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Bark-Binding || Barley.

ing, as well as for the fetching ſea-water to make ſalt of. They have a deck, and are filled with water up to the deck.

Bark-Binding, a diſtemper incident to trees; cured by ſlitting the bark, or cutting along the grain.

Bark-Galling, is when the trees are galled with thorns, &c. It is cured by binding clay on the galled places.

Bark-Longue, or *Barca Longa*, a ſmall low ſharp-built, but very long, veſſel without a deck. It goes with ſails and oars, and is very common in Spain.

BARKHAMSTEAD, or BERKHAMSTEAD, a town of Hertfordſhire in England, ſeems to have been the ſite of a Roman town. It had formerly a ſtrong caſtle built by the Normans, but it has been long ſince demoliſhed. W. Long. 0. 35. N. Lat. 45. 49.

BARKING, a town of Eſſex in England, ſeated on the river Roding, not far from the Thames, in a very unwholeſome air. It has been chiefly noted for a large monaſtery, now in ruins; there being nothing left ſtanding but a ſmall part of the walls and a gate-houſe. E. Long. 0. 13. N. Lat. 51. 30.

Barking of Trees, the peeling off the rind or bark. This muſt be done, in our climate, in the month of May, becauſe at that time the ſap of the tree ſeparates the bark from the wood. It would be very difficult to perform it at any other time of the year, unleſs the ſeaſon was extremely wet and rainy; for heat and dryneſs are a very great hindrance to it.

By the French laws, all dealers are forbid to bark their wood while growing, on the penalty of 500 livres. This law was the reſult of ignorance; it being now found that barking of trees, and letting them die, increaſes the ſtrength of timber.

BARKLEY, a town of Glouceſterſhire in England, ſeated on a branch of the river Severn. It was formerly of ſome note for a nunnery, and has ſtill the title of a barony. W. Long. 2. 30. N. Lat. 51. 40.

BARKWAY, a town of Hertfordſhire in England, on the great road from London to York. W. Long. 0. 5. N. Lat. 52.

BARLÆUS, GASPAR, profeſſor of philoſophy at Amſterdam, and one of the beſt Latin poets of the 17th century. There was ſcarce any thing great that happened in the world, while he lived, but he made a pompous elegy upon it, when reaſons of ſtate were no obſtacle to it. He was a great defender of Arminius; and ſhowed his abilities in hiſtory by his relation of what paſſed in Braſil during the government of Count Maurice of Naſſau, publiſhed 1647. He died the year after.

BARLERIA, SNAP-DRAGON. See BOTANY *Index*.

BARLETTA, a handſome and ſtrong town of Italy, in the kingdom of Naples, and in the Terra di Bari, with a biſhop's ſee. It is ſituated on the gulf of Venice, in E. Long. 16. 32. N. Lat. 41. 30.

BARLEY, in *Botany*. See HORDEUM, BOTANY and AGRICULTURE *Index*.

The principal uſe of barley among us is for making beer; in order to which it is firſt malted. See the article BEER.

The Spaniards, among whom malt liquors are little known, feed their horſes with barley as we do with oats. In Scotland, barley is a common ingredient in broths; and the conſumpt of it for that purpoſe is very conſiderable, *barley-broth* being a diſh as frequent there as that of *ſoup* in France.

Pearl-Barley || Barlow.

Pearl BARLEY, and *French* BARLEY; barley freed of the huſk by a mill; the diſtinction between the two being, that the pearl barley is reduced to the ſize of ſmall ſhot, all but the very heart of the grain being ground away.

Barley-Water, is a decoction of either of theſe, reputed ſoft and lubricating, of frequent uſe in phyſic. This well known decoction is a very uſeful drink in many diſorders; and is recommended, with nitre, by ſome authors of reputation, in ſlow fevers.

Barley-Corn is uſed to denote a long meaſure, containing in length the third part of an inch, and in breadth the eighth. The French carpenters alſo uſe barley-corn, *grain d'orge*, as equivalent to a line, or the twelfth part of an inch.

Barley-Corn (*grain d'orge*), is alſo uſed in building for a little cavity between the mouldings of joiners work, ſerving to ſeparate or keep them aſunder; thus called becauſe made of a kind of plane of the ſame name.

BARLOW, WILLIAM, biſhop of Chicheſter, deſcended of an ancient family in Wales, was born in the county of Eſſex. In his youth he favoured the Reformation; and travelled to Germany to be inſtructed by Luther, and other preachers of the new doctrine. How long he continued a Proteſtant is uncertain: but from his letter to King Henry VIII. quoted below, it appears that he wrote ſeveral books againſt the church of Rome. However, he was a regular canon in the Auguſtine monaſtery of St Oſith in the county of Eſſex, and ſtudied ſome time at Oxford with the brothers of that order, where he took the degree of doctor in divinity. He was then made prior of the convent at Biſham in Berkſhire; and afterwards ſucceeded to the ſeveral priories of Blackmore, Typtree, Lega, Bromhole, and Haverford-weſt. On the diſſolution of abbeys, he reſigned not only with a good grace, but perſuaded ſeveral other abbots to follow his example. King Henry was ſo pleaſed with his ready obedience on this occaſion, that he ſent him, in 1535, on an embaſſy to Scotland; in the ſame year, made him biſhop of St Aſaph; in two months after, tranſlated him to the ſee of St David's and in 1547 to that of Bath and Wells. During this time, our good biſhop, as appears from the following epiſtle to the king, was, or pretended to be, a ſtaunch Papiſt: it was written in 1533. "Prayſe be to God, who of his infynyte goodneſs and mercy ineſtymable hath brought me out of darkneſs into light, and from deadly ignorance into the quick knowledge of the truth. From which, through the fiend's inſtigation and falſe perſuaſion, I have greatly ſwerved.—In ſo much that I have made certayn bokes, and have ſoffred them to be emprinted, as the tretiſe of the *Buryall of the Maſs*, &c. In theſe tretiſes I perceive and acknowledge myſelf grievouſly to have erred, namely againſt the bleſſed ſacrament of the altare; diſallowing the maſſe and denying purgatory, with ſlanderous infamy of the pope and my lord cardinal, and outrageous rayling againſt the clergy; which I have forſaken and utterly renounced—Aſks pardon, William Barlow." Howéver, when Edward VI. came to the crown, he was again a Proteſtant; and for

Barlow. that reaſon, on Queen Mary's acceſſion, was deprived of his biſhopric, and ſent priſoner to the Fleet, where he continued ſome time. At length he found means to eſcape, and immediately joined the other Engliſh Proteſtants in Germany. When Queen Elizabeth aſcended the throne, our prelate was raiſed to the ſee of Chicheſter, and ſoon after made firſt prebendary of the collegiate church of Weſtminſter. He died in 1568, and was buried in the cathedral at Chicheſter. He had five daughters, each of which married a biſhop. He wrote, 1. The Buryal of the maſſe. 2. The climbing up of Fryers and religious Perſons, portred with Figures. 3. Chriſtian Homilies. 4. A book upon Coſmography. 5. The godly and pious Inſtitution of a Chriſtian Man, commonly called the *Biſhop's Book;* and ſeveral other works. He is ſaid to be the tranſlator of the Apocrypha as far as the book of Wiſdom. His letters to M. Parker are in manuſcript in Corpus Chriſti college, Cambridge, Miſc. i. 445.

Barlow, *William*, a mathematician and divine, the ſon of the biſhop of Chicheſter, was born in Pembrokeſhire whilſt his father was biſhop of St David's. In 1560, he was entered commoner of Baliol college in Oxford; and in 1564, took a degree in arts, which having completed by determination, he left the univerſity and went to ſea; but in what capacity is uncertain: however, he acquired conſiderable knowledge in the art of navigation. About the year 1573, he entered into orders; and became prebendary of Wincheſter and rector of Eaſton near that city. In 1588, he was made prebendary of Litchfield, which he exchanged for the place of treaſurer of that church. Some years after, he was made chaplain to Prince Henry, the ſon of King James I.; and in 1614, archdeacon of Saliſbury. He was the firſt writer on the nature and properties of the magnet. Barlow died in the year 1625, and was buried in the church at Eaſton. His works are, 1. "The Navigator's Supply, containing many things of principal importance belonging to navigation, and uſe of diverſe inſtruments framed chiefly for that purpoſe." London, 1597, 4to, Dedicated to Robert earl of Eſſex. 2. "Magnetical Advertiſements, or diverſe pertinent Obſervations and approved Experiments concerning the Nature and Properties of the Loadſtone." London, 1616, 4to. 3. "A brief Diſcovery of the idle Animadverſions of Mark Ridley, M. D. upon a Treatiſe entitled Magnetical Advertiſements." London, 1618, 4to.

Barlow, *Thomas*, born in 1607, was appointed fellow of Queen's college in Oxford in 1633; and two years after was choſen reader of metaphyſics to the univerſity. He was keeper of the Bodleian library, and in 1657 was choſen provoſt of Queen's college. After the reſtoration of King Charles II. he was nominated one of the commiſſioners for reſtoring the members unjuſtly expelled in 1648. He wrote at that time *The Caſe of Toleration in Matters of Religion*, to Mr R. Boyle. In 1675, he was made biſhop of Lincoln. After the popiſh plot, he publiſhed ſeveral tracts againſt the Roman catholic religion; in which he ſhows an uncommon extent of learning, and ſkill in polemical divinity. Nevertheleſs, when the duke of York was proclaimed king, he took all opportunities of expreſſing his affection toward him; but after the revolution he as readily voted that the king had abdicated his kingdom; and was very vigorous in excluding thoſe of the clergy who refuſed the oaths, from their benefices. Barlow || Barmas.

Mr Granger obſerves, that "this learned prelate, whom nature deſigned for a ſcholar, and who acted in conformity with the bent of nature, was perhaps as great a maſter of the learned languages, and of the works of the celebrated authors who have written in thoſe languages, as any man in his age. The greateſt part of his writings, of which Mr Wood has given us a catalogue, are againſt Popery; and his conduct for ſome time, like that of other Calviniſts, appeared to be in direct oppoſition to the church of Rome. But after James aſcended the throne, he ſeemed to approach much nearer to Popery than he ever did before. He ſent the king an addreſs of thanks for his declaration for liberty of conſcience, and is ſaid to have written reaſons for reading that declaration. His compliances were much the ſame after the revolution. His moderation, to call it by the ſofteſt name, was very great; indeed ſo great as to bring the firmneſs of his character in queſtion. But caſuiſtry, which was his moſt diſtinguiſhed talent, not only reconciles ſeeming contradictions, but has alſo been known to admit contradictions themſelves. He was, abſtracted from this laxity of principles, a very great and worthy man." He died at Buckden, in Huntingdonſhire, on the 8th of October 1691, in the 85th year of his age.

Barlow, *Francis*, an Engliſh painter, was born in Lincolnſhire. On his coming to London, he was placed with one Shephard, a limner; but his genius led him chiefly to drawing of birds, fiſh, and other animals. There are ſix books of animals from his drawings, and he painted ſome ceilings with birds for noblemen and gentlemen in the country. His etchings are numerous; his illuſtration of Eſop is his greateſt work. He died in 1702. There is ſomething pleaſing in the compoſition and manner of this maſter, though neither is excellent. His drawing too is very indifferent; nor does he characterize any animal juſtly. His birds in general are better than his beaſts.

BARM, the ſame with yeſt. See Yest.—Barm is ſaid to have been firſt uſed by the Celtæ in the compoſition of bread. About the time of Agricola's entrance into Lancaſhire, a new ſort of loaf had been introduced at Rome; which was formed only of water and flour, and much eſteemed for its lightneſs: and it was called the *water cake* from its ſimple compoſition, and the *Parthian roll* from its original inventors. But even this was not comparable to the French or Spaniſh bread for its lightneſs. The uſe of curmi*, and the knowledge of brewing, had acquainted the Celtes with an ingredient for their bread, which was much better calculated to render it light and pleaſant, than the leaven, the eggs, the milk, or the wine and honey, of other nations. This was the ſpume which aroſe on the ſurface of their curmi in fermentation, and which the Welch denominate *burm* and we *barm*. The Celtes of Gaul, of Spain, and moſt probably therefore of South-Britain, had long uſed it; and their bread was, in conſequence of this, ſuperior in lightneſs to that of any other nation in the world †. See the articles Baking and Bread.

* See *Ale*.

† *Pliny*, lib. xviii. c. 7, 11.

BARMAS, an Eaſt Indian people, who in 1515 poſſeſſed

Barn
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Barnabas's.

poſſeſſed all the coaſt extending from Bengal to Pegu. It appears alſo, that they were formerly maſters of Ava, the dominions of which extended as far as China; and of conſequence the Barmas were maſters of moſt of the northern part of the peninſula beyond the Ganges. Their dominions, however, were afterwards reduced to very narrow bounds, and their king became tributary to the king of Pegu; but by degrees they not only recovered their former empire, but conquered the kingdoms of Pegu, Siam, and ſeveral others. By the lateſt accounts, their kingdom extends from the province of Yun-nan in China, about 800 miles in length from north to ſouth, and 250 in breadth from eaſt to weſt. See Asia and Pegu.

BARN, in *Huſbandry*, a covered place or houſe, with air-holes in the ſides, for laying up any ſort of grain, hay, or ſtraw.

St BARNABAS'S Day, a Chriſtian feſtival, celebrated on the 11th of June.—St Barnabas was born at Cyprus, and deſcended of the tribe of Levi, whoſe Jewiſh anceſtors are thought to have retired thither to ſecure themſelves from violence during the troubleſome times in Judea. His proper name was *Joſes;* to which, after his converſion to Chriſtianity, the apoſtles added that of *Barnabas*, ſignifying either *the ſon of prophecy*, or *the ſon of conſolation;* the firſt reſpecting his eminent *prophetic gifts*, the other his *great charity* in ſelling his eſtate for the comfort and relief of the poor Chriſtians. He was educated at Jeruſalem, under the great Jewiſh doctor Gamaliel; which might probably lay the foundation of that intimate friendſhip which was afterwards contracted between this apoſtle and St Paul. The time of his converſion is uncertain; but he is generally eſteemed one of the ſeventy diſciples choſen by our Saviour himſelf.

At Antioch, St Paul and St Barnabas had a conteſt, which ended in their ſeparation: but what followed it with reſpect to St Barnabas is not related in the *Acts of the Apoſtles*. Some ſay, he went into Italy, and founded a church at Milan. At Salamis, we are told, he ſuffered martyrdom; whither ſome Jews, being come out of Syria, ſet upon him, as he was diſputing in the ſynagogue, and ſtoned him to death. He was buried by his kinſman Mark, whom he had taken with him, in a cave near that city. The remains of his body are ſaid to have been diſcovered in the reign of the emperor Zeno, together with a copy of St Matthew's goſpel, written with his own hand, and lying on his breaſt.

St Barnabas's Epiſtle, an apocryphal work aſcribed to St Barnabas, and frequently cited by St Clement of Alexandria and Origen. It was firſt publiſhed in Greek, from a copy of Father Hugh Menard a Benedictine monk. An ancient verſion of it was found in a manuſcript of the abbey of Coebey, near a thouſand years old. Voſſius publiſhed it, in the year 1656, together with the epiſtles of St Ignatius.

St Barnabas's Goſpel, another apocryphal work, aſcribed to St Barnabas the apoſtle, wherein the hiſtory of Jeſus Chriſt is related in a manner very different from the account given us by the four Evangeliſts. The Mahometans have this goſpel in Arabic, and it correſponds very well with thoſe traditions which Mahomet followed in his Koran. It was, probably, a forgery of ſome nominal Chriſtians; and afterwards altered and interpolated by the Mahometans, the better to ſerve their purpoſe.

Barnabites
||
Barneveldt.

BARNABITES, a religious order, founded in the 16th century by three Italian gentlemen, who had been adviſed by a famous preacher of thoſe days to read carefully the epiſtles of St Paul. Hence they were called *clerks of St Paul;* and *Barnabites*, becauſe they performed their firſt exerciſe in a church of St Barnabas at Milan. Their habit is black; and their office is to inſtruct, cathechiſe, and ſerve in miſſion.

BARNACLE, a ſpecies of gooſe. See Anas, Ornithology *Index*.

BARNACLES, in *Farriery*, an inſtrument compoſed of two branches joined at one end with a hinge, to put upon horſes noſes when they will not ſtand quietly to be ſhod, blooded, or dreſſed.

BARNADESIA. See Botany *Index*.

BARNARD, or Bernard, John, the ſon of John Barnard gent. was born at Caſtor in Lincolnſhire, and educated at Cambridge. After ſeveral preferments, he was made a prebendary of the church of Lincoln. He wrote *Cenſura Clerior*, againſt ſcandalous miniſters not fit to be reſtored to church livings; the Life of Dr Heylyn; and a few other works. He died at Newark, Auguſt 17. 1683.

Barnard Caſtle, ſeated on the river Tees in the county of Durham, is a town and barony belonging to Vane earl of Darlington. It is indifferently large, and has a manufacture of ſtockings. W. Long. 1. 45. N. Lat. 54. 35.

BARNES, Joshua, profeſſor of the Greek language at Cambridge, in the beginning of the 18th century. He was choſen queen's profeſſor of Greek in 1695, a language he wrote and ſpoke with the utmoſt facility. His firſt publication was a whimſical tract, entitled, *Gerania*, or *a new Diſcovery of the little ſort of people called Pygmies*. After that appeared his *Life of Edward* III. in which he introduces his hero making long and elaborate ſpeeches.—In the year 1700, when he publiſhed many of his works, Mrs Maſon, of Hemmingford, in Huntingdonſhire, a widow lady of between 40 and 50, with a jointure of 200l. per annum, who had been for ſome time a great admirer of him, came to Cambridge, and deſired leave to ſettle 100l. a year upon him after her death; which he politely refuſed, unleſs ſhe would likewiſe condeſcend to make him happy with her perſon, which was not very engaging. The lady was too obliging to refuſe any thing to Joſhua, for whom ſhe ſaid, "the ſun ſtood ſtill;" and they were accordingly married. Mr Barnes wrote ſeveral other books beſides thoſe abovementioned, particularly, *Sacred Poems; The life of Oliver Cromwell, the Tyrant; ſeveral dramatic pieces; a poetical Paraphraſe on the Hiſtory of Eſther, in Greek verſe*, with a Latin tranſlation, &c.: and he publiſhed editions of *Euripides*, *Anacreon*, and *Homer's Iliad and Odyſſey*, with notes and a Latin tranſlation. He wrote with greater eaſe in Greek than even in Engliſh, and yet is generally allowed not to have underſtood the delicacies of that language. He was of ſuch a humane diſpoſition, and ſo unacquainted with the world, that he gave his only coat to a vagrant begging at his door. This excellent man died on the 3d of Auguſt 1712, in the 58th year of his age.

BARNEVELDT, John d'Olden, the celebrated

Barnet || Barocci.

Dutch ſtateſman, and one of the founders of the civil liberty of Holland. His patriotic zeal inducing him to limit the authority of Maurice prince of Orange the ſecond ſtadtholder of Holland, the partizans of that prince falſely accuſed him of a deſign to deliver his country into the hands of the Spaniſh monarch. On this abſurd charge he was tried by 26 commiſſaries deputed from the ſeven provinces, condemned, and beheaded in 1619. His ſons William and Réné, with a view of revenging their father's death, formed a conſpiracy againſt the ſtadtholder, which was diſcovered. William fled: but Réné was taken and condemned to die; which fatal circumſtance has immortalized the memory of his mother, of whom the following anecdote is recorded. She ſolicited a pardon for Réné; upon which Maurice expreſſed his ſurpriſe that ſhe ſhould do that for her ſon which ſhe had refuſed for her huſband. To this remark, ſhe replied with indignation, "I would not aſk a pardon for my huſband, becauſe he was innocent. I ſolicit it for my ſon, becauſe he is guilty."

BARNET, a town partly in Middleſex and partly in Hertfordſhire. It is a great thoroughfare, and the market is very remarkable for hogs. W. Long. 0. 5. N. Lat. 51. 42.

BARNSLEY, or Black Barnsley, a town of the weſt riding of Yorkſhire, ſeated on the ſide of a hill, and five furlongs in length. W. Long. 1. 20. N. Lat. 53. 35.

BARNSTABLE, a ſea-port town of Devonſhire, ſeated on the river Tau, over which there is a good bridge. It is a corporation town, and ſends two members to parliament. W. Long. 4. 5. N. Lat. 51. 15.

