geo. III. c. 25. unmanufactured tobacco may be imported from any place in Britifh veffels navigated according to law, or in foreign fhips navigated in any manner whatever belonging to any ftates in amity with Great Britain; and fuch tobacco fhall be liable to the fame regulations as tobacco from the Britifh plantations.

But no tobacco or fnuff fhall be imported in any veffel of lefs burthen than 120 tons; nor any tobacco-ftalks, tobacco-ftalk flour, or fnuff-work, in any veffel whatever; nor any tobacco or fnuff in cafks lefs than 450lbs. on the like penalty; except loofe tobacco for the crew, not exceeding 5lbs. for each perfon; nor fhall the veffel be forfeited, if proof be made from the fmallnefs of the quantity that fuch tobacco or fnuff was on board without the knowledge of the owner or mafter. 29 Geo. III. c. 68.

And no tobacco or fnuff fhall be imported except at London, Briftol, Liverpool, Lancafter, Cowes, Falmouth, Whitehaven, and Hull (and by 31 Geo. III. c. 47. Newcaftle-upon-Tyne); on the like forfeiture.

			£	s.	d.
Every manufacturer of tobacco or fnuff fhall take out a licence from the officers of excife, for which he fhall pay, if the quantity of tobacco and fnuff-work, weighed by him for manufacture within the year, ending the 10th of October previous to his taking out fuch licence, did not exceed	-	20,000 lbs.	2	0	0
If above 20,000 and not exceeding		30,000	3	0	0
30,000	-	40,000	4	0	0
40,000	-	50,000	5	0	0
50,000	-	60,000	6	0	0
60,000	-	70,000	7	0	0
70,000	-	80,000	8	0	0
80,000	-	90,000	9	0	0
90,000	-	100,000	10	0	0
100,000	-	120,000	12	0	0
120,000	-	150,000	15	0	0
150,000	-	-	20	0	0
Every perfon who fhall firft become a manufacturer of tobacco or fnuff, fhall pay for every fuch licence 2*l.*, and within ten days after the 10th of October next after taking out fuch licence, fuch further additional fum, as with the faid 2*l.* fhall amount to the duty herein before directed to be paid, according to the quantity of tobacco and fnuff-work weighed for manufacture within the preceding year	-	-	2	0	0

and a furcharge.

And every dealer in tobacco and fnuff fhall take out a licence in like manner, for which he fhall pay, within the liberties of the chief office in London, 5*s.*, elfewhere 2*s.* 6*d.* 43 Geo. III. c. 69. Sched. (A.)

But perfons licenfed as manufacturers, who fhall not fell tobacco in a lefs quantity than four pounds, nor fnuff in two pounds, need not be licenfed as dealers. 29 Geo. III. c. 68.

Every perfon who fhall manufacture or deal in tobacco or fnuff without taking out fuch licence; or fhall not renew the fame ten days at leaft before the end of the year, fhall forfeit, if a manufacturer, 200*l.*, and if a dealer, 50*l.*

But no perfon fhall be liable to the faid penalty of 50*l.* for felling unmanufactured tobacco or fnuff, whilft remaining in the king's warehoufe.

But perfons in partnerfhip need not take out more than one licence for one houfe.

Every perfon who fhall manufacture tobacco, tobacco-ftalks, or returns of tobacco, or flatten any tobacco-ftalks, or or cut the ſame into Spaniſh, ſhall be deemed a manufacturer of tobacco. And every perſon who ſhall grind or manufacture any tobacco-ſtalk flour, ſnuff-work or ſnuff, ſhall be deemed a manufacturer of ſnuff. And every perſon who ſhall ſell any tobacco, tobacco-ſtalks, or returns of tobacco, or ſtalks flattened or cut into Spaniſh, ſhall be deemed a dealer in tobacco. And every perſon who ſhall ſell any tobacco-ſtalk flour, ſnuff-work or ſnuff, ſhall be deemed a dealer in ſnuff, within the meaning of this act.

Every manufacturer and dealer ſhall make entry in writing of his houſe or place intended to be made uſe of for manufacturing, keeping, or ſelling tobacco or ſnuff, three days before he ſhall begin, on pain of forfeiting 200*l.*, and alſo the tobacco and ſnuff there found, together with the caſks and package, which may be ſeized by the officers of the cuſtoms or exciſe.

Every manufacturer, within the limits of the head office, muſt be an occupier of a tenement of 10*l.* a-year, and pay to the pariſh rates; elſewhere, he muſt pay to the church and poor.

Every ſuch manufacturer ſhall, three days before he begins, make entry in writing at the exciſe-office of all mills, preſſes, engines, rollers, ſtoves, mullers, or ſpinning-wheels, intended to be uſed by him about the manufacturing of tobacco or ſnuff; on pain of forfeiting 50*l.* for every ſuch utenſil not entered.

Every ſuch manufacturer and dealer ſhall cauſe to be put up in large legible characters over his door, or on ſome conſpicuous part of ſuch houſe or place, the words *Manufacturer of, and Dealer in Tobacco and Snuff*, or *Tobacco* or *Snuff*, or *Manufacturer of*, or *Dealer in Tobacco and Snuff*, or *Tobacco* or *Snuff* (as the caſe may be); on the penalty of 50*l.*

If any perſon, who has not made ſuch entry as aforeſaid, ſhall put up the ſaid words, he ſhall forfeit 100*l.*

And by 30 Geo. III. c. 40. no perſon ſhall ſet up or begin any manufactory of tobacco or ſnuff within five miles of the ſea-coaſt, except in the ports and places aforeſaid, where tobacco may be imported, or places within three miles thereof; or in cities, or the ſuburbs thereof, and market-towns; and no entry thereof ſhall be of any avail. But the ſame ſhall not extend to places duly entered before the 5th of July, 1789.

But tobacco and ſnuff may be manufactured by any unlicenſed Spaniſh cutter or ſnuff-miller at any entered mill, on account of any licenſed manufacturer, provided the ſame be legally permitted from ſuch manufacturer, and for the ſole purpoſe of manufacturing or grinding. 29 Geo. III. c. 68.

Every manufacturer ſhall give notice in writing to the officers (if in London ſix, in cities and market-towns twelve, and elſewhere twenty-four hours), before he ſhall begin to ſtrip, ſpin, or preſs any tobacco for cutting; or make any tobacco into carrots, or flatten any ſtalks for Spaniſh; and ſhall expreſs therein the weight of each article, and the time he intends to begin: and the officer ſhall attend accordingly, and he ſhall begin within one hour of the time ſo mentioned, and ſhall proceed without delay; and ſhall afterwards deliver a declaration in writing to ſuch officer, of the quantity intended to be uſed for each ſort of tobacco; on the penalty of 20*l.* and ſuch notice being void. 30 Geo. III. c. 40.

Provided, that if ſuch tobacco ſhall afterwards appear to be unfit for the purpoſe ſpecified in ſuch declaration, it may be applied to any other purpoſe, on giving 48 hours' notice to the officer of the ſort it is intended for. 29 Geo. III. c. 68.

Such manufacturer, as ſoon as the manufacturing is finiſhed, ſhall deliver to the officer a declaration of the weight of the different ſorts of tobacco ſo manufactured, and the number of the rolls or carrots made, and the weight thereof, and of the tobacco-ſtalks and returns ariſing from the operation; and ſhall keep each ſort ſeparate for twenty-four hours, or until an account be taken; on the penalty of 50*l.*

If any manufacturer ſhall make, or have in his poſſeſſion, any roll or carrot tobacco for exportation, which ſhall have any tobacco-ſtalks therein, the ſame ſhall be forfeited, and may be ſeized, and he ſhall alſo forfeit 50*l.*

Every perſon who ſhall cut any walnut-tree, or other leaves, herbs, or plants, in imitation of tobacco (not being tobacco-leaves or plants); or ſhall colour the ſame ſo as to reſemble tobacco; or ſhall mix any ſuch leaves, herbs, or plants with tobacco; or ſhall ſell, or expoſe to ſale, or have in his poſſeſſion any ſuch leaves, herbs, or plants ſo cut, coloured, or mixed, ſhall forfeit the ſame with the caſks and package, which may be ſeized; and alſo 200*l.*

Provided, that nothing herein ſhall extend to prohibit any ſuch manufacturer from dyeing tobacco, or for having ſuch dye in his poſſeſſion for that purpoſe. 30 Geo. III. c. 40.

Every manufacturer of ſnuff ſhall provide proper moveable caſks for preparing, laying down, or putting into bins ſnuff-work and tobacco-ſtalks for flour; and ſhall place them ſo as that the officer may conveniently examine and weigh the ſame at all times; and ſhall mark every ſuch caſk with a progreſſive number, and the tare and weight thereof; and ſhall not lay down any ſnuff-work in any caſk not ſo marked; nor put the ſame in any bin; on the penalty of 50*l.* 29 Geo. III. c. 68.

Such manufacturer of ſnuff ſhall, before he begins to liquor, or cut any tobacco or ſtalks, &c. or to lay down any ſnuff-work, give like notice as aforeſaid to the officer, and ſhall in ſuch notice declare the weights thereof reſpectively, and the number of each particular caſk or bin in which the ſame is intended to be laid down; and ſuch officer ſhall attend accordingly; and ſuch perſon ſhall begin within one hour of the time ſo mentioned, and ſhall without delay proceed therein, until the whole is weighed; and ſhall then deliver an account in writing of the quantity intended for each ſort of ſnuff or flour; and when put into caſks, he ſhall give a like notice, and in the preſence of the officer ſhall affix to each caſk a ticket ſpecifying the number of ſuch caſk, and the weight of the ſnuff-work, &c. therein, and the time when laid down, and what ſort of ſnuff it is intended for; which ticket ſhall be ſigned both by ſuch manufacturer or his ſervant and the officer; and when the ſame is intended to be taken out to be ground, like notice ſhall be given, and the ſame ſhall be weighed out in the preſence of the officer. And no ſuch manufacturer ſhall mix ſnuff-work or tobacco-ſtalks for flour of one making with another; on pain of forfeiting for every offence aforeſaid 50*l.*

Provided always, that if ſuch ſnuff-work ſhall afterwards appear to be unfit for the purpoſes ſpecified in ſuch declaration, or be intended to be manufactured contrary thereto, notice thereof in writing ſhall be given to the officer within forty-eight hours after the delivery of ſuch declaration, and a freſh declaration ſhall be given, ſpecifying the ſort it is intended for, and ſuch manufacturer ſhall proceed therein in manner as aforeſaid. 30 Geo. III. c. 40.

Scotch ſnuff and tobacco-ſtalk flour may be manufactured into brown Scotch ſnuff, and tobacco-ſtalk flour into rappee ſnuff, ſubject to the regulations aforeſaid. And on taking

 ſtock,

ftock, certain credits fhall be allowed, as fet forth in the act; and if on taking fuch ftock any excefs be found, the fame fhall be forfeited, and may be feized. 30 Geo. III. c. 40.

And to fnuff-work in operation, tobacco, tobacco-ftalks, or flour, or returns of tobacco, may be added, on giving to the officer, previous to fuch increafe being made a like notice, and conforming to the regulations fpecified in the act.

The whole of any parcel of fnuff-work in cure, may be mixed with the whole of any other parcel in cure, although laid down at different times, if the fame be mixed in the prefence of an officer, to whom notice is to be given as aforefaid.

If any manufacturer has occafion to fupply his cuftomers with manufactured tobacco or fnuff from any parcel in operation, before the whole is finifhed, he may, in the prefence of an officer, take for the purpofe aforefaid any manufactured tobacco or fnuff not lefs than 200lbs. But if taken without conforming to the regulations fpecified in the act, he fhall forfeit 50*l.*

And every manufacturer fhall diligently manufacture fuch fnuff-work, and ftalks for flour, when taken out of fuch cafk, according to the notice given; and when the fame is finifhed, he fhall deliver to the officer a declaration in writing of the weight of each fort fo made, and fhall keep the fame feparate for twenty-four hours, or until the officer fhall have taken an account thereof; on the penalty of 50*l.* 29 Geo. III. c. 68.

Every manufacturer may have a ftore-room for keeping dried Scotch fnuff, but the fame fhall have but one door or opening, which fhall be locked up, fealed, and fecured by the officer; wherein may be depofited Scotch fnuff returned directly from the mill for fix months, without being taken as part of his ftock. And when the fame is intended to be taken out of fuch room, notice fhall be given to the officer, who fhall attend and open fuch room, and fuch fnuff fhall be taken out in his prefence; and fhall be kept feparate one making from another; on the penalty of 50*l.* And if any fuch manufacturer fhall open fuch ftore-room, except in the prefence of an officer, he fhall forfeit 200*l.*

Every perfon, who fhall cut any walnut, hop, fycamore, or other leaves, or any other herbs, plants, or materials (not being tobacco-leaves or plants); or fhall colour or cure any fuch, to make the fame refemble tobacco; or fhall fell the fame, mixed or unmixed, for tobacco;——fhall forfeit 5*s.* a pound, half to the king (charges of the profecution firft deducted), and half with full cofts to him who fhall fue. 1 Geo. I. ft. 2. c. 46.

Every perfon who fhall make, mix, or colour any fnuff with ochre, umber, or other colouring, except water tinged with Venetian red only; or fhall mix with fnuff any fuftic or yellow ebony, touchwood, or other wood, or any dirt, fand, or fmall tobacco fifted from tobacco,—fhall forfeit the fame, and 3*l.* for every pound weight, half to the king, and half to him that fhall fue. 1 Geo. I. ft. 2. c. 46. 5 Geo. I. c. 11.

And all fuch leaves and other materials, and all engines, utenfils, and tools for working the fame, may be fearched for and feized, by warrant of three commiffioners of the treafury or of the cuftoms. 1 Geo. I. ft. 2. c. 46.

If any perfon fhall mix any fuftic, or other wood, or any leaves, herbs, or plants (other than tobacco), or any earth, clay, or tobacco-fand, with any fnuff-work or fnuff; or fhall colour the fame with any fort of colouring (water tinged with colour only excepted); he fhall forfeit 200*l.* And if any manufacturer or dealer in fnuff fhall fell, or expofe to fale, or have in his entered premifes, any fuftic, yellow ebony, touchwood, logwood, red or Guinea wood, Braziletto or Jamaica wood, Nicaragua wood, or Saunders wood; or any walnut-tree, hop, or fycamore-leaves; or fhall have in his poffeffion any of the aforefaid articles; or any other wood, leaves, herbs, plants, earth, clay, or tobacco-fand, mixed with any fnuff-work or fnuff; or fuch fnuff-work or fnuff-coloured (except as aforefaid); he fhall forfeit 50*l.*, and the fame fhall be forfeited, and may be feized. 29 Geo. III. c. 68.

Any manufacturer of Britifh rappee, Scotch or brown Scotch fnuff completely finifhed, and of which an account has been taken by the officer, may liquor the fame, before mixing with fnuff of a different making, fo as it exceed not the legal credit. And if fuch manufacturer fhall intend to liquor fnuff, for which the legal credit has not been received, he fhall give notice thereof to the officer. But no fnuff fhall be liquored in lefs parcels than 200lbs., nor in more than four different parcels of one making. 30 Geo. III. c. 40.

Snuff, for which fuch allowance fhall have been made, fhall be kept feparate from all other fnuff, and fhall be fhewn to the officer on demand; on the penalty of 20*l.*

Every manufacturer and dealer, who fhall mix Spanifh with fhort cut tobacco, or any tobacco-ftalk flour with fnuff, or fnuff of different forts the one with the other, fhall every day enter in a book or paper, the quantity fold, fent out, or confumed of two pounds or upwards, and the grofs weight thereof, and the time when mixed; on pain of forfeiting 50*l.* 29 Geo. III. c. 68.

When any officer fhall difcover that the manufacturing of tobacco or fnuff is carried on in any unentered place, and that any perfon knowingly affifts, or is any ways concerned in carrying on the fame, every fuch perfon fhall forfeit 30*l.* over and above all penalties and forfeitures that the proprietor thereof fhall be liable to; and fuch officer or his affiftant, may ftop and arreft fuch perfon, and convey him before a juftice, who, on his confeffion, or the oath of one witnefs, may convict fuch perfon fo difcovered, who fhall immediately pay the faid penalty to fuch officer or perfon who brought him; and if not fo paid, fuch juftice fhall commit him to the houfe of correction to hard labour for fix months from the day of conviction, or until the faid penalty be paid. And for a fecond offence, he fhall forfeit 60*l.*, which, if not paid in manner aforefaid, he fhall be committed in like manner for one year, or until fuch penalty be paid.

The officers of excife (between five in the morning and eleven in the evening without a conftable, and between eleven in the evening and five in the morning with a conftable) may enter into any houfe or place belonging to or made ufe of by any manufacturer or dealer, and take an account of the ftock found therein; and fhall give credit (as particularly fet forth in the act). And if at any time any excefs in ftock fhall be found, of which no notice has been given to the officer, unlefs received by permit, the fame fhall be deemed and taken to be brought in without permit.

Every manufacturer and dealer fhall keep fufficient fcales and weights for the ufe of the officers, on the penalty of 100*l.* And if any fuch perfon fhall, in weighing, ufe any art or device to prevent fuch officer from taking a true weight of fuch tobacco, &c. he fhall forfeit 200*l.* together with fuch fcales and weights, which may be feized.

And every fuch manufacturer and dealer fhall with a fufficient number of his fervants affift fuch officer in taking fuch account of ftock, on pain of forfeiting 50*l.*

But

But no officer ſhall weigh any tobacco, tobacco-ſtalks, or ſnuff-work, whilſt actually in the operation of manufacture; except ſnuff-work intended to be ſent out or received by permit.

And unmanufactured tobacco, tobacco in the ſtate of operation, and manufactured tobacco, ſhall be kept ſeparate from each other; on the penalty of 50*l*.

The officers ſhall be permitted to take ſamples of tobacco or ſnuff, &c. in the poſſeſſion of any manufacturer or dealer, paying for the ſame (if demanded) the value or uſual price; on the penalty of 100*l*. upon refuſal.

Every manufacturer and dealer ſhall, in a book or paper, to be furniſhed by the officers, keep an account of all tobacco, &c. and ſnuffs which he ſhall have ſold, ſent out, or conſumed the preceding day, in quantities of 4lbs. or upwards, of tobacco, &c. and 2lbs. or upwards of ſnuffs; and alſo another book or paper in like manner, if under 4lbs. of tobacco, &c. or 2lbs. of ſnuffs. But no ſuch perſon ſhall have more than one ſuch book or paper of each ſort at the ſame time, which is to be returned to the officer, if in London, or any city or market-town every ſix weeks, elſewhere every ſix months, or when the ſame is filled up or demanded; and ſhall be verified on oath. And ſuch books and papers ſhall lie open for the inſpection of the officer, and ſhall be made up at his requeſt; on the penalty of 100*l*. for every offence.

If any officer ſhall diſcover any increaſe in ſtock not legally accounted for, the ſame ſhall be deemed and taken to be made by a commodity, for which no duty has been paid, and privately brought in without permit; and ſuch increaſe ſhall be forfeited, and may be ſeized; and the perſon, in whoſe ſtock ſuch increaſe ſhall be found, ſhall alſo forfeit 20*l*.

But Scotch ſnuff, in the cuſtody of a manufacturer or dealer, not having gained more than 5lbs. in the 100lbs. by the moiſture of the air, ſhall be deemed a fair commodity, and ſuch perſon ſhall have credit for the ſame in his ſtock, and may remove the ſame by permit. And ſuch ſnuff ſhall be kept ſeparate from all other ſnuff, and ſhewn to the officer upon demand; on the penalty of 20*l*.