BARO, or Baron, Peter, profeſſor of divinity in the univerſity of Cambridge, in the 16th century, was born at Eſtampes in France, and educated in the univerſity of Bourges, where he was admitted a licentiate in the law but being of the Proteſtant religion, he was obliged to leave his native country to avoid perſecution; and withdrawing into England, was kindly entertained by Lord Burleigh. He afterwards ſettled at Cambridge; and by the recommendation of his noble patron, was, in 1574, choſen Lady Margaret's profeſſor there. For ſome years he quietly enjoyed his profeſſorſhip; but there was at laſt raiſed a reſtleſs faction againſt him, by his oppoſing the doctrine of abſolute predeſtination; which rendered his place ſo uneaſy to him, that he choſe to leave the univerſity, and to ſettle in London. He wrote, 1. *In Jonam Prophetam Prælectiones* xxxix. 2. *De Præſtantia et Dignitate Divinæ Legis;* and other pieces. He died in London, about the year 1600.

BAROCCI, Frederic, a celebrated painter, was born at Urbino, where the genius of Raphael inſpired him. In his early youth he travelled to Rome; where he painted ſeveral things in freſco. He then returned to Urbino; and giving himſelf up to intenſe ſtudy, acquired a great name in painting. His genius particularly led him to religious ſubjects. At his leiſure hours, he etched a few prints from his own deſigns; which are highly finiſhed, and executed with great ſoftneſs and delicacy. The *Salutation* is his capital performance in that way: of which we ſeldom meet with any impreſſions, but thoſe taken from the retouched plate, which are very harſh. He died at Urbino in 1612, aged 84.

Baroche || Barometer.

BAROCHE, a town of Cambaya, in the dominions of the Great Mogul; it is walled round, and was formerly a place of great trade. It is now inhabited by weavers and ſuch mechanics as manufacture cotton cloth. Here they have the beſt cotton in the world, and of conſequence the beſt baſtas are manufactured in this place. The Engliſh and Dutch had formerly factories here, which are now abandoned. E. Long. 72. 5. N. Lat. 22. 15.

BAROCO, in *Logic*, a term given to the fourth mode of the ſecond figure of ſyllogiſms. A ſyllogiſm in baroco has the firſt propoſition univerſal and affirmative, but the ſecond and third particular and negative, and the middle term is the predicate in the two firſt propoſitions. For example,

Nullus homo non eſt bipes:
Non omne animal eſt bipes:
Non omne animal eſt homo.

BAROMETER (from *βαρος weight*, and *μετρον meaſure*), an inſtrument for meaſuring the weight of the atmoſphere, and of uſe in foretelling the changes of the weather, and alſo for meaſuring the height of mountains, &c.

1 Principles of the barometer.

The common barometer conſiſts of a glaſs tube hermetically ſealed at one end, and filled with quickſilver well defecated and purged of its air. The finger being then placed on the open end, in immediate contact with the mercury, ſo as not to admit the leaſt particle of air, the tube is inverted, and the lower end plunged into a baſon of the ſame prepared mercury; then upon removing the finger, the mercury in the tube will join that in the baſon, and the mercurial column in the tube will ſubſide to the height of 29 or 30 inches, according to the ſtate of the atmoſphere at that time. This is the principle on which all barometers are conſtructed. Of their invention, the different kinds of them, and the theories by which their phenomena are ſolved, we ſhall proceed to give an hiſtorical account.

2 Diſcovered by Galilæo, and improved by Torricelli.

In the beginning of the laſt century, when the doctrine of a plenum was in vogue, philoſophers were of opinion, that the aſcent of water in pumps was owing to the abhorrence of a vacuum; and that by means of ſuction, fluids might be raiſed to any height whatever. But Galilæo, who flouriſhed about that time, diſcovered that water could not aſcend in a pump unleſs the ſucker reached within 33 feet of its ſurface in the well. From hence he concluded, that not the power of ſuction, but the preſſure of the atmoſphere, was the cauſe of the aſcent of water in pumps; that a column of water 33 feet high was a counterpoiſe to one of air of an equal baſe, whoſe height extended to the top of the atmoſphere; and that for this reaſon the water would not follow the ſucker any farther. From this Torricelli, Galilæo's diſciple, took the hint; and conſidered, that if a column of water of about 33 feet in height was equal in weight to one of air having the ſame baſe, a column of mercury no longer than about 29½ inches would be ſo too, becauſe mercury being about 14 times heavier than water, a column of mercury muſt be 14 times ſhorter than one of water equally heavy. Accordingly, having filled a glaſs tube with mercury, and inverted it into a baſon of the ſame, he found the mercury in the tube to deſcend till it ſtood about 29½ inches above the ſurface of that in the baſon.

Notwithſtanding

Barometer.

Notwithſtanding this clear proof of the preſſure of the atmoſphere, however, the aſſertors of a plenum left no means untried to ſolve the phenomena of the Torricellian experiment by ſome other hypotheſis. The moſt ridiculous ſolution, and which at the ſame time gave the adverſe party the greateſt difficulty to overthrow it, was that of Linus. He contended, that in the upper part of the tube, there is a film, or *rope of mercury*, extended through the ſeeming vacuity; and that, by this rope, the reſt of the mercury was ſuſpended, and kept from falling into the baſon. Even this ſo abſurd hypotheſis he pretended to confirm by the following experiments. Take, ſays he, a ſmall tube, open at both ends, ſuppoſe about 20 inches long; fill this tube with mercury, ſtopping the lower orifice with your thumb: Then cloſing the upper end with your finger, and immerging the lower in ſtagnant mercury, you ſhall perceive, upon the removal of your thumb, a manifeſt ſuction of your finger into the tube; and the tube and mercury will both ſtick ſo cloſe to it, that you may carry them about the room. Therefore, ſays he, the internal cylinder of mercury in the tube is not held up by the preponderate air without; for if ſo, whence comes ſo ſtrong a ſuction, and ſo firm an adheſion of the tube to the finger?—The ſame effect follows, though the tube be not quite filled with mercury; for if a little ſpace of air is left at the top, after the tube is immerged in the ſtagnant mercury, there will be a conſiderable ſuction as before.

3 Strange hypotheſis of Linus.

4 Experiments in confirmation of it.

5 Refuted.

These experiments, which are themſelves clear proofs of the preſſure of the air, ſupported for ſome time the *funicular* hypotheſis, as it was called, of Linus. But when it was diſcovered, that if the tube was carried to the top of a high mountain the mercury ſtood lower than on the plain, and that if removed into the vacuum of an air-pump it fell out altogether, the hypotheſis of Linus was rejected by every body.—There are, however, two experiments which create a conſiderable difficulty. One is mentioned by Mr Huygens, viz. that if a glaſs tube 75 inches long, or perhaps longer, is filled with mercury well purged of its air, and then inverted, the whole will remain ſuſpended; whereas, according to the Torricellian experiment, it ought to ſubſide immediately to the height of 29 or 30 inches. It is true indeed, that, upon ſhaking the tube, the mercury preſently ſubſides to that height; but why it ſhould remain ſuſpended at all, more than twice the height to which it can be raiſed by the preſſure of the moſt denſe atmoſphere, ſeems not eaſily accounted for; and accordingly, in the Philoſophical Tranſactions, we find attempts to account for it by the preſſure of a medium more ſubtile than the common air, and capable of pervading both the mercury and glaſs. We find there alſo another very ſurpriſing fact of the ſame kind mentioned; viz. that a pretty large tube under 29 inches in length, filled with mercury, and inverted into a baſon of the ſame, will remain full, though there be a ſmall hole in the top. This too, is there accounted for by the preſſure of a medium more ſubtile than common air; but by no means in a ſatisfactory manner. Mr Rowning, who mentions the phenomenon of the 75 inch tube, accounts for it in the following manner. "The cauſe of this phenomenon ſeems to be, that by the great weight of ſo long a column of mercury, it was preſſed into ſo cloſe contact with the glaſs in pouring in, that, by the mutual attraction of coheſion between the mercury and the glaſs, the whole column was ſuſtained after the tube was inverted."—Here, however, we muſt obſerve, that this ſolution ſeems equally unſatisfactory with that of the ſubtile medium already mentioned; becauſe it is only one end of the column which ſuſtains ſo great a preſſure from the weight of the mercury; and therefore, though five or ſix inches of the upper part of the tube, where the preſſure had been ſtrongeſt, might thus remain full of mercury, yet the reſt ought to fall down. Beſides, it is only the outſide of the mercurial column that is in contact with the glaſs, and conſequently theſe parts only ought to be attracted. Therefore, even granting the preſſure to be equally violent, on the inverſion of the tube, all the way from 29 to 75 inches, yet the glaſs ought to be only as it were ſilvered over by a very thin film of mercury, while the middle parts of the column ought to fall out by reaſon of their fluidity.

6 Remarkable experiments by Mr Huygens.

7 Unſatisfactorily accounted for in the Philoſophical Tranſactions

8 Mr Rowning's ſolution.

Barometer.

9 Inſufficient.

10 Another experiment with ſiphons.

The other experiment hinted at, is with regard to ſiphons; which though it belongs more properly to the article HYDROSTATICS, yet ſeems neceſſary to be mentioned here. It is this: That a ſiphon, once ſet a running, will continue to do ſo though ſet under the receiver of an air-pump and the air exhauſted in the moſt perfect manner; or if a ſiphon is filled, and then ſet under a receiver and the air exhauſted, if by any contrivance the end of the lower leg is opened, it will immediately begin to run, and diſcharge the water of any veſſel in which the other leg is placed, as though it was in the open air. The cauſe of this phenomenon, as well as the former, ſeems very difficult to be inveſtigated. Some philoſophers have attempted a ſolution on a principle ſomething ſimilar to that of the funicular hypotheſis of Linus above-mentioned; namely, that "fluids in ſiphons ſeem as it were to form one continued body; ſo that the heavier part, deſcending, like a chain pulls the lighter after it." This might be deemed a ſufficient explanation, if the ſiphon were only to empty the water it at firſt contains in itſelf: but when we conſider that the water in the veſſel, which much exceeds the quantity contained in the ſiphon, is likewiſe evacuated, this hypotheſis can by no means be admitted; becauſe this would be like the lighter part of a chain pulling the heavier after it.

11 Another ſolution.

12 Inſufficient.

13 Another ſolution from the action of electricity.

Concerning the cauſe of theſe ſingular phenomena, we can only offer the following conjecture. The exiſtence of a medium much more ſubtile than air, and which pervades the vacuum of an air-pump with the utmoſt facility, is now ſufficiently aſcertained in the phenomena of electricity. It is alſo well known, that this fluid ſurrounds the whole earth to an indeterminate height. If therefore this fluid either is the power of gravity itſelf, or is acted upon by that power, it muſt neceſſarily preſs upon all terreſtrial bodies in a manner ſimilar to the preſſure of the atmoſphere. If then we could from any veſſel entirely exclude this ſubtile fluid, and form an electrical vacuum, as well as we can do an aerial one by means of the air-pump, we would in that caſe ſee fluids as evidently raiſed by the preſſure of the electric matter, as we now ſee them raiſed by that of the air. But though this cannot be done, we are aſſured that there are certain ſubſtances, of which glaſs is one, through which the electric matter cannot

Barometer. pafs but with difficulty. We are likewife certain, that though the electric matter paffes through the pores of water, metals, &c. with very great facility, yet it ftill muft meet with fome refiftance from their folid and impenetrable parts, which cannot be pervaded by any material fubftance. We know alfo, that all fubftances do naturally contain a certain quantity of this electric matter, which they are not always ready to part with; and when by any means the fluid they contain is fet in motion, they are then faid to be *electrified*. Now, though we are certain, that the friction of glafs by mercury does fet in motion the electric fluid contained in the mercury or in the glafs; yet when the tube is filled with the metallic fluid, whatever quantity has been extricated either from the glafs or mercury during the time of filling, will be reabforbed again by the metal and conveyed to the earth during the time of inverfion; and confequently, the mercurial tube, when inverted, will not be electrified, but both glafs and mercury will be in their natural ftate. Here, then, the preffure of the electrical fluid is kept off in fome meafure from the upper part of the mercury by the glafs, which it cannot penetrate eafily at leaft. To the mercury in the bafon it has free acceffs, and therefore preffes more upon the lower than the upper part; the confequence of which is a fufpenfion of the mercury. It is true, this fluid very eafily penetrates the metallic matter; but it muft be confidered, that the electric fluid itfelf is in fome meafure entangled in the particles of the quickfilver, and cannot be extricated without motion. As foon therefore as the tube is fhaken, fome part of the electricity is extricated, and the mercury begins to defcend. The fubtilty of the medium is fuch, that no fooner has it begun to extricate itfelf, than, by the motion of the metal downwards, it iffues forth in great quantities, fo as to become vifible, like a blue flame, in the dark. The equilibrium is therefore deftroyed in an inftant, as it would be were we to admit air to the top of the barometer; nay, in a more effectual manner. For if a fmall quantity of air was admitted to the top of a barometer, the mercury would only defcend in proportion to the quantity of air admitted; but here, no fooner is a quantity of electric matter admitted, than it procures admiffion for a vaft deal more, and confequently the mercury defcends with accelerated velocity.—On this principle the afcent of water in the fiphon while *in vacuo* is fo eafily accounted for, that we need not take up time in explaining it farther.—But why an inverted glafs tube fhould remain full of mercury when it has a hole either great or fmall in the top, is more difficult to be accounted for, and requires this farther circumftance to be taken into conffideration, viz. that though all folid bodies will, by the action of gravity, or by any other impulfe, eafily approach very near to one another, yet they cannot be brought into abfolute contact without a very conffiderable force, much greater than is fufficient to overcome their gravity; and thus it appears from fome experiments, that the links of a chain are by no means in contact with one another, till the chain has a conffiderable weight appended to it. This may be the cafe with the tube in queftion. The air by its gravity defcends upon it, and is ready to enter the fmall hole in the top; but, by a repulfive power from the glafs, its action is prevented, fo that the mercury cannot fall.

It was, however, fome time after the Torricellian experiment had been made, and even after it had been univerfally agreed that the fufpenfion of the mercury was owing to the weight of the atmofphere, before it was difcovered that this preffure of the air was different at different times though the tube was kept in the fame place. But the variations of altitude in the mercurial column were too obvious to remain long unobferved; and accordingly philofophers foon became careful enough to mark them. When this was done, it was impoffible to avoid obferving alfo, that the changes in the height of the mercury were accompanied, or very quickly fucceeded, by changes in the weather. Hence the inftrument obtained the name of the *weather-glafs*, and was generally made ufe of with a view to the foreknowledge of the weather. In this character, its principal phenomena are as follow: Barometer. 14 Barometer ufed for prognofticating the weather.

15 Its phenomena as a weather-glafs by Mr Patrick;

1. The rifing of the mercury prefages, in general, fair weather; and its falling, foul weather, as rain, fnow, high winds, and ftorms.

2. In very hot weather, the falling of the mercury foreffhows thunder.

3. In winter, the rifing prefages froft; and in frofty weather, if the mercury falls three or four diviffions, there will *certainly* follow a thaw. But in a continued froft, if the mercury rifes, it will *certainly* fnow.

4. When foul weather happens foon after the falling of the mercury, expect but little of it; and, on the contrary, expect but little fair weather when it proves fair fhortly after the mercury has rifen.

5. In foul weather, when the mercury rifes much and high, and thus continues for two or three days before the foul weather is quite over, then expect a continuance of fair weather to follow.

6. In fair weather, when the mercury falls much and low, and thus continues for two or three days before the rain comes, then expect a great deal of wet, and probably high winds.

7. The unfettled motion of the mercury denotes uncertain and changeable weather.

8. You are not fo ftrictly to obferve the words engraven on the plates (though in general it will agree with them), as the mercury's *rifing* and *falling*. For if it ftand at *much rain*, and then rifes up to *changeable*, it prefages fair weather; though not to continue fo long as if the mercury had rifen higher: and fo, on the contrary, if the mercury ftood at *fair*, and falls to *changeable*, it prefages foul weather; though not fo much of it as if it had funk lower.

16 Remarks by Mr Rowning.

Thefe are the obfervations of Mr Patrick, on which Mr Rowning makes the following remarks: "From thefe obfervations it appears, that it is not fo much the height of the mercury in the tube that indicates the weather, as the motion of it up and down: wherefore, in order to pafs a right judgment of what weather is to be expected, we ought to know whether the mercury is actually rifing or falling; to which end the following rules are of ufe.

"1. If the furface of the mercury is convex, ftanding higher in the middle of the tube than at the fides, it is generally a fign that the mercury is then rifing.

"2. If the furface is concave, it is then finking: and,

"3. If it is plain, the mercury is ftationary; or rather, if it is a little convex: for mercury being put into

Barometer. a glaſs tube, eſpecially a ſmall one, will naturally have its ſurface a little convex, becauſe the particles of mercury attract one another more forcibly than they are attracted by glaſs. Further,

" 4. If the glaſs is ſmall, ſhake the tube; and if the air is grown heavier, the mercury will riſe about half the tenth of an inch higher than it ſtood before; if it is grown lighter, it will ſink as much. This proceeds from the mercury's ſticking to the ſides of the tube, which prevents the free motion of it till it is diſengaged by the ſhock: and therefore, when an obſervation is to be made with ſuch a tube, it ought always to be ſhaken firſt; for ſometimes the mercury will not vary of its own accord, till the weather it ought to have indicated is preſent.

17 Theſe phenomena peculiar to the temperate and frigid zones. * *Philoſ. Tranſact.* N° 220.

Here we muſt obſerve, that the above-mentioned phenomena are peculiar to places lying at a conſiderable diſtance from the equator; for, in the torrid zone, the mercury in the barometer ſeldom either riſes or falls much. In Jamaica, it is obſerved by Sir William Beeſton *, that the mercury in the morning conſtantly ſtood at one degree below *changeable* and at noon ſunk to one degree above *rain;* ſo that the whole ſcale of variation there was only $\frac{3}{10}$ of an inch. At St Helena, too, where Dr Halley made his obſervations, he found the mercury to remain wholly ſtationary whatever weather happened. Of theſe phenomena, their cauſes, and why the barometer indicates an approaching change of weather, the Doctor gives us the following account:

18 Phenomena of the barometer ſolved by Dr Halley.

" 1. In calm weather, when the air is inclined to rain, the mercury is commonly low.

" 2. In ſerene, good, and ſettled weater, the mercury is generally high.

" 3. Upon very great winds, though they be not accompanied with rain, the mercury ſinks loweſt of all, with relation to the point of the compaſs the wind blows upon.

" 4. *Cæteris paribus*, the greateſt heights of the mercury are found upon eaſterly, or north-eaſterly, winds.

" 5. In calm froſty weather, the mercury generally ſtands high.

" 6. After very great ſtorms of wind, when the mercury has been very low, it generally riſes again very faſt.

" 7. The more northerly places have greater alterations of the barometer than the more ſoutherly.

" 8. Within the tropics, and near them, thoſe accounts we have had from others, and my own obſervations at St Helena, make very little or no variation of the height of the mercury in all weathers.

" Hence I conceive, that the principal cauſe of the riſe and fall of the mercury is from the variable winds which are found in the temperate zones, and whoſe great inconſtancy here in England is notorious.

" A ſecond cauſe is, the uncertain exhalation and precipitation of the vapours lodging in the air, whereby it comes to be at one time much more crowded than at another, and conſequently heavier; but this latter depends in a great meaſure upon the former. Now from theſe principles I ſhall endeavour to explicate the ſeveral phenomena of the barometer, taking them in the ſame order I have laid them down. Thus,

" 1. The mercury's being lower inclines it to rain becauſe the air being light, the vapours are no longer ſupported thereby, being become ſpecifically heavier than the medium wherein they floated; ſo that they deſcend towards the earth, and, in their fall, meeting with other aqueous particles, they incorporate together, and form little drops of rain: but the mercury's being at one time lower than another, is the effect of two contrary winds blowing from the place where the barometer ſtands; whereby the air of that place is carried both ways from it, and conſequently the incumbent cylinder of air is diminiſhed, and accordingly the mercury ſinks: As, for inſtance, if in the German ocean it ſhould blow a gale of weſterly wind, and, at the ſame time, an eaſterly wind in the Iriſh ſea; or, if in France it ſhould blow a northerly wind, and in Scotland a ſoutherly; it muſt be granted, that that part of the atmoſphere impendant over England would thereby be exhauſted and attenuated, and the mercury would ſubſide, and the vapours which before floated in theſe parts of the air of equal gravity with themſelves would ſink to the earth. Barometer.

" 2. The greater height of the barometer is occaſioned by two contrary winds blowing towards the place of obſervation, whereby the air of other places is brought thither and accumulated; ſo that the incumbent cylinder of air being increaſed both in height and weight, the mercury preſſed thereby muſt needs ſtand high, as long as the winds continue ſo to blow; and then the air being ſpecifically heavier, the vapours are better kept ſuſpended, ſo that they have no inclination to precipitate and fall down in drops, which is the reaſon of the ſerene good weather which attends the greater heights of the mercury.

" 3. The mercury ſinks the loweſt of all by the very rapid motion of the air in ſtorms of wind. For the tract or region of the earth's ſurface, wherein the winds rage, not extending all round the globe, that ſtagnant air which is left behind, as likewiſe that on the ſides, cannot come in ſo faſt as to ſupply the evacuation made by ſo ſwift a current; ſo that the air muſt neceſſarily be attenuated when and where the ſaid winds continue to blow, and that more or leſs according to their violence: add to which, that the horizontal motion of the air being ſo quick as it is, may in all probability take off ſome part of the perpendicular preſſure thereof; and the great agitation of its particles is the reaſon why the vapours are diſſipated, and do not condenſe into drops ſo as to form rain, otherwiſe the natural conſequence of the air's rarefaction.

" 4. The mercury ſtands higheſt upon the eaſterly and north-eaſterly wind; becauſe in the great Atlantic ocean, on this ſide the 35th degree of north latitude, the winds are almoſt always weſterly or ſouth-weſterly; ſo that whenever here the wind comes up at eaſt and north-eaſt, it is ſure to be checked by a contrary gale as ſoon as it reaches the ocean; wherefore, according to our ſecond remark, the air muſt needs be heaped over this iſland, and conſequently the mercury muſt ſtand high as often as theſe winds blow. This holds true in this country; but is not a general rule for others, where the winds are under different circumſtances: and I have ſometimes ſeen the mercury here as low as 29 inches upon an eaſterly wind; but then it blew exceedingly hard, and ſo comes to be accounted for by what was obſerved in the third remark.

" 5. In calm froſty weather the mercury generally

ſtands

Barometer. ſtands high; becauſe (as I conceive) it ſeldom freezes but when the winds come out of the northern and north-eaſtern quarters, or at leaſt unleſs thoſe winds blow at no great diſtance off. For the north parts of Germany, Denmark, Sweden, Norway, and all that tract from whence north-eaſtern winds come, are ſubject to almoſt continual froſt all the winter: and thereby the lower air is very much condenſed, and in that ſtate is brought hitherward by thoſe winds, and, being accumulated by the oppoſition of the weſterly wind blowing in the ocean, the mercury muſt needs be preſſed to a more than ordinary height; and as a concurring cauſe, the ſhrinking of the lower parts of the air into leſſer room by cold, muſt needs cauſe a deſcent of the upper parts of the atmoſphere, to reduce the cavity made by this contraction to an equilibrium.

"6. After great ſtorms, when the mercury has been very low, it generally riſes again very faſt: I once obſerved it to riſe one inch and a half in leſs than ſix hours after a long-continued ſtorm of ſouth-weſt wind. The reaſon is, becauſe the air being very much rarefied by the great evacuations which ſuch continued ſtorms make thereof, the neighbouring air runs in the more ſwiftly to bring it to an equilibrium; as we ſee water runs the faſter for having a greater declivity.

"7. The variations are greater in the more northerly places, as at Stockholm greater than at Paris (compared by M. Paſchal); becauſe the more northerly parts have uſually greater ſtorms of wind than the more ſouthcrly, whereby the mercury ſhould ſink lower in that extreme; and then the northerly winds bringing in the more denſe and ponderous air from the neighbourhood of the pole, and that again being checked by a ſoutherly wind at no great diſtance, and ſo heaped, muſt of neceſſity make the mercury in ſuch caſe ſtand higher in the other extreme.

"8. Laſtly, this remark, that there is little or no variation near the equinoctial, does above all others confirm the hypotheſis of the variable winds being the cauſe of theſe variations of the height of the mercury; for in the places above named there is always an eaſy gale of wind blowing nearly upon the ſame point, viz. E. N. E. at Barbadoes, and E. S. E. at St Helena; ſo that there being no contrary currents of air to exhauſt or accumulate it, the atmoſphere continues much in the ſame ſtate: however, upon hurricanes, the moſt violent of ſtorms, the mercury has been obſerved very low; but this is but once in two or three years, and it ſoon recovers its ſettled ſtate, about $29\frac{1}{2}$ inches."

19 Objections to this theory.

This theory has been controverted, and the principal objections are, "That if the wind was the ſole agent in raiſing or depreſſing the mercury, the alterations of its height in the barometer would be only relative or topical; there would ſtill be the ſame quantity ſupported at ſeveral places taken collectively: thus what a tube at London loſt, another at Paris, Piſa, or Zurich, &c. would gain. But the contrary is found to be the caſe; for, from all the obſervations hitherto made, the barometers in ſeveral diſtant parts of the globe riſe and fall together. This is a very ſurpriſing fact; and deſerves to be well examined. Again, ſetting aſide all other objections, it is impoſſible, on Dr Halley's hypotheſis, to explain the mercury's fall before and riſe after, rain. For ſuppoſe two contrary winds ſweeping the air from over London: We know that few if any of the winds reach above a mile high; all therefore they can do will be to cut off a certain part of the column of air over London: if the conſequence of this be the fall of the mercury, yet there is no apparent reaſon for the rains following it. The vapours indeed may be let lower; but it will only be till they come into an air of the ſame ſpecific gravity with themſelves, and there they will ſtick as before. Laſtly, it is impoſſible, according to the laws of fluids, that the air above any place could be exhauſted by the blowing of two contrary winds from it: for, ſuppoſe a north-eaſt and ſouth-weſt wind both blow from London at the ſame time, there will be two others at the ſame time blowing towards it from oppoſite points, viz. a north-weſt and ſouth-eaſt one, which will every moment reſtore the equilibrium, ſo that it can never be loſt in any conſiderable degree at leaſt." Barometer.

20 Hypotheſis of Mr Leibnitz.

Mr Leibnitz accounted for the ſinking of the mercury before rain upon another principle, viz. That as a body ſpecifically lighter than a fluid, while it is ſuſpended by it, adds more weight to that fluid than when, by being reduced in its bulk, it becomes ſpecifically heavier, and deſcends; ſo the vapour, after it is reduced into the form of clouds, and deſcends, adds leſs weight to the air than before; and therefore the mercury falls. To which it is anſwered, 1. That when a body deſcends in a fluid, its motion in a very little time becomes uniform, or nearly ſo, a farther acceleration of it being prevented by the reſiſtance of the fluid; and then, by the third law of nature, it forces the fluid downwards with a force equal to that whereby it tends to be farther accelerated, that is, with a force equal to its whole weight. 2. The mercury by its deſcent foretels rain a much longer time before it comes, than the vapour after it is condenſed into clouds can be ſuppoſed to take up in falling. 3. Suppoſing that as many vapours as fall in rain during a whole year were at once to be condenſed into clouds, and even quite ceaſe to gravitate upon the air, its gravity would ſcarce be diminiſhed thereby ſo much as is equivalent to the deſcent of two inches of mercury in the barometer. Beſides, in many places between the tropics, the rains fall at certain ſeaſons in very great quantities, and yet the barometer ſhows there very little or no alteration in the weight of the atmoſphere. 21 Refuted.

22 Another hypotheſis but inſufficient.

Another hypotheſis ſomewhat ſimilar to that of Leibnitz has been given: but as it is liable to the objections juſt now mentioned, eſpecially the laſt, we forbear to give any particular account of it; and ſhall attempt, upon other principles, to give a ſatisfactory ſolution of this phenomenon.

23 Another theory.

The neceſſary preliminaries to our hypotheſis are, 1. That vapour is formed by an intimate union between the element of fire and that of water, by which the fire or heat is ſo totally enveloped, and its action ſo entirely ſuſpended by the watery particles, that it not only loſes its properties of giving light and of burning, but becomes incapable of affecting the moſt ſenſible thermometer; in which caſe, it is ſaid by Dr Black, the author of this theory, to be in a latent ſtate. For the proofs of this, ſee the articles Evaporation, Cold, Congelation, &c. 2. If the atmoſphere is affected

Barometer. affected by any unuſual degree of heat, it thence becomes incapable of ſupporting ſo long a column of mercury as before, for which reaſon that in the barometer ſinks. This appears from the obſervations of Sir William Beeſton already mentioned; and likewiſe from thoſe of De Luc, which ſhall be afterwards taken notice of.

Theſe axioms being eſtabliſhed, it thence follows, that as vapour is formed by an union of fire with water, or if we pleaſe to call it an *elective* attraction between them, or ſolution of the water in the fire, it is impoſſible that the vapour can be condenſed until this union, attraction, or ſolution, be at an end. The beginning of the condenſation of the vapour then, or the firſt ſymptoms of an approaching rain, muſt be the ſeparation of the fire which lies hid in the vapour. This may be at firſt ſlow and partial, or it may be ſudden and violent: in the firſt caſe, the rain will come on ſlowly, and after a conſiderable interval; and in the other, it will be very quick, and in great quantity. But Dr Black hath proved, that when fire quits its latent ſtate, however long it may have lain dormant and inſenſible, it always aſſumes its proper qualities again, and affects the thermometer as though it had never been abſorbed. The conſequence of this muſt be, that in proportion as the latent heat is diſcharged from the vapour, it muſt ſenſibly affect thoſe parts of the atmoſphere into which it is diſcharged; and in proportion to the heat communicated to theſe, they will become ſpecifically lighter, and the mercury ſink of courſe. Neither are we to imagine that the quantity of heat diſcharged by the vapour is inconſiderable; for Dr Black hath ſhown, that when any quantity of water, a pound for inſtance, is condenſed from the vapour of a common ſtill, as much heat is communicated to the head and refrigeratory as would have been ſufficient to heat the pound of water red hot, could it have borne that degree of ſenſible heat.

The cauſes by which this ſeparation between the fire and water is, or may be effected, come to be conſidered under the articles RAIN, CONDENSATION, VAPOUR, &c. Here we have only to obſerve, that as the ſeparation may be gradual and ſlow, the barometer may indicate rain for a conſiderable time before it happens: or if the ſenſible heat communicated from the vapour to the atmoſphere ſhall be abſorbed by the colder parts, or by any unknown means carried off, or prevented from affecting the ſpecific gravity of the air, the barometer will not be affected; and yet the water being deprived of the heat neceſſary to ſuſtain it, muſt deſcend in rain; and thus it is found that the indications of the barometer do not always hold true. Hence alſo it appears, that though the ſpecific gravity of the air is diminiſhed, unleſs that diminution proceeds from a diſcharge of the latent heat contained in the vapours, no rain will follow; and thus the ſinking of the barometer may prognoſticate wind as well as rain, or ſometimes nothing at all.

The difficulty, however, on this hypotheſis, is to account for the barometer being ſtationary in all weathers between the tropics; whereas it ought to move up and down there as well as here, only more ſuddenly, as the changes of weather there are more ſudden than here. But it muſt be conſidered, that in theſe climates, during the daytime, the action of the ſun's rays is ſo violent, that what is gained by the diſcharge of latent heat from the vapour, is loſt by the interpoſition of the clouds betwixt the ſun and earth, or by the great evaporation which is conſtantly going on; and in the night, the cold of the atmoſphere is ſo much increaſed, that it abſorbs the heat as faſt as the vapour diſcharges it, ſo that no ſenſible effect can be produced; for in warm climates, though the day is exceſſively hot, the night is obſerved to be vaſtly colder in proportion than it is with us. This, however, does not prevent the barometer from being affected by other cauſes, as well as with us; for Dr Halley obſerves, that in the time of hurricanes it ſinks very low. The cauſe of this is moſt probably a great commotion in the electric fluid, by which the air is internally agitated, and its power of gravitation in part ſuſpended.—A confirmation of the above hypotheſis, however, is taken from the different heights at which the mercury arrives in different climates. The barometer range, for inſtance, at the latitude of 45° is the greateſt of all; becauſe here the evaporation and condenſation of the vapours are both very conſiderable, at the ſame time that the latent heat diſcharged cannot be abſorbed ſo ſuddenly as in the torrid zone, the difference betwixt the length of the days and nights being greater, and conſequently the nights warmer in ſummer and colder in winter. Farther to the northward the range is leſs, and in the latitude of 60° only two inches, by reaſon of the greater cold and length of the days and nights; whence the quantity of vapour condenſed, or of latent heat expelled, becomes proportionably leſs. Barometer.

24 Different kinds of barometers deſcribed.

Having thus given an account of the ſeveral phenomena of the barometer conſidered as a weather-glaſs, and likewiſe endeavoured to account for them in the moſt ſatisfactory manner, we now proceed to give a particular deſcription of the barometers moſt commonly made uſe of, with various ſchemes for their improvement.

Plate LXXXV.

Fig. 1. repreſents the common barometer, ſuch as was invented by Torricelli, and ſuch as we have already given a general deſcription of. AB repreſents a tube of glaſs, a quarter of an inch in diameter, and 34 inches long, hermetically ſealed at A. This tube being ſuppoſed to be filled with mercury, is then inverted into the baſon CD; upon which the mercury in the tube falls down to GH, ſomewhat above 28 inches, while that in the baſon riſes to CF. The loweſt ſtation of the mercury in this country is found to be 28 inches, and the higheſt 31. From the ſurface of the mercury CF, therefore, 28 inches are to be meaſured on the tube AB, which ſuppoſe to reach to the point K. This point, therefore, is the loweſt of the ſcale of variation, and in the common barometers is marked *ſtormy*. In like manner, the higheſt point of the ſcale of variation I, is placed 31 inches above EF; and is marked *very dry* on one ſide for the ſummer, and *very hard froſt* on the other for the winter. The next half inch below is marked *ſet fair* on the one ſide, and *ſet froſt* on the other. At 30 inches from CF is marked the word *fair* on one ſide, and *froſt* on the other. Half an inch below that, is wrote the word *changeable*, which anſwers both for ſummer and winter. At 29 inches is *rain* on the one ſide, and *ſnow* on the other; and at $28\frac{1}{2}$ are the words *much rain* on the one ſide, and *much ſnow* on the other. Each of theſe

Barometer. large diviſions is uſually ſubdivided into 10; and there is a ſmall ſliding index fitted to the inſtrument, by which the aſcent or deſcent of the mercury to any number of diviſions is pointed out. Each of theſe tenths is ſometimes divided into *ten* more, or *hundredths* of an an inch, by means of a ſliding ſlip of braſs with a *vernier* ſcale on it, which ſhall be hereafter deſcribed and explained. This kind of barometer is the moſt common, and perhaps the moſt uſeful and accurate, of any that has yet been invented, from the following circumſtance, that the natural ſimplicity of its conſtruction, in preference to others hereafter deſcribed, does not admit of any kind of reſiſtance to the free motion of the column of mercury in the tube. The ſcale of variation being only three inches, and it being naturally wiſhed to diſcover more minute variations than can thus be perceived, ſeveral improvements have been thought of.

The improvement moſt generally adopted is the diagonal barometer repreſented fig. 2. in which the ſcale of variation, inſtead of three inches, may be made as many feet, by bending the tube ſo as to make the upper part of it the diagonal of a parallelogram of which the ſhorteſt ſide is the three-inches ſcale of variation of the common barometer. This, however, has a very great inconvenience: for not only is the friction of the mercury upon the glaſs ſo much increaſed that the height doth not vary with every ſlight change of air; but the column of mercury is apt to break in the tube, and part of it to be left behind, upon any conſiderable deſcent.

Fig. 3. is the rectangular barometer; where AC repreſents a pretty wide cylinder of glaſs, from which proceeds the tube CDF bent into a right angle at D. Suppoſe now the cylinder AC to be four times larger than the tube CD, ſo that every inch of the cylinder from C to A ſhould be equal in capacity to four inches of the tube CD. The whole being then filled with mercury, and inverted, the mercury will ſubſide from A to B, at the ſame time that it cannot run out at the open orifice F, becauſe the air preſſes in that way. If any alteration then happens in the weight of the air, ſuppoſe ſuch as would be ſufficient to raiſe the mercury an inch from B towards A, it is evident that this could not be done without the mercury in the horizontal leg retiring four inches from E towards D; and thus the ſcale of variation counted on the horizontal leg would be 12 inches. But the inconveniences of friction are much greater here than in the diagonal barometer; and beſides, by the leaſt accident the mercury is apt to be driven out at the open orifice F.

The pendant barometer (fig. 4.) conſiſts of a ſingle tube, ſuſpended by a ſtring faſtened to the end A. This tube is of a conical or tapering figure, the end A being ſomewhat leſs than the end B. It is hermetically ſealed at A, and filled with mercury: then will the mercury ſink to its common ſtation, and admit of a length of altitude CD, equal to that in the common barometers. But from the conical bore of the tube, the mercury will deſcend as the air grows lighter, till it reaches its loweſt altitude, when the mercury will ſtand from the lower part of the tube B to E, ſo that BE will be equal to 28 inches: conſequently the mercury will, in ſuch a tube, move from A to E, or 32 inches, if the tube be five feet, or 60 inches; and therefore the ſcale AE is here above ten times greater than in the common barometer: but the fault of this barometer is, that the tube being of a very ſmall bore, the friction will be conſiderable, and prevent its moving freely; and if the tube is made of a wider bore, the mercury will be apt to fall out. Barometer.

Fig. 5. is an invention of Mr Rowning, by which the ſcale of variation may be increaſed to any length, or even become infinite. ABC is a compound tube hermetically ſealed at A, and open at C, empty from A to D, filled with mercury from thence to B, and from thence to E with water. Let GBH be a horizontal line; then it is plain from the nature of the ſiphon, that all the compound fluid contained in the part from H to G, will be always *in æquilibrio* with itſelf, be the weight of the air what it will, becauſe the preſſure at H and G muſt be equal. Whence it is evident, that the column of mercury DH is *in æquilibrio* with the column of water GE, and a column of air taken conjointly, and will therefore vary with the ſum of the variations of theſe. That the variation in this barometer may be infinite, will appear from the following computation. Let the proportion between the bores of the tube AF and FC be ſuch, that when HD, the difference of the legs wherein the mercury is contained, is augmented one inch, GE, the difference of the legs wherein the water is contained, ſhall be diminiſhed 14: then, as much as the preſſure of the mercury is augmented, that of the water will be diminiſhed, and ſo the preſſure of both taken together will remain as it was; and conſequently, after it has begun to riſe, it will have the ſame tendency to riſe on, without ever coming to an equilibrium with the air.

Fig. 6. repreſents Dr Hook's wheel-barometer. Here ACDG is a glaſs tube, having a large round head at A, and turned up at the lower end F. Upon the ſurface of the mercury in the bent leg is an iron ball G, with a ſtring going over a pulley CD. To the other end of the ſtring is faſtened a ſmaller ball H, which as the mercury riſes in the leg FG, turns the index KL from N towards M, on the graduated circle MNOP; as it riſes in the other leg, the index is carried the contrary way by the deſcent of the heavier ball G, along with the mercury. The friction of this machine, however, unleſs it is made with very great accuracy, renders it uſeleſs.

Fig. 7. is another barometer, invented by Mr Rowning, in which alſo the ſcale may be infinite. ABCD is a cylindrical veſſel, filled with a fluid to the height W, in which is immerged the barometer SP conſiſting of the following parts: The principal one is the glaſs tube TP (repreſented ſeparately at *tp*), whoſe upper end T is hermetically ſealed: this end does not appear to the eye, being received into the lower end of a tin pipe GH, which in its other end G receives a cylindric rod or tube ST, and thus fixes it to the tube TP. This rod ST may be taken off, in order to put in its ſtead a larger or a leſſer as occaſion requires. S is a ſtar at the top of the rod ST; and ſerves as an index by pointing to the graduated ſcale LA, which is fixed to the cover of the veſſel ABCD. MN is a large cylindrical tube made of tin (repreſented ſeparately at *mn*), which receives in its cavity the ſmaller part of the tube TP, and is well cemented to it at both ends, that none of the fluid may get in. The tube TP, with this apparatus,

Barometer. apparatus, being filled with mercury, and plunged into the baſon MP, which hangs by two or more wires upon the lower end of the tube MN, muſt be ſo poiſed as to float in the liquor contained in the veſſel ABCD; and then the whole machine riſes when the atmoſphere becomes lighter, and *vice verſa*. Let it now be ſuppoſed, that the fluid made uſe of is water; that the given variation in the weight of the atmoſphere is ſuch, that, by preſſing upon the ſurface of the water at W, the ſurface of the mercury at X may be raiſed an inch higher (meaſuring from its ſurface at P) than before; and that the breadth of the cavity of the tube at X, and of the baſon at P, are ſuch, that by this aſcent of the mercury, there may be a cubic inch of it in the cavity X more than before, and conſequently in the baſon a cubic inch leſs. Now, upon this ſuppoſition, there will be a cubic inch of water in the baſon more than there was before; becauſe the water will ſucceed the mercury, to fill up its place. Upon this account the whole machine will be rendered heavier than before by the weight of a cubic inch of water; and therefore will ſink, according to the laws of hydroſtatics, till a cubic inch of that part of the rod WS, which was above the ſurface of the water at W, comes under it. Then, if we ſuppoſe this rod ſo ſmall, that a cubic inch of it ſhall be 14 inches in length, the whole machine will ſink 14 inches lower into the fluid than before; and conſequently the ſurface of the mercury in the baſon will be preſſed, more than it was before, by a column of water 14 inches high. But the preſſure of 14 inches of water is equivalent to one of mercury; this additional preſſure will make the mercury aſcend at X as much as the ſuppoſed variation in the weight of the air did at firſt. This aſcent will give room for a ſecond cubic inch of water to enter the baſon; the machine will therefore be again rendered ſo much heavier, and will ſubſide 14 inches farther, and ſo on *in infinitum*. If the rod was ſo ſmall that more than fourteen inches of it were required to make a cubic inch, the variation of this machine would be negative with reſpect to the common barometer; and inſtead of coming nearer to an equilibrium with the air by its aſcent or deſcent, it would continually recede farther from it: but if leſs than 14 inches of rod were required to make a cubic inch, the ſcale of variation would be finite, and might be made in any proportion to the common one. Neither this nor the other infinite barometer have ever been tried, ſo that how far they would anſwer the purpoſes of a barometer is as yet unknown.