If any manufacturer ſhall remove any tobacco or ſnuff out of his entered houſe or place, before the ſame has been weighed, and taken an account of by the officer, or ſhall hide or conceal the ſame from the view of ſuch officer; he ſhall forfeit 50*l*.

And no tobacco (except returns) of 4lbs. and upwards, nor ſnuff of 2lbs. and upwards, nor any tobacco-ſtalks, Spaniſh returns of tobacco, tobacco-ſtalks for flour, ſnuff-work, or tobacco-ſtalk flour, exceeding 200lbs. ſhall be removed by land or water without a permit, on pain of forfeiting the ſame, with the caſks and package, and alſo the horſes, cattle, boats, barges, and carriages uſed in conveying the ſame, which may be ſeized.

Such officer on requeſt ſhall grant permits, wherein ſhall be limited the time for ſuch removal; and if the goods permitted ſhall not be delivered within the time ſo limited, the ſame ſhall be deemed and taken to be removed without permit.

But no permit ſhall be granted or be valid for the removal of any ſnuff-work from one part of the kingdom to another except from the entered premiſes of a manufacturer of ſnuff, where the ſame was laid down to the mill for the purpoſe of grinding; on forfeiture thereof, together with the horſes, cattle, boats, barges, and carriages, which may be ſeized. 30 Geo. III. c. 40.

And no ſuch permit ſhall be granted or be valid, unleſs the requeſt note from ſuch manufacturer or dealer contain the particulars ſpecified in the act, and ſuch permit to correſpond with the requeſt note; and if for removing unmanufactured tobacco (other than ſamples), except the ſame be in the original package, and be removed according to the regulations ſpecified in the act: and all tobacco, &c. removed contrary thereto ſhall be forfeited, together with the caſks and package, and the horſes, cattle, boats, barges, and carriages uſed in the removal thereof, which may be ſeized. 29 Geo. III. c. 68.

Provided always, that permits may be granted for the removal of any unmanufactured tobacco, in any quantity not leſs than 200lbs. in any package whatſoever, from the entered premiſes of any manufacturer to any mill to be manufactured, and back to ſuch entered premiſes. 30 Geo. III. c. 40.

And every manufacturer of tobacco or ſnuff may manufacture their tobacco, tobacco-ſtalks, ſnuff-work, and returns of tobacco, at any entered mill, and may remove the ſame by permit to and from ſuch mill.

Provided, that nothing herein ſhall extend to prevent any manufacturer from ſtoving or finiſhing tobacco, or drying ſnuff-work at any mill, provided the officer be allowed to weigh and take an account thereof. 29 Geo. III. c. 68.

Where any permit ſhall be granted for the removal of any tobacco or ſnuff, &c. and the ſame ſhall not be removed agreeable thereto, ſuch permit ſhall be returned before the expiration of the time limited for ſuch removal; on forfeiture of treble the value of ſuch goods. And where ſuch permit ſhall not be ſo returned as aforeſaid, and on taking ſtock a decreaſe does not appear to anſwer the contents of ſuch permit, a like quantity ſhall be forfeited, and may be ſeized.

No manufacturer, unleſs licenſed as a dealer, ſhall have a permit for, or ſhall ſell or ſend out, any manufactured tobacco, Spaniſh, or returns of tobacco, in a leſs quantity than 4lbs., nor ſnuff than 2lbs.; on the penalty of 20*l*.

No tobacco, &c. or ſnuff, &c. ſhall be brought into any houſe or place of a manufacturer or dealer without a permit, and alſo notice thereof ſhall be given to the officer; on pain of forfeiting the ſame, together with the caſks and package, which may be ſeized, and ſuch manufacturer or dealer ſhall alſo forfeit treble the value thereof.

No tobacco or ſnuff, &c. ſhall be removed from any place without the limits of the bills of mortality or exciſe-office in London, to any place within thoſe limits; nor from any place without the limits of the ports herein before enumerated to any place within, or within two miles of thoſe limits; on forfeiture thereof, with the caſks and package, and alſo the veſſels, horſes, cattle, and carriages employed in removing the ſame, which may be ſeized. But the ſame ſhall not extend to the legal removal of the ſeveral articles ſpecified in the act.

By 30 Geo. III. c. 40. tobacco-ſtalks ſtripped from the leaf may be removed, by permit, from any entered premiſes out of the limits of the bills of mortality, to any place within thoſe limits, ſubject to the regulations in the aforeſaid act, and this act ſpecified.

Any manufacturer or dealer, who hath received into his ſtock, by permit, any tobacco or ſnuff, may return the ſame within forty-eight hours to the perſon from whom he received it under certain regulations. But if found returned, or returning without permit, or ſhall not be the ſame identical tobacco or ſnuff which had been received, without any alteration; the ſame ſhall be forfeited, with the caſks and package, which may be ſeized, and the perſon who ſhall return the ſame ſhall alſo forfeit 50*l*. 29 Geo. III. c. 68.

If any tobacco of 4lbs. or upwards, or fnuff of 2lbs. or upwards, or any tobacco-ftalks, &c. fhall be found removing, unlefs between feven in the morning and five in the evening from 29th Sept. to 25th March, and between five in the morning and feven in the evening from 25th March to 29th Sept. (except by a common carrier or veffel which ufually goes out of thefe hours,) the fame fhall be forfeited, with the cafks and package, and the horfes, carriages, and veffels made ufe of in conveying the fame, which may be feized, whether the fame be accompanied with a permit or not.

If any perfon whatfoever without a permit, or hawkers with one, fhall offer any tobacco, &c. to fale, he fhall forfeit the fame, together with the package, and alfo 20*l*. And the perfon to whom it fhall be fo offered to fale, may feize the fame, and carry it to the next warehoufe belonging to the cuftoms or excife, and fhall bring the perfon fo offering it to fale before a juftice, who fhall commit him to prifon, that he may be profecuted for fuch penalty; and the perfon fo feizing the fame fhall be entitled to the fame rewards as the officers of the cuftoms or excife; and in cafe fuch perfon fhall defire it, the commiffioners may caufe threepence for every pound of tobacco, &c. fo feized to be paid to him, till the fame can be difpofed of, upon a certificate under the hand and feal of fuch juftice, of fuch offender being committed to prifon; and after fale, the money fo advanced fhall be replaced out of the produce of fuch fale.

If any perfon fhall counterfeit or forge any permit, he fhall forfeit 500*l*.

If any perfon fhall affault, refift, oppofe, moleft, obftruct, or hinder any officer in the due execution of this or any other act; or fhall refcue any goods which have been feized; or any veffel, horfes, cattle, or carriages, which have been forfeited, and for which no particular penalty is provided; he fhall forfeit 200*l*.

If any perfon fhall give or offer any bribe, recompence, or reward to any officer to prevent him doing his duty, whether the fame be accepted or not, he fhall forfeit 500*l*.

No tobacco, fnuff, &c. fhall be landed, without firft making entry thereof with the officers of the cuftoms, on forfeiture thereof, with the cafks and package.

If any officer of excife fhall have caufe to fufpect that any tobacco, &c. or fnuff, which fhall have been imported contrary to this act, or forfeited by this or any other act, is depofited, lodged, hid, or concealed, if within London or Weftminfter, or the limits of the chief office, upon oath made before two commiffioners, elfewhere upon oath made before one juftice fetting forth the ground of his fufpicion, fuch commiffioners or juftice may, by warrant, authorife fuch officer by day or night, but if in the night, in the prefence of a conftable, to enter into fuch fufpected place, and to feize and carry away all fuch tobacco, &c. or fnuff which fhall be there found, together with the cafks and package containing the fame. And if any perfon fhall obftruct or hinder any fuch officer fo authorifed, or perfon affifting him in the execution of fuch warrant, he fhall forfeit 100*l*.

Tobacco and fnuff, taken as prize, are fubjected to the regulations of this act, by 43 Geo. III. c. 134.

No manufacturer or dealer in tobacco or fnuff, or perfon anywife interefted or concerned therein, fhall act as a magiftrate in the execution of any act relating to tobacco or fnuff; and all acts done by fuch perfon fhall be utterly null and void.

If any tobacco-ftalks or ftems ftript from the leaf fhall be imported, the fame fhall be forfeited and burned, and the officer feizing the fame fhall be allowed one penny a pound; and every perfon, who fhall be affifting or otherwife concerned in unfhipping the fame, or to whofe hands they fhall knowingly come after unfhipping, fhall forfeit treble value, together with the veffels, bags, cafks, or other things, wherein the fame are contained, and the horfes, cattle, carts, and other carriages, made ufe of in removing the fame; half to the king, and half to fuch officer of the cuftoms, who fhall feize, inform, or fue for the fame. 12 Geo. c. 28. 5 Geo. III. c. 43. 8 Geo. c. 18.

All feizures of veffels or boats of 15 tons or under, and of horfes or other cattle and carriages, by virtue of any act relating to the cuftoms, may be profecuted, heard, and determined, before two juftices refiding near where the feizure was made. 8 Geo. III. c. 18. 5 Geo. III. c. 43. 29 Geo. III. c. 68.

And all penalties and forfeitures in the excife may be fued for, levied, and mitigated as by the laws of excife, or in the courts at Weftminfter, half to the king, and half to him who fhall fue (unlefs otherwife particularly directed). 29 Geo. III. c. 68. 30 Geo. III. c. 40. 43 Geo. III. c. 69.

Tobacco-ftalks or ftems, ftripped from the leaf, that are imported, fhall be forfeited and burnt, and the officer feizing the fame fhall be allowed 1*d*. a pound; and perfons affifting in unfhipping them, &c. fhall forfeit treble value, with the veffels, horfes, &c. which may be profecuted and determined before two juftices near the place where the feizure was made. (12 Geo. c. 28. 5 Geo. III. c. 43. 8 Geo. c. 18.) By 24 Geo. II. c. 41. and 26 Geo. II. c. 13. no tobacco or ftalks exceeding 24lbs. weight, nor any fnuff exceeding 10lbs. fhall be conveyed by land, without proper certificates, under penalty of forfeiture, together with horfes and carriages, and commitment of the carrier to the county-gaol for one month by one juftice. The feizure of horfes and carriages may be determined by two juftices near the place where the feizure was made.

Tobacco, *Englifh*, *Nicotiana minor*, or *Nicotiana ruftica* of Linnæus, is a fpecies of tobacco, which was originally a native of America, but now propagates itfelf plentifully in England and other parts of Europe. The flowers are of an herbaceous yellow colour, appearing in July, and are fucceeded by roundifh capfules filled with fmall feeds, which ripen in autumn. The leaves are faid by fome to be of the fame quality with thofe of henbane; but by others, to be fimilar to the preceding, but weaker. They have been fometimes fubftituted in our markets, inftead of the true tobacco; but are eafily diftinguifhed by their fmallnefs and oval fhape, and by being furnifhed with pedicles. Lewis.

Tobacco, *Kanafter*. See Kanaster.

Tobacco-*Water*, among *Sheep-Farmers*, a liquor prepared by infufing or boiling tobacco in water. A very ufeful mode of preparing it is, by boiling one pound of tobacco in two gallons of ftrong falt brine, adding, after the liquid has become cool, about three ounces of the oil of turpentine. It is fometimes, too, the practice to diffolve fifteen or twenty grains, or more, of fublimate or muriated quickfilver in the turpentine, before it is added to the liquor or mixture. A fmall proportion of corrofive fublimate, diffolved in fpirits of wine, is alfo a fafe and neat mode of incorporating it with the tobacco-water or liquid.

Tobacco-water, or liquor, is likewife occafionally mixed with other fubftances; as two pints of it have fometimes three ounces of fulphur mixed in them, being put on a fire until they boil together. The liquor is ufed in a cold ftate.

The South Down ſheep-farmers have a decoction of tobacco, wildvine-root, and ſulphur, which is boiled in brine for a quarter of an hour, and then ſtrained off for uſe.

Tobacco-water, or liquor, is kept ready prepared for the uſe of farmers in many places where ſheep are largely kept, but it is probably the beſt way for them to provide their own.

This water, or liquor, is a powerfully efficacious remedy in various caſes of the ſcab kind in ſheep, and probably in other animals. It is uſually applied by ſhedding or dividing the wool by the fingers and thumbs, and pouring a little of the liquid in along it. It may be uſed every night, as there may be occaſion. Such diſeaſes are readily removed by it in moſt caſes, and eſpecially in long-woolled ſheep, in which they often take place.

In gardening, the ſimple water, or liquor, which is prepared by infuſing or boiling tobacco in ſoft water, without any admixture, or having any ſuch ſubſtances as above diſſolved in it, is often found beneficial in deſtroying and removing inſects of different kinds on fruit-trees and fruit-ſhrubs, by having it repeatedly ſprinkled over them by means of a watering-pot, or dew-ſyringe, or in any other way. Many ſorts of theſe trees and ſhrubs in hot-houſes, and other places, are treated in this manner with great effect and advantage in clearing them of ſuch vermin.

Tobacco *Key*, in *Geography*, a ſmall iſland in the bay of Honduras, near the coaſt of Yucatan. N. lat. 16° 45′. W. long. 88° 35′.

Tobacco-*Pipe*. See *Tobacco* Pipe.

Tobacco-*Pipe Clay*. See Cimolite.

Tobacco-*Pipe Fiſh*, in *Ichthyology*, the Engliſh name of the *Acus*, or the Syngnathus *Acus* of Linnæus; which ſee.

TOBACTLI, in *Ornithology*, a name which Nieremberg ſays is often given to the American bird more commonly called *hoactli*.

TOBAGO, in *Geography*, one of the Caribbee iſlands, in the Weſt Indies, about 30 miles in length from ſouth-eaſt to north-weſt, and about nine in breadth. This iſland was firſt diſcovered by Columbus, in the year 1498; but though projects were formed for ſettling it, particularly by William, earl of Pembroke, who obtained a grant of it in the year 1628, and alſo of Barbuda and St. Bernard, they proved ineffectual. About the year 1632, ſome Zealanders, having fitted out a ſmall ſquadron for trading to thoſe iſlands, made ſuch a favourable report of this in particular, upon their return home, that the company of merchants to which they belonged undertook to ſettle it, and gave it the name of *New Walcheren*, from one of the iſlands in Zealand. The new colony, in a ſhort time, increaſed to about 200, who, finding themſelves peſtered by the viſits of the Caribbean Indians, began to erect a fort for their preſervation. The Indians had recourſe to the Spaniards, who readily granted them aſſiſtance. They ſent a force upon the iſland which demoliſhed the riſing fort, and exterminated the new colony. It was probably from ſome Dutch merchants who travelled to Courland, that James, duke of that country, conceived the deſign of ſettling Tobago. Being a prince of an active diſpoſition, and finding there was room for ſuch a ſettlement, he ſent over a colony of his own ſubjects, who ſettled upon what has ſince been called *Great Courland Bay*, and erected a ſmall regular fort, with a town, in the neighbourhood; and the duke's title was farther confirmed by a grant from Charles II. king of England, but diſputed by the Dutch. Upon the extinction of the Kettler family, dukes of Courland, in the perſon of Ferdinand, ſon of duke James, the fief of the iſland of Tobago reverted to the crown of England in 1737. By the treaty of Aix-la-Chapelle in 1748, St. Vincent, Dominica, St. Lucia, and Tobago, were declared neutral, and thoſe who remained of the ancient proprietors were left in unmoleſted poſſeſſion. By the 9th article of the peace of Paris, ſigned on the 10th of February, 1763, the three iſlands of Dominica, St. Vincent, and Tobago, were aſſigned to Great Britain, and St. Lucia to France; the Charaibes not being mentioned in the whole tranſactions, as if no ſuch people exiſted. The climate of Tobago is far more temperate than could be expected in an iſland that is but 11 degrees 16 minutes north from the equator; for the heat is allayed by the ſea-breezes. Tobago has another favourable circumſtance to recommend it, by its lying out of the track of thoſe hurricanes that prove ſo fatal to the other Weſt India iſlands. The ſurface of the iſland is unequal and agreeably diverſified; but no part of it is rugged or impaſſable, though its north-weſt extremity is mountainous. Its ſoil is of different kinds, but in general the mould is rich and black, and proper for producing, in the greateſt plenty, whatever is raiſed in other parts of the Weſt Indies. The abundance of ſprings upon the iſland contributes to its healthfulneſs, and its bays and creeks are ſo diſpoſed as to be very commodious for all kinds of ſhipping. Its ſituation, however, requires fortifications to render the iſland ſecure againſt the viſits of ſavages and enemies. Beſides its producing the different kinds of wood that are to be found in the other Weſt India iſlands, the Dutch affirm, that both the true nutmeg-tree and the cinnamon-tree, with that which produces the real gum copal, grows upon the iſland, but this aſſertion wants confirmation. Mr. Blome, who, in 1687, wrote "The preſent State of our American Iſlands," ſays that the ſoil of Tobago produces Indian corn, Guinea corn, peaſe, beans, French beans, figs, pine-apples, pomegranates, oranges, lemons, limes, plantains, bananas, grapes, guavas, tamarinds, prickly pears, papaws, and a variety of other fruits, which are not to be found in Europe. The cocoa-tree grows here to ſuch perfection, that the Indians call it God's tree, as producing both meat, drink, and clothing. Muſk-melons, water-melons, gourds, cucumbers, and pompions, are raiſed to perfection: neither is there any want of potatoes, yams, carrots, turnips, parſnips, onions, and manioc. Wild hogs abounded ſo much in Tobago, that the people killed at leaſt twenty thouſand of them every year without their being ſenſibly diminiſhed. Here are likewiſe found peccaros, reſembling ſwine, armadilloes, guanoes, Indian rabbits, and badgers. Horſes, cows, aſſes, ſheep, deer, goats, and rabbits, were probably introduced by the Dutch, and have multiplied exceedingly. The ſea is ſtored with excellent fiſh, particularly turtle of every kind, and mullets of a moſt delicious taſte, with other kinds unknown in England. In ſhort, the commodities which the country doth, or may produce, are cocoa-nut, ſugar, tobacco, indigo, ginger, ſarſaparilla, ſempervivum, bees'-wax, venelloes, natural balſam, balm, ſilk-graſs, green tar, ſoap-earth, with many curious ſhells, ſtones, marcaſites, and minerals. In 1781, the iſland was ſurrendered to the French on favourable terms. In 1793, it was again taken by the French, and ſoon after retaken by the Britiſh. N. lat. 11° 16′. W. long. 60° 30′.

Tobago, *Little*, a ſmall iſland near the eaſt coaſt of Tobago, about two miles long, and one broad.

TOBAK, a town of European Turkey, in Beſſarabia, on lake Jalpug. In 1789, the Ruſſians were defeated by the Turks, near this town; 34 miles N.N.W. of Iſmail.

TOBAN, a town of the iſland of Cuba; 16 miles N.E. of Trinidada.

TOBAR,

TOBAR, a town of Spain, in Old Caftile; 18 miles from Burgos.

TOBATA, in *Ancient Geography*, a town of Afia, in the interior of Paphlagonia.

TOBATI, in *Geography*, a town of Paraguay; 50 miles N.E. of Affumption.

TOBED NIGAURLEDEGH, a river of New Brunfwick, which runs into the St. John, N. lat. 46° 50'. W. long. 67° 36'.