Fig. 8. repreſents another contrivance for enlarging the ſcale of the barometer to any ſize.—AB is the tube of a common barometer open at B and ſealed at A, ſuſpended at the end of the lever which moves on the fulcrum E.—CD is a fixt glaſs tube, which ſerves in place of the ciſtern. This laſt tube muſt be ſo wide as to allow the tube AB to play up and down within it.—AB being filled with mercury, is nearly counterbalanced by the long end of the lever. When the atmoſphere becomes lighter, the mercury deſcends in the long tube, and the ſurface of the mercury riſing in the ciſtern puſhes up the tube AB, which at the ſame time becoming lighter, the lever preponderates, and points out the moſt minute variations. Here too the friction occaſions inconveniences; but this may be in ſome meaſure remedied by a ſmall ſhake of the apparatus at each inſpection. Barometer.

In the Philoſophical Tranſactions, Mr Caſwell gives the following account of a barometer, which has been commended as a very accurate one: "Let ABCD (Fig. 9.) repreſent a bucket of water, in which is the barometer *e r z o s m*, which conſiſts of a body *e r s m*, and a tube *e z y o*: the body and tube are both concave cylinders communicating with one another, and made of tin: the bottom of the tube *z y*, has a lead weight to ſink it ſo that the top of the body may juſt ſwim even with the ſurface of the water by the addition of ſome grain weights on the top. The water, when the inſtrument is forced with its mouth downwards, gets up into the tube to the height *y u*. There is added on the top a ſmall concave cylinder, which I call the *pipe*, to diſtinguiſh it from the bottom ſmall cylinder which I call the *tube*. This pipe is to ſuſtain the inſtrument from ſinking to the bottom: *m d* is a wire; *m s*, *d e*, are two threads oblique to the ſurface of the water, which threads perform the office of diagonals: for that while the inſtrument ſinks more or leſs by the attraction of the gravity of the air, there, where the ſurface of the water cuts the thread, is formed a ſmall bubble; which bubble aſcends up the thread, as the mercury in the common barometer aſcends."

The dimenſions of this inſtrument given there are, 21 inches for the circumference of the body, the altitude 4, each baſe having a convexity of $6\frac{1}{2}$ inches. The inner circumference of the tube is 5.14 inches, and its length $4\frac{1}{2}$; ſo that the whole body and tube will contain almoſt $2\frac{1}{4}$ quarts. The circumference of the pipe, that the machine may not go to the bottom on every ſmall alteration of the gravity of the air, is 2.14 inches; according to which dimenſions, he calculates that it will require 44 grains to ſink the body to the bottom, allowing it only four inches to deſcend; at the ſame time that it is evident, that the fewer grains that are required to ſink it to this depth, the more nice the barometer will be. He alſo calculates, that when the mercury in the common barometer is $30\frac{1}{2}$ inches high, the body with a weight of 44 grains on its top will be kept *in æquilibrio* with the water; but when the mercury ſtands at 28 inches, only 19 grains can be ſupported: and laſtly, by computing the lengths of the diagonal threads, &c. he finds, that his inſtrument is 1200 times more exact than the common barometer. The following are his obſervations on the uſe of it.

25 Mr Caſwell's obſervations with his barometer.

"1. While the mercury of the common barometer is often known to be ſtationary 24 hours together, the bubble of the new barometer is rarely found to ſtand ſtill one minute.

"2. Suppoſe the air's gravity increaſing, and accordingly the bubble aſcending; during the time that it aſcends 20 inches, it will have many ſhort deſcents of the quantity of half an inch, one, two, three, or more inches; each of which being over, it will aſcend again. Theſe retroceſſions are frequent, and of all varieties in quantity and duration; ſo that there is no judging of the general courſe of the bubble by a ſingle inſpection, though you ſee it moving, but by waiting a little time.

"3. A ſmall blaſt of wind will make the bubble

Barometer.

deſcend; a blaſt that cannot be heard in a chamber of the town will ſenſibly force the bubble downward. The blaſts of wind ſenſible abroad, cauſe many of the above-mentioned retroceſſions or accelerations in the general courſe; as I found by carrying my barometer to a place where the wind was perceptible.

"4. Clouds make the bubble deſcend. A ſmall cloud approaching the zenith, works more than a great cloud near the horizon. In cloudy weather, the bubble deſcending, a break of the clouds (or clear place) approaching to the zenith, has made the bubble to aſcend: and after that break had paſſed the zenith a conſiderable ſpace, the bubble again deſcended.

"5. All clouds (except one) hitherto by me obſerved, have made the bubble to deſcend. But the other day, the wind being north, and the courſe of the bubble deſcending, I ſaw to the windward a large thick cloud near the horizon, and the bubble ſtill deſcended: but as the cloud drew near the zenith, it turned the way of the bubble, making it to aſcend; and the bubble continued aſcending till the cloud was all paſſed, after which it reſumed its former deſcent. It was a cloud that yielded a cold ſhower of ſmall hail."

Theſe are the moſt remarkable contrivances for the improvement of the common barometer: the laſt, on account of its being ſo exceedingly ſenſible, and likewiſe eaſy of conſtruction and portable, ſeems to deſerve attention much more than the others, which are always the more inaccurate, and the leſs eaſily moved, according to the enlargement of their ſcale; whereas this is ſeemingly ſubject to no ſuch inconvenience. It is evident, however, that none of theſe could be uſed at ſea, on account of the unſteady motion of the ſhip: for which reaſon Dr Hook thought of conſtructing a barometer upon other principles.

26 Marine barometer by Mr Hook.

His contrivance was no other than two thermometers. The one was the common ſpirit-of-wine thermometer, which is affected only by the warmth of the air: the other, which acts by the expanſion of a bubble of air included, is affected not only by the external warmth, but by the various weight of the atmoſphere. Therefore, keeping the ſpirit thermometer as a ſtandard, the exceſs of the aſcent or deſcent of the other above it would point out the increaſe or decreaſe of the ſpecific gravity of the atmoſphere. This inſtrument is recommended by Dr Halley, who ſpeaks of it as follows. "It has been obſerved by ſome, that, in long keeping this inſtrument, the air included either finds a means to eſcape, or depoſites ſome vapours mixed with it, or elſe for ſome other cauſe becomes leſs elaſtic, whereby in proceſs of time it gives the height of the mercury ſomewhat greater than it ought: but this, if it ſhould happen in ſome of them, hinders not the uſefulneſs thereof, for that it may at any time very eaſily be corrected by experiment, and the riſing and falling thereof are the things chiefly remarkable in it, the juſt height being barely a curioſity.

27 Recommended by Dr Halley.

"I had one of theſe barometers with me in my late ſouthern voyage, and it never failed to prognoſticate and give early notice of all the bad weather we had, ſo that I depended thereon, and made proviſion accordingly; and from my own experience I conclude, that a more uſeful contrivance hath not for this long time been offered for the benefit of navigation."

Barometer.

Fig. 10. repreſents a kind of *Chamber Barometer*, or a complete inſtrument for obſerving in a fixed place, ſuch as a room, &c. the changes in the atmoſphere. It is conſtructed by Mr W. Jones optician, London; and conſiſts of a barometer *d*, thermometer *aa*, and hygrometer *c*, all in one mahogany frame. One advantage of this inſtrument is, that either the thermometer or hygrometer may be taken from the frame, and occaſionally made uſe of in another place if required. The thermometer is ſeparated by only unſcrewing two ſcrews *a*, *a*; and the hygrometer, by unſcrewing a braſs pin at the back of the frame, not ſeen in this figure. The index of the hygrometer is at any time ſet, by only moving with your finger the braſs wheel ſeen at *c*; the two ſliding indexes of the barometer and thermometer are moved by a rack-work motion, ſet in action by the key *g* placed in the holes *h* and *i*. The diviſions of the barometer plate *b* are in *tenths* of an inch, from 28 to 31 inches; theſe again ſubdivided into *hundredths* by means of the *vernier ſcale*, placed oppoſitely on a ſliding ſlip of braſs ſimilar to the common barometers, moſt of which are now made with this *vernier*. On this vernier are *ten equal parts*, or diviſions; (ſee A, fig. 11. which for the ſake of perſpicuity is drawn larger). All of theſe together are equal juſt to 11 of thoſe on the ſcale of inches; that is, to eleven tenths. By this artifice the height of the mercury at E is evident by inſpection only, to the one hundredth part of an inch. To underſtand this, nothing more is neceſſary than to conſider, that *one tenth part of a tenth of an inch* is the *one hundredth part of an inch*. Now every tenth of an inch in the ſcale B is divided into ten equal parts by the ſlip or *vernier* A: for ſince ten diviſions on that exceed ten on the ſcale by one diviſion, that is, by one-tenth of an inch; therefore one diviſion on the vernier will exceed one diviſion on the ſcale by *one-tenth part*; and two diviſions on the *vernier* will exceed two on the ſcale by *two tenths*, and ſo on: Therefore every diviſion on the *vernier* will exceed the ſame number of diviſions in the ſcale *by ſo many tenths of a tenth*, or *by ſo many hundredth parts of an inch*. Therefore the ten equal diviſions of an inch on the ſcale B, muſt be looked upon as ſo many *ten hundredth parts of an inch*, and numbered thus, 10, 20, 30, 40, &c. parts of an inch; then the *vernier* gives the unit to each ten, thus: Set the index C very nicely to the top of the ſurface of the mercury E; and if at the ſame time the beginning of the diviſions at C coincides with a line of diviſion in the ſcale B, then it ſhows the altitude of the mercury in *inches* and *tenths of an inch* exactly. But ſuppoſe the index line C of the *vernier* falls *between* two diviſions or tenths on the ſcale B, then there will be a coincidence of lines in both at that number of the vernier, which ſhows how many tenth parts of that tenth the index of the vernier has paſſed the laſt decimal diviſion of the ſcale. Thus, for example, ſuppoſe the index of the vernier were to point ſomewhere between the ſixth and ſeventh tenth above 30 on the ſcale: then if, by looking down the *vernier*, you obſerve the coincidence at number 8, it ſhows that the altitude of the mercury is 30 inches and 68 parts of a hundredth of another inch; or ſimply thus, 30.68 inches.

28 Chamber barometer by Mr William Jones.

29 Method of uſing the vernier ſcale.

The

Barometer.

The ſcrew at fig. 10. ſerves to preſs the mercury quite up into the tube, when required to be much moved or carried about, thereby rendering the barometer of the kind called *portable*. To the lower extremity of the tube (ſee fig. 14.) is cemented a wooden reſervoir A, with a kind of leathern bag at bottom, the whole containing the mercury, but not quite full: and though the external air cannot get into the bag to ſuſpend the mercury in the tube, by preſſing on its ſurface, as in the common one; yet it has the ſame effect by preſſing on the outſide of the bag; which being flexible, yields to the preſſure, and keeps the mercury ſuſpended in the tube to its proper height. Through the under part of the frame paſſes the ſcrew *f*, with a flat round plate at its end; by turning of this ſcrew, the bag may be ſo compreſſed as to force the mercury up to the top of the tube, which keeps it ſteady, and hinders the tube from breaking by the mercury daſhing againſt the top when carried about, which it is otherwiſe apt to do.

30 Marine barometer by Mr Nairne.

A new kind of marine barometer has lately been invented by Mr Nairne. It differs from the common one in having the bore of the tube ſmall for about two feet in its lower part; but above that height it is enlarged to the common ſize. Through the ſmall part of the inſtrument the mercury is prevented from aſcending too haſtily by the motion of the ſhip; and the motion of the mercury in the upper wide part is conſequently leſſened. Much is found to depend on the proper ſuſpenſion of this inſtrument; and Mr Nairne has ſince found, by experiment, the point from which it may be ſuſpended ſo as not to be affected by the motion of the ſhip.

31 By Paſſemente.

Another marine barometer has been invented by one Paſſemente, a French artiſt. It is only a common one having the middle of the tube twiſted into a ſpiral conſiſting of two revolutions. By this contrivance, the impulſes which the mercury receives from the motions of the ſhip are deſtroyed by being tranſmitted in contrary directions.

32 Barometer applied to the menſuration of altitudes.

We muſt now ſpeak of the barometer in its ſecond character, namely, as an inſtrument for meaſuring acceſſible altitudes. This method was firſt propoſed by M. Paſcal; and ſucceeding philoſophers have been at no ſmall pains to aſcertain the proportion between the ſinking of the mercury and the height to which it is carried. For this purpoſe, however, a new improvement in the barometer became neceſſary, viz. the making of it eaſily portable from one place to another, without danger of its being broken by the motion of the mercury in the tube; which was effected by the contrivance already mentioned.

33 Statical barometer.

Among the number of portable barometers we may perhaps reckon what Mr Boyle called his *Statical* Barometer. It conſiſted of a glaſs bubble, about the ſize of a large orange, and blown very thin, ſo as to weigh only 70 grains. This being counterpoiſed by braſs weights in a pair of ſcales that would turn with the 30th part of a grain, was found to act as a barometer. The reaſon of this was, that the ſurface of the bubble was oppoſed to a vaſtly larger portion of air than that of the braſs weight, and conſequently liable to be affected by the various ſpecific gravity of the atmoſphere: thus, when the air became ſpecifically light, the bubble deſcended, and *vice verſa*; and thus, he ſays, he could have perceived variations of the atmoſphere no greater than would have been ſufficient to raiſe or lower the mercury in the common barometer an eighth part of an inch. Barometer.

34 Method of meaſuring the changes of the air by the ſound of a wire.

To theſe we may add an account of a new and very ſingular barometer mentioned by M. Lazowſki in his tour through Switzerland. "A curè, ſhortſighted, who nevertheleſs amuſed himſelf with firing at a mark, thought of ſtretching a wire in ſuch a manner as to draw the mark to him, in order to ſee how he had aimed. He obſerved, that the wire ſometimes ſounded as if it had been oſcillatory; and that this happened when a change was about to enſue in the atmoſphere; ſo that he came to predict with conſiderable accuracy when there was to be rain or fine weather. On making further experiments, it was obſerved, that this wire was more exact, and its ſounds more diſtinct, when extended in the plane of the meridian than in other poſitions. The ſounds were more or leſs ſoft, and more or leſs continued, according to the changes of weather that were to follow; though the matter was not reduced to any accuracy, and probably is not capable of much. Fine weather, however, was ſaid to be announced by the ſounds of counter tenor, and rain by thoſe of baſs. M. Volta was ſaid to have mounted 15 chords at Pavia, in order to bring this method to ſome perfection; but there are as yet no accounts of his ſucceſs.

35 Difficulties in meaſuring heights by the barometer.

The portable barometer, as already obſerved, has long been in uſe for the menſuration of acceſſible altitudes; and, in ſmall heights, was found to be more exact than a trigonometrical calculation, the mercury deſcending at the rate of about one inch for 800 feet of height to which it was carried: but, in great heights, the moſt unaccountable differences were found between the calculations of the moſt accurate obſervers; ſo that the ſame mountain would ſometimes have been made thouſands of feet higher by one perſon than another; nay, by the ſame perſon at different times. All theſe anomalies M. de Luc of Geneva undertook to account for, and to remove; and in this undertaking he perſiſted with incredible patience for 20 years. The reſult of his labour is as follows.

36 Removed by M. de Luc.

The firſt cauſe of irregularity obſerved was a fault in the barometer itſelf. M. de Luc found, that two barometers, though perfectly alike in their appearance, did not correſpond in their action. This was owing to air contained in the tube. The air was expelled by boiling the mercury in them; after which, the motions of both became perfectly conſonant. That the tubes may bear boiling, they muſt not be very thick, the thickneſs of the glaſs not above half a line, and the diameter of the bore ought to be from two and a half to three lines. The operation is performed in the following manner: A chaffing diſh with burning coals is placed on a table; the tube hermetically ſealed at one end, is inverted, and filled with mercury within two inches of the top; the tube is gradually brought near the fire, moving it obliquely up and down, that the whole length of it may be heated; and advancing it nearer and nearer, till it is actually in the flame, the globules of air begin to move viſibly towards the top. The boiling at laſt commences; and it is eaſy to make it take place from one end to the other, by cauſing the ſeveral parts of the tube ſucceſſively paſs with rapidity through

37 Mercury, how boiled in the tubes, with the effects.

Barometer. through the flame. By this operation the mercury is freed from all aerial particles, particularly thoſe which line the inſide of the tube, and which cannot eaſily be got clear of by any other method. When this laſt ſtratum of air is diſcharged, the tube may be afterwards emptied, and filled even with cold mercury, when it will be found nearly as free of air as before. The mercury in the tube thus prepared by a determinate quantity of heat, will riſe higher than thoſe in the common ſort, and the barometers will more nearly correſpond with each other; whereas there will be a difference of ſix or eight lines in the aſcent of mercury in the common barometers. Inſtruments of this kind riſe uniformly in a heated room, whilſt thoſe of the common kind deſcend in different proportions. On cooling the room, the former deſcend uniformly, while the latter deſcend unequally, by reaſon of the unequal proportions of air in them.

38 Variation of the height of the mercury by heat.

The next cauſe of variation was a difference of temperature. To diſcover the effects of heat on the mercury, ſeveral barometers were choſen that for a long time had been perfectly conſonant in their motions. One of theſe was placed in an apartment by itſelf, to mark the change in the external air, if any ſhould happen. The reſt were ſituated in another apartment, along with three thermometers, graduated according to the ſcale of M. de Reaumur, and exactly correſpondent with one another. The point at which the mercury ſtood when the experiment began, was carefully noted, and alſo the preciſe height of the thermometers. The latter apartment then was gradually heated; and with ſo much uniformity, that the thermometers continued ſtill to agree. When the heat had been augmented as much as poſſible, the altitudes both of the barometers and thermometers were again accurately marked, to aſcertain the differences that correſponded to one another. This experiment was repeated ſeveral times with next to no variation; and from the barometer in the firſt apartment it appeared, that no ſenſible alteration had taken place in the external air. Hence M. de Luc found, that an increaſe of heat ſufficient to raiſe the thermometer from the point of melting ice to that of boiling water, augments the height of the mercury in the barometer preciſely ſix lines; and, therefore, dividing the diſtance between theſe two points on the thermometer into 96 equal parts, there will be $\frac{1}{16}$th of a line to add to, or ſubtract from, the height of the mercury in the barometer, for every degree of variation of the thermometer ſo graduated. A ſcale of this kind, continued above boiling or below freezing water, accompanies his portable barometer and thermometer.—So accurate, he ſays, did long practice make him in barometrical obſervations, that he could diſtinguiſh a variation of $\frac{1}{12}$ of a line in the height of the mercury. He allows of no inclination of the tube, or other means to augment the ſcale, as all theſe methods diminiſh the accuracy of the inſtrument. Two obſervations are always required to meaſure the altitude of a mountain: one with a barometer left on the plain, and another on the ſummit; and both muſt be accompanied with a thermometer.

39 M. de Luc's portable barometer.

His portable barometer conſiſts of two tubes, one of 34 French inches in length; and from the top, for this length, perfectly ſtraight; but below this, it is bent round, ſo that the lower end turns up for a ſhort ſpace parallel to the ſtraight part. On this open end Barometer. is fixed a cock; and on the upper ſide of this cock is placed another tube, of the ſame diameter with the former, eight inches in length, open at both ends, and communicating with the long tube, through the cock. When the barometer is carried from one place to another, it is inverted very ſlowly, to hinder any air getting in; the quickſilver retires into the long tube on which the key of the cock is turned; and to preſerve the cock from too great preſſure of the mercury, the barometer is conveyed about in this inverted poſture. When an obſervation is to be made, the cock is firſt opened; the tube is then turned upright, very ſlowly, to prevent, as much as poſſible, all the vibration of the mercury, which diſturbs the obſervation; and according to the weight of the atmoſphere, the mercury falls in the longer branch, and riſes up through the cock, into the ſhorter.

The whole of the cock is made of ivory, except the key. The extremities of the tubes are wrapped round with the membrane employed by the gold-beaters, done over with fiſh-glue, in order to fix them tight, the one in the lower, and the other in the upper, end of the perpendicular canal of the cock. The part of the key that moves within the cock is of cork, and the outward part or the handle is of ivory. The cork is faſtened firmly to the ivory by means of a broad thin plate of ſteel, which cuts both the ivory and cork, lengthwiſe, through the centre, and reaches inward to the hole of the key. This plate alſo counteracts the flexibility of the cork, and makes it obey the motion of the handle, notwithſtanding it is very conſiderably compreſſed by the ivory, to render it tight. That this compreſſion may not abridge the diameter of the hole of the key, it is lined with a thin hollow ivory cylinder, of the ſame diameter with the tubes.

On the upper end of the ſhorter tube is fixed, in the intervals of obſervation, a kind of funnel, with a ſmall hole in it, which is ſhut with an ivory ſtopple. The uſe of it is to keep the tube clean; to replace the mercury that may have made its way through the cock in conſequence of any dilatation; and likewiſe to replace the mercury taken out of the ſhorter tube; after ſhutting the cock, on finiſhing an obſervation; becauſe, when the mercury is left expoſed to the air, it contracts a dark pellicle on its ſurface, that ſullies both itſelf and the tube. The ſhorter tube ſhould be wiped from time to time, by a little bruſh of ſponge fixed on the end of a wire.

The barometer, thus conſtructed, is placed in a long box of fir, the two ends of which are lined on the inſide with cuſhions of cotton covered with leather. This box may be carried on a man's back, like a quiver, either walking or riding; and ſhould have a cover of wax-cloth to defend it againſt rain. It ſhould be kept at ſome diſtance from the body of the man, and be protected from the ſun by an umbrella, when near the place of obſervation, to prevent its being affected by any undue degree of heat. The barometer ſhould, farther, be attended with a plummet, to determine the perpendicular poſition of it; and a tripod to ſupport it firm in that poſition at the time of obſervation.

The ſcale of the barometer begins on the long tube, at a point on a level with the upper end of the ſhort one;

Barometer. and riſes, in the natural order of the numbers, to 21 inches. Below the above point, the ſcale is transferred to the ſhort tube; and deſcends on it, in the natural order of the numbers, to 7 inches. The whole length of the ſcale is 28 French inches; and ſince, as the mercury falls in the one tube, it muſt riſe in the other, the total altitude will always be found by adding that part of the ſcale, which the mercury occupies in the long tube, to that part of it which the mercury does not occupy in the ſhort one. In eſtimating, however, the total fall or riſe on the long tube, every ſpace muſt be reckoned twice; becauſe, of barometers of this conſtruction, half the real variation only appears in one of the branches.

Near the middle of the greater tube is placed the thermometer abovementioned, for aſcertaining the corrections to be made on the altitude of the mercury in conſequence of any change in the temperature of the air. It is placed about the middle of the barometer, that it may partake as much as poſſible of its mean heat. The ball is nearly of the ſame diameter with the tube of the barometer, that the dilatations or condenſations of the fluids they contain may more exactly correſpond. The ſcale is divided into 96 parts; between the points of boiling water and melting ice, and the term of 0 is placed one-eighth part of this interval above the lower point; ſo that there are 12 degrees below, and 84 above, it. The reaſon for placing 0 here is, that as 27 French inches are about the mean height of the barometer, ſo the 12th degree above freezing is nearly the mean altitude of the thermometer. Hence, by taking theſe two points, the one for the mean altitude, and the other for the mean heat, there will be fewer corrections neceſſary to reduce all obſervations to the ſame ſtate, than if any higher or lower points had been fixed upon.

If then the barometer remains at 27 inches, and the thermometer at 0, there are no corrections whatever to be made. But if, while the barometer continues at 27 inches, the thermometer ſhall riſe any number of degrees above 0, ſo many ſixteenths of a line muſt be ſubtracted from the 27 inches, to obtain the true height of the barometer produced by the weight of the atmoſphere, and to reduce this obſervation to the ſtate of the common temperature. If, on the other hand, the thermometer ſhall fall any number of degrees below 0, while the barometer ſtill ſtands at 27 inches, ſo many ſixteenths muſt be added to that height, to obtain the true altitude.

Nothing is more ſimple than theſe corrections, when the barometer is at or near 27 inches of height. If, however, it fall ſeveral inches below this point, as the portable barometer very frequently muſt, the dilatations will no longer keep pace with the degrees of heat, after the rate of $\frac{1}{16}$ of a line for every degree of the thermometer; becauſe the columns of mercury being ſhortened, the quantity of fluid to be dilated will be diminiſhed. The truth is, the quantity of the dilatations for the ſame degree of heat is juſt as much diminiſhed as the column is ſhortened. If, then, it ſhall ſtill be found convenient to reckon the dilatations by ſixteenths of a line, theſe ſixteenths muſt be counted on a ſcale, of which the degrees ſhall be as much longer than the degrees of the firſt ſcale, as the ſhortened column of mercury is leſs than 27 inches, the height to which the length of the degrees of the firſt ſcale was adapted. For inſtance, let the mercury deſcend to $13\frac{1}{2}$ inches half the mean column, and let the thermometer aſcend 10 degrees above the mean heat; 10 ſixteenths ſhould be deduced from the mean column, for this temperature, according to the rule; but 10 half-ſixteenths only, or 5 whole ſixteenths, muſt be ſubtracted from the column of $13\frac{1}{2}$ inches, becauſe the ſum of its dilatations will be half that of the former, the quantities of fluid being to one another in that proportion. Barometer.

It would cauſe conſiderable embarraſſment if the ſixteenths of correction were always to be ſubdivided into leſs fractions, proportional to every half inch of deſcent of the barometer; and the ſame end is obtained in a very eaſy manner, by reckoning the corrections on different ſcales of the ſame length, but of which the degrees are longer according as the columns of the barometer are ſhorter. For example, the degrees of correction on the ſcale applicable to the column of $13\frac{1}{2}$ inches, will be double in length what the ſame degrees are for the column of 27 inches; and of courſe the number of corrections will be reduced likewiſe one half, which we have ſeen by the rule they ought to be.

The author conſtructed, on a piece of vellum, ſcales with theſe properties, for no leſs than 23 columns of mercury, being all thoſe between 18 inches and 29 incluſive, counting from half inch to half inch; within which extremes, every practical caſe will be comprehended. He wrapped this vellum on a ſmall hollow cylinder, including a ſpring, like a ſpring-curtain, and fixed it on the right ſide of the thermometer. The vellum is made to paſs from right to left, behind the tube of the thermometer, and to graze along its ſurface. The obſerver, to find the corrections to be made, pulls out the vellum till the ſcale correſponding to the obſerved altitude of the barometer comes to touch the thermometer, and on that ſcale he counts them. The vellum is then let go, and the ſcrew gently furls it up.

40
His operations on the mountain of Saleve.

The author having now, as he imagined, completely finiſhed the inſtruments neceſſary for the accurate menſuration of heights, proceeded to eſtabliſh, by experiment, the altitudes correſponding to the different deſcents of the mercury. Much had been written, and many rules had been given, on this ſubject, by different eminent philoſophers, ſince the days of Paſcal, who firſt broached it: but theſe diſagreed ſo much with one another, and preſented ſo little good reaſon why any one of them ſhould be preferred, that no concluſion could with confidence be deduced from them. It became requiſite, therefore, to lay them all aſide, and to endeavour to diſcover by practice what could not be aſcertained by theory. Saleve, a mountain near Geneva, was choſen for the ſcene of theſe operations. This mountain is near 3000 French feet high. The height of it was twice meaſured by levelling, and the reſult of the menſurations differed only $10\frac{1}{4}$ inches; though there intervened ſix months between them, and the total altitude was ſo conſiderable. On this mountain were choſen no leſs than 15 different ſtations, riſing after the rate of 200 feet, one above another, as nearly

as

Barometer.

as the ground would admit. At theſe ſtations, it was propoſed to make ſuch a number of obſervations as might be a good foundation either for eſtabliſhing a new rule of proportion between the height of places and the deſcents of the mercury, or for preferring ſome one of thoſe formerly diſcovered.

41 Strange anomalies of the barometer at different times of the day.

Little progreſs was made in this plan, when a phenomenon, altogether unexpected, preſented itſelf. The barometer being obſerved, at one of the ſtations, twice in one day, was found to ſtand higher in the latter obſervation than in the former. This alteration gave little ſurpriſe, becauſe it was naturally imputed to a change of the weight of the atmoſphere, which would affect the barometer on the plain in the ſame manner. But it produced a degree of aſtoniſhment, when on examining the ſtate of the latter, it was found, inſtead of correſponding with the motions of the former, to have held an oppoſite courſe, and to have fallen while the other roſe. This difference could not proceed from any inaccuracy in the obſervations, which had been taken with all imaginable care; and it was ſo conſiderable as to deſtroy all hopes of ſucceſs, ſhould the cauſe not be detected and compenſated.

The experiment was repeated ſeveral times, at intervals, that no material circumſtance might eſcape notice. An obſerver on the mountain, and another on the plain, took their reſpective ſtations at the riſing of the ſun, and continued to mark an obſervation, every quarter of an hour, till it ſet. It was found, that the lower barometer gradually deſcended for the firſt three quarters of the day; after which it reaſcended, till in the evening it ſtood at nearly the ſame height as in the morning. While the higher barometer aſcended for the firſt three-fourths of the day; and then deſcended, ſo as to regain likewiſe, about ſun-ſet, the altitude of the morning.

42 Accounted for.

The following theory ſeems to account in a ſatisfactory manner for this phenomenon. When the ſun riſes above the horizon of any place, his beams penetrate the whole of the ſection of the atmoſphere of which that horizon is the baſe. They fall, however, very obliquely on the greater part of it, communicate little heat to it, and conſequently produce little dilatation of its air. As the ſun advances, the rays become more direct, and the heat and rarefaction of courſe increaſe. But the greateſt heat of the day is not felt even when the rays are moſt direct, and the ſun is in the meridian. It increaſes while the place receives more rays than it loſes, which it will do for a conſiderable time after mid-day; in like manner as the tide attains not its higheſt altitude till the moon has advanced a conſiderable way to the weſt of the meridian. The heat of the atmoſphere is greateſt at the ſurface of the earth, and ſeems not to aſcend to any great diſtance above it. The dilatations, for this reaſon, of the air, produced by the ſun, will be found chiefly, if not ſolely, near the earth. A motion muſt take place, in all directions, of the adjacent air, to allow the heated air to expand itſelf. The heated columns extending themſelves vertically, will become longer, and at the ſame time ſpecifically lighter, in conſequence of the rarefaction of their inferior parts. The motion of air, till it riſes into wind, is not rapid: theſe lengthened columns, therefore, will take ſome time to diſſipate their ſummits among the adjacent leſs rarefied columns that are not ſo high; at leaſt, they will not do this as faſt as their length is increaſed by the rarefaction of their baſes. Barometer.

The reader, we preſume, anticipates the application of this theory to the ſolution of the phenomenon in queſtion. The barometer on the plain begins to fall a little after morning, becauſe the column of air that ſupports it becomes ſpecifically lighter on account of the rarefaction ariſing from the heat of the ſun. It continues to fall for the firſt three quarters of the day; becauſe, during that time, the heat, and conſequently the rarefaction, are gradually increaſing. It riſes again, after this period; becauſe the cold, and of courſe the condenſation, coming on, the ſpecific gravity is augmented by the ruſhing in of the adjacent air. The equilibrium is reſtored, and the mercury returns to the altitude of the morning.

The barometer on the eminence riſes after morning, and continues to do ſo for three-fourths of the day, for two reaſons. The denſity of the columns of air is greateſt near the earth, and decreaſes as the diſtance from it increaſes. The higher, for this reaſon, we aſcend in the atmoſphere, we meet with air ſpecifically lighter. But by the rarefaction of the baſe of the column that ſupports the mercury of the barometer on the eminence, the denſer parts of that column are raiſed higher than naturally they would be if left to the operation of their own gravity. On this account, the higher barometer is preſſed with a weight, nearly as great as it would ſuſtain, were it brought down, in the atmoſphere, to the natural place of that denſer air now raiſed above it by the prolongation of the baſe of the column. The other reaſon is, that as the rarefaction does not take place at any great diſtance from the earth, little change is produced in the ſpecific gravity of the portion of the column that preſſes on the higher barometer, and the ſummit of that column diſſipates itſelf more ſlowly than it increaſes. Thus, we ſee how this barometer muſt aſcend during the firſt three-fourths of the day, and purſue a courſe the reverſe of that on the plain. The condenſations returning after this time, the denſer air ſubſides, the equilibrium takes place, and the mercury deſcends to its firſt poſition.

43 Render another pair of thermometers neceſſary.

This phenomenon prompted the idea of a ſecond pair of thermometers, to meaſure the mean heat of the column of air intercepted between the barometers. Theſe thermometers are extremely delicate and ſenſible. The tubes are the fineſt capillary, the glaſs very thin, and the diameters of the balls only three lines. The balls are inſulated, or detached from the ſcales, which are fixed to the tubes only, by ligatures of fine braſs-wire covered with ſilk. The air, by this contrivance, has free communication with the balls on all ſides; and, if the direct rays of the ſun be intercepted at ſome diſtance by a bit of paper, or even the leaf of a tree, the thermometers will quickly mark the true temperature of the air.

44 Method of computing the altitudes.

The reader, perhaps, will aſk here, Could not this end have been gained by the firſt pair of thermometers? But we muſt requeſt him to ſuſpend his judgement till we have explained the theory of computing the altitudes from the deſcents of the mercury. He will

Barometer. will then find the ſcales of theſe thermometers ſo different, that neither of them could, without much inconveniency, ſerve the purpoſe of the other.

The altitudes are computed by logarithms. A table of logarithms contains two ſeries of numbers, running parallel to one another. The firſt has its terms in geometrical progreſſion, and the ſecond its terms in arithmetical. The natural numbers 1, 2, 3, 4, &c. form the firſt ſeries; which, though in arithmetical progreſſion when ſtanding detached, are in geometrical in regard of the ſecond ſeries; whoſe terms are in arithmetical progreſſion, and are called *logarithms*, becauſe they expreſs the diſtance of their correſpondent terms of the geometrical progreſſion from the beginning of the ſeries.

To apply this table to the preſent purpoſe: let us ſuppoſe the whole atmoſphere divided into concentric ſpherical ſections, whoſe common centre is that of the earth. Suppoſe alſo all theſe ſections of equal thickneſs, namely, 12.497 toiſes, which is found to be the thickneſs of the loweſt ſection, and balances a line of mercury, when the barometer ſtands at 348 lines or 29 inches. Add, then, all theſe ſections together; and we ſhall have the total altitude of the atmoſphere expreſſed in an arithmetical progreſſion, whoſe common difference is 12.497 toiſes. Conſequently, in this view, the heights are proportioned to the logarithms.

It remains only to find the deſcents of the mercury, which meaſures the weights of the reſpective ſections, in geometrical proportion, in order to juſtify the application of the logarithmic table to the computation of the altitudes. Now, it is eaſy to prove, in a very ſatisfactory manner, that the mean denſities of theſe ſections, which are in proportion of their weights, muſt be in geometrical progreſſion, when the altitudes are in arithmetical; conſequently, it is with great propriety and convenience that the logarithms are employed in the computation of the altitudes correſponding to the deſcents of the mercury. For, to find the vertical diſtance between two barometers, at different heights, no more is neceſſary than to look, in a table of logarithms, for the numbers that expreſs in lines, or ſixteenths of a line, the altitudes of the two columns of mercury, and take the logarithms of theſe numbers, whoſe difference will give this diſtance accurately, in thouſandth parts of a toiſe. Multiply the toiſes by 6, which will furniſh the altitudes in French feet.

The author made about 500 different obſervations at the ſeveral ſtations on the mountain of Saleve, which both ſuggeſted and verified the computation by logarithms. Many, however, of theſe obſervations, produced concluſions that deviated conſiderably from the reſults of the actual menſuration, on account of the different temperatures in which they were taken. It was the deſign of the ſecond pair of thermometers to point out the corrections of theſe deviations. In ſettling the ſcales neceſſary for this end, the firſt object was, to mark the temperature of all the obſervations where the logarithms gave the altitudes exactly, or nearly equal to what they were found to be by levelling. This temperature correſponded to 16¼ on the ſcale of Reaumur, and to 70 on that of Fahrenheit, and as it was fixed the term 0. The next ſtep was, to determine the corrections of the heights that became neceſſary, according as the ſtate of the air was warmer or colder than the fixed point. With this view, all the remaining obſervations were collected, and compared with the different temperatures in which they were taken; and from an attentive examination of theſe circumſtances, it was diſcovered, that for every 215 feet of height furniſhed by the logarithms, one foot of correction muſt be added or ſubtracted, for every degree of the thermometer, according as it ſtood above or below the term 0. Barometer.

The ſcale of Reaumur did not conveniently expreſs this correction of 1 to 215. The author wiſhed to adopt the ratio of 1 to 1000, in forming a new ſcale for that purpoſe; but the diviſions would have been too ſmall. He employed, therefore, that of 1 to 500: becauſe, by doubling the degrees of the higher thermometer above or below 0; or, which amounted nearly to the ſame thing, by doubling the mean heat of the column of air in taking the ſum of the degrees of both thermometers, there reſulted the ratio of 1 to 1000. The new ſcale, then, was divided by the following proportion: As 215, the laſt term of the ratio found by Reaumur's ſcale, is to 500, the laſt term of the ratio to be applied on the new ſcale: ſo is 80, the parts between the fixed points of the firſt ſcale, to 186, the number of parts between the ſame points on the ſecond. And as 80 is to 186; ſo is 16¼, the point on Reaumur's ſcale at which the logarithms give the altitudes without correction, to 39, the point at which they give them on the new ſcale. The term 0 is placed at this point, 39 at melting ice, and 147 at that of boiling water. To reduce all obſervations to the ſame temperature by this ſcale, nothing more is neceſſary than to multiply the heights found from the logarithms by the ſum of the degrees of both thermometers above or below 0, and to divide the product by 1000. The quotient muſt be added to, or ſubtracted from, the logarithmic height, according as the temperature is poſitive or negative.

As a ſpecimen of the author's method, we ſhall now preſent our readers with the reſult of his operations at the 15 ſtations on Saleve. In one column are marked the heights found by levelling, and oppoſite to them the ſame heights found by the barometer; to the latter are prefixed the number of obſervations of which they are the mean. 45 Specimen of this method of menſuration.

Stations.	*Heights by Levelling.* Feet.	Inches.	*Number of Obſervations.*	*Heights by Barometer.* Feet.
1	216	2	12	230 3/4
2	428	10	13	435 1/13
3	586	0	13	591 11/13
4	728	8	21	732 1/7
5	917	0	24	919 12/24
6	1218	8	27	1221 7/27
7	1420	0	23	1418 17/23
8	1800	0	17	1798 8/17
9	1965	3	17	1962 2/7
10	2211	0	17	2210
11	2333	0	17	2331 5/7
12	2582	4	16	2583 13/13
13	2700	0	15	2703 6/15
14	2742	0	10	2741 1/5
15	2926	0	11	2924 10/12

From this table we preſume the reader will be inclined to entertain the moſt favourable opinion of the abilities

Barometer.

46 Deſcription of the moſt improved barometer yet invented.

abilities and induſtry of M. de Luc. Notwithſtanding the amazing pains, however, which he has taken to remove every inaccuracy in the barometer, it did not remain entirely free from error; nor in many inſtances have the obſervations made by different perſons exactly correſponded. Conſiderable improvements have been ſuggeſted by Colonel Roy and Sir George Shuckburgh, &c. (ſee *Phil. Tranſ.* vol. 67. and 68.); and put in execution, with improvements, by Mr Ramſden, and other ingenious inſtrument-makers in London. The following is a deſcription of a very portable one conſtructed by Mr William Jones of Holborn, which, from its principle, comprehends every advantage that M. de Luc's inſtrument poſſeſſes; in many particulars is exempted from the errors to which his is liable; and is not ſubject to be deranged by carriage or other motion.