TOBIANUS, in *Ichthyology*, a name given by Schoneveldt and others to the ammodytes, or fand-eel.

TOBIRA, or TOBERA, in *Botany*, a Japanefe fhrub, figured and defcribed by Kæmpfer; fee PITTOSPORUM, n. 2. See alfo EUONYMUS, where its ill-agreement with the latter genus is noticed.

TOBIS, in *Ichthyology*, a name given by the Swedes to the ammodytes, or fand-eel.

TOBITSCHAU, or TOWACZOW, in *Geography*, a town of Moravia, in the circle of Olmutz; 10 miles S. of Olmutz. N. lat. 49° 23'. E. long. 17° 14'.

TOBIUS, in *Ancient Geography*, a river of the ifle of Albion, the mouth of which is placed by Ptolemy on the weftern coaft, between the promontory Octapitorum and that of Ratoftathybius.

TOBLER BACH, in *Geography*, a river of Wurtemberg, which runs into the Glatt, 2 miles N.W. of Sultz.

TOBLPAD, a town of the duchy of Stiria; 8 miles S.W. of Gratz.

TOBOL, a river of Ruffia, which rifes in N. lat. 52° 30', and long. 81°, in the country of the Kirghiftzi, in the chain of mountains that parts it from the government of Upha. It pours itfelf into the Irtyfh or Irtifch at Tobolfk, after running a courfe of about 500 verfts, in which it receives the following rivers; *viz.* the Ui, the Ifet, the Tura, and the Tavda, all which fall into it on the left. Of thefe, the Tura is the largeft; it rifes near Verkhoturia, in the Ural mountains, and glides into the Tobol, in lat. 57° 30', after having taken up the rivers Salda, Tagil, Pyfhma, Nitza, &c. into which laft-mentioned, the Neiva, the Ætfh, and the Irbit flow. By this acceffion of waters, the Tura becomes a confiderable river, not much inferior to the Tobol itfelf. The Ifet is likewife a river of fome confequence, rifing out of a lake two verfts from Ekatarineburg; and after having taken up feveral rivers, as the Sifert, the Sinava, the Tfetfha, and the Miæs, falls into the Tobol, in N. lat. 57°. The Tobol has moftly low fhores; and in the fpring feafon frequently fhade its waters far around.

TOBOLOVO, an oftrog of Ruffia, in the government of Tobolfk, on the Enifei. N. lat. 69° 40'. E. long. 86° 42'.

TOBOLSK, a city of Ruffia, and capital of a government, at the confluence of the Irtifch and Tobol. It is the fee of an archbifhop, and was heretofore the capital of all Siberia. This city is divided into the Upper and Lower Towns. The Upper Town ftands very high, on the eaft fide of the Irtifch; and the Lower Town lies on a plain, between the hill on which the former is built, and the river. Both towns taken together are of a very large circumference; but the houfes being moftly built with wood, it was nearly confumed by fire about the year 1786, and afterwards rebuilt chiefly of ftone. It contains about 15,000 inhabitants. In the Upper Town, which is properly called the city, ftands the fort, which was built with ftone, by governor Gagarin. In the fort are the governor's court, as it is called, the governor's houfe, the archbifhop's palace, the exchange, and two of the principal churches, which are all ftone buildings. The Upper Town, which ftands on the eaft fide of the fort, and is inclofed within an earthen rampart, affords nothing remarkable, but a market for provifions and all kinds of fmall ware, three wooden churches, and a convent. The Lower Town contains a market-place for all kinds of provifions, on which feveral fhops are built. The Upper Town is out of the reach of inundations from the river, by its high fituation, which, however, is attended with this inconveniency, that the inhabitants are under a neceffity of going down the hill for water. Befides, large maffes of earth fall from the fide of a hill, on which the town ftands, towards the river, almoft every year, which obliges the inhabitants to pull down and rebuild the houfes that ftand near the declivity. The Lower Town, indeed, has water at hand, but is expofed to inundations when the river overflows its banks; but fuch floods do not happen every year. The town is very populous, and almoft the fourth part of its inhabitants is compofed of Tartars, who are partly defcended from thofe that were fettled there before the conqueft of Siberia, and partly from the Bucharians. Thefe Tartars, in general, behave very quietly, and carry on fome commerce; but practife no mechanic trades. They are very fober, and averfe from intemperance, and all kinds of riotous living. The reft of the inhabitants are Ruffians, whofe anceftors were banifhed hither for their crimes, or fuch as are exiles themfelves. As every thing is fold here fo exceeding cheap, that a common man may live very well at Tobolfk at ten rubles a year; indolence and floth prevail to fuch a degree, that it is a hard matter to get the leaft utenfil, &c. made, though the town abounds with artificers, who want neither tools nor materials to carry on their refpective trades. The commerce is in a flourifhing condition in this city: and the traffic which the Bucharian and Kalmuck merchants carry on in Indian goods, with which they fupply all Siberia, and part of Ruffia, is very confiderable. All the Chinefe caravans are obliged to pafs through this town; and all the furs furnifhed by Siberia are brought into a warehoufe in this city, and from hence are forwarded to the Siberian chancery at Mofcow. Several of the Swedifh officers, who were taken prifoners at the battle of Pultawa, and fent to Tobolfk, fet up fchools here, in the year 1713, for teaching the children of Swedes, Ruffians, Coffacks, Tartars, &c. the German, Latin, and French languages, with geography, geometry, and drawing. Many of them alfo took in boarders. Thefe fchools acquired great reputation; fo that children were fent hither for education, from a confiderable diftance, and the exemplary behaviour of thefe military pedagogues was attended with uncommon fuccefs. However, when the peace of Nyftadt was concluded, the Swedifh officers returned into their own country, and then thefe beneficial feminaries of learning dropped of courfe. Some time after a German fchool was founded here, under the aufpices of the emprefs; 1000 miles E. of Mofcow. N. lat. 57°. E. long. 68° 14'.

TOBOLSKIAN TARTARS, derive their appellation from the river Tobol, on which they dwell; and they are the defcendants of the inhabitants of Ifker or Sibir, their ancient capital, which being reduced to a heap of ruins after Yormak's conqueft, they abandoned; and inftead of it the Ruffians afterwards built Tobolfk. Thefe are diftinct from the Tartar inhabitants of Tobolfk, who are a barbarian colony. Their number amounts to upwards of 4000 males.

TOBOLSKOI, a government of Ruffia, extending from N. lat. 55° to 78°. E. long. 59° to 108°, including a confiderable part of Siberia. Tobolfk is the capital.

TOBORON, a town of Thibet; 53 miles N. of Tourfan Hotun.

TOBOSO, El, a town of Spain, in New Caftile; 37 miles S. of Huete.

TOBRONA, a town of the ifland of Cuba; 148 miles S.W. of Havannah.

TOBRUS, in *Ancient Geography*, a town of Africa Propria, in the number of thofe fituated between the river Bagradus and the town of Thabraca. Ptolemy.

TOBULLA, in *Geography*, a town of Africa, on the E. coaft of Tunis; 8 miles N.W. of Medea.

TOBY, a town of Sweden, in Eaft Bothnia, near the Gulf; 20 miles N. of Chriftianfand.

Toby's *Creek*, a river of Pennfylvania, which runs into the Allegany, N. lat. 41° 8′. W. long. 79° 40′.

TOCA, a central town of New Granada, E. of Bogota, the capital.

TOCAIGH, a bay on the W. coaft of the ifland of Owhyhee: the depth of water was 25 fathoms; the bottom a ftiff clay, and good holding ground, incommoded by a patch of rocky bottom, which was found to fhoal fuddenly, and the depth to decreafe to 7, 4, and 3 fathoms, about the fourth of a mile to the fouth-weftward of the anchoring-place; and confequently to be a very great inconvenience to the roadftead, which at beft, in the opinion of captain Vancouver, is but a very indifferent one, being entirely expofed to the north-weft winds, and the weftern oceanic fwell, which beats with great violence in the reefs that encompafs the fhores. Thefe reefs ftretch out a mile or upwards, leaving between them and the land a narrow channel, that affords comfortable and commodious landing for fmall boats and canoes; but the landing is at too great a diftance from the place of anchorage to allow of profecuting any debarkation from the fhip. N. lat. 20° 3′. E. long. 204° 4′.

TOCAIMA, a central town of New Granada, in the immediate proximity of Bogota, the capital, and W. of it: founded in 1544, at fome diftance from the river Poti, called Bogota, not far from its confluence with the river Magdalena. Its fituation is bad, expofed to great heats, and numerous venomous creatures, and even deftitute of water. But the diftrict is very fertile in cacao, tobacco, fugar, maize, yucas, plantains, potatoes, &c. and the fifh are abundant in the rivers of Bogota and Fufagafuga, though there be many alligators. The inhabitants, about 700, are moftly poor. Here are mines of excellent copper, though not worked.

TOCANTIN's River, a river of South America, formed by the union of a number of fmall rivers in Brafil, which rife about the 18th or 19th degrees of fouth latitude, and between the 50th and 51ft degrees of weft longitude. Its courfe is due north to the 2d degree of fouth latitude, when it joins the Guanapu, about 120 miles from the fea, and takes the name of Para, from a city fo called.

TOCAT, or Tokat, a city of Afiatic Turkey, in the pachalic of Sivas, anciently a city of Pontus, called *Berifa*. It is fituated on the river Tofanlu, in the corner of a valley, and almoft furrounded with mountains, which afford quarries of marble, and well fupplied with water from innumerable fprings. On the top of a lofty rocky mountain, on the W. fide of the town, are the remains of an old caftle. The ftreets are well paved, but frequently built on uneven ground. The houfes are tiled, and moftly built with wood. It is the refidence of a cadi, a waiwode, and an aga, commanding a thoufand janizaries, and fome fpahis. The inhabitants are computed to be 60,000, confifting of 20,000 Turkifh families, 4000 Armenians, and about 400 families of Greeks. The Armenians have feven churches, the Greeks only one. The Armenians make an excellent wine, refembling claret in flavour, but ftronger. Fruits are abundant in this town, and the grape-vines are excellent. It is the fee of a metropolitan, dependent on the archbifhop of Niefara, or Neocæfarea, an ancient city, almoft ruined, about two days' journey from Tocat. Here are fome manufactures of filk and yellow Turkey leather; but the chief trade is in copper veffels, kettles, candlefticks, &c. which are fent to Conftantinople, Egypt, &c. Tocat may be confidered as the centre of trade of Afia Minor. The copper is obtained from the mines of Gumifcana, at the diftance of three days' journey from Trebifond, and from thofe of Caftan Boal, yet richer, and fituated ten days' journey from Tokat, on the W., towards Angora. The caravans from Diarbek arrive in eighteen days, from Sinob in fix, from Burfa in twenty, from Smyrna in twenty-feven, and proportionally lefs on horfeback, or on mules; 40 miles N.W. of Sivas. N. lat. 39° 35′. E. long. 36° 30′.

TOCAYO. See Tocuyo.

TOCCATA, Ital. from *toccare, to touch:* to prelude, to touch an inftrument, to play a fhort movement extempore, previous to the performance of a regular piece.

TOCCATINA, a fhort prelude, or trial of an inftrument.

TOCCAVIENSIS Bolus, *Bole of Tokay*, in the *Materia Medica*, a fine medicinal earth, dug about Tokay in Tranfylvania, and efteemed a powerful aftringent. Kentman calls it the *bolus Pannonica vera;* and Crato, *bolus Hungarica*.

This laft author efteemed it fuperior even to the bole armenic of Galen, and had a great opinion of it in malignant fevers. It is a fine and pure earth, and very heavy, moderately compact in its texture, but not very hard; and in colour of a confiderably deep and ftrong yellow. It is naturally of a fmooth furface, and does not ftain the fingers in handling. It ferments violently with acid menftrua, and does not become red in burning. Hill. See Bole.

TOCHEN, in *Geography*, a town of Germany, in the principality of Anhalt Zerbft; 5 miles W. of Zerbft.

TOCHU, a town of Africa, in the kingdom of Quoja.

TOCKAY, in *Zoology*, the name of a fpecies of Indian lizard, diftinguifhed from the other kinds, by being fpotted all over.

TOCKSDORF, in *Geography*, a town of Pruffia, in the province of Bartenland; 6 miles N.W. of Raftenburg.

TOCMIA, in *Ancient Geography*, a town of Arcadia, in the fouthern part to the N.W. of Megalopolis, and E. of the Alpheus. It ftood upon an eminence; but it was in ruins in the time of Paufanias.

TOCMOL, in *Natural Hiftory*, a name given by fome to the common turtle.

TOCOCA, in *Botany*, a Caribbean name, ufed by Aublet.—Guian. 437. t. 174. Juff. 330. See Melastoma.

TOCOLOSIDA, in *Ancient Geography*, a town of Africa, in Mauritania Tingitana. Ptolemy. The Itinerary marks it 48 miles from Tingis, and three miles from Volubilis.

TOCORARY, or Tukorari, in *Geography*, a town of Africa, in the country of Ante; 10 miles E. of Infuma.

TOCORT. See Tuggurt.

TOCOSANNA, in *Ancient Geography*, a river of India, on the other fide of the Ganges. Ptolemy places its mouth in the Ganges.

TOCOYENA, in *Botany*, an unexplained name.—Aubl. Guian. 131. t. 50. Juff. 201. Lamarck Illuftr. t. 163.

See

See Gardenia, of which this is probably a fpecies. The author calls his only fpecies *T. longiflora*, and his defcription contains the following particulars.

The *ftem* is three feet high, erect, fimple, leafy, fcarcely fhrubby. *Leaves* oppofite, erect, pliant, fifteen inches long, lanceolate, entire, fmooth, tapering at each end, on fmooth *footftalks*, about an inch and half in length, attached to a pair of triangular, acute, combined, intrafoliaceous *ftipulas*. *Flowers* about fourteen in a terminal head, in oppofite feffile pairs, each flower accompanied by two fmall fcaly *bracteas*. *Calyx* fuperior, bell-fhaped, in five fmall fegments, meafuring with the *germen* not more than four lines. *Corolla* with a yellowifh cylindrical tube, as thick as a goofe-quill, and nine or ten inches long, dilated at the throat, and terminating in a white bell-fhaped limb, with five ovate, equal, fpreading fegments. *Anthers* nearly feffile, between the fegments of the corolla, oblong, incumbent. *Germen* oval, inferior. *Style* capillary, the length of the tube, tumid and hairy for an inch below the top. *Stigma* of two large, compreffed, oval lips, included within the throat of the corolla. *Berry* oval, an inch long, crowned with the calyx, of two cells, with numerous roundifh *feeds*, imbedded in vifcid pulp. The *flowers* have a very fweet fmell. Aublet met with feveral plants of this fpecies in the wood of Aroura in Guiana, flowering in Auguft.—All the leaves were perforated or gnawed by infects. His dried fpecimen of the flower is as black as ink. If *mannia* of Thunberg and Salifbury be diftinct from *Gardenia*, the prefent plant fhould feem to belong to the former.

TOCRUM, in *Geography*, a town of Bengal; 8 miles S. of Koonda.

TOCRUR, a town of Africa, and capital of a kingdom, in Nigritia, on the north fide of the Niger, W. of Cafhna; 270 miles E.N.E. of Tombuctoo. N. lat. 16° 32′. E. long. 6° 5′.

TOCSON Hotun, a town of Thibet; 20 miles W.S.W. of Tourfan. N. lat. 43° 26′. E. long. 89° 14′.

TOCUYO, a city of South America, in the government of Venezuela, fituated in a valley formed by two mountains. Its divifion and conftruction are very regular: the ftreets are on a line, and fufficiently wide. It has a well-built parifh church, on which depends a chapel of eafe. The Francifcans have one monaftery, and the Dominicans another. It is governed by a common-council. The climate is rather cold than hot; and though the fky is often overcaft, the air is wholefome. The inhabitants are graziers, agriculturifts, artifans, and traders. The wheat of its vicinity is reckoned the beft in the province, and furnifhes fufficient for the confumption of many towns of the interior. They export from 8000 to 10,000 quintals of flour. From the wool of their fheep they fabricate coverlids, and other cloths, which they carry as far as Maracaibo and Carthagena. They have alfo tanneries and taweries, and, like the inhabitants of Carora, work up as many as they can of the raw materials, and fell the reft. Another article of commerce, very lucrative to the citizens of Tocuyo, is falt, which they bring from the falt-ponds of Coro. In this city are reckoned 10,200 perfons, who are reproached with the crime of fuicide. Tocuyo is 90 leagues diftant S.W. of Caraccas, and 20 leagues N. of Truxillo. N. lat. 9° 35′. Long. W. of Paris 72° 40′.—Alfo, a river of Venezuela, which difcharges itfelf into the fea, 25 leagues E. of the Gaigues, which runs 16 leagues W. of Coro. The fource of Tocuyo is about 15 leagues S. of Carora, upwards of 60 leagues from the fea. It is navigable as far as Banagua, a village fituated on its banks, at the diftance of 40 leagues from its mouth. Its vicinity furnifhes abundance of timber of the largeft fize, and fit for every kind of building. Depons, vol. i. and ii.

TOD *of Wool* is mentioned in the ftatute 12 Car. II. c. 32. as a weight containing twenty-eight pounds, or two ftone. See Weight.

Some will have the word derived from the French, *toilet*, a wrapper, within which, by ufage, two ftone of wool are folded.

A laft of wool contains 12 facks, a fack 2 weighs, 13 tods, 26 ftone, 52 cloves, or 364 pounds.

Tod-*Head*, in *Geography*, a cape on the eaft coaft of Scotland, in the county of Kincardine; 5 miles S. of Stonehaven. N. lat. 56° 51′. W. long. 2° 11′.

TODDALIA, in *Botany*, Juff. 371. Poiret in Lam. Dict. v. 7. 693, a barbarous name made out of the Kaka-toddali of Rheede, Hort. Mal. v. 5. 81. t. 41. (See Scopolia.)—Todda, with fome addition, is the appellation of other Indian plants, as Todda-pana of *Cycas circinalis*, and Todda-vaddi of *Oxalis fenfitiva*. We humbly hope that the worthy M. Poiret, who is fo highly difpleafed at our wifhing to retain a *Scopolia*, will approve of our having fo much laboured to eftablifh a Poiretia. See that article.

TODDA-PANA, the name by which many authors call the *palma farinifera*, or fago-tree.

TODDINGTON, or Tuddington, in *Geography*, an ancient market-town in the hundred of Manfhead, and county of Bedford, England; is fituated five miles N. by W. from Dunftable, and 39 miles N.W. by N. from London. A market was originally held here on Thurfdays, by a grant from king Henry III. in 1218; but this was changed to Saturday, by a charter of Edward II. in 1316, which was confirmed by Richard II. in 1385. In 1681, the market was fo confiderable, that fixteen butchers rented ftalls in the market-place. It gradually declined, and of late years has been wholly difcontinued. The market-houfe was pulled down in 1799, and the materials fold. It is probable, that it had been before difcontinued, and afterwards revived, as Leland does not include Toddington in the lift of the market-towns in Bedfordfhire. A fair was granted by the charters of 1218 and 1316: five are now held in the year. The population return of the year 1811, ftates the parifh to contain 259 houfes, and 1143 inhabitants. The manor of Toddington was given by William the Conqueror to Ernulfus de Hefdin, anceftor of the earls of Perch. On the death of the laft earl, in 1216, it devolved to the earl of Pembroke, and from him to Paulinus Peyvre, fteward of the houfehold to Henry III. From the Peyvre family, the manor defcended to fir Thomas Cheney, K. G. whofe fon, Henry, was knighted by queen Elizabeth in 1563, fhe being then on a vifit to him at Toddington. In 1572, fhe created him lord Cheney. Lord Cheney built a noble manfion at Toddington, of which nothing now remains but the kitchen, which is remarkably fpacious. Toddington church is a handfome ftructure; the frieze, on the outfide, is decorated with grotefque figures of animals. The fouth tranfept contains fome ancient monuments of the Peyvres, and alfo thofe of the Cheneys. The north tranfept was the burial-place of the Wentworths, and contains two monuments to lady Maria, and lady Henrietta Wentworth, on each of which 2000*l*. were expended. Both tranfepts are in a fhameful ftate of dilapidation. In the year 1443, an hofpital was founded at Toddington, by fir John Broughton, for three poor men, and a mafter or chaplain, who was to pray for the fouls of the Peyvre family. There are now no traces of the hofpital: the ftones were ufed in building the market-houfe. Lyfons's Magna Britannia, vol. i. Bedfordfhire, 1806.