Fig. 12. is a repreſentation of the inſtrument as encloſed in its mahogany caſe by means of three metallic rings *b b b*: This caſe is in the form of a hollow cone divided into three arms or legs from *a* to *c*, and is ſo carved in the inſide as to contain ſteadily the body of the barometer: The arms, when ſeparated, form three firm legs or ſupports for the barometer when making obſervations (ſee fig. 13.): The inſtrument is ſuſpended at the part *g* of the caſe, by a kind of improved gimbals; and therefrom, with its own weight, is ſufficiently ſteady in expoſed weather. In that part of the frame where the barometer tube is ſeen (*a e*), there is a long ſlit or opening made, ſo that the altitude of the mercury may be ſeen againſt the light, and the vernier piece *a* brought down to coincide with the edge of the mercury to the greateſt poſſible exactneſs. When the inſtrument is placed on its ſupport, the ſcrew *f* is to be let down in order that the mercury may ſubſide to its proper height; and alſo a peg at *p* muſt be looſened, to give admiſſion to the action of the external air upon the mercury contained in the box *b*. The adjuſtment or mode of obſerving what is called the *zero*, or 0, diviſion of the column of mercury, is by the mercury being ſeen in the tranſparent part of the box *b*; the inſide of which is a glaſs tube or reſervoir for the mercury, and an edge piece of metal fixed on the external part of the box. The mercury is to be brought into contact with the edge by turning the ſcrew *f* towards the right or left as neceſſary. The vernier piece at *a* that determines the altitude of the column of mercury, is to be brought down by the hand to a near contact, and then accurately adjuſted by turning the ſcrew *b* at top of the inſtrument. This barometer has uſually two different ſorts of ſcales inſerted on it: that on the right at *a e*, is a ſcale of French inches from 19 to 31, meaſured from the ſurface or *zero* of the mercury in the box *b* below, divided into 12th parts or lines, and each line ſubdivided by the *vernier* into ten parts, ſo that the height of the column of mercury may be aſcertained to the 120th part of a French inch. The ſcale which is on the other ſide, or left of obſervation, is of the ſame length; but divided into Engliſh inches, each of which is ſubdivided into 20ths of an inch, and the *vernier* ſubdivides each 20th into 25 parts; ſo that the height of the mercury is hereby aſcertained to the 500th part of an Engliſh inch (viz. $20 \times 25 = 500$). But this *vernier* is figured *double* for the convenience of calculation, viz. The firſt 5 diviſions are marked 10, the 20 marked 40, and the 25 marked 50: then each exact diviſion is reckoned as the *two thouſandths* of an inch, which amounts to the ſame; for $\frac{1}{500}$ is the ſame in value as $\frac{2}{1000}$ of an inch. A *thermometer* is always attached to the barometer, and indeed is indiſpenſably neceſſary: it is faſtened to the body at *c*, counterſunk beneath the ſurface of the frame, which makes it leſs liable to be broken: the degrees of the thermometer are marked on two ſcales, one on each ſide, viz. that of Fahrenheit and Reaumur, ſcales generally known; the freezing point of the former being at 32 and the latter at 0. On the right-hand ſide of theſe two ſcales there is a third, called a ſcale of *correction*; it is placed oppoſitely to that of Fahrenheit, with the words *add* and *ſubtract*: it ſerves as a neceſſary correction to the obſerved altitude of the mercury at any given temperature of the air ſhown by the thermometer. There are ſeveral other valuable pieces of mechaniſm about the inſtrument that cannot clearly be repreſented in the figure; but what has already been ſaid, we preſume, is ſufficient for the reader's general information. For the manner of making the neceſſary obſervations, and calculating the neceſſary particulars deducible therefrom, a full information may be obtained from M. De Luc, *Recherches ſur les Modifications de l'Atmoſphere*, and the Philoſophical Tranſactions, vol. 67. and 68. before cited.

Barometer.

It may be neceſſary to add here, that by very ſmall additional contrivances to this inſtrument, Mr Jones renders it equally uſeful for making obſervations at ſea with any *marine* barometer that has hitherto been invented.

This article may not be improperly concluded by an obſervation of Mr Magellan *, relative to a principal cauſe of error in barometrical meaſurements. This he ſtates to be owing to the inattention of obſervers to the *ſpecific gravity* of the mercury with which their barometers were made. If two barometers were both at 30 inches high, and equally circumſtanced in every other reſpect, excepting only their ſpecific gravity of the quickſilver; ſo that one be filled with the firſt kind I have tried, viz. whoſe ſpecific gravity was $=13{,}62$ and the other $=13{,}45$. In this caſe, and in all probability many of this kind have often occurred, the error muſt have been no leſs than 327 feet; becauſe the heights of the mercurial columns in each barometer muſt be in the inverſe ratio of their ſpecific gravities: viz. $13{,}45 : 1362 :: 30 : 30{,}379$.

* *Magellan's edition of Cronſtedt's Mineralogy*, Notes on *Mercury*.

Now the logarithm of $30 = 4771.21$

ditto of $30{,}379 = 4825.73$

the difference is $= 54.52$

which difference ſhows, that there are 54.52 fathoms between one place and another, or 327 feet; though in reality both places are on the ſame level.

" But if the ſpecific gravity of the mercury, in the two barometers, were as the two above alluded to of Bergman and Fourcroy; viz. one of 14,110, and the other of 13,000, which may happen to be the caſe, as the heavieſt is commonly reputed the pureſt mercury; on this ſuppoſition the error muſt have amounted to 35,576 toiſes, or above 2134 feet and a half; becauſe $13{,}000 : 14{,}110 :: 30 : 32{,}561$.

Now

BAROMETER.

Plate LXXXV.

Fig. 1.

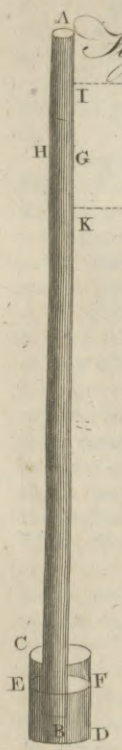


Fig. 2.

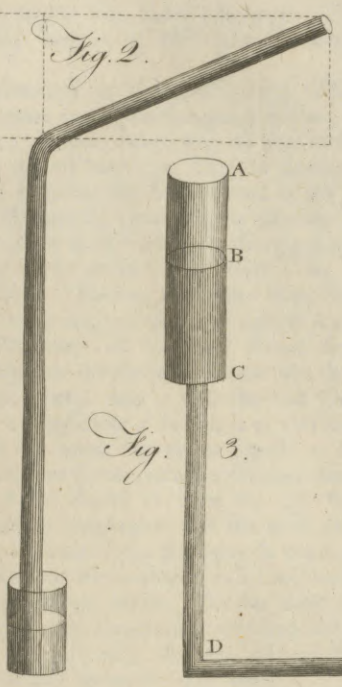


Fig. 3.

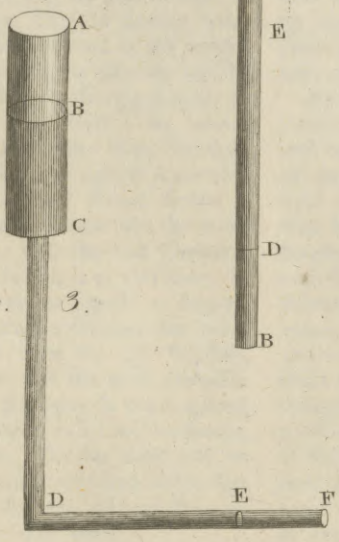


Fig. 4.

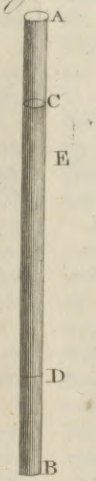


Fig. 7.

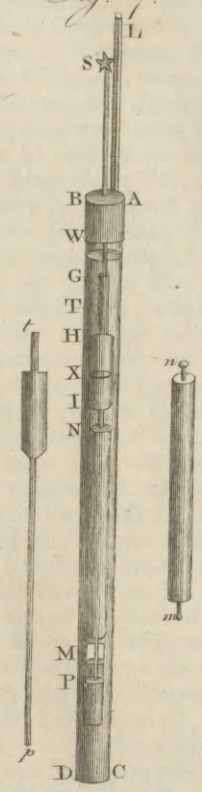


Fig. 9.

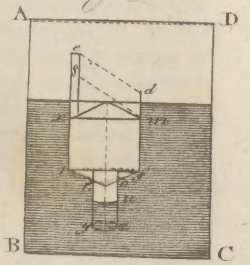


Fig. 11.

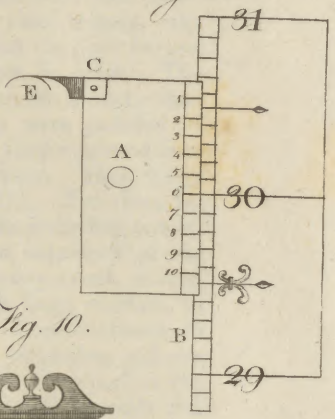


Fig. 10.

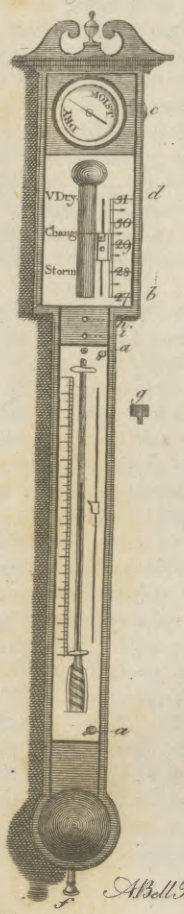


Fig. 8.

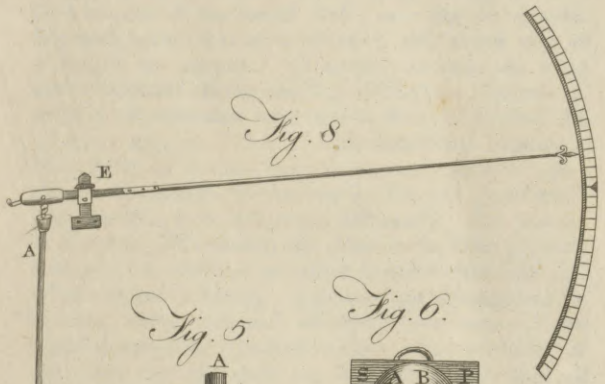


Fig. 5.

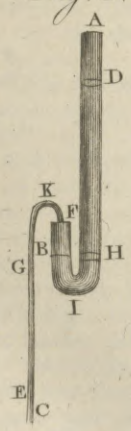


Fig. 6.

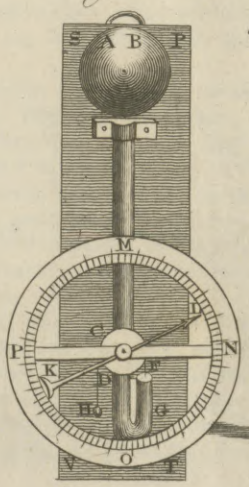


Fig. 13.

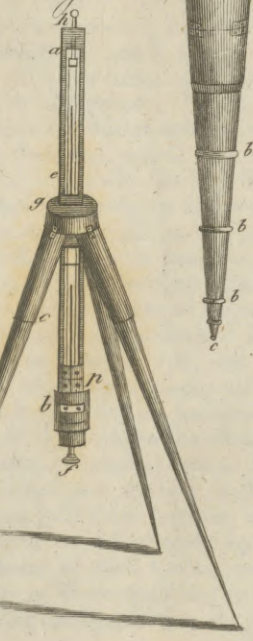


Fig. 12.

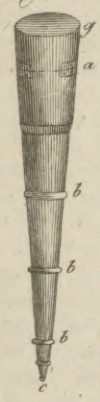


Fig. 14.

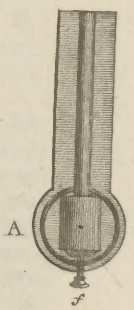
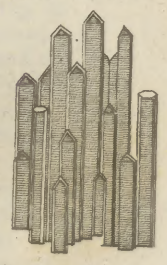


Fig. 15.

BASALTES.



A Bell Prin. Wal. Sculptor fecit.

Baron. Now the logarithm of 30=4771,21
and that of 32,561=5126,97

the difference is=355,76; which ſhows that the error ſhould amount to ſo many fathoms, or 2134.5 feet.

BARON, a perſon who holds a barony. The origin and primary import of this term is much conteſted.

Menage derives it from the Latin *baro*, which we find uſed in the pure age of that language for *vir*, a *ſtout* or *valiant man*; whence, according to this author, it was, that thoſe placed next the king in battles were called *barones*, as being the braveſt men in the army; and as princes frequently rewarded the bravery and fidelity of thoſe about them with fees, the word came to be uſed for any noble perſon who holds a fee immediately of the king. Iſidore, and after him Camden, take the word in its original ſenſe, to ſignify a *mercenary ſoldier*. Meſſieurs of the Port Royal derive it from βαρος, *weight* or *authority*. Cicero uſes the word *baro* for a ſtupid brutal man; and the old Germans make mention of *buffetting a baron*, i. e. a *villain*; as the Italians uſe the word *barone* to ſignify a *beggar*. M. de Marca derives baron from the German *bar*, *man*, or *freeman*; others derive it from the old Gauliſh, Celtic, and Hebrew languages; but the moſt probable opinion is, that it comes from the Spaniſh *varo*, a *ſtout*, *noble perſon*; whence wives uſed to call their huſbands, and princes their tenants, *barons*. In the Salic law, as well as the laws of the Lombards, the word *baron* ſignifies a *man* in the general; and the old gloſſary of Philomenes tranſlates baron by ανηρ, *man*.

BARON is more particularly uſed, among us, for a lord or peer of the loweſt claſs; or a degree of nobility next below that of a viſcount, and above that of a knight or baronet. In ancient records the word *baron* included all the nobility of England, becauſe regularly all noblemen were barons, though they had alſo a higher dignity. But it hath ſometimes happened, that, when an ancient baron hath been raiſed to a new degree of peerage, in the courſe of a few generations the two titles have deſcended differently; one perhaps to the male deſcendants, the other to the heirs general; whereby the earldom or other ſuperior title hath ſubſiſted without a barony: and there are alſo modern inſtances, where earls and viſcounts have been created without annexing a barony to their other honours: ſo that now the rule doth not hold univerſally that all peers are barons.

The original and antiquity of barons has occaſioned great inquiries among our Engliſh antiquarians. The moſt probable opinion is ſuppoſed to be, that they were the ſame with our preſent lords of manors; to which the name of *court baron* (which is the lord's court, and incident to every manor) gives ſome countenance. It is ſaid the original name of this dignity in England was *vavaſſour*, which by the Saxons was changed to *thane*, and by the Normans into *baron*. It may be collected from King John's *magna charta*, that originally all lords of manors, or barons, had ſeats in the great council or parliament: but ſuch is the deficiency of public records, that the firſt precept to be found is of no higher date than the 49th year of King Henry III.; which, although it was iſſued out in the king's name, was neither by his authority nor by his direction: for, not only the king himſelf, but his ſon Prince Edward, and moſt of the nobility who ſtood loyal to him, were then priſoners in the hands of the rebellious barons; having been ſo made in the month of May preceding, at the battle of Lewes, and ſo continued until the memorable battle of Eveſham, which happened in Auguſt the year following; when, by the happy eſcape of Prince Edward, he reſcued the king and his adherents out of the hands of Simon Mountfort earl of Leiceſter. It cannot be doubted but that ſeveral parliaments were held by King Henry III. and King Edward I.; yet no record is to be found giving any account thereof (except the 5th of King Edward I.), until the 22d year of the reign of the laſt mentioned king. Baron.

Before the 49th of Henry III. the ancient parliaments conſiſted of the archbiſhops, biſhops, abbots, earls, and barons. Of theſe barons there were two ſorts: the *greater barons*, or the king's chief tenants, who held of him *in capite* by barony; and the *leſſer barons*, who held of the firſt military ſervice *in capite*. The former had ſummons to parliament by ſeveral writs; and the latter (i. e. all thoſe who were poſſeſſed of thirteen knights fees and a quarter) had a general ſummons from the ſheriff in each county. Thus things continued till the 49th of Henry III. But then, inſtead of keeping to the old form, the prevailing powers thought fit to ſummon, not all, but only thoſe of the greater barons who were of their party; and, inſtead of the leſſer barons who came with large retinues, to ſend their precepts to the ſheriff of each county, to cauſe two knights in every ſhire to be choſen, and one or two burgeſſes for each borough, to repreſent the body of the people reſiding in theſe counties and boroughs; which gave riſe to the ſeparation into two houſes of parliament. By degrees the title came to be confined to the greater barons, or lords of parliament only; and there were no other barons among the peerage but ſuch as were ſummoned by writ, in reſpect of the tenure of their lands or baronies, till Richard II. firſt made it a mere title of honour, by conferring it on divers perſons by his letters patent. See further on this ſubject the article LAW.

When a baron is called up to the houſe of peers by writ of ſummons, the writ is in the king's name, and he is directed to come to the parliament appointed to be held at a certain time and place, and there to treat and adviſe with his majeſty, the prelates, and nobility, about the weighty affairs of the nation. The ceremony of the admiſſion of a baron into the houſe of peers is thus: He is brought into the houſe between two barons, who conduct him up to the lord chancellor, his patent or writ of ſummons being carried by a king at arms, who preſents it kneeling to the lord chancellor, who reads it, and then congratulates him on his becoming a member of the houſe of peers, and inveſts him with his parliamentary robe. The patent is then delivered to the clerk of the parliament, and the oaths are adminiſtered to the new peer, who is then conducted to his ſeat on the barons bench. Some barons hold their ſeats by tenure. The firſt who was raiſed to this dignity by patent was John de Beauchamp of Holt Caſtle, created baron of Kidderminſter in Worceſterſhire, to him and his heirs male, by King Richard II. in the 11th year of his reign. He

Barons, Baron.

inveſted him with a mantle and cap. The coronation-robes of a baron are the ſame as an earl's, except that he has only two rows of ſpots on each ſhoulder. In like manner, his parliamentary robes have but two guards of white fur, with rows of gold lace. In other reſpects they are the ſame as other peers. King Charles II. granted a coronet to the barons. It has ſix pearls, ſet at equal diſtances on the chaplet. His cap is the ſame as a viſcount's. His ſtyle is *Right Honourable;* and he is ſtyled by the king or queen, *Right Truſty and Well Beloved.*

Barons by ancient tenure were thoſe who held certain territories of the king, who ſtill reſerved the tenure in chief to himſelf. We alſo read of *barons by temporal tenure;* who are ſuch as hold honours, caſtles, manors, as heads of their barony, that is by grand ſergeanty; by which tenure they were anciently ſummoned to parliament. But at preſent a baron by tenure is no lord of parliament, till he be called thither by writ.

The barons by tenure after the Conqueſt, were divided into *majores* and *minores*, and were ſummoned accordingly to parliament; the *majores* or greater barons, by immediate writ from the king; the *minores*, or leſſer barons, by general writ from the high ſheriff, at the king's command.

Anciently they diſtinguiſhed the greater barons from the leſs, by attributing high, and even ſovereign juriſdiction, to the former, and only inferior juriſdiction over ſmaller matters to the latter.

Barons of the Exchequer, the four judges to whom the adminiſtration of juſtice is committed, in cauſes between the king and his ſubjects relating to matters concerning the revenue. They were formerly barons of the realm, but of late are generally perſons learned in the laws. Their office is alſo to look into the accounts of the king, for which reaſon they have auditors under them. See Exchequer.

Barons of the Cinque-ports are members of the houſe of commons, elected by the five ports, two for each port. See the article Cinque-ports.

Baron and Feme, in the *Engliſh Law*, a term uſed for huſband and wife, in relation to each other: and they are deemed but one perſon; ſo that a wife cannot be witneſs for or againſt her huſband, nor he for or againſt his wife, except in caſes of high treaſon.

Baron and Feme, in *Heraldry*, is when the coats of arms of a man and his wife are borne par pale in the ſame eſcutcheon, the man's being always on the dexter ſide, and the woman's on the ſiniſter; but here the woman is ſuppoſed not an heireſs, for then her coat muſt be borne by the huſband on an eſcutcheon of pretenee.

BARON, Robert, a dramatic author, who lived during the reign of Charles I. and the protectorſhip of Oliver Cromwell. He received the earlier parts of his education at Cambridge, after which he became a member of the honourable ſociety of Gray's Inn. During his reſidence at the univerſity, he wrote a novel called the *Cyprian Academy*, in which he introduced the two firſt of the dramatic pieces mentioned below. The third of them is a much more regular and perfect play, and was probably written when the author had attained a riper age. The names of them are, 1. *Deorum Dona*, a maſque. 2. *Gripus and Hegio*, a paſtoral. 3. *Mirza*, a tragedy. Mr Baron had a great intimacy with the celebrated Mr James Howell, the great traveller, in whoſe collections of Letters * there is one to this gentleman, who was at that time at Paris. To Mr Howell in particular, and to all the ladies and gentlewomen in England in general, he has dedicated his romance.

Baronet, Baronets.

* Vol. iii. Let. 418.