TODDIPOODY, a town of Hindooftan, in the circar of Rajamundry; 18 miles E.S.E. of Rajamundry.

TODDY, or Toddi, is a juice drawn from various kinds of palms, by cutting off the branch intended by nature to produce fruit, and receiving from the wounded branch the fap which was defigned for the nourifhment of the future crop. But as toddy, although fweetifh when firft drawn, is in a ftate of fermentation in the courfe of 24 hours, acquiring an intoxicating quality, and thus becomes four and harfh, it could not have been the palm-wine of the ancients; which muft have kept for fome time, as it was carried on the rivers during voyages of many days, and even appears to have been ftored up. Toddy is ufed with molaffes, rice, and other ingredients, in the diftillation of *Arrack;* which fee. The toddy of the date-tree is faid to be of an inferior quality to that from fome other kinds of palms. The palm-wine was made in Babylonia, where palms abounded, of the fruit of the palm-tree. This was fweet to the tafte, but apt to give the head-ache. The palm, as Herodotus informs us (Clio, c. 193.) produced to the inhabitants of Babylonia, bread, wine, and honey. The wine muft have been very plentiful, for he fays that the boats which defcended the Tigris from Armenia, fome of which were very large, were loaded with palm-wine as the principal article of their commerce. We derive fimilar information from Xenophon, who fpeaks of the floats that paffed the Euphrates at Carmanda, and the Tigris at Cænæ. We learn, from the travels of M. Burckhardt in Nuba (Nubia) in 1813, that the practice of making wine as an article of commerce is difcontinued in Mefopotamia and Babylonia, where the date-trees abounded, and where the profufion of fruit rendered wine fo plentiful, becaufe in modern times the want of a proper diftribution of water for irrigation, has left only a fmall proportion of date-trees; and hence it is probable, that none of the fruit can be fpared from the neceffary demand for food. Kæmpfer is filent on the fubject of palm-wine; and this circumftance fatisfactorily proves the difcontinuance of the practice of making it in thofe countries. M. Burckhardt tells us, that in all the larger villages of Nubia, the ufe of palm-wine is very common; and at Derr, the reputed capital of the country, a great quantity of fpirit is confumed. The wine, he fays, does not tafte amifs; but it is too rich and too thick to be drank with pleafure. When the date-fruit has acquired its full maturity, it is thrown into large earthen boilers, and left to boil without interruption for two or three days. It is then ftrained, and the clear juice put into earthen jars, well clofed and buried in the ground, where it ferments. It is left ten or twelve days under ground; at the expiration of which time it is fit to drink. It keeps for twelve months, and then turns four. The aqua-vitæ made from dates is of a very good quality, and keeps well for years. People of the upper claffes at Derr are every evening intoxicated either with date-wine or fpirits, of which great quantities are confumed. They are fold openly. From Siout, fouthward, through Upper Egypt, date-fpirits are made and publicly fold; the pacha receiving a tax upon it from the inn-keepers: they alfo make a kind of jelly or honey from the dates, which ferves for a fweetmeat.

Toddy-*Tree.* See Mammee-*Tree.*

TODEA, in *Botany*, a fuppofed genus of ferns, dedicated by Willdenow to the memory of the Rev. Henry Julius Tode, a clergyman of Mecklenburg, who died in 1797, aged 64. He is diftinguifhed among cryptogamic botanifts, as the author of an accurate and practical work, in quarto, with numerous plates, entitled *Fungi Mecklenburgenfes Selecti*, publifhed at Lunenberg, in 1790, to which the reader will find frequent references in our feveral articles relating to the order of *Fungi.* This genus, however, is funk in Osmunda; fee that article, n. 3.

TODENDORP, in *Geography*, a town of the duchy of Holftein; 6 miles N.E. of Hamburgh.

TODI, Maria Francisca, in *Biography*, born in Portugal in 1748, arrived in England in 1777, with Jermoli, as firft woman in the comic opera. She muft have improved extremely after fhe left this country, where fhe remained only one feafon, and was little noticed; her voice being feeble, and feldom perfectly in tune. But fhe afterwards became the moft captivating finger for tafte and expreffion in cantabile airs, in France and Germany (according to report), that ever appeared in Europe. She was taught by Perez.

Todi, in *Geography*, a town of the Popedom, in the duchy of Spoleto, near the Tiber, the fee of a bifhop, immediately under the pope. It contains feveral churches and convents; 18 miles W. of Spoleto. N. lat. 42° 47′. E. long. 12° 18′.

TODIALOOR, a town of Hindooftan, in the country of Coimbetore; 5 miles N. of Coimbetore.

TODIVESTI, a town of Moldavia; 6 miles N.E. of Saczava.

TODOROVA, a town of Croatia; 18 miles W.N.W. of Novi.

TODOS Santos. See All-*Saints*.

TODS, a town of the ftate of Virginia; 9 miles E.N.E. of Hanover.

TODTENVOGEL, in *Ornithology*, a name by which Gefner and fome other authors have called that fpecies of œnanthe, known in England by the name of the *ftone-chatter, ftone-fmich*, or *moor-titling.*

TODTIBERG, in *Geography*, a mountain of Switzerland, and reckoned one of the higheft in the country, in the road from Difentis to the Grifons.

TODUCÆ, in *Ancient Geography*, a people of Africa, in Mauritania Cæfarienfis, towards the fource of the river Ampfaga.

TODUS, Tody, in *Ornithology*, a genus of the order Picæ, the characters of which are, that the bill is awl-fhaped, fomewhat depreffed, obtufe, ftraight, and at its bafe befet with briftles; the noftrils are ovate and fmall; the feet are formed for walking; and the outer toe is connected at the bafe to the middle one.

Species.

Viridis. Green, with a red breaft: the green tody. Found in the warmer parts of America, and the neighbouring iflands.

Cinereus. Afh-coloured, with the under part yellow: the *Tie-tie* of Buffon; the grey and yellow fly-catcher of Edwards. Found in open places of Surinam and Guiana.

Fuscus. Ferruginous, under part olive-coloured, fpotted with white; the tail ferruginous, and wings croffed with a blackifh bar. Found in South America, lefs than the green.

Cæruleus. Blueifh, with white throat; temples, throat, and abdomen orange. Found in America, of the fize of the green.

Varius. Varied with blue, black and green; the bill, head, throat, neck, feet, nails, and tail black; the margin of the tail, and the coverts of the wings, green. Found in India.

Leucocephalus. Black, the head fubcriftated; throat and upper part of the neck white: white-headed tody of Latham. Found in America.

Brachyurus. Black, the vertex, neck, back, and ſhort tail black: the ſhort-tailed tody of Latham. Found in America.

Plumbeus. Above lead-coloured hoary, beneath milky; the crown, wing-feathers, and tail black: plumbeous tody of Latham. Found in Surinam.

Obscurus. Above brown and black, underneath very ſordid white, with pale throat: the duſky tody of Pennant and Latham. Found in Rhode iſland.

Regius. Black and brown; the breaſt whitiſh, ſtriated tranſverſely with blackiſh; the throat and eye-brows white; the abdomen, rump, and tail red; the creſt ferruginous at the apex, tipped with black: king tody of Latham. Found in Cayenne.

Paradiseus. Creſted head black; body white; tail wedge-formed; the intermediate tail-feathers very long: pied bird of paradiſe of Edwards, and paradiſe fly-catcher of Latham. It has the following varieties; *viz.* the tody with wings and tail pale-red; the tody underneath white, the breaſt from cæruleſcent to cinereous; and the Braſilian creſted tody. Found in Africa and the iſland of Madagaſcar.

Ferrugineus. Ferruginous-black, underneath ferruginous; wing-feathers marked with a brown bar; cheeks ſpotted with black and white: the ferruginous-bellied tody of Latham. Found in Cayenne.

Novus, or Gularis. Brown, underneath white; throat white, and breaſt ſpotted with brown, above yellow: white-chinned tody of Latham.

Platyrhynchos, or Rostratus. Brown-yellowiſh, beneath yellow, throat whitiſh; vertex lead-coloured, with a white ſpot upon it; wings and tail brown; bill very broad: the broad-billed tody of Latham.

Macrorhynchos, or Nasutus. Black, bill very broad; chin, ſides of the cheeks, abdomen, vent and rump red: the great-billed tody of Latham.

Rubecula. Cinereous, with orange throat and breaſt, and white abdomen: the red-breaſted tody of Latham. Native of New Holland.

Xanthogaster, or Flavigaster. Brown-cinereous, ſix inches long; beneath luteous, with pale bill: the yellow-bellied tody of Latham. Native of New Holland.

Cristatus. Creſt crimſon; body brown, ſpotted with white. Found in Guinea.

TOEBAN, in *Geography*, a town on the N. coaſt of the iſland of Java.

TOELCHUS *de Apie*, a diſtrict of South America, in the country of Patagonia.

Toelchus *de la Caballo*, a diſtrict of South America, in the country of Patagonia.

TOE-LING Hotun, a town of Chineſe Tartary; 375 miles E.N.E. of Peking. N. lat. 42° 22′. E. long. 123° 29′.

TOENDE, in *Commerce*, a corn meaſure in Denmark, equal to 8 ſcheffels or ſkiepers, or 32 foertels or fierdingers, and 12 toendes = a laſt: 100 toendes of Copenhagen, anſwer to about $49\frac{1}{2}$ Engliſh quarters. A laſt of Spaniſh ſalt, or of coals, contains 18 toendes, and the toende = 8 ſkiepers or 176 pots, which contain $5\frac{1}{2}$ Daniſh cubic feet; but Norway ſalt is ſold by weight, and the toende muſt weigh 250 lbs. Daniſh weight, or 275 lbs. avoirdupois. A laſt of French ſalt, or of lime, contains 12 toendes, corn meaſure; a laſt of oil, butter, and other fat ſubſtances, is 12 toendes, beer meaſure; and a toende of beer muſt hold $4\frac{1}{4}$ Daniſh cubic feet, or 136 pots. By a tonne or toende of hard corn is meant as much land as can be ſown with 1 toende of rye, 1 of barley, and 2 of oats. What is called a toende of ſaatland or arable land is the fourth part of the above, and contains $563\frac{1}{7}$ Daniſh ſquare ruthes, or 220 Engliſh ſquare perches. Thus the toende of hard corn is = $5\frac{1}{2}$ Engliſh acres. A Daniſh ſquare foot contains about 153 Engliſh ſquare inches; or 16 Daniſh ſquare feet = 17 Engliſh ſquare feet nearly.

TOENII, in *Ancient Geography*, a people of Germany, in the vicinity of a lake, which was common to them, the Rhætians, and Vindelicians. Ptol.

TOENJOLOKER, in *Geography*, a ſmall iſland in the Eaſt Indian ſea. S. lat. 5° 30′. E. long. 132° 32′.

TOES, by anatomiſts called *digiti pedis*, are the extreme diviſions of the feet, anſwering to the fingers of the hand, and reſembling them in figure, and make the third part of the foot. See Extremities.

Toes, *Adheſions of the.* It is a frequent thing to meet with new-born infants with their fingers or toes cohering or growing together, either by a ſtrict adheſion of the fleſh, or elſe by ſome looſe productions of the ſkin, as in the feet of ducks and geeſe; and a diſorder of the ſame kind is alſo ſometimes found in adults, from accidents; as when the fingers or toes have been neglected, after an excoriation of them by burns or wounds. In both theſe caſes the ſurgeon's aſſiſtance is neceſſary, partly to remove the deformity, and partly to reſtore the proper uſe of the fingers.

Theſe adheſions, according to the nature of the diſorder, are to be ſeparated by cutting out the intermediate ſkin, or elſe barely by dividing them from each other with a pair of ſciſſors. When this is done, to prevent their coheſions again, each finger muſt be inveſted ſeparately with a ſpiral bandage about an inch broad, dipped in lime-water and ſpirit of wine.

Sometimes the fingers, inſtead of adhering to each other, grow to the palm of the hand, from wounds or burns, ſo that they cannot be by any means extended, or drawn back to open the hand. The method of relieving this diſorder is firſt very carefully to ſeparate the fingers from the adheſions of the palm, without injuring their tendons, then dreſs them with a vulnerary balſam, and ſcraped lint, and extend them on a ferula or thick paſte-board; and let them remain in this extended poſture, ſeparately to be dreſſed till they are perfectly healed; but at every dreſſing they muſt be gently moved, to prevent a rigidity or ſtiffneſs of the joints. Heiſter.

Toe, in the *Manege*, is the ſtay of the hoof upon the forepart of the foot comprehended between the quarters.

We commonly ſay the toe before, and the heel behind, in French *pince devant et talon derriere;* implying, that in horſes, the toe of the fore-feet is ſtronger than the toe of the hind-feet: and, on the other hand, that the heels behind are ſtronger than thoſe before; and accordingly, in ſhoeing we drive higheſt in the toes of the fore-feet, and in the heels of the hind-feet.

A horſe that does not reſt his hind-feet all equally upon the ſhoe, but raiſes his heels, and goes upon the toes of his hind-feet, is called in French *rampin.*

Toe-*Head*, in *Geography*, a cape of the county of Cork, Ireland, not far from the Stags of Caſtlehaven. N. lat. 51° 27′. W. long. 9° 9′.—Alſo, a cape of Scotland, on the S.W. coaſt of the iſland of Lewis, in that part called Harris; 42 miles S.W. of Stornaway. N. lat. 57° 50′. W. long. 7° 5′.

Toe-*Shell*, in *Conchology*. See Pollicipes.

Toe-*Stick*, in *Agriculture*, the ſtick or bar which confines that part of ſmall carts in its place, that contains the load, but which, on being ſlipped out, lets that or a part of it be diſcharged. It has been obſerved in the Corrected Agricultural Report of the County of Norfolk, that Mr. Overman,

Overman, of Burnham, in that diſtrict, has made an improvement in his carts of this kind: inſtead of the toe-ſtick drawing out to let the back or framed part of the cart tilt up, and deliver the load or part of it, this contrivance turns in the centre on a pivot, and the hooks which confine it at the ends, are each in a poſition the reverſe of the other, by means of which it is expeditiouſly effected.

TOESA, in *Commerce*, a long meaſure in Spain; the toeſa or braza is 2 varas, or 6 feet, that is, $66\frac{3}{4}$ Engliſh inches; a paſo or pace, is 5 feet; an eſtadal, 12 feet, or 4 varas; and a cuerda, $8\frac{1}{2}$ varas.

TOESCHI, Alessandro, in *Biography*, the head of a celebrated muſical family from Romania, ſettled at Munich, who in 1756 was appointed concert-maſter to the elector of Bavaria's eccleſiaſtical band.

Toeschi, Charles Joseph, after being director of the chamber-muſic of the court of Bavaria, in 1756 was appointed firſt violin in the famous band of the elector palatine at Manheim. He was ſeven years concert-maſter, and engaged in other honourable profeſſional employments about the court of Manheim till 1786. In 1766 he publiſhed at Paris ſix ſymphonies; violin quartets; and flute concertos. About the ſame time, ſix violin duets, and other works at Amſterdam. His ſtyle is full of fire, new effects, and in ſlow movements, grace and elegance. He was a diſciple of the great Stamitz, and died at Manheim in 1788, in the 60th year of his age, leaving behind him an excellent private character.

Toeschi, John, concert-maſter at Manheim, and an admirable performer on the violin. He was one of the principal ornaments of the famous court-band in 1756.

Toeschi, Susannah, a ſinger of great merit in the ſervice of the court at Munich, brought up under Holtzbauer, the maeſtro di capella to the elector palatine.

TOESOBIUS, in *Ancient Geography*, a river of the iſle of Albion, which had its mouth, according to Ptolemy, on the weſtern coaſt, between the gulf Sereia and the promontory Ganganorum: probably the river Conway.

TOE-YAH-YAH, in *Geography*, a bay of Owhyhee, one of the Sandwich iſlands, extending along the whole coaſt from the weſternmoſt point, to the northern extremity of the iſland, and bounded to the N. by two very conſpicuous hills. Towards the bottom of the bay there is foul, corally ground, extending upward of a mile from the ſhore, without which the ſoundings are regular, with good anchorage, in twenty fathoms. Cook's Third Voyage, vol. iii.

TOFIELDIA, in *Botany*, was ſo called by the late Mr. Hudſon, after his correſpondent Mr. Tofield, who reſided in the neighbourhood of Doncaſter, and to whom Britiſh botaniſts are indebted for the diſcovery of *Vicia bithynica*, the original ſpecimens of which are preſerved in his herbarium, now belonging to William Younge, M.D. F.L.S. of Sheffield, Yorkſhire.—Hudſ. Angl. ed. 2. 157. Sm. Fl. Brit. 397. Dryandr. in Ait. Hort. Kew. v. 2. 324. Purſh 246. Kunth Nov. Gen. et Sp. Pl. v. 1. 267. (Anthericum; Linn. Gen. Pl. ed. 1. 106, but not of the ſubſequent editions. Narthecium; Ger. Gallopr. 142. Juſſ. 47. Michaux Boreal.-Amer. v. 1. 209. Lamarck Illuſtr. t. 268.)—Claſs and order, *Hexandria Trigynia*. Nat. Ord. *Tripetaloideæ*, Linn. *Junci*, Juſſ.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, membranous, three-cleft, ſmall, permanent. *Cor.* Petals ſix, oblong, concave, equal, ſpreading, permanent, many times longer than the calyx. *Stam.* Filaments ſix, oppoſite to the petals, awl-ſhaped, ſimple, ſmooth, about the length of the corolla; anthers incumbent, roundiſh-heartſhaped. *Piſt.* Germens three, ſuperior, converging, pointed, terminating in as many ſhort, diſtant, vertical ſtyles; ſtigmas capitate. *Peric.* Capſules three, connected at the baſe, gibbous, keeled, membranous, of one cell and two valves, burſting chiefly at the inner edge. *Seeds* numerous, elliptic-oblong, angular, inſerted into the inner margin of each valve.

Eſſ. Ch. Calyx three-cleft. Petals ſix, equal. Styles vertical, ſhort. Capſules three, ſuperior, combined at the baſe. Seeds numerous. Anthers roundiſh.

The ſmall membranous permanent calyx, more or leſs diſtantly ſeparated from the other parts of the flower by an elongation of the baſe of the latter, is the very peculiar character of *Tofieldia*. By this it is diſtinguiſhed from Helonias, Narthecium and Anthericum, with all which it has been confounded; ſee thoſe articles. *Helonias* moreover has a ſimple germen and capſule, with very few ſeeds. *Narthecium* and *Anthericum* have each a ſimple ſtyle; the former hairy filaments, and tunicated ſeeds; the latter angular ſeeds.

Five of the ſix ſpecies, now known to compoſe the genus before us, have been confounded together as one. We ſhall give their characters, and moſt eſſential ſynonyms. The whole hiſtory of the miſtakes which have embroiled the ſynonyms and characters, both generic and ſpecific, of *Tofieldia*, have lately been detailed, more at length than ſuits our purpoſe here, in a paper communicated to the Linnæan Society by the writer of the preſent article.

The ſpecies are all perennial and herbaceous, with ſimple *ſtems*, ſpiked, or generally cluſtered, *flowers*, ſword-ſhaped, equitant, moſtly radical, *leaves*, the habit of the whole very nearly according with *Narthecium*. The *ſeeds*, in ſome inſtances, betray an affinity to that genus, in a little membranous appendage at each extremity, as may be ſeen in our *T. alpina*.

1. T. *paluſtris*. Scottiſh Aſphodel, or Marſh Tofieldia. Hudſ. n. 1. Fl. Brit. n. 1. Ait. n. 1. Engl. Bot. t. 536. (T. puſilla; Purſh n. 1. Anthericum calyculatum; Linn. Sp. Pl. 447. Fl. Lapp. ed. 2. 106. t. 10. f. 3. Fl. Dan. t. 36. Lightf. Scot. 181. t. 8. f. 2. Helonias borealis; Willd. Sp. Pl. v. 2. 274.)—Head of flowers ovate. Stem ſmooth, thread-ſhaped, leafleſs. Petals obovate, obtuſe Germens roundiſh.—Native of bogs, and the margins of rivulets, on the mountains of Lapland, Scotland, Durham, and North America, flowering about July. A little ſmooth plant, of a deep green, with a ſlender ſolitary *ſtem*, from four to ſix inches high, naked, except an occaſional ſmall leaf at the baſe. The radical *leaves* are two inches long, erect, forming ſeveral tufts. *Flowers* ſmall, pale green, in a ſolitary ovate-oblong denſe head, ſcarcely more than half an inch in length, often much leſs. There are hardly any diſcernible *bracteas*, the *calyx* being cloſe to the main ſtalk, and divided down to the baſe, into three ſmall, acute, membranous ſegments. The reſt of the *flower* is elevated on a ſhort ſtalk within the calyx, which, as the fruit advances, becomes very conſpicuous. The *capſules* are obovate, each about the ſize of muſtard-ſeed, crowded together into a globular form, minutely pointed, and crowned by the ſtyles.

Michaux and Purſh, miſtaking what we ſhall next deſcribe, for the true Linnæan *Anthericum calyculatum*, juſtly conſidered this as a new ſpecies. A little examination, of the *Flora Lapponica* in particular, would have prevented this error, though all writers upon European plants have hitherto confounded the two ſpecies in queſtion.

2. T. *alpina*. Alpine Tofieldia. Sm. MSS. n. 2. (T. paluſtris; Redout. Liliac. t. 256. Narthecium iridifolium; Villars Dauph. v. 2. 225. N. calyculatum; Allion. Pedem.

v. 2.

v. 2. 165. Poiret in Lamarck Dict. v. 4. 431, the fynonyms confufed. Phalangium alpinum paluftre, iridis folio; Tourn. Inft. 368. Segu. Veron. v. 2. 61. t. 14, copied in Lamarck's t. 268. Pfeudo-afphodelus fecundus; Cluf. Hift. v. 1. 198. Afphodelus Lancaftriæ verus; Ger. Em. 96.) —Clufter cylindrical. Bracteas nearly equal in length to the flower-ftalks. Stem fmooth, bearing two leaves. Petals obovate. Germens oblong.—Very common in moift graffy paftures, or the margins of rivulets, on the Alps of Auftria, Switzerland, Italy, Savoy and Dauphiny, flowering in Auguft. We know not of its having ever been obferved in Britain, notwithftanding the name in Gerarde's herbal, which is mifapplied to the figure of this plant, and properly belongs to *Narthecium offifragum*, exhibited in the preceding page of the fame book. Linnæus knew the prefent fpecies by its fynonyms only, cited, with marks of well-founded doubt, in his *Fl. Lapp.* He was led by Dillenius to efteem it a mere variety of the foregoing, an opinion generally adopted ever fince, but certainly for want of due enquiry. The *alpina* is not only twice the fize of *paluftris*, with a thicker more woody *root*, but the *ftem* always bears two diftant *leaves*. The *flowers* form a *clufter*, not a head or fpike, from one to two inches long, often interrupted, with a concave *bractea* at the bafe of each *ftalk*, about its own length. *Calyx* clofe to the reft of the flower, rather flightly three-cleft. *Petals* more yellowifh. *Capfules* oblong, combined almoft all the way up, thrice as large as in *paluftris*. As the *fruit* advances, the partial ftalks become ftill more evident than in the flower.

3. T. *ftenopetala*. Narrow-petalled Tofieldia. Sm. MSS. —Clufter cylindrical. Bracteas overtopping the calyx. Stem fmooth, bearing two leaves. Petals lanceolate, acute. —Native of North America, where it was gathered by Kalm, whofe fpecimens were referred by Linnæus to his *Anthericum calyculatum*. They more agree with our *T. alpina*, in fize and habit, having two or three *leaves* on the *ftem*. The *clufter* is denfe and obtufe, an inch and a half long. *Bracteas* very different from that fpecies, being lanceolate, and always as long as the *partial ftalk* and *calyx* taken together; fometimes much longer. *Calyx* broad and fhallow, unequally notched. *Petals* greenifh-white, lanceolate, narrow and acute, not obovate. *Anthers* pointed. *Germens* tapering into ftyles twice the length of the foregoing. No doubt can exift of this being a moft diftinct fpecies. We find no indications of it in the works of Michaux or Purfh, nor is its precife place of growth known.

4. T. *cernua*. Drooping-flowered Tofieldia. Sm. MSS. (Anthericum n. 39; Gmel. Sibir. v. 1. 73. t. 18. f. 2.)— Clufter cylindrical. Flowers drooping. Bracteas very fhort. Flower-ftalks fmooth, the length of the corolla. Stem leaflefs.—Found by Gmelin in mountainous woods in Siberia, flowering late in July. This is a fpecies fo evidently diftinct from all the foregoing, that we cannot account for their having been confounded; except by fuppofing that Linnæus, not having fpecimens of each in fruit as well as in flower, too haftily confidered the various appearances before him, as caufed by different ftages of growth. The drooping *flowers*, and quite pendulous *fruit*, of the prefent plant are remarkable at firft fight; and the former are expreffed in Gmelin's figure. Thefe characters are too decided, in both our fpecimens, to be attributed to any accident in drying. The whole plant indeed is larger than any of the former three, with more creeping *roots*. *Stem* a foot high, or more, quite leaflefs, except at the very bottom, glaucous in the upper part. *Leaves* near three inches long, narrow, with a fmall oblique point, fuch as may be feen in fome of the leaves of moft of the fpecies, except *ftenopetala*, whofe foliage is peculiar for its long ftraight, taper points. *Clufter* erect, fmooth, two inches long while in flower, near four when in feed, rather lax, many-flowered, fcarcely interrupted. *Flower-ftalks* fpreading, flender, fcattered, about an eighth of an inch long, and ftill longer when the fruit is full-grown, having a little ovate *bractea* at the bafe of each, about a quarter the length of the ftalk. *Flowers* white, about twice the fize of *Convallaria bifolia*. *Calyx* with three fhallow lobes. *Petals* obovate, obtufe, flightly pointed, concave, the length of the flower-ftalks, and keeping pace with them in their fubfequent elongation. *Stamens* fhorter than the corolla, with yellow, heart-fhaped, pointlefs *anthers*. *Germens* ovato-lanceolate, with longifh *ftyles*. *Capfules* fhorter than the permanent corolla, obovate, membranous, but brittle, combined nearly all the way up, fo as to form a turbinate three-lobed fruit, crowned with the three fpreading *ftyles* and capitate *ftigmas*. *Seeds* minute, prifmatic.—Gmelin's fuppofed variety, taken from Steller, having a leafy *ftem*, is probably another fpecies. *T. cernua* is a very pretty plant, and we may hope that, in fome of the frequent importations from Siberia, it may be introduced into the gardens of England.

5. T. *pubens*. Downy American Tofieldia. Dryandr. in Ait. Hort. Kew. n. 2. (T. pubefcens; Purfh n. 2. Narthecium pubens; Michaux Bor.-Amer. v. 1. 209. Anthericum filamentis lævibus, perianthio trifido; Linn. Hort. Cliff. 140. Gron. Virg. ed. 1. 39. Afphodelus minor albus; Pluk. Mant. 29. Phyt. t. 342. f. 3.)—Clufter cylindrical, interrupted. Flower-ftalks aggregate, rough, the length of the corolla.—Found in the moift meadows, and moffy boggy woods, of Virginia and Carolina, flowering in July, according to Clayton and Purfh. This is moft like the laft in ftature and habit, but the roughnefs of the *flower-ftalks* and their *main ftalk*, effentially diftinguifhes it. The former grow three or four together, as if rather whorled than fcattered. The *flowers* are white, with yellow *anthers*, and appear to be always erect.

6. T. *glutinofa*. Vifcid Yellow Tofieldia. Purfh n. 3. (Narthecium glutinofum; Michaux Bor.-Amer. v. 1. 210.) —Clufter ovate, denfe. Flower-ftalks glutinous, rough, the length of the corolla. Anthers prominent, orbicular. —Gathered by Mr. Menzies on the weft coaft of North America. Michaux fays his plant is found from Quebec to lake Miftaffins. There is no room to fuppofe the latter different from our's, though the *Narthecium glutinofum* of Mr. Gawler, Curt. Mag. t. 1505, is very decidedly fo, being a real and evident *Narthecium*, not, like Michaux's, a *Tofieldia*. Purfh calls it *N. americanum*, p. 227, which name, though not one of the beft, we would fubftitute for *glutinofum* in our article NARTHECIUM, the plant not being glutinous. All reference to Michaux and his obfervations in that place are to be erafed. The plant is, according to Purfh, a native of boggy fields and woods, on the pine-barrens, as they are termed, of New Jerfey, flowering in June and July.

Our *Tofieldia glutinofa* has a tuberous horizontal *root*, with long fimple fibres. *Stem* a foot high, angular, roughifh all over with fhort glandular hairs, efpecially for two inches from the fummit. *Leaves* few, almoft entirely radical, four or five inches long, narrow, ribbed, fmooth, except a little roughnefs towards the point. *Clufter* about an inch in length, of twelve or fourteen pale-yellow *flowers*, on hairy vifcid ftalks, about a quarter of an inch long, fometimes in pairs, having at the bafe one or two acute *bracteas*, one-third that length. Lobes of the *calyx* fhallow. *Petals* obovate, rather fhorter than the ftamens. *Anthers* purplifh,

nearly

nearly orbicular, pointlefs. *Germens* ovate-oblong, tapering into longifh *ftyles*, with fmall *ftigmas*. The habit and hue of the plant are very fimilar to the European *Narthecium offifragum* as well as to the *N. americanum* above-mentioned.

7. T. *frigida*. Wintry Tofieldia. Kunth Nov. Gen. et Sp. Pl. v. 1. 267.—Clufter lax, partly fcattered. Flower-ftalks fmooth, twice the length of the bracteas. Petals rather acute. Stem fmooth, with three diftant ovate leaves towards the top.—Native of lofty fummits of the Andes, in the kingdom of Quito, between Loxa and the village of Ona, where it was found, by the celebrated travellers Von Humboldt and Bonpland, flowering in December. Having feen no fpecimen of this, we can only extract its characters from the defcription of our able friend Mr. Kunth, who unluckily was not acquainted with the technical differences of the other fpecies, fo that his fpecific character anfwers nearly equally well to any one of the genus. The *root* is perennial, perpendicular, branched. *Stem* about a foot high, round, fmooth, bearing in its upper part three ovate, acute, fmooth, diftant *leaves*, called by Mr. Kunth *bracteas*. *Radical leaves* two-ranked, fword-fhaped, ribbed, fmooth, rigid, three or four inches long. *Clufter* (erroneoufly termed *fpica*) folitary, erect, two inches long. *Flowers* on folitary partial ftalks, which are fmooth, round, two lines in length, with an ovate acute *bractea*, half as long, at the bafe of each. *Calyx* in three deep, ovate, acute fegments, one-fourth as long as the oblong, fharpifh, ftriated, whitifh *petals*. *Stamens* fhorter than the corolla, fmooth, with oblong upright *anthers*. *Germens* combined. The prefent fpecies may perhaps be neareft akin to our *T. ftenopetala*, differing effentially in having fhorter *bracteas*, to fay nothing of other diftinctions, which the reader will detect by the above defcription.—The author fpeaks of *Tofieldia* as monogynous, taking the *ftyles* for *ftigmas*, and not adverting, as it appears, to the partial feparation of either the *germens* or *capfules*. Hence we muft conclude that this feparation is here lefs remarkable than in the other fpecies, which brings the plant in queftion nearer to *Helonias*, the *calyx* being its only, though all-fufficient, diftinction.

TOFSALA, in *Geography*, a town of Sweden, in the government of Abo, on an ifland; 20 miles W.N.W. of Abo.

TOFT, TOFTUM, or *Tofta*, in our *Law-Books*, a parcel of land, or a place where a meffuage hath ftood, but is decayed, or cafually burnt, and not re-edified.

TOFT alfo fignifies a grove of trees.

TOFTA, in *Geography*, a fmall ifland in the Baltic, E. of the ifland of Aland. N. lat. 60° 13′. E. long. 20° 7′.

TOFTS, KATHARINE, in *Biography*, an Englifh finger of great renown on our ftage at the beginning of the laft century. In 1703, fhe fung at a fubfcription concert in Lincoln's-Inn theatre, feveral Italian and Englifh fongs. This lady was the conftant rival of Margarita de l'Epine.

In 1704, fhe fung at the fubfcription mufic in Drury-lane playhoufe; and foon after, fignora Margarita fung for the firft time at the fame theatre. At her fecond appearance, there was a difturbance while fhe was finging, which, from the natural, and, it is to be feared, not uncommon effects of rival malice, was fufpected to have been created by the emiffaries of Mrs. Tofts; an idea the more difficult to eradicate, as the principal agent had happened to live with that lady as a fervant. But as the law of retaliation is frequently practifed on the like occafions by the injured party, it was thought neceffary, a few days after, to infert a paragraph and letter in the Daily Courant, February 8, 1704, in vindication of Mrs. Tofts.

She was the principal finger in Clayton's Arfinoe, in 1705, the firft opera attempted in our country and language on the Italian model. See CLAYTON.

Mrs. Tofts was likewife the heroine of the famous opera of Camilla, of Addifon's Rofamond, fet by Clayton, and Thomyris, adjufted to Italian mufic, and wholly to Englifh words, till the arrival of Valentini, in 1707, the firft male foprano finger that ever appeared on our ftage; when Camilla and Thomyris were performed, half in Englifh and half in Italian. And even after the arrival of the celebrated Nicolini, when a new opera, entitled Pyrrhus and Demetrius, was brought on the ftage in 1708, in which almoft all the characters were filled up by Italians, Mrs. Tofts continued to perform her part in Englifh, as did Ramondon and Cook; but the public feemed perfectly fatisfied with the motley performance, which had a run of eighteen nights; and the confufion of tongues, concerning which Mr. Addifon is fo pleafant in the Spectator, feems to have been tolerated with perfect good humour by the public, which, in mufic as well as words, feemed to care much lefs about *what* was fung, than *how* it was fung.

After the year 1709, when the whole opera, poetry, mufical compofition and performers were Italian, Mrs. Tofts, who feems to have endeared herfelf to an Englifh audience by her voice, figure, and performance, more than any preceding finger of our country, retired.

Colley Cibber, though he does not fpeak of mufic *en connoiffeur*, and, as an Englifh actor and patentee of a theatre, was an enemy to Italian operas and Italian fingers upon a principle of felf-defence, probably gives us the general and genuine opinion of his acquaintance concerning Mrs. Tofts, who, he fays, had her firft mufical inftructions in her own country, "before the Italian tafte had fo highly prevailed, and was then not an adept: whatever defect the fafhionably fkilful might find in her manner, fhe had, in the general fenfe of her hearers, charms that few of the moft learned fingers ever arrive at. The beauty of her fine proportioned figure, and exquifitely fweet filver-tone of voice, with peculiar rapid fwiftnefs of her throat, were perfections not to be imitated by art or labour."

This performer had fongs given to her in all ftyles; her compafs, however, did not furpafs the common limits of a foprano, or treble voice. With refpect to her execution, of which we are ftill enabled to judge by the printed copies of her fongs, it chiefly confifted in fuch paffages as are comprifed in the fhake, as indeed did that of moft other fingers at this time.

Mrs. Tofts quitted the ftage in 1709. The talents of this finger and of Margarita de l'Epine gave rife to the firft mufical factions which we hear of in this country. According to Hughes, author of the Siege of Damafcus, their abilities were difputed by the firft people in the kingdom.

"Mufic has learn'd the difcords of the ftate,
And concerts jar with Whig and Tory hate.
Here Somerfet and Devonfhire attend
The Britifh Tofts, and ev'ry note commend;
To native merit juft, and pleas'd to fee
We've Roman arts, from Roman bondage free.
There fam'd l'Epine does equal fkill employ,
While lift'ning peers crowd to th' ecftatic joy:
Bedford to hear her fong his dice forfakes,
And Nottingham is raptur'd when fhe fhakes;
Lull'd ftatefmen melt away their drowfy cares
Of England's fafety, in Italian airs."

Although it is publicly infinuated in the Tatler, for Thurfday, May 26, 1709, that Mrs. Tofts was infane, it feems doubtful whether we are to take this account literally, or whether

whether sir Richard Steele had not recourse to invention, or at least exaggeration, in order to throw a ridicule on opera quarrels in general, and on her particular disputes at that time with the Margarita or other female singers. See Tatler, N° 20.

After quitting the stage, by which she is said to have acquired a considerable fortune, she married Mr. Joseph Smith, who was afterwards appointed consul at Venice, where he resided till the time of his death, about the year 1770. He was a great collector of books and pictures, and a patron of the arts in general.

TOGA, in *Ancient Geography*, a town of Asia, in Greater Armenia. Ptol.

Toga, in *Antiquity*, a wide woollen gown, or mantle, without sleeves, used among the Romans, both by men and women.

In process of time, none wore the toga but lewd women: whence that of Horace, *in matrona, ancilla, peccesve togata*. Lib. i. sat. ii. ver. 63.

The toga was of divers colours, and admitted of various ornaments: there was that called *toga domestica*, worn within doors; *toga forensis*, worn abroad; *toga militaris*, used by soldiers, tucked up after the Gabinian fashion; and *toga picta*, or *triumphalis*, wherein the victorious triumphed: this was embroidered with palms: that without any ornaments was called *toga pura*.

The *toga picta*, &c. was an ancient habit of the Etruscans, and not brought to Rome till after Tarquinius Priscus had subdued the twelve states of that nation.