BARONET, a dignity or degree of honour next beneath a baron, and above a knight; having precedency of all knights excepting thoſe of the garter, and being the only knighthood that is hereditary.

The dignity of baronet is given by patent, and is the loweſt degree of honour that is hereditary. The order was founded by King James I. at the ſuggeſtion of Sir Robert Cotton, in 1611, when 200 baronets were created at once; to which number it was intended they ſhould always be reſtrained: but it is now enlarged at the king's pleaſure, without limitation.

They had ſeveral conſiderable privileges given them, with an *habendam* to them and their heirs male. They were allowed to charge their coat with the arms of Ulſter, which are, in a field argent, a ſiniſter hand, gules; and that upon condition of their defending the province of Ulſter in Ireland againſt the rebels, who then haraſſed it extremely: to which end they were each to raiſe and keep up 30 ſoldiers at their own expence for three years together, or to pay into the exchequer a ſum ſufficient to do it; which, at 8d. per day per head, was 1095l. So that, including fees, the expence of this dignity may be about 1200l. ſterling. To be qualified for it, one muſt be a gentleman born, and have a clear eſtate of 1000l. per annum.

Baronets take place according to the dates of their patents; by the terms of which no honour is to be erected between barons and baronets. The title *Sir* is granted them by a peculiar clauſe in their patents, though they be not dubbed knights: but both a baronet, and his eldeſt ſon, being of full age, may claim knighthood.—The firſt baronet who was created was Sir Nicholas Bacon of Redgrave in Suffolk, whoſe ſucceſſor is therefore ſtyled *Primus Baronetorum Angliæ*.

Baronets of Scotland, called alſo *Baronets of Nova Scotia*. The order of knights baronets was alſo deſigned to be eſtabliſhed in Scotland in the year 1621, by King James I. for the plantation and cultivation of the province of Nova Scotia in America; but it was not actually inſtituted till the year 1625 by his ſon Charles I. when the firſt perſon dignified with this title was Sir Robert Gordon of Gordonſtone, a younger ſon of the earl of Sutherland. The king granted a certain portion of land in Acadia or New Scotland, to each of them, which they were to hold of Sir William Alexander (afterwards earl of Stirling), for their encouragement who ſhould hazard their lives for the good and increaſe of that plantation, with precedeney to them, and their heirs-male for ever, before all knights called *equites aurati*, and all leſſer barons called *lairds*, and all other gentlemen, except Sir William Alexander his majeſty's lieutenant in Nova Scotia, his heirs, their wives and children; that the title of *Sir* ſhould be prefixed to their Chriſtian name, and *Baronet* added to their ſurname; and that their own and their eldeſt ſons wives ſhould enjoy the title of *Lady*, *Madam*, or *Dame*.

Baronets, Baroni.

Dame.—His majeſty was ſo deſirous of adding every mark of dignity to this his favourite order, that, four years after its inſtitution, he iſſued a royal warrant, granting them the privilege of wearing an orange ribbon and a medal; which laſt was preſented to each of them by the king himſelf, according to the words of the warrant. All the privileges of the order, particularly this of wearing the medal, were confirmed at the king's requeſt by the convention of eſtates in the year 1630; and in order to eſtabliſh them on the moſt ſolid foundation, they were again confirmed by an act of the parliament of Scotland in the year 1633. This mark of diſtinction fell to the ground with all the other honours of Scotland during the uſurpation of the long parliament and of Oliver Cromwell. It continued in general, though not total, diſuſe after the Reſtoration. There have been former meetings of the order to revive the uſe of it, one in the year 1721, and another in 1734. Theſe meetings proved ineffectual, becauſe the proper ſteps towards its revival were not taken; but, under the auſpices of our illuſtrious monarch George III. ſuch meaſures were concerted in the year 1775 as have effectually eſtabliſhed this honourable dignity.

Baronets of Ireland. This order was likewiſe inſtituted by King James I. in the 18th year of his reign for the ſame purpoſe and with the ſame privileges within the kingdom of Ireland, as he had conferred on the like order in England; for which the Iriſh baronets paid the ſame fees into the treaſury of Ireland. The firſt of that kingdom who was advanced to this hereditary dignity was Sir Francis Blundell, then ſecretary for the affairs of Ireland. Since his time, ſeveral have been created, no number being limited.

BARONI, Leonora, a celebrated ſinger and compoſer, was born at Naples, but ſpent the greateſt part of her life at Rome. She was daughter of Adriana Baroni of Mantua, baroneſs of Pian-caretta; a lady alſo diſtinguiſhed for her muſical talents, and for her beauty ſurnamed *the fair*. Leonora had leſs beauty than her mother; but excelled her in her profound ſkill in muſic, the fineneſs of her voice, and the charmingneſs of her manner. She is ſaid by Mr Bayle to have been one of the fineſt ſingers in the world. She was, as well as her mother, celebrated by the wits, who ſtrove to excel each other in recording her praiſes; and in 1639 there was publiſhed, at Bracciano, a collection of Latin, Greek, Italian, Spaniſh, and French poems addreſſed to her, under this title, *Applauſi Poetici alle Glorie della Signora Leonora Baroni.* Among the Latin poems of Milton are no fewer than three entitled *Ad Leonoram Romæ canentem*, wherein this lady is celebrated for her ſinging, with an alluſion to her mother's exquiſite performance on the lute. A fine eulogium on this accompliſhed woman is contained in a diſcourſe on the Muſic of the Italians, printed with the life of Malherbe, and ſome other treatiſes at Paris, 1672, in 12mo. This diſcourſe was compoſed by M. Maugars prior of St Peter de Mac, the king's interpreter of the Engliſh language, and beſides ſo famous a performer on the viol, that the king of Spain and ſeveral other ſovereign princes of Europe deſired to hear him. The character given by this perſon of Leonora Baroni is as follows: "She is endowed with fine parts; ſhe has a very good judgment to diſtinguiſh good from bad muſic; ſhe underſtands it perfectly well, and even compoſes; which makes her abſolute miſtreſs of what ſhe ſings, and gives her the moſt exact pronunciation and expreſſion of the ſenſe of her words. She does not pretend to beauty, neither is ſhe diſagreeable or a coquet. She ſings with a bold and generous modeſty, and an agreeable gravity; her voice reaches a large compaſs of notes, and is exact, loud, and harmonious; ſhe ſoftens and raiſes it without ſtraining or making grimaces. Her raptures and ſighs are not laſcivious; her looks having nothing impudent, nor does ſhe tranſgreſs a virgin modeſty in her geſtures. In paſſing from one key to another, ſhe ſhows ſometimes the diviſions of the enharmonic and chromatic kind with ſo much art and ſweetneſs, that every body is raviſhed with that fine and difficult method of ſinging. She has no need of any perſon to aſſiſt her with a theorbo or viol, one of which is neceſſary to make her ſinging complete; for ſhe plays perfectly well herſelf on both theſe inſtruments. In ſhort, I have had the good fortune to hear her ſing ſeveral times above 30 different airs, with ſecond and third ſtanzas compoſed by herſelf. I muſt not forget to tell you, that one day ſhe did me the particular favour to ſing with her mother and her ſiſter. Her mother played upon the lute, her ſiſter upon the harp, and herſelf upon the theorbo. This concert, compoſed of three fine voices, and of three different inſtruments, ſo powerfully tranſported my ſenſes, and threw me into ſuch raptures, that I forgot my mortality, and thought myſelf already among the angels enjoying the felicity of the bleſſed."

Baronius, Barony.

BARONIUS, Cæsar, a pious and learned cardinal, was born at Sore in 1538. He ſtudied at Rome, and put himſelf under the diſcipline of St Philip de Neri. In 1593, he was made general of the congregation of the Oratory by the reſignation of the founder Philip de Neri. Pope Clement VIII. made him his confeſſor, and created him a cardinal in 1596. He was afterwards made librarian to the Vatican; and died in 1605, at 68 years of age. He wrote ſeveral works, the principal of which is his *Annales Eccleſiaſtici*, from A. D. 1 to 1198, in 12 vols folio; which has been abridged by ſeveral perſons, particularly by Henry Spondæus, Bzovius, and Ludovico Arelio.

BARONY, Baronia, or *Baronagium*, the lordſhip or fee of a baron, either temporal or ſpiritual: In which ſenſe *barony* amounts to the ſame with what is otherwiſe called *honour*.

A barony may be conſidered as a lordſhip held by ſome ſervice in chief of the king, coinciding with what is otherwiſe called *grand ſergeanty*. Baronies, in their firſt creation, moved from the king himſelf, the chief lord of the whole realm, and could be holden immediately of no other lord. For example, the king enfeoffed a man of a great ſeigneurie in land, to hold to the perſon enfeoffed and his heirs, of the king and his heirs, by baronial ſervice; to wit, by the ſervice of 20, 40, 60 knights, or of ſuch other number of knights, either more or fewer, as the king by his enfeoffment limited or appointed.—In the ages next after the Conqueſt, when a great lord was enfeoffed by the king of a large ſeigneurie, ſuch ſeigneurie was called a *barony*, but more commonly an *honour;* as, the honour of Glouceſterſhire, the honour of Wallingford, the honour

Barony || Barraba.

nour of Lancaſter, the honour of Richmond, and the like. There were in England certain honours, which were often called by Norman or other foreign names; that is to ſay, ſometimes by the Engliſh and ſometimes by the foreign name. This happened when the ſame perſon was lord of an honour in Normandy, or ſome other foreign country, and alſo of an honour in England. For example, William de Forz, de Force, or de Fortibus, was lord of the honour of Albemarle in Normandy: he was alſo lord of two honours in England; to wit, the honour of Holderneſs. and the honour of Skipton in Cravene. Theſe honours in England were ſometimes called by the Norman name, the honour of Albemarle, or the honour of the earl of Albemarle. In like manner, the earl of Britannie was lord of the honour of Britannie in France, and alſo of the honour of Richmond in England: the honour of Richmond was ſometimes called by the foreign name, the honour of Britannie, or the honour of the earl of Britannie. This ſerveth to explain the terms "honour of Albemarle in England," *honor Albemarliæ*, or *comitis Albemarliæ in Anglia; honor Britanniæ*, or *comitis Britanniæ in Anglia*, "the honour of Britannie," or "the earl of Britannie in England." Not that Albemarle or Britannie were in England, but that the ſame perſon reſpectively was lord of each of the ſaid honours abroad and of each of the ſaid honours in England. The baronies belonging to biſhops are by ſome called *regalia*, as being held ſolely on the king's liberality. Theſe do not conſiſt in one barony alone, but in many; for *tot erant baroniæ, quot majora prædia*.

A barony, according to Bracton, is a right indiviſible. Wherefore, if an inheritance be to be divided among coparceners, though ſome capital meſſuages may be divided, yet if the capital meſſuage be the head of a county or barony, it may not be parcelled: and the reaſon is, leſt by this diviſion many of the rights of counties and baronies by degrees come to nothing, to the prejudice of the realm, which is ſaid to be compoſed of counties and baronies.

BARRA, or BARRAY, iſland of. See BARRAY.

BARRA, in *Commerce*, a long-meaſure uſed in Portugal and ſome parts of Spain, to meaſure woollen cloths, linen cloths, and ſerges. There are three ſorts; the barra of Valencia, 13 of which make 12⅞ yards Engliſh meaſure; the barra of Caſtile, 7 of which make 6¼ yards; and the barra of Aragon, 3 of which make 2¼ yards Engliſh.

BARRABA, DESERT OF; a tract of land in Siberia, lying between the rivers Irtis and Oby, in the province of Tobolſk. It is uninhabited, but not through any deficiency of the ſoil; for that is excellent for tillage, and part of it might alſo be laid out in meadows and paſtures. It is interſperſed with a great number of lakes, which abound with a ſpecies of carp called by the neighbouring people *karawſchen;* and the country produces great numbers of elks, deer, foxes, ermine, and ſquirrels. Between the Irtis and Oby are ſome rich copper-mines; particularly on a mountain called *Pictowa*, from the *picta* or white firs that grow upon it. Every hundred weight of the ore found here yields 12 pounds of pure copper; and there is no occaſion for digging deep in order to come at it. Moſt of theſe ores, beſides being very rich in copper, yield a great deal of ſilver, which affords ſo much gold as makes rich returns for the trouble and expence of extracting it.

Barracan || Barray.

BARRACAN, in *Commerce*, a ſort of ſtuff, not diapered, ſomething like camblet, but of a coarſer grain. It is uſed to make cloaks, ſurtouts, and ſuch other garments, to keep off the rain.—The cities where the moſt barracans are made in France are Valenciennes, Liſle, Abbeville, Amiens, and Roan. Thoſe of Valenciennes are the moſt valued: they are all of wool, both the warp and the woof.

BARRACIDA, a ſpecies of pike. See ESOX, ICHTHYOLOGY *Index*.

BARRACKS, or BARACKS, places for ſoldiers to lodge in, eſpecially in garriſons.—Barracks, when damp, are greatly prejudicial to the health of the ſoldiers lodged in them; occaſioning dyſenteries, intermitting fevers, coughs, rheumatic pains, &c. For which reaſon, quarter-maſters ought to be careful in examining every barrack offered by the magiſtrates of a place; rejecting all ground-floors in houſes that have either been uninhabited, or have any ſigns of moiſture.

BARRATOR, or BARRETOR, in *Law*, a perſon guilty of barretry. See BARRETRY.

Lambert derives the word *barretor* from the Latin *balatro*, "a vile knave;" but the proper derivation is from the French *barrateur*, i. e. "a deceiver;" and this agrees with the deſcription of a common barretor in my Lord Coke's report, viz. that he is a common mover and maintainer of ſuits in diſturbance of the peace, and in taking and detaining the poſſeſſion of houſes and lands or goods by falſe inventions, &c. And therefore it was adjudged that the indictment againſt him ought to be in theſe words, viz. That he is *communis malefactor, calumniator, et ſeminator litium et diſcordiarum inter vicinos ſuos, et pacis regis perturbator*, &c. And there it is ſaid that a common barretor is the moſt dangerous oppreſſor in the law, for he oppreſſeth the innocent by colour of law, which was made to protect them from oppreſſion.

BARRATRY, in *Law*. See BARRETRY.

BARRATRY, in a ſhipmaſter, is his cheating the owners. If goods delivered on ſhip-board are embezzled, all the mariners ought to contribute to the ſatisfaction of the party that loſt his goods, by the maritime law; and the cauſe is to be tried in the admiralty. In a caſe where a ſhip was inſured againſt the barratry of the maſter, &c. and the jury found that the ſhip was loſt by the fraud and negligence of the maſter, the court agreed, that the fraud was barratry, though not named in the covenant; but that negligence was not.

BARRAUX, a fortreſs of Dauphiny, belonging to France. It ſtands in the valley of Greſivaudan, and was built by a duke of Savoy in 1597. The French took it in 1598, and have kept it ever ſince. It is ſeated on the river Iſer, in E. Long. 4. 35. N. Lat. 45. 0.

BARRAY, or BARRA, one of the Weſtern iſles, in the county of Inverneſs, Scotland; is eight miles in length, and four in breadth. The ſoil in general is thin and fit only for paſture, but in ſome places it produces corn and potatoes. The population amounts to 1604. The inhabitants are chiefly employed in the cod and ling fiſhery, which is here very ſucceſsful. In the

Barre || Barretry.

the year 1787 they carried 30,000 ling to the Glaſgow market. The fiſh is carried to market in the ſame boat in which it is taken, either by going round the mull of Cantire, or drawing the boat by horſes acroſs the iſthmus of Tarbet. There is a good harbour in the north-eaſt ſide. Some cattle are reared in the iſland, and a little kelp is burned on the ſhore.

BARRE, Louis Francois Joseph de la, of Tournay, author of ſeveral works printed at Paris. Amongſt others, *Imper. Orientale*, *Recueil des Medailles des Empereurs*, "Memoirs for the hiſtory of France," &c. He died in 1738.

BARREL, in *Commerce*, a round veſſel, extending more in length than in breadth, made of wood, in form of a little tun. It ſerves for holding ſeveral ſorts of merchandiſe.

Barrel is alſo a meaſure of liquids. The Engliſh barrel, wine meaſure, contains the eighth part of a tun, the fourth part of a pipe, and one half of a hogſhead; that is to ſay, it contains 31½ gallons: a barrel, beer-meaſure, contains 36 gallons; and ale-meaſure 32 gallons. The barrel of beer, vinegar, or liquor preparing for vinegar, ought to contain 34 gallons, according to the ſtandard of the ale-quart.

Barrel alſo denotes a certain weight of ſeveral merchandiſes, which differs according to the ſeveral commodities. A barrel of Eſſex butter weighs 106 pounds; and of Suffolk butter, 256 pounds. The barrel of herrings ought to contain 32 gallons wine meaſure, which amount to about 28 gallons old ſtandard, containing about 1000 herrings. The barrel of ſalmon muſt contain 42 gallons; the barrel of eels the ſame. The barrel of ſoap muſt weigh 256lb.

Barrel, in *Mechanics*, a term given by watch-makers to the cylinder about which the ſpring is wrapped; and by gunſmiths to the cylindrical tube of a gun, piſtol, &c. through which the ball is diſcharged.

Barrel, in *Anatomy*, a pretty large cavity behind the tympanum of the ear, about four or five lines deep, and five or ſix wide.

Fire Barrels. See *Fire-Ship*.

Thundering Barrels, in the military art, are filled with bombs, grenades, and other fire-works to be rolled down a breach.

BARRENNESS, the ſame with ſterility. See Sterility.

BARRETRY, in *Law*, is the offence of frequently exciting and ſtirring up ſuits and quarrels between his Majeſty's ſubjects, either at law or otherwiſe. The puniſhment for this offence, in a common perſon, is by fine and impriſonment: but if the offender (as is too frequently the caſe) belongs to the profeſſion of the law, a barretor who is thus able as well as willing to do miſchief ought alſo to be diſabled from practiſing for the future. And indeed it is enacted by ſtatute 12 Geo. I. c. 29. that if any one, who hath been convicted of forgery, perjury, ſubornation of perjury, or common barretry, ſhall practiſe as an attorney, ſolicitor, or agent, in any ſuit; the court, upon complaint, ſhall examine it in a ſummary way; and, if proved, ſhall direct the offender to be tranſported for ſeven years. Hereunto alſo may be referred another offence, of equal malignity and audaciouſneſs; that of ſuing another in the name of a fictitious plaintiff, either one not in being at all, or one who is ignorant of the ſuit. This offence, if committed in any of the king's ſuperior courts, is left, as a high contempt, to be puniſhed at their diſcretion: but in courts of a lower degree, where the crime is equally pernicious, but the authority of the judges not equally extenſive, it is directed by ſtatute 8 Eliz. c. 2. to be puniſhed by ſix months impriſonment, and treble damages to the party injured.

Barricade || Barrington.

BARRICADE, or Barricado, a military term for a fence formed in haſte with veſſels, baſkets of earth, trees, palliſades, or the like, to preſerve an army from the ſhot or aſſault of the enemy.—The moſt uſual materials for barricades conſiſt of pales or ſtakes, croſſed with batoons, and ſhod with iron at the feet, uſually ſet up in paſſages or breaches.

Barricade, in *Naval Architecture*, a ſtrong wooden rail, ſupported by ſtanchions, extending acroſs the foremoſt part of the quarter-deck. In a veſſel of war, the vacant ſpaces between the ſtanchions are commonly filled with rope-matts, cork, or pieces of old cable; and the upper part, which contains a double rope-netting above the rail, is ſtuffed with full hammocks to intercept the motion, and prevent the execution of ſmall-ſhot in the time of battle.

BARRIER, in *Fortification*, a kind of fence made at a paſſage, retrenchment, &c. to ſtop up the entry thereof. It is compoſed of great ſtakes, about four or five feet high, placed at the diſtance of eight or ten feet from one another, with tranſums, or overthwart rafters, to ſtop either horſe or foot, that would enter or ruſh in with violence: in the middle is a moveable bar of wood, that opens or ſhuts at pleaſure. A barrier is commonly ſet up in a void ſpace, between the citadel and the town, in half moons, &c.

Barriers, ſignifies that which the French call *jeux de barres*, i. e. *palæſtra*; a martial exerciſe of men armed and fighting together with ſhort ſwords, within certain bars or rails which ſeparated them from the ſpectators: it is now diſuſed in this country.

BARRING a vein, in *Farriery*, an operation performed upon the veins of a horſe's legs, and other parts of his body, with intent to ſtop the courſe, and leſſen the quantity, of the malignant humours that prevail there.

BARRINGTON, John Shute, Lord Viſcount Barrington, a nobleman diſtinguiſhed for theological learning, was the youngeſt ſon of Benjamin Shute, merchant, and was born in 1678. He received part of his education at the univerſity of Utrecht; and, after returning to England, ſtudied law in the Inner Temple. In 1701 he commenced writer in favour of the civil rights of Proteſtant diſſenters, to which body he belonged. At the recommendation of Lord Somers he was employed to engage the Preſbyterians in Scotland to favour the union of the two kingdoms; and in 1708, for this ſervice, was appointed to the place of commiſſioner of the cuſtoms. From this he was removed by the Tory miniſtry of Queen Anne; but his fortune was, in the mean time, improved by the bequeſt of two conſiderable eſtates; one of them left him by Francis Barrington of Tofts, Eſq. whoſe name he aſſumed by act of parliament. Mr Barrington now ſtood at the head of the Diſſenters. On the acceſſion of George I. he was returned member of

parliament

Barrington. parliament for Berwick-upon-Tweed; and in 1720 the king raiſed him to the Iriſh peerage, by the ſtyle of Viſcount Barrrington of Ardglaſs. He was unfortunately engaged as ſub-governor in one of the bubbles of the time, the Harburgh lottery, and underwent the diſgrace of expulſion from the houſe of commons, in 1723; a cenſure which was thought greatly too ſevere, and altogether unmerited on his part. In 1725 he publiſhed his principal work, entitled *Miſcellanea Sacra*, or a new Method of conſidering ſo much of the Hiſtory of the Apoſtles as is contained in Scripture, in an abſtract of their hiſtory, an abſtract of that abſtract, and four critical eſſays; 2 vols. 8vo. This work traces the methods taken by the firſt preachers of the goſpel for propagating Chriſtianity, and explains the ſeveral gifts of the Spirit, by which they were enabled to diſcharge their office. It has always been reckoned a valuable and judicious defence of the Chriſtian cauſe; and was reprinted with additions and corrections, in 3 vols. 8vo, 1770, by his ſon, afterwards biſhop of Durham. In the ſame year he publiſhed "An Eſſay on the ſeveral Diſpenſations of God to Mankind, in the Order in which they lie in the Bible, &c." 8vo, 1725. He wrote various other tracts, chiefly on ſubjects relative to toleration in matters of religion. He died in 1734, in his 56th year, leaving ſeveral children, of whom five ſons had the uncommon fortune of riſing to high ſtations in the church, the law, the army, and the navy. Lord Barrington was a friend and diſciple of Locke, and adopted his ſentiments as to the right and advantage of free enquiry, and the value of civil and religious liberty. He contributed greatly to the riſing ſpirit of liberal ſcriptural criticiſm among thoſe who wiſhed to render religion rational. He was a man of great moderation, and, though chiefly connected with the Diſſenters, he occaſionally frequented and communicated with the eſtabliſhed church. *Gen. Biog.*

BARRINGTON, *Daines*, fourth ſon of Lord Viſcount Barrington, diſtinguiſhed as an antiquarian and naturaliſt, was educated for the profeſſion of the law; and, after poſſeſſing various poſts, was appointed a Welſh judge in 1757, and afterwards ſecond juſtice of Cheſter. He never roſe to much eminence at the bar, but he ſhowed his knowledge of the law as an object of liberal ſtudy, by a valuable publication entitled "Obſervations on the Statutes, chiefly the more ancient, from Magna Charta to 21 James I. c. 27; with an Appendix, being a Propoſal for new-modelling the Statutes," 4to, 1766. This work has been quoted with great reſpect by many of our hiſtorians and conſtitutional antiquaries. In 1773 he publiſhed an edition of *Oroſius*, with Alfred's Saxon verſion, and an Engliſh tranſlation and notes of his own, which met with ſome ſevere animadverſion from the critics. His "Tracts on the Probability of reaching the North Pole," 1775, 4to, were written in conſequence of the northern voyage of diſcovery undertaken by Captain Phipps (now Lord Mulgrave). He accumulates in them a variety of evidence favourable to his own opinion of the practicability of attaining the object in which that voyage failed; but there is little probability that the attempt will be renewed. Mr Barrington's other writings, which are numerous, are chiefly to be found in the publications of the Royal and Antiquarian Societies, of both of which he was long an aſſiduous member, and of the latter, vice preſident. They relate to a variety of topics in natural hiſtory and antiquities, and ſhow great induſtry and extent of reſearch, though with an occaſional leaning to ſingularity and paradox. Many of his tracts were collected by him in a 4to volume entitled "Miſcellanies on various Subjects," 1781. His "Experiments and Obſervations on the Singing of Birds," and his "Eſſay on the Language of Birds, are among the moſt curious and ingenious of his papers. Theſe, and many others, prove that he was not only deeply converſant in books, but was a very attentive and ſagacious obſerver of nature. In private life he was a man of worth and integrity, unambitious, and devoted to ſtudy and literary converſation. He reſigned his office of juſtice of Cheſter in 1785, and afterwards lived in retirement in his chambers in King's-bench-walks, Inner-temple, aſſociating chiefly with his brother benchers, and amuſing himſelf with ſuperintending the improvements of the gardens. He died March 14. 1800, and was buried in the Temple church. Barringtonia || Barros.

BARRINGTONIA. See BOTANY *Index*.

BARRISTER, is a counſellor learned in the law, admitted to plead at the bar, and there to take upon him the protection and defence of clients. They are termed *juriſconſulti*; and in other countries called *licentiati in jure*: and anciently barriſters at law were called *apprentices* of the law, in Latin *apprenticii juris nobiliores*. The time before they ought to be called to the bar, by the ancient orders, was eight years, now reduced to five; and the exerciſes done by them (if they were not called *ex gratia*) were twelve grand moots performed in the inns of Chancery in the time of the grand readings, and 24 petty moots in the term times, before the readers of the reſpective inns: and a barriſter newly called is to attend the ſix (or four) next long vacations the exerciſe of the houſe, viz. in Lent and Summer, and is thereupon for thoſe three (or two) years ſtyled a *vacation barriſter*. Alſo they are called *utter barriſters*, i. e. pleaders *ouſter* the bar, to diſtinguiſh them from benchers, or thoſe that have been readers, who are ſometimes admitted to plead within the bar, as the king, queen, or prince's counſel are.

BARRITUS is a word of German original, adopted by the Romans to ſignify the general ſhout uſually given by the ſoldiers of their armies on their firſt encounter after the *claſſicum* or alarm. This cuſtom, however, of ſetting up a general ſhout was not peculiar to the Romans, but prevailed amongſt the Trojans according to Homer, amongſt the Germans, the Gauls, Macedonians, and Perſians. See CLASSICUM.

BARROS, JOHN, a celebrated Portugueſe hiſtorian, born at Viſco in 1496. He was educated at the court of King Emanuel, among the princes of the blood, and made a great progreſs in Greek and Latin. The Infant John, to whom he attached himſelf, and became preceptor, having ſucceeded the king his father in 1521, Barros obtained a place in this prince's houſehold; and in 1522, was made governor of St George del Mina, on the coaſt of Guinea. Three years after, the king having recalled him to court, made him treaſurer of the Indies, and this poſt inſpired him with the thought of writing this hiſtory, for which purpoſe

Barrow. purpoſe he retired to Pompas, where he died in 1570. His hiſtory of Aſia and the Indies is divided into decades; the firſt of which he publiſhed in 1552, the ſecond in 1553, and the third in 1563; but the fourth decade was not publiſhed till the year 1615, when it appeared by order of King Philip III. who had the manuſcript purchaſed of the heirs of John Barros. Several authors have continued it, ſo that we have at preſent 12 decades. He left many other works; ſome of which have been printed, and others remain in manuſcript.

BARROW, Isaac, an eminent mathematician and divine of the laſt century, was the ſon of Mr Thomas Barrow a linen draper in London, where he was born in 1630. He was at firſt placed at the charter-houſe ſchool for two or three years; where his behaviour afforded but little hopes of ſucceſs in the profeſſion of a ſcholar, he being fond of fighting, and promoting it among his ſchoolfellows: but being removed from thence, his diſpoſition took a happier turn; and having ſoon made a great progreſs in learning, he was admitted a penſioner of Peter-houſe in Cambridge. He now applied himſelf with great diligence to the ſtudy of all parts of literature, eſpecially to that of natural philoſophy. He afterwards turned his thoughts to the profeſſion of phyſic, and made a conſiderable progreſs in anatomy, botany, and chemiſtry; after this he ſtudied chronology, aſtronomy, and geometry. He then travelled into France and Italy, and in a voyage from Leghorn to Smyrna gave a proof of his bravery; for the ſhip being attacked by an Algerine pirate, he ſtaid upon deck, and with the greateſt intrepidity fought, till the pirate, perceiving the ſtout reſiſtance the ſhip made, ſheered off and left her (A).

At Smyrna he met with a moſt kind reception from Mr Bretton the Engliſh conſul, upon whoſe death he afterwards wrote a Latin elegy. From thence he proceeded to Conſtantinople, where he received the like civilities from Sir Thomas Bendiſh the Engliſh ambaſſador, and Sir Thomas Dawes, with whom he afterwards preſerved an intimate friendſhip. At Conſtantinople he read over the works of St Chryſoſtom, once biſhop of that ſee, whom he preferred to all the other fathers. When he had been in Turkey ſomewhat more than a year, he returned to Venice. From thence he came home in 1659, through Germany and Holland; and was epiſcopally ordained by Biſhop Brownrig. In 1660, he was choſen to the Greek profeſſorſhip at Cambridge. When he entered upon this province, he intended to have read upon the tragedies of Sophocles; but he altered his intention, and made choice of Ariſtotle's rhetoric. Theſe lectures having been lent to a friend who never returned them, are irrecoverably loſt. July the 16th 1662, he was elected profeſſor of geometry in Greſham-college, by the recommendation of Dr Wilkins, maſter of Trinity-college, and afterwards biſhop of Cheſter. Upon the 20th of May 1663 he was elected a fellow of the Royal Society, in the firſt choice made by the council after their charter. The ſame year the executors of Mr Lucas having, according to his appointment, founded a mathematical lecture at Cambridge, they fixed upon Mr Barrow for the firſt profeſſor; and though his two profeſſorſhips were not inconſiſtent with each other, he choſe to reſign that of Greſham-college, which he did May the 20th 1664. In 1669 he reſigned his mathematical chair to his learned friend Mr Iſaac Newton, being now determined to give up the ſtudy of mathematics for that of divinity. Upon quitting his profeſſorſhip, he was only a fellow of Trinity-college, till his uncle gave him a ſmall ſinecure in Wales, and Dr Seth Ward biſhop of Saliſbury conferred upon him a prebend in his church. In the year 1670 he was created doctor in divinity by mandate; and, upon the promotion of Dr Pearſon maſter of Trinity-college to the ſee of Cheſter, he was appointed to ſucceed him by the king's patent, bearing date the 13th of February 1672. When the king advanced him to this dignity, he was pleaſed to ſay, "he had given it to the beſt ſcholar in England." His majeſty did not ſpeak from report, but from his own knowledge: the doctor being then his chaplain, he uſed often to converſe with him, and in his humourous way, to call him an "unfair preacher," becauſe he exhauſted every ſubject, and left no room for others to come after him. In 1675 he was choſen vice-chancellor of the univerſity. The doctor's works are very numerous, and ſuch as do honour to the Engliſh nation. They are, 1. Euclid's Elements. 2. Euclid's Data. 3. Optical Lectures, read in the public ſchool of Cambridge. 4. Thirteen Geometrical Lectures. 5. The Works of Archimedes, the four Books of Apollonius's Conic Sections, and Theodoſius's Spherics explained in a new Method. 6. A Lecture, in which Archimedes's Theorems of the Sphere and Cylinder are inveſtigated and briefly demonſtrated. 7. Mathematical Lectures, read in the public ſchools of the univerſity of Cambridge: the above were all printed in Latin; and as to his Engliſh works, they are printed together in four volumes folio.—"The name of Dr Barrow (ſays the reverend and learned Mr Granger) will ever be il- Barrow.

(A) There is another anecdote told of him, which not only ſhowed his intrepidity, but an uncommon goodneſs of diſpoſition, in circumſtances where an ordinary ſhare of it would have been probably extinguiſhed. He was once in a gentleman's houſe in the country, where the neceſſary was at the end of a long garden, and conſequently at a great diſtance from the room where he lodged: as he was going to it before day, for he was a very early riſer, a fierce maſtiff, who uſed to be chained up all day, and let looſe at night for the ſecurity of the houſe, perceiving a ſtrange perſon in the garden at that unſeaſonable time, ſet upon him with great fury. The doctor catched him by the throat, threw him, and lay upon him; and whilſt he kept him down, conſidered what he ſhould do in that exigence: once he had a mind to kill him; but he altered this reſolution, upon recollecting that it would be unjuſt, ſince the dog did only his duty, and he himſelf was in fault for rambling out of his room before it was light. At length he called out ſo loud, that he was heard by ſome of the houſe, who came preſently out, and freed the doctor and the dog from the danger they were both in.

Barrows. luſtrious for a ſtrength of mind and a compaſs of knowledge that did honour to his country. He was unrivalled in mathematical learning, and eſpecially in the ſublime geometry; in which he has been excelled only by one man, and that man was his pupil, the great Sir Iſaac Newton. The ſame genius that ſeemed to be born only to bring hidden truths to light, to riſe to the heights or deſcend to the depths of ſcience, would ſometimes amuſe itſelf in the flowery paths of poetry, and he compoſed verſes both in Greek and Latin. He at length gave himſelf up entirely to divinity; and particularly to the moſt uſeful part of it, that which has a tendency to make men wiſer and better. He has, in his excellent ſermons on the Creed, ſolved every difficulty and removed every obſtacle that oppoſed itſelf to our faith, and made divine revelation as clear as the demonſtrations in his own Euclid. In his ſermons he knew not how to leave off writing till he had exhauſted his ſubject; and his admirable diſcourſe on the Duty and Reward of Bounty to the Poor, took him up three hours and a half in preaching. This excellent perſon, who was a bright example of Chriſtian virtue, as well as a prodigy of learning, died on the 4th of May 1677, in the 47th year of his age;" and was interred in Weſtminſter abbey, where a monument, adorned with his buſt, was ſoon after erected, by the contribution of his friends.

BARROWS, in *Ancient Topography*, artificial hillocks or mounts, met with in many parts of the world, intended as repoſitories for the dead, and formed either of ſtones heaped up, or of earth. For the former, more generally known by the name of *cairns*, ſee CAIRNS.—Of the latter Dr Plott takes notice of two ſorts in Oxfordſhire: one placed on the military ways; the other in the fields, meadows, or woods; the firſt ſort doubtleſs of Roman erection, the other more probably erected by the Britons or Danes. We have an examination of the barrows in Cornwall by Dr Williams, in the Phil. Tranſ. N° 458. from whoſe obſervations we find that they are compoſed of foreign or adventitious earth; that is, ſuch as does not riſe on the place, but is fetched from ſome diſtance.—Monuments of this kind are alſo very frequent in Scotland. On digging into the barrows, urns have been found in ſome of them, made of calcined earth, and containing burnt bones and aſhes; in others, ſtone cheſts containing bones entire; in others, bones neither lodged in cheſts nor depoſited in urns. Theſe tumuli are round, not greatly elevated, and generally at their baſes ſurrounded with a foſs. They are of different ſizes; in proportion, it is ſuppoſed, to the greatneſs, rank, and power, of the deceaſed perſon. The links or ſands of Skail, in Sandwich, one of the Orkneys, abound in round barrows. Some are formed of earth alone, others of ſtone covered with earth. In the former was found a coffin, made of ſix flat ſtones. They are too ſhort to receive a body at full length: the ſkeletons found in them lie with the knees preſſed to the breaſt, and the legs doubled along the thighs. A bag, made of ruſhes, has been found at the feet of ſome of theſe ſkeletons, containing the bones, moſt probably, of another of the family. In one were to be ſeen multitudes of ſmall beetles; and as ſimilar inſects have been diſcovered in the bag which encloſed the ſacred *Ibis*, we may ſuppoſe that the Egyptians, and the nation to whom theſe tumuli did belong, might have had the ſame ſuperſtition reſpecting them. On ſome of the corpſes interred in this iſland, the mode of burning was obſerved. The aſhes, depoſited in an urn which was covered on the top with a flat ſtone, have been found in the cell of one of the barrows. This coffin or cell was placed on the ground, then covered with a heap of ſtones, and that again caſed with earth and ſods. Both barrow and contents evince them to be of a different age from the former. Theſe tumuli were in the nature of family vaults: in them have been found two tiers of coffins. It is probable, that on the death of any one of the family, the tumulus was opened, and the body interred near its kindred bones. Barrows.

Ancient Greece and Latium concurred in the ſame practice with the natives of this iſland. Patroclus among the Greeks, and Hector among the Trojans, received but the ſame funeral honours with our Caledonian heroes; and the aſhes of Dercennus the Laurentine monarch had the ſame ſimple protection. The urn and pall of the Trojan warrior might perhaps be more ſuperb than thoſe of a Britiſh leader: the riſing monument of each had the common materials from our mother earth.

> The ſnowy bones his friends and brothers place,
> With tears collected, in a golden vaſe.
> The golden vaſe in purple palls they roll'd
> Of ſofteſt texture and inwrought with gold.
> Laſt o'er the urn the ſacred earth they ſpread,
> And rais'd a tomb, memorial of the dead.
>
> *Pope's Homer's Iliad*, xxiv. 1003.

Or, as it is more ſtrongly expreſſed by the ſame elegant tranſlator, in the account of the funeral of Patroclus;

> High in the midſt they heap the ſwelling bed
> Of riſing earth, memorial of the dead.
>
> *Ib.* xxiii. 319.

The Grecian barrows, however, do not ſeem to have been all equally ſimple. The barrow of Alyattes, father of Crœſus king of Lydia, is deſcribed by Herodotus as a moſt ſuperb monument, inferior only to the works of the Egyptians and Babylonians. It was a vaſt mound of earth heaped on a baſement of large ſtones by three claſſes of the people; one of which was compoſed of girls who were proſtitutes. Alyattes died, after a long reign, in the year 562 before the Chriſtian era. Above a century intervened, but the hiſtorian relates, that to his time five ſtones (ὅροι, *termini* or *ſtelæ*) on which letters were engraved, had remained on the top, recording what each claſs had performed; and from the meaſurement it had appeared, that the greater portion was done by the girls. Strabo likewiſe has mentioned it as a huge mound raiſed on a lofty baſement by the multitude of the city. The circumference was ſix ſtadia or three quarters of a mile; the height two plethra or two hundred feet; and the width thirteen plethra. It was cuſtomary among the Greeks to place on barrows either the image of ſome animal, or *ſtelæ*, commonly round pillars with inſcriptions. The famous barrow of the Athenians in the plain of Marathon, deſcribed by Pauſanias, is an inſtance of the latter uſage. An ancient monument in Italy by the Appian-way, called without

reaſon

Barrows. reaſon the ſepulchre of the Curiatii, has the ſame number of *termini* as remained on the barrow of Alyattes; the baſement, which is ſquare, ſupporting five round pyramids.—Of the barrow of Alyattes the apparent magnitude is deſcribed by travellers as now much diminiſhed, and the bottom rendered wider and leſs diſtinct than before, by the gradual increaſe of the ſoil below. It ſtands in the midſt of others by the lake Gygæus; where the burying-place of the Lydian princes was ſituated. The barrows are of various ſizes, the ſmaller made perhaps for children of the younger branches of the royal family. Four or five are diſtinguiſhed by their ſuperior magnitude, and are viſible as hills at a great diſtance. That of Alyattes is greatly ſupereminent. The lake it is likely furniſhed the ſoil. All of them are covered with green turf; and all retain their conical form without any ſinking in of the top.

Barrows, or ſimilar tumuli, are alſo found in great numbers in America. Theſe are of different ſizes, according to Mr Jefferſon's * account; ſome of them conſtructed of earth, and ſome of looſe ſtones. That they were repoſitories of the dead has been obvious to all; but on what particular occaſion conſtructed, was matter of doubt. Some have thought they covered the bones of thoſe who have fallen in battles fought on the ſpot of interment. Some aſcribed them to the cuſtom ſaid to prevail among the Indians, of collecting at certain periods the bones of all their dead, whereſoever depoſited at the time of death. Others again ſuppoſed them the general ſepulchres for towns, conjectured to have been on or near theſe grounds; and this opinion was ſupported by the quality of the lands in which they are found (thoſe conſtructed of earth being generally in the ſofteſt and moſt fertile meadow grounds on river ſides), and by a tradition ſaid to be handed down from the aboriginal Indians, that when they ſettled in a town, the firſt perſon who died was placed erect, and earth put about him, ſo as to cover and ſupport him; that when another died, a narrow paſſage was dug to the firſt, the ſecond reclined againſt him, and the cover of earth replaced, and ſo on. "There being one of theſe barrows in my neighbourhood (ſays Mr Jefferſon), I wiſhed to ſatisfy myſelf whether any, and which of theſe