The toga was sometimes worn open, and called *aperta;* sometimes girt or tucked up, called *præcincta;* and this cincture or girding, again, according to Sigonius, was of three kinds; *laxior*, or the loose kind, where the tail trailed on the ground; *adstrictior*, the close kind, wherein it did not reach so low as the feet; and *Gabinia*, where one of the skirts or lappets was girt round the body.

Sigonius distinguishes the several togæ, or Roman gowns, into *pura*, *candida*, *pulla*, *picta*, *prætexta*, *trabea*, and *paludamentum*. See Prætexta, Paludamentum, &c.

The *toga pura* was also called *virilis*. Kennet's Rom. Ant. part ii. c. 8.

Toga is sometimes used metaphorically for peace. See Trope.

Togæ, *Jus*, or privilege of the toga, was the same with the privilege of a Roman citizen, *i. e.* the right of wearing a Roman habit, and of taking, as they explain it, fire and water through the Roman empire.

TOGAWADY, in *Geography*, a town of Hindoostan, in Baramaul; 7 miles S. of Sankerydurgam.

TOGDA, or Todga, a town and district of Africa, in the country of Sugulmessa; 50 miles W. of Sugulmessa.

TOGEBAUT, a town of Persia, in the province of Irac; 81 miles N. of Ispahan.

TOGETHER, in *Sea Language*, the order given to the men in the exercises of heaving, rowing, twisting, &c. to act all in concert, or at the same instant.

TOGGEL, in a *Ship*, a small wooden pin, about five or six inches long, and usually tapering from the middle toward the extremities. It is used to fix transversely in the lower part of a tackle, in which it serves as a hook whereby to attach the tackle to a strop, slings, or any body in which the effort of the tackle is to be employed.

There are also toggels of another kind, employed to fasten the top-gallant sheets to the span, which is knotted round the cap at the top-mast-head. Falconer See Beckets.

TOGGENBURG, in *Geography*, a county of Switzerland, dependent on the abbey of St. Gal, bounded on the N. by the territory of St. Gal, on the E. by the canton of Appenzell, on the S. by the county of Sargans and the territory of Caster, and on the W. by the canton of Zurich. In its natural quality it resembles Appenzell and the other cantons, and, being full of fertile Alps, abounds in numerous breeds of cattle. Till the year 1436, this county had its own counts; the last of whom carried his indulgence to his vassals so far, as to grant them such privileges as nearly amounted to a state of absolute freedom: accordingly, on his demise in the above year, they entered into a close alliance with the cantons of Schweitz and Glaris, which alliance was confirmed in 1440. Afterwards, the county descended to the barons of Raron; but, in 1468, they sold it to Ulrich VIII. abbot of St. Gal, who, in 1469, entered into a perpetual league with the cantons of Schweitz and Glaris, and likewise gave his sanction to the former compact between the inhabitants of the county and the said cantons. In the beginning of the eighteenth century, the Toggenburgers, resenting the illegal and oppressive exactions of abbot Leodegarius, applied for assistance to their allies, who readily granted it; and, in 1707, Zurich and Bern also declared, that they would maintain the county of Toggenburg in the secure enjoyment of its rights and liberties, against all illicit violence whatsoever. On this the people began to assert their rights, and, in 1707, in a solemn landesgemeine, held at Watweil, renewed their federal oath, and erected three councils, named the great, lesser, and privy, which are composed of an equal number of members of both sects. The intestine commotions here continued however to increase, till, in 1712, they broke out into open war, in which Zurich and Bern sided with the county, and Schweitz and Glaris with the abbot. In 1718, at Baden, in the Argau, an accommodation, confirming the liberties of the county, was brought about between the new abbot and the cantons of Bern and Zurich. Pursuant to this peace, the abbot and prince of St. Gal both is, and bears the title of, natural sovereign, and territorial lord of the county of Toggenburg; and the people are to take the accustomed oath to him, and to pay him suitable services, but without any violation of their rights and liberties.

TOGLUPOUR, a town of Hindoostan, in the subah of Delhi; 15 miles W.N.W. of Panniput.

TOGOMI, a town of Japan, in the island of Niphon; 80 miles N.W. of Meaco.

TOGOSOHATCHEE Creek, a branch of the Oakmulgee river, in the state of Georgia.

TOGRIN, Cape, a cape at the mouth of the river Sierra Leone.

TOGULA, among the Romans, a narrow kind of toga, used by the poorer sort of people.

TOHBA, a denomination given to a class of priests in Thibet. Youth intended for the monastery of Teshoo-Loomboo, are, upon their first being admitted, at the age of eight or nine years, into the establishment, called "Tuppa," and they are then occupied in receiving the instructions suited to their age, and the duties for which they are designed. At fifteen they are usually admitted into the order of Tohba, the first step in their religious class, and after due examination, they are advanced from the order of Tohba to that of Gylong, between the age of twenty-one and twenty-four. See Gylong.

TOHOTCHIE Hotun, in *Geography*, a town of Chinese Tartary, in the country of Hami; 30 miles N.W. of Hamil Hotun.

TOJIE, a town of Hindoostan, in Candeish; 10 miles N. of Hurdah.

TOIKO, a town of Japan, in the ifland of Niphon; 80 miles E.S.E. of Jedo. N. lat. 36° 5′. E. long. 140° 40′.

TOILES, fnares or nets fet by hunters for catching of wild beafts; as deer, &c.

TOILET, a fine covering, of linen, filk, or tapeftry, fpread over the table in a bed-chamber, or dreffing-room, to undrefs and drefs upon.

The dreffing-boxes, in which are kept the paints, pomatums, effences, patches, &c. the pin-cufhion, powder-box, brufhes, &c. are efteemed parts of the equipage of a lady's toilet.

That of the men confifts of comb-cafe, brufhes, &c.

To make a vifit to one at his toilet, is to come to entertain him while he is dreffing or undreffing.

Sattin, lace, velvet, brocade, point de France, &c. are now ordinarily ufed for toilets: anciently they were made much plainer: whence the name, which is formed from the French, *toilette*, a diminutive of *toile*, any thin ftuff.

TOISE, or Fathom, a long meafure in France, containing 6 feet, the foot being 12 inches, the inch 12 lines, fubdivided into 12 points: 76 French feet are equal to 81 Englifh feet, or, more accurately, 4000 French feet equal 4263 Englifh feet.

TOISON *d'Or*, a term, in *Heraldry*, for a golden fleece, which is fometimes borne in a coat of arms.

TOISSEY, in *Geography*, a town of France, in the department of the Ain, near the Chalaregne and Saône, which unite about half a mile from the town; 18 miles W. of Bourg-en-Breffe.

TOJUCA, a river of Brafil, which runs into the Atlantic, S. lat. 27° 44′.

TOKA, a town of Hindooftan, in the circar of Aurungabad; 33 miles S.W. of Aurungabad.

TOKAI, a river of Bucharia, which runs into the Gihon, near Hefdr-afp.

TOKARESTAN, a diftrict of Grand Bucharia, fituated to the eaftward of Balk.

TOKAY, a town or rather village of Hungary, fituated at the foot, and to the E. of a high hill, clofe by the conflux of the river Bodrug with the Theis or Tibifcus. The inhabitants are chiefly either Hungarians of the Proteftant religion, or Greeks, who came originally from Turkey, but have been long fettled here, for the purpofe of carrying on the wine-trade. The hills on which the vine grows lie all to the W. of the river Bodrug, and beginning clofe by the town of Tokay, extend weftward and northward from thence, and occupy a fpace of perhaps ten Englifh miles fquare; but they are interrupted and interfperfed with many extenfive plains, and feveral villages. Near fome of thefe, particularly Tabia and Tarczal, the wine is better than that which is produced on the hill of Tokay; but it all goes under the fame name; 98 miles N.W. of Colofvar. N. lat. 48° 10′. E. long. 10° 57′.

Tokay-*Wine*, derives its name from the town or village of Hungary, where it is produced. (See the preceding article.) The vineyards extend beyond the forty-eighth degree of northern latitude; the foil where the vines grow is a yellow clayifh earth, extremely deep, and interfperfed with large loofe lime-ftones: the expofures moft inclining to the fouth, the fteepeft declivities, and the higheft parts of thefe, produce the beft wine. This wine, fo far from its being found in fo fmall a quantity as never to be genuine, unlefs when given in prefents by the court of Vienna, is a common defert wine in all the great families at Vienna and in Hungary, and is very generally drank in Poland and Ruffia: nor is the Tokay wine altogether the property of the crown, but many of the German and Hungarian nobility, as well as gentlemen, and even peafants, have vineyards at Tokay. The grapes are all white, and the vintage commonly begins about the 28th of October, fometimes as late as the 11th of November. There are four forts of wine made from the fame grapes, diftinguifhed at Tokay by the names of effence, aufpruch, mafslafch, and the common wine.—The effence is made by picking out the half-dried and fhrivelled grapes, and putting them into a perforated veffel, where they remain as long as any juice runs off by the mere preffure of their own weight. This is put into fmall cafks. The aufpruch is made by pouring the expreffed juice of the grapes from which the former had been picked on thofe that yielded the effence, and treading them with the feet. The liquor thus obtained ftands for a day or two to ferment, and then is poured into fmall cafks, which are kept in the air for about a month, and afterwards put into the cellars. The fame procefs is again repeated by the addition of more juice to the grapes which have already undergone the two former preffures, and they are now wrung with the hands; and thus is had the mafslafch. The fourth kind is made by taking all the grapes together at firft, and fubmitting them to the greateft preffure: this is chiefly prepared by the peafants. The effence is thick, and very fweet and lufcious; it is chiefly ufed to mix with the other kinds. The aufpruch is the wine commonly exported, and which is known in foreign countries by the name of Tokay. The goodnefs of it is determined by the following rules. The colour fhould neither be reddifh nor very pale, but a light filver: in trying it, the palate and tip of the tongue fhould be wetted without fwallowing it, and if it manifeft any acrimony to the tongue, it is not good; but the tafte ought to be foft and mild: when poured out, it fhould form globules in the glafs, and have an oily appearance: when genuine, the ftrongeft is always of the beft quality: when fwallowed, it fhould have an earthy aftringent tafte in the mouth, which is called the tafte of the root. All Tokay wine has an aromatic tafte, which diftinguifhes it from every other fpecies of wine. It keeps to any age, and improves by time; but is never good till about three years old. It is the beft way to tranfport it in cafks; for when it is on the feas, it ferments three times every feafon, and thus refines itfelf. When in bottles, there muft be an empty fpace left between the wine and the cork, otherwife it would burft the bottle. A little oil is put upon the furface, and a piece of bladder tied over the cork. The bottles are always laid on their fides in fand. Phil. Tranf. vol. lxiii. part ii. p. 292, &c.

TOKE, in *Geography*, a town of Bengal; 35 miles N.N.E. of Dacca.

TOKEN-BESSEYS, a clufter of fmall iflands in the Eaft Indian fea. S. lat. 6°. E. long. 123° 36′.

TOKENS, in *Peftilential Cafes*, thofe livid fpots which appear in the feveral ftages of the difeafe, and are certain forerunners of death. They generally appear only under the moft defperate circumftances, and when the patient would otherwife be declared dying; but Hodges gives us inftances where they appeared before any other fymptoms of the difeafe, and came out without any pain or trouble; yet even in thefe cafes the perfon always died. Thefe tokens are the mark by which the fearchers conclude of the caufe of the death of the perfon, and are the rule for ordering the houfe to be fhut up, to prevent the fpreading of the difeafe. But the nurfes, and other crafty people, have a way of difguifing the fymptom after death, by covering the body with wet and cold fheets. Thefe ftrike in the fpots, fo that the perfon may be thought to have died by fome other difeafe.

Tokens, *Falfe*, in *Law*. See False.

Tokens, in *Coinage*, coins in the reign of queen Elizabeth, ftruck ſtruck in the cities of Briſtol, Oxford, and Worceſter, and alſo by about 3000 tradeſmen and others; upon returning which to the iſſuer, he gave current coin, or value, for them, as deſired. In the ſucceeding reign, on the 19th of May, 1613, king James's royal farthing tokens commenced by proclamation. Theſe were not forced upon the people as farthings or eſtabliſhed coin, but merely as pledges or tokens, for which government was obliged to give other coin if required. Their legend was the king's common titles running upon each ſide. Theſe pieces were not favourably received, but continued in a kind of reluctant circulation through the whole of this reign, and the beginning of the ſucceeding. In 1635, Charles I. ſtruck thoſe with the roſe inſtead of the harp. But the vaſt number of counterfeits, and the king's death in 1648, put an utter ſtop to their currency; and the tokens of towns and tradeſmen again took their run, increaſing prodigiouſly till the year 1672, when farthings properly ſo called were firſt publiſhed by government. Theſe town-pieces and tradeſmen's tokens, together with thoſe of the time of queen Elizabeth, are collected by ſome antiquaries with great avidity. Similar tokens, ſays Pinkerton, are to this day current in Scotland, both of copper and tin, principally uſed by the bakers and grocers; farthings not being very common in that country.

In 1804, the bank of Ireland bought in a large quantity of depreciated ſilver coin; and, as a ſubſtitute, iſſued Spaniſh dollars, newly ſtamped, at 6*s*. Iriſh, and alſo fractions of the dollar, which had been minted for the occaſion at the Tower of London, conſiſting of five-penny, ten-penny, and thirty-penny pieces Iriſh, being exactly $\frac{1}{13}$, $\frac{2}{13}$, and $\frac{6}{13}$ of the dollar. All theſe coins are called Bank tokens, the Bank having engaged to receive them again at the iſſued price, and they have been declared a legal tender in the payment of taxes: their intrinſic value may be known from that of the dollar. In 1809, a new ſilver coinage was minted at the Tower of London for the colonies of Eſſequibo and Demerary, conſiſting of pieces of 3, 2, 1, $\frac{1}{2}$, and $\frac{1}{2}$ guilders: the larger piece weighs 15 dwt., and is 1 oz. 6 dwt. worſe than Engliſh ſtandard. Its value therefore is 3*s*. 5*d*. ſterling, or, computing it as the dollar is now rated in the Weſt Indies (*i. e.* at 4*s*. 8*d*.), its value is 3*s*. $8\frac{1}{4}$*d*. and the ſmaller pieces in proportion. They are marked on the reverſe "Colonies of Eſſequibo and Demerary Token," and the king's is on the obverſe. The exchange with London ſhould be about 12 guilders for 1*l*. ſterling, but varies conſiderably above this, even to 20 guilders, and upwards. Kelly's Cambiſt.

TOKIS, in *Geography*, a town of Japan, in the iſland of Niphon; 40 miles N.N.E. of Meaco.—Alſo, a town of Japan, in the province of Ximo; 15 miles N.N.W. of Nangaſaki.

TOKI-TAO, a ſmall iſland near the coaſt of China. N. lat. 38° 7′. E. long. 120° 39′.

TOKORARI. See Tocorary.

TOKTABA, a town of Bootan; 50 miles N. of Beyhar.

TOL, in *Law*, a term ſignifying to defeat, or take away. From the Latin, *tollere*, which ſignifies the ſame.

Thus, *to tol the entry*, is to take away the right of entry.

Tol *Peden Penwith*, in *Geography*, a cape on the S. coaſt of the weſtern extremity of Cornwall; 3 miles S.E. of Land's End. N. lat. 50° 4′. W. long. 5° 36′.

TOLA, in *Commerce*, a weight for gold and ſilver at Bombay, Surat, and other places in India: at Bombay, the tola contains 40 valls, 100 gonze or Bombay grains, or 600 chowes. The tola is equal in weight to the ſilver rupee; 24 tolas make 1 ſeer, and 32 tolas 13 valls = 1 lb. troy. At Surat, the tola contains 32 valls or 96 ruttees: $82\frac{1}{2}$ valls make 1 oz. troy, and therefore 31 tolas 1 lb. troy nearly.

TOLABO, Cape, in *Geography*, a cape on the E. coaſt of Celebes. S. lat. 0° 45′. E. long. 122° 50′.

TOLAGO Bay, a bay on the N.E. coaſt of the northern iſland of New Zealand, in the South Pacific ocean, diſcovered by captain Cook in the year 1769. It is moderately large, and has from ſeven to thirteen fathom, with a clean ſandy bottom and good anchorage, and is ſheltered from all winds except the north-eaſt. On the ſouth point lies a ſmall but high iſland, ſo near the main as not to be diſtinguiſhed from it. Cloſe to the north end of the iſland, at the entrance into the bay, are two high rocks; one of which is round, like a corn-ſtack, but the other is long, and perforated in ſeveral places, ſo that the openings appear like the arches of a bridge. Within theſe rocks is a cove, convenient for wood and water. Off the north point of the bay is a pretty high rocky iſland; and about a mile without it, are ſome rocks and breakers. The tide flows at the full and change of the moon, about ſix o'clock, and riſes and falls perpendicularly from five to ſix feet. Captain Cook ſaw no four-footed animals, nor the appearance of any, either tame or wild, except dogs and rats, and theſe were very ſcarce: the people eat the dogs, as at Otaheite, and adorn their garments with the ſkins. He climbed many of the hills, hoping to get a view of the country, but could ſee nothing from the top except higher hills, in a boundleſs ſucceſſion. The ridges of theſe hills produce little beſides fern; but the ſides are moſt luxuriantly clothed with wood and verdure of various kinds, with little plantations intermixed. In the woods he found trees of above twenty different ſorts, and carried ſpecimens of each on board; but there was nobody to whom they were not altogether unknown. The tree cut for firing was ſomewhat like the maple, and yielded a whitiſh gum. Another ſort was found of it, of a deep yellow, which might be uſeful in dyeing. One cabbage-tree was met with, and cut down for the cabbages. The country abounds with plants, and the woods with birds in an endleſs variety, exquiſitely beautiful, and of which none of them had the leaſt knowledge. The ſoil of both the hills and vallies is light and ſandy, and very fit for the production of all kinds of roots; though none were ſeen except ſweet potatoes and yams. S. lat. 38° 22′. W. long. 181° 15′.

TOLAND, John, in *Biography*, a writer on ſubjects of political and religious controverſy, was born in the year 1669, in Ireland, near Londonderry; and his parents, of a good family, were Roman Catholics. Educated in the principles of his family, he renounced them before he attained the age of ſixteen years, and became a zealous oppoſer of popery. Accordingly he completed his education in Scotland, and having ſpent three years in the univerſity of Glaſgow, removed to Edinburgh, where he graduated M. A. in 1690. From Edinburgh he removed to London, and became acquainted with ſome reſpectable diſſenters, who enabled him to purſue his ſtudies for two years more at Leyden. On his return to London, he viſited Oxford, and here he collected materials for the execution of ſome literary projects: one of which was a diſſertation in order to prove that the common narrative of the death of Regulus was a fable. In 1696 he publiſhed at London his "Chriſtianity not myſterious; or a Treatiſe ſhewing that there is nothing in the Goſpel contrary to Reaſon, or above it; and that no Chriſtian Doctrine can be properly called a Myſtery." This publication cauſed an alarm, and not without reaſon, among

among Chriſtians of all denominations, by whom it was regarded as an attempt to overthrow revealed religion. At home and abroad it excited attention, and the advocates of Chriſtianity concurred in the defence of their religion againſt what they conceived to be an attack upon it. The magiſtrates, alſo, intruded into this controverſy, and procured a preſentment by the grand jury of Middleſex. The author withdrew from the ſtorm which ſeemed to be gathering into his own country; but the obnoxious character of his book had excited prejudices againſt him. Toland, as we learn from the correſpondence between Mr. Molyneux and Mr. Locke on the ſubject, does not ſeem to have acted with that moderation and prudence which might reaſonably have been expected in his circumſtances. His manner of defending and propagating his opinions gave juſt offence even to thoſe who entertained ſome degree of reſpect for his talents and learning; and was condemned by thoſe who were avowed advocates of rational liberty and enemies to every kind of perſecution. From another quarter he experienced a ſeverity of treatment, which his own miſconduct had provoked, but which, in this more enlightened and liberal period, none, we preſume, will undertake to juſtify. In a reply to Toland's book, by Mr. Peter Brown, ſenior fellow of Trinity college, the civil magiſtrate was called upon to interfere; accordingly the grand jury of Dublin made a preſentment of the book: the parliament of Ireland voted it to be burnt by the common hangman, and iſſued an order that the author ſhould be taken into cuſtody by the ſerjeant at arms, and proſecuted by the attorney-general. Toland, univerſally ſhunned by his acquaintance, and reduced to pecuniary diſtreſs, left the country, and returned to England. While ſome diſapproved the violence of this proceeding, others juſtified it; and Dr. South, in particular, highly commends the Iriſh parliament for having, "to their immortal honour, preſently ſent him (Toland) packing, and, without the help of a faggot, ſoon made the kingdom too hot to hold him." On the ſpirit which dictated this language we make no comment. Toland, upon his arrival in London, publiſhed an account of his treatment in Ireland, and renouncing communion with the Diſſenters, declared himſelf a latitudinarian, or one who would comply with the religious worſhip of any claſs of Proteſtants, whoſe differences were not, in his eſtimation, of ſufficient importance to juſtify diſturbing the peace of a nation. He then directed his attention to other topics; and in 1698 he publiſhed a pamphlet, intitled "The Militia reformed," in which he propoſed to ſubſtitute that ſpecies of armament to a ſtanding army. In the ſame year he wrote a "Life of Milton," to be prefixed to an edition of his proſe works, and which was alſo printed ſeparately. In this preface he oppoſed the notion then prevalent, that the "Icon Baſilike" was written by Charles I.; and from the conſideration of this impoſture, as he pronounced it to be, he digreſſed to the conſideration of the ſpurious works that had been aſcribed to Chriſt and his apoſtles. Againſt a hoſt of political and religious adverſaries, he defended himſelf in a treatiſe intitled "Amyntor;" in which he gave a complete hiſtory of the "Icon Baſilike," and alſo a catalogue of ſuch primitive writers, who were judged by him to be ſpurious. As he was ſuppoſed in the diſcuſſion of this latter topic to impugn the authenticity of the received canon of Scripture, he drew forth replies from ſome of the ableſt advocates of Chriſtianity, and particularly Mr. (afterwards the highly celebrated Dr.) Samuel Clarke.

In 1699, Toland was engaged by the duke of Newcaſtle to publiſh "Memoirs of Denzil Lord Holles;" and in the following year by Mr. Robert Harley, afterwards earl of Oxford, then a Whig, to give a new edition of Harrington's "Oceana." When the Act of Succeſſion was paſſed, on occaſion of the death of the duke of Glouceſter in 1701, he publiſhed "Anglia Libera," being an explanation and eulogy of this act; and he accompanied the earl of Macclesfield, who was deputed to carry it to Hanover, and had the honour of preſenting his book to the electreſs Sophia, and of kiſſing her hand on the occaſion. At Berlin, which he viſited, he held a diſpute, before the queen of Pruſſia, with the learned Beauſobre, on the authority of the books of the New Teſtament; an account of which was ſent by the latter to the "Bibliotheque Germanique." Upon his return to England in 1704, he publiſhed "Letters to Serena," (meaning the queen of Pruſſia,) on the origin and force of prejudices; the hiſtory of the ſoul's immortality among the heathens; the origin of idolatry; and remarks on Spinoza's philoſophy. Theſe letters were animadverted upon by Wotton, and by the author of the Divine Legation. In 1708 he publiſhed at the Hague two Latin diſſertations, entitled "Adeiſidæmon, ſive Titus Livius a Superſtitione vindicatus," and "Origines Judaicæ, ſive Strabonis de Moyſe et Religione Judaica Hiſtoria breviter illuſtrata." In 1718 he publiſhed "Nazarenus; or Jewiſh, Gentile, or Mahometan Chriſtianity," &c. in which he endeavours to ſhew that the Jewiſh converts were to obſerve their own law throughout all generations, &c. Two years afterwards appeared a Latin tract, entitled "Pantheiſticon: ſive Formula celebrandæ Sodalitatis Socraticæ, &c.:" a work which has ſubjected its author to the charge of atheiſm, and in conſequence of which he was unjuſtly accuſed by Dr. Hare with having compoſed a profane prayer to Bacchus in his character of Pantheiſt. In the ſame year he publiſhed his "Tetradymus," on the pillar of cloud and fire that guided the Iſraelites; on the exoteric and eſoteric philoſophy of the ancients; on Hypatia, the female philoſopher; and a defence of his Nazarenus againſt Dr. Mangey. To this work he annexed an account of his conduct and ſentiments, ſolemnly profeſſing his preference of the Chriſtian religion, pure and unmixed, to all others.

Toland's health was now declining, and being in low circumſtances, lord Moleſworth aſſured him that he ſhould never want, while he himſelf lived. However, his diſeaſe baffled all remedies, and his life cloſed on the 11th of March, 1722, in the 53d year of his age. He manifeſted a conſiderable degree of reſolution and patience during the progreſs of his illneſs: replying to one who aſked him if he wanted any thing, "I want nothing but death;" and after taking a calm leave of his friends, ſaying to them that "he was going to ſleep." In an epitaph which he prepared for himſelf, he expreſſes that confidence and ſelf-applauſe which belonged to his character. He cloſes with theſe words: "Spiritus cum æthereo patre, a quo prodiit olim, conjungitur; corpus item; naturæ cedens, in materno gremio reponitur. Ipſe vero æternum eſt reſurrecturus, at idem futurus Tolandus nunquam." His poſthumous works were publiſhed in 2 vols. 8vo. in 1726, and again in 1747, with an account of his life and writings, by Des Maizeaux. Biog. Brit.

TOLANORE, in *Geography*, a town of Hindooſtan, in the Carnatic; 5 miles N. of Volconda.

TOLASTRA REGIO, in *Ancient Geography*, a country of Aſia, in Galatia. Ptolemy.

TOLBIACUM, a town of Gallia Belgica, according to Tacitus; ſituated on the route from Trevari to Colonia Agrippina.

TOL-BOOTH, or TOLL-BOOTH, a place in a city, where goods are weighed, to aſcertain the duties or import on them.

TOLCESTER, Tolcestrum, in our *Old Writers*, an old excife, or duty paid by the tenants of fome manors to the lords, for liberty to brew and fell ale.

TOLCKSDORF, in *Geography*, a town of Pruffia, in Ermeland; 12 miles S.E. of Frauenburg.

TOLEDO, in *Biography*. See Alva.

Toledo, in *Geography*, a city of Spain, in New Caftile, on the Tagus, the fee of an archbifhop, and an univerfity, founded in the year 1475. The origin of Toledo is uncertain; it is only known to have been a Roman colony, and made the depofitory of the treafures fent to Rome. From the Romans it paffed under the dominion of the Goths; Leovigild refided there and embellifhed the city, which became more confiderable under his fucceffors. The Moors took Toledo in 714, and reigned there till 1085, when it was taken from them by Alphonfo VI., who ftyled himfelf emperor of Toledo, whence it took, and has preferved, the title of royal and imperial. Toledo, as is well known, was formerly famous for the exquifite temper of the fword-blades made there; and the genuine ones that ftill remain are fold at an exorbitant price. It is faid that the fecret of hardening them has been again recovered; and experiments have been made with blades lately fabricated there which feem to juftify this affertion. When one of thefe has undergone the operation of tempering, if it be in the leaft notched, by ftriking with it feveral violent blows on an iron head-piece, it is rejected: almoft all that are made here, it is faid, will ftand this proof. Two centuries ago, Toledo contained more than 200,000 inhabitants, but now fcarcely 30,000. When a houfe falls to decay, it is never rebuilt; and in 20 years more, this city will be little elfe than a heap of ruins. Toledo is built upon rocks, and commanded by eminences which feem to prefent the image of fterility; yet, in the midft of thefe precipices, the traveller finds, to his furprife, feveral fertile and charming fituations, impenetrable to the burning rays of the fun. Thefe places are called *Cigarrales*. Several councils have been held at Toledo, particularly one in 633, in which it was declared unlawful and unchriftian to force people to believe, feeing it is God only who hardens, and fhews mercy to whom he will; but by another council in a few years after, they highly commended their monarch for perfecuting the Jews. In 681 it was decreed, that the archbifhop of Toledo fhould have power to create bifhops throughout Spain in the king's abfence, and confirm thofe made by the king. In 1355, it was feized by Henry and Frederick, the baftards, brothers of king Peter, who robbed all the Jews, and murdered about 1000 of them; 32 miles S.S.W. of Madrid. N. lat. 39° 56′. W. long. 4° 18′.

TOLEN, a town of Norway; 22 miles W. of Berga.—Alfo, an ifland belonging to the ftate of Zealand, in the eaft branch of the Scheldt, feparated from the main land of Brabant by a canal, about ten miles in length, and four in breadth. It contains two towns, Tolen and St. Martyn's Dyck, and feveral villages. Tolen, the capital, from whence the ifland itfelf is named, is a handfome town, and ranks as fourth in the affembly. The name of it is derived from the toll which was formerly paid here by order of the counts of Zealand. It is fortified with feven baftions, and the ftates have caufed a fort, called Suckenburg, to be built on the other fide of the river, fo that it is now one of the ftrongeft frontier towns of the ftate of Zealand. The ftadt-houfe is an old building, which makes a good fhow. The arfenal is fituated at the entrance of the fmall harbour; there is alfo a magazine for powder. The church is built in the figure of a crofs, and is an extraordinary piece of architecture; 4 miles N.W. of Berg-op-Zoom. N. lat. 51° 36′. E. long. 3° 58′.

TOLENTINO, a town of the Popedom, in the marquifate of Ancona, on the Chiento, the fee of a bifhop, united to Macerata. It is only remarkable for being the depofitory of the body of St. Nicholas, where the arm, by bleeding afrefh, prognofticates when any fignal calamity is to befall Italy; 18 miles W. of Fermo. N. lat. 43° 10′. E. long. 13° 18′.

TOLENTINUM, in *Ancient Geography*, a town of Italy, in Picenum, S.W. of Ricina.

TOLENUS, a river of Italy, in the country of the Marfi.

TOLERATION, in *Religion*, a term which has engaged much attention in the difputes among Proteftants.

M. Bafnage, and fome others, diftinguifh *civil* toleration from *ecclefiaftical*. The latter allows of different, and even oppofite fentiments in the church; and the firft permits them in civil fociety.

By civil toleration, is meant impunity and fafety in the ftate for every fect which does not maintain any doctrine inconfiftent with the peace and welfare of the ftate. This *civil* or *political* toleration, implies a right of enjoying the benefit of the laws, and of all the privileges of the fociety, without any regard to difference of religion.

Ecclefiaftical toleration is an allowance of certain opinions, which, not being fundamentals, do not hinder thofe who profefs them from being efteemed members of the church. But as to the quality and number of thefe fundamental points, they never could, nor in all probability ever will be agreed upon.

In order to difcover the genuine principles of toleration, it is neceffary to confider that, antecedently to the formation of civil focieties, mankind poffefs certain rights, independent of all human grant, not derived from any compact, and which are therefore to be acknowledged as the rights of human nature. A right to judge for themfelves in points of religion is one of thefe rights; which, whilft it authorizes every individual to claim the exercife of this privilege to himfelf, obliges him to allow it in the fame extent to all about him, and eftablifhes one uniform regulation for his behaviour toward others, and their behaviour toward him: *e.g.* no apprehenfions of the truth and certainty of any perfon's religious fentiments can juftify him in attempting to impofe them on his neighbour; for the fame right of judgment which any *one* can claim, belongs, on the fame principle, equally to *all*, and ought to be equally facred and inviolable in all; and no reafon can be alleged by him for taking the religious liberty of others from them, but what will, at the fame time, equally deftroy his own title to it. The injuftice of fimilar encroachments upon *him* from *others* follows from the fame principle, and with the fame evidence.

Whether the claim of fuch a liberty of judgment in religion for ourfelves is weakened by men's entering into civil fociety, is the next object of confideration.

The great end of government is to protect the fubjects of it from the injuries to which they were expofed in a ftate of nature; and as all injuries imply rights of which they are violations, and the care taken to guard againft the violation of thefe rights is an acknowledgment of the reality and importance of them; it evidently follows, that when they enter into fociety, if the primary and leading view of government be to prevent or reftrain thofe injuries, to which men were expofed for want of its protection, they carry thefe rights with them; that they continue to retain them; and that, inftead of fuppofing themfelves to be deprived of them, the very defign with which they put themfelves under the authority of government is to fecure them the more firmly. With this view they entruft the prefervation of them to common guardians, by whofe intervention, it is prefumed, they will be more vigoroufly afferted and more effectually protected, than it is poffible they fhould be in a ftate where there is no common umpire to check the evils of oppreffion on the one hand, and reftrain the no lefs formidable evils of immoderate refentment on the other.

If we confider what are the rights which men give up to government, when they enter into civil focieties, they will be found to be, not thofe which may moft properly be ftyled the primary rights of human nature; not the right which every man has to live undifturbed, to enjoy the advantages which he juftly poffeffes, and to be left to his freedom in all things not injurious to his fellow-creatures; but the confequential, though equally real and certain right which, where men are not fubject to government, every perfon has to take the affertion of all his rights into his own hands, and correct the infringers of them by the inflicting of fuch pains, or the ufe of fuch other methods of deterring the authors of the wrong, as reafon fhall warrant for his future fecurity: and, fpeaking precifely, even thefe rights are not abfolutely extinguifhed and utterly loft, but fufpended by fuch limitations as the order and well-being of fociety require, and fo long as the fuccours of government fhall be effectual. The primary rights of liberty, fafety, and protection from oppreffion, ftill fubfift in their full vigour. To fuppofe them abandoned, renounced, and annihilated, or that government can have any right to deftroy them, is afcribing to it a right to defeat the end for which it is eftablifhed, and betray the truft repofed in it. It is, indeed, totally inverting the principle upon which the power of rulers ftands, and by which the acts of it ought to be guided.

Man was not made for government, but government for man; and the great object, to which all the operations of it fhould be directed, is to guard, as much as poffible, the equal, impartial eafe and freedom of all the fubjects of it. To this purpofe judge Blackftone obferves, that the principal aim of fociety is to protect individuals in the enjoyment of thofe abfolute rights, which were vefted in them by the immutable law of nature, but which could not be preferved in peace without that mutual affiftance and intercourfe, which are gained by the inftitution of friendly and civil communities: fo that the primary end of human laws is to maintain and regulate thefe abfolute rights of individuals. See Government and *Civil* Liberty.

Now of all the rights inherent in human nature, that of thinking for ourfelves, and following the conviction of our own judgments in relation to the object of our faith, worfhip, and religious obedience, is the moft facred, inconteftible, and in every view of it, intitled to the moft careful protection. The prefervation of thefe is one of the chief, perhaps the firft end for which civil focieties are inftituted, and the rulers of them invefted with power: and therefore, in all governments, the rights of confcience fhould have a principal place affigned them in the care of thofe, to whom the protection of their fellow-creatures is committed. If the fecuring of equal, impartial liberty, in all thofe inftances of it in which it is not injurious to others, be fo much the object of every equitable, wife, and well-conftituted fyftem of laws, that all needlefs encroachments upon it are deviations from the fpirit which ought to be diffufed through all laws, and impair the benefit which they ought to confirm, can it be fuppofed that the rights of confcience ought not to be guarded from violation? Rights of this kind are the laft which men can ever be imagined to give up to be modelled at the pleafure of others; nor (as it is argued) is there any one principle connected with their fubmiffion to governors in other refpects, that can require or juftify fuch a furrender. Does it follow that, becaufe the magiftrate is entrufted with authority to decide difputes between us and our fellow-citizens concerning property, he is to determine points which lie only between God and our own confciences? Becaufe it is allowed to be his office to guard the peace of his fubjects, and to inflict punifhments for this purpofe on thofe who unjuftly difturb it; is it to be taken for granted, that he is to dictate to them what rule of faith they fhall adopt, and in what manner they are to worfhip the Deity; when it is allowed on all hands, that of thefe things the will of God is the only rule, and that no worfhip can be acceptable to him, but what is accompanied with the fincere conviction of him who offers it? Befides, it is argued, that fuch is the nature of this right, and it fo ftands upon a foundation peculiar to itfelf, and is diftinguifhed from every other right, that it *cannot* be given up. Property may be refigned, transferred, or fubmitted to the regulation of others; a man may relinquifh his eafe, and fubject himfelf to inconveniences, and be not only innocent but laudable; nay, he may facrifice life itfelf, and merit the higheft applaufe; but his confcience he cannot refign.

To "prove all things, and hold faft that which is good," is not only a privilege but a duty; an obligation laid upon him by the very nature of religion and virtue, and from which he cannot difcharge himfelf without departing from the principles of both. It muft always remain entire to him; nor, while the principles of the moft reafonable liberty are allowed to fubfift in their due extent, can any attempt be confiftently made to take it from him.

From thefe principles it has been inferred, that toleration, fo far from being a matter of mere grace or favour, which government has a right to withhold, grant, abridge, or refume at pleafure, is the acknowledgment and confirmation of a right: not one of thofe adventitious rights, which are fubfequent to the eftablifhment of civil focieties, and arife out of the peculiar forms and conftitution of it; but of thofe higher rights which belong to men as fuch, and which ought to be preferved under all ftates and governments whatever, as effectually, univerfally, and impartially as any other right. With regard to the extent of toleration, it is urged, that if liberty of confcience be a right effential to human nature, all penalties in cafes merely of a religious nature muft be an infringement of a right, and a degree of oppreffion, though inflicted by a law. Farther, the inquiry concerning the perfons entitled to toleration does not depend on the fuppofed truth or error of the fentiments which men may adopt, but upon the common right, which all men have, to be led in thefe points by the light of their own minds, and to enjoy all the fecurities and benefits of fociety, while they fulfil the obligations of it. All who can give good fecurity to the government under which they live, and to the community to which they belong, for the performance of the duties of good fubjects and good citizens, have an undoubted claim to it, and cannot with any juft reafon be deprived of it. It is not error, but injury to the ftate, or the individuals who are under the care of it, which juftifies the animadverfion of the magiftrate; and all to whom this cannot be juftly imputed, are the objects of his protection.

Archdeacon Paley diftinguifhes two kinds of toleration: the one *partial*, which is the allowing to diffenters the unmolefted profeffion and exercife of their religion, but with an exclufion from offices of truft and emolument in the ftate; and the other *complete*, which is the admiffion of them, without diftinction, to all the civil privileges and capacities of other citizens. The juftice and expediency of toleration in general is founded by this ingenious writer primarily in its conducivenefs to truth, and in the fuperior value of truth to that of any other quality which a religion can poffefs. Befides this principal argument for toleration, there are other auxiliary confiderations that are important. The reftriction of the fubject to the religion of the ftate is a needlefs violation of natural liberty, and in an inftance with regard to which conftraint is always grievous. Perfecution produces no fincere conviction, nor any real change of opinion; on the contrary, it vitiates the public morals, by driving men to prevarication, and commonly ends in a general though fecret infidelity, by impofing, under the name of revealed religion, fyftems of doctrine, which man cannot believe, and dare not examine: finally, it difgraces the character, and wounds the reputation of Chriftianity itfelf, by making it the author of oppreffion, cruelty, and bloodfhed. Our author includes under the idea of religious toleration the toleration of all books of ferious argumentation, without deeming it any infringement of religious liberty to reftrain the circulation of ridicule, invective, and mockery upon religious fubjects.

Concerning the admiffion of diffenters from the eftablifhed religion to offices and employments in the public fervice, which is neceffary to render toleration *complete*, doubts, fays Dr. Paley, have been entertained with fome appearance of reafon. In vindication of thefe doubts, he refers to thofe who hold religious opinions that are utterly incompatible with the neceffary functions of civil government; enthufiafts, who maintain that all diftinction of property is abolifhed by Chriftianity, and that the gofpel enjoins upon its followers a community of goods; and to Quakers or Friends, who believe it to be contrary to Chriftianity to take up arms. He allows, however, that with the fingle exception of refufing to bear arms, the various fects of Chriftians which actually prevail in the world hold no tenet which incapacitates men for the fervice of the ftate. It has indeed been afferted, that difcordancy of religions, even fuppofing each religion to be free from any errors that affect the fafety or the conduct of government, is enough to render men unfit to act together in public ftations. But upon what argument, or upon what experience, is this affertion founded? "I perceive no reafon," fays this liberal writer, "why men of different religious perfuafions may not fit upon the fame bench, deliberate in the fame council, or fight in the fame ranks, as well as men of various or oppofite opinions upon any controverted topic of natural philofophy, hiftory, or ethics." For a further account of this author's fentiments on toleration and collateral fubjects, fee RELIGION, SUBSCRIPTION, and TEST-*Act*.

To the term *toleration*, though it has been adopted by Mr. Locke and feveral writers of the firft diftinction, others have objected; alleging that, as words have a confiderable influence on opinions, this term appears to be injurious to that religious liberty, which it is defigned to import. It implies a *right* to impofe articles of faith, and modes of worfhip; that nonconformity is a crime; and that the *fufferance* (toleration) of it is a matter of favour or lenity. But the nonconformift in every country, whether he be a Chriftian at Conftantinople, a Proteftant at Rome, an Epifcopalian in Scotland, or a Prefbyterian in England, and, we may add, a Catholic in any part of Great Britain, if his rational principles be confonant to his practice, will regard this claim of *right* as ufurpation; and will urge, that it has been neither conferred by Jefus Chrift, nor delegated by the people. Our Saviour exprefsly declares, "My kingdom is not of this world;" and his religion was perfecuted and oppreffed, during the period of its greateft purity and perfection, and when the minifters of it had gifts and powers which are now unknown. The people could not delegate fuch a right to any man or body of men; for the human mind is fo mutable, that no individual can fix a ftandard of his own faith, much lefs can he commiffion another to eftablifh one for him and his pofterity; and this power would be in no hands fo dangerous as in thofe of the ftatefman or prieft, who has the folly and prefumption to think himfelf qualified to exercife it. The ufe of this term was introduced at a time, when very imperfect notions of religious liberty, and very erroneous ideas of the authority of the civil magiftrate in the province of religion, prevailed. In its literal acceptation, it is without doubt objectionable, and incompatible with juft views of religious liberty. What human being, however exalted his rank or extenfive his influence, can prefume to *tolerate* or *fuffer* a fellow-creature to worfhip God according to the dictates of his own confcience, and in that way, or according to thofe rites and forms, which he apprehends the object of his worfhip has prefcribed; or, in other words, to *tolerate* God in receiving that worfhip; for to this extreme the argument may be extended. All difabilities and penalties incurred by not worfhipping God, and performing other acts of religion, according to any merely human ritual, are in fact prohibitions againft man's rendering and God's receiving the homage of the underftanding and the heart. Toleration, it has been faid, fuppofes on the part of thofe who exercife it an authority, to which they have no juft claim; and on the part of thofe who are the objects of it, a certain degree of criminality and culpability, which the perfons that exercife the right of toleration condefcend to excufe and allow. Such are the ideas which fome modern writers have entertained on this fubject; and accordingly they have wifhed for a difufe of the term, as it is founded in, and leads to, error. Liberty, whether it be complete, or partial, is a term well underftood; and the ufe of it is lefs liable to objection than that of toleration.—See on this fubject, Fownes's Inquiry into the Principles of Toleration, &c. 8vo. 1772. Locke's Letters concerning Toleration, in his Works, vol. ii. p. 231, &c. Hoadley's Rights of Subjects, paffim. Paley's Philofophy, vol. ii. c. 10. Percival's Effay on Truth, p. 90.

To the account above given of the general principles of toleration, it will be proper to add a few words concerning the ftate of toleration in our own country. With regard to the Proteftant-diffenters in general, fee DISSENTERS, NONCONFORMISTS, and QUAKERS. See alfo CONVENTICLE, CORPORATION-*Act*, SHERIFF, and TEST.

As for diffenting teachers, or minifters in particular, they were prohibited by 17 Car. II. cap. 2. from coming within five miles of a city, town-corporate, or borough, unlefs only in paffing upon the road, or unlefs required by legal procefs, without taking an oath of allegiance therein mentioned, on pain of 40*l.*, and of commitment by two juftices, on oath of the offence, for fix months. And by 22 Car. II. cap. 1. preaching in any meeting or conventicle, in other manner than according to the practice of the church of England, incurred a forfeiture of 20*l.* for the firft offence, and for every other offence 40*l.* Moreover, by 13 & 14 Car. II. cap. 4. no perfon fhall prefume to confecrate and adminifter the facrament before he be ordained prieft, according to the form of the church of England, on pain of 100*l.* But now by 1 W. cap. 18. commonly called the Act of Toleration, which, by 19 Geo. III. cap. 44. is declared to be a public act, they are exempted from the penalties of thofe ftatutes, upon taking the oaths of allegiance and fupremacy, and fubfcribing the declaration againft popery; and alfo, by 1 W. cap. 18. fubfcribing the articles of religion mentioned in the ftat. 13 Eliz. cap. 12. (which only concern the confeffion of the Chriftian faith and the doctrine of the facraments) with an exprefs exception of thofe relating to the government and powers of the church,

church, and to infant baptiſm; or if they ſcruple ſubſcribing the articles, upon making and ſubſcribing the declaration preſcribed by ſtat. 19 Geo. III. cap. 44. profeſſing themſelves to be Chriſtians and Proteſtants, and that they believe the Scriptures of the Old and New Teſtament, as commonly received among Proteſtant churches, to contain the revealed will of God, and that they receive the ſame as the rule of their doctrine and practice; for the regiſter of which they ſhall pay *6d.* to the officer of the court and no more, and *6d.* for a certificate thereof ſigned by ſuch officer. A farther enlargement of the Toleration Act, in favour of thoſe who impugn the doctrine of the Trinity, was made by 53 Geo. III. c. 160.

Any preacher or teacher, duly qualified, ſhall be allowed to officiate in any congregation, although the ſame be not in the county where he was ſo qualified, provided that the place of meeting hath been duly certified and regiſtered, and ſuch teacher or preacher ſhall, if required, produce a certificate of his having ſo qualified himſelf, and before any juſtice of ſuch county where he officiates, make and ſubſcribe ſuch declaration, and take ſuch oaths as aforeſaid, if required. (10 Ann. cap. 2.) And every ſuch teacher, having taken the oaths, and ſubſcribed as above, ſhall from thenceforth be exempted from ſerving in the militia, or on any jury, or from being appointed to bear the office of churchwarden, overſeer of the poor, or any other parochial or ward office, or other office in any hundred, city, town, pariſh, diviſion, or wapentake. For the ſtate of diſſenting ſchool-maſters, ſee SCHOOL-*Maſter*.

In conſequence of the Toleration Act, non-conformity is no longer a crime in the eye of the law, and the penalties to which it was obnoxious are not only ſuſpended, but abſolutely annulled with regard to thoſe diſſenters who are qualified as the act directs. See Furneaux's Letters to Judge Blackſtone, letter i. See DISSENTERS.

For an account of the laws relating to Papiſts or Catholics, ſee PAPISTS. We ſhall here ſtate the toleration granted to Catholics by the 31 Geo. III. c. 32. By this act it ſhall be lawful for perſons profeſſing the Roman Catholic religion, to appear in any of the courts at Weſtminſter, or at the general quarter ſeſſions for the county, city, or place where he ſhall reſide, and there in open court, between the hours of nine in the morning and two in the afternoon, take, make, and ſubſcribe the following declaration and oath: *viz.*

"I A. B. do hereby declare, that I do profeſs the Roman Catholic religion.

I A. B. do ſincerely promiſe and ſwear, that I will be faithful and bear true allegiance to his majeſty king George the Third, and him will defend to the utmoſt of my power, againſt all conſpiracies and attempts whatſoever, that ſhall be made againſt his perſon, crown, or dignity; and I will do my utmoſt endeavour to diſcloſe and make known to his majeſty, his heirs and ſucceſſors, all treaſons and traitorous conſpiracies which may be formed againſt him or them: and I do faithfully promiſe to maintain, ſupport, and defend, to the utmoſt of my power, the ſucceſſion of the crown; which ſucceſſion, by an act intitled, *An Act for the further limitation of the crown and better ſecurity of the rights and liberties of the ſubject*, is and ſtands limited to the princeſs Sophia, electreſs and ducheſs dowager of Hanover, and the heirs of her body, being Proteſtants, hereby utterly renouncing and abjuring any obedience or allegiance unto any other perſon claiming or pretending a right to the crown of theſe realms. And I do ſwear, that I do reject and deteſt, as an unchriſtian and impious poſition, that it is lawful to murder or deſtroy any perſon or perſons whatſoever, for or under pretence of their being heretics or infidels; and alſo that unchriſtian and impious principle, that faith is not to be kept with heretics or infidels. And I do further declare that it is not an article of my faith, and that I do renounce, reject, and abjure the opinion, that princes excommunicated by the pope and council, or any authority of the ſee of Rome, or by any authority whatſoever, may be depoſed or murdered by their ſubjects, or any perſon whatſoever. And I do promiſe that I will not hold, maintain, or abet any ſuch opinion, or any other opinion contrary to what is expreſſed in this declaration. And I do declare, that I do not believe that the pope of Rome, or any other foreign prince, prelate, ſtate, or potentate, hath or ought to have any temporal or civil juriſdiction, power, ſuperiority, or pre-eminence, directly or indirectly, within this realm. And I do ſolemnly, in the preſence of God, profeſs, teſtify, and declare, that I do make this declaration, and every part thereof, in the plain and ordinary ſenſe of the words of this oath, without any evaſion, equivocation, or mental reſervation whatever; and without any diſpenſation already granted by the pope, or any authority of the ſee of Rome, or any perſon whatever; and without thinking that I am or can be acquitted before God or man, or abſolved of this declaration, or any part thereof, although the pope or any other perſon or authority whatſoever ſhall diſpenſe with or annul the ſame, or declare that it was null or void."

Which ſaid declaration and oath ſhall be ſubſcribed by ſuch perſon with his name at full length, if he can write, and if not, with his mark, and his name ſhall be written by the officer, adding his title, addition, and place of abode, which ſhall there remain of record: and ſuch officer ſhall make, ſubſcribe, and deliver a certificate of ſuch declaration and oath having been duly made and taken, if demanded, for which he ſhall have *2s.*; which certificate ſhall be competent evidence, unleſs falſified.

And ſuch officer ſhall yearly, on or before the 25th of December, tranſmit to the privy council liſts of the perſons, with their titles, additions, and places of abode, who ſhall have made and ſubſcribed ſuch declaration and oath in the preceding year.

And no Roman Catholic, who ſhall have taken and ſubſcribed the ſaid oath as aforeſaid, ſhall be convicted upon any of the acts following; *viz.* 1 Eliz. c. 2. 23 Eliz. c. 1. 29 Eliz. c. 6. 35 Eliz. c. 2. 1 Jac. I. c. 4. 3 Jac. I. c. 4. 3 Jac. I. c. 5. and 7 Jac. I. c. 6. or any other ſtatute or law of this realm; or in any eccleſiaſtical court, for not reſorting to church, or having ſervants who ſhall not reſort to church, or other place of common prayer.

And by 43 Geo. III. c. 30. Roman Catholics taking and ſubſcribing the declaration and oath contained in the 31 Geo. III. c. 32. ſhall be entitled to all the benefits of the 18 Geo. III. c. 60. to every purpoſe as if they had taken the oath thereby preſcribed.

And whereas, by 23 Eliz. c. 2. 27 Eliz. c. 2. 35 Eliz. c. 2. 2 Jac. I. c. 4. 3 Jac. I. c. 5. 3 Car. I. c. 2. 25 Car. II. c. 2. Papiſts are made ſubject to ſeveral puniſhments, penalties, and diſabilities, it is enacted that no perſon who ſhall take and ſubſcribe the ſaid oath in manner aforeſaid ſhall be proſecuted or convicted for being a Papiſt, or reputed Papiſt, or for profeſſing or being educated in the Popiſh religion, or for hearing or ſaying maſs, or for being a prieſt or deacon, or entering or belonging to any eccleſiaſtical order or community of the church of Rome, or for being preſent at or performing or obſerving any rite, ceremony, practice, or obſervance of the popiſh religion, or maintaining or aſſiſting others therein.

Provided always, that no place of congregation or aſſembly for religious worſhip ſhall be allowed, until the place of of ſuch meeting ſhall be certified to the ſeſſions of the county or place in which the ſame ſhall be held, and be there recorded; and the clerk of the peace ſhall give a certificate thereof, if demanded, for which he ſhall have *6d.* And no miniſter or other perſon ſhall officiate in any ſuch place of meeting until his name and deſcription as a prieſt or miniſter ſhall have been recorded at the ſeſſions, for which ſhall be paid *6d.* and a certificate thereof ſhall be granted, if demanded, for which ſhall be paid *2s.* And no prieſt or miniſter who ſhall officiate in any ſuch meeting not ſo recorded as aforeſaid ſhall be deemed to be within the benefit of this act for any purpoſe whatſoever.

Provided, that if any ſuch place of aſſembly ſhall have the doors locked, barred, or bolted, during the time of meeting, all perſons who ſhall come to or be at ſuch meeting ſhall receive no benefit from this act, notwithſtanding his having taken ſuch oath as aforeſaid, but ſhall be liable to the ſame pains and penalties, as if this act had not been made.

If any Roman Catholic ſhall hereafter be appointed high or petty conſtable, churchwarden, overſeer of the poor, or any other parochial or ward office, and ſhall ſcruple to take upon him any of the ſaid offices, he may execute the ſame by a ſufficient deputy, to be approved of in like manner as other perſons.

Every miniſter of any Roman Catholic congregation who ſhall take and ſubſcribe the ſaid oath in manner aforeſaid, ſhall be exempt from ſerving on juries, and from the office of church-warden, overſeer, or other parochial or ward office, or other office in any hundred of any ſhire, city, town, pariſh, diviſion, or wapentake.

But all laws made for frequenting divine ſervice ſhall continue in force, unleſs where perſons ſhall come to ſome religious worſhip permitted by this act, or an act of 1 W. & M. for exempting Diſſenters.

And if any perſon ſhall wilfully and on purpoſe maliciouſly and contemptuouſly come into any congregation or aſſembly of religious worſhip permitted by this act, and diſturb the ſame; or miſuſe any prieſt, miniſter, preacher, or teacher therein, he ſhall, on proof by two witneſſes, before one juſtice, find two ſureties of the peace to be bound by recognizance in *50l.* and in default thereof, ſhall be committed to priſon till the next ſeſſions, and on conviction of ſuch offence at the ſeſſions, ſhall forfeit *20l.* to the king.

Provided, that no benefit herein contained ſhall extend to any Roman Catholic eccleſiaſtic permitted by this act, who ſhall officiate in any congregation, or aſſembly hereby permitted, with a ſteeple and bell, or at any funeral in any church or church-yard; or who ſhall exerciſe any of the rites or ceremonies of his religion; or wear the habits of his order, ſave within ſome place of congregation, or aſſembly for religious worſhip permitted by this act; or in any private houſe where there ſhall not be more than five perſons aſſembled beſides thoſe of the houſehold; or who ſhall not previouſly to his ſo exerciſing his function have taken the oath of allegiance, abjuration, and declaration hereby appointed, in manner aforeſaid.

But nothing herein ſhall exempt any Roman Catholic from paying tithes or other parochial duties, or any other duties to the church or miniſter; or to repeal any part of 26 Geo. II. c. 33. "for preventing clandeſtine marriages," or any parts of any ſtatutes concerning marriages; or to give any eaſe or benefit to any perſon who ſhall, by preaching, teaching, or writing, deny or gainſay the oath and declaration aforeſaid, or the doctrines therein contained, or any of them; or to repeal or affect any law concerning the right ſucceſſion to or limitation of the crown.

And no Roman Catholic, who ſhall take and ſubſcribe the ſaid oath of allegiance, abjuration, and declaration, as aforeſaid, ſhall be proſecuted for teaching youth as a tutor or ſchool-maſter; but he ſhall not hold any maſterſhip of any college, or ſchool of royal foundation, or of any other endowed college or ſchool for the education of youth; nor ſhall keep a ſchool in either of the univerſities; nor ſhall receive into his ſchool for education the children of any Proteſtant father; nor ſhall teach any ſchool until his name ſhall be entered at the ſeſſions in manner aforeſaid, as a Roman Catholic ſchoolmaſter: and no perſon offending in the premiſes ſhall receive any benefit from this act.

Provided alſo, that nothing herein ſhall make it lawful to found, endow, or eſtabliſh any religious order or ſociety of perſons bound by monaſtic or religious vows; or any ſchool, academy, or college by any Roman Catholic; and that all uſes, truſts, and diſpoſitions, whether of real or perſonal property, before deemed to be unlawful, ſhall continue to be ſo deemed.

No perſon ſhall be ſummoned to take the oath required by 1 W. & M. ſeſſ. 1. c. 8. or the declaration required by 25 Geo. II. c. 2. Nor ſhall the 1 W. & M. ſeſſ. 1. c. 9. for removing Papiſts from London and Weſtminſter, extend to Roman Catholics who ſhall have taken and ſubſcribed the oath, &c. herein appointed.

No peer who ſhall have taken and ſubſcribed the ſaid oath, &c. in manner aforeſaid, ſhall be liable to be proſecuted under 30 Car. II. ſt. 2.

And the 1 Geo. I. ſeſſ. 2. c. 55. and 3 Geo. III. c. 18. requiring Papiſts to regiſter their names and real eſtates are repealed; and all deeds and wills of Papiſts ſhall, after the 24th of June 1791, be good as if the ſaid acts had never been made.

And whereas by 7 & 8 Will. c. 4. and 1 Geo. I. ſt. 2. c. 13. every perſon acting as a counſellor at law, barriſter, attorney, ſolicitor, clerk, or notary, not having taken the oaths and declaration therein preſcribed, ſhould be liable to certain penalties, it is enacted that theſe oaths and declarations ſhall be no longer required; but the oath and declaration herein appointed ſhall be taken in lieu thereof, in manner aforeſaid.

END OF VOL. XXXV.

Printed by A. Strahan,
New-Street-Square, London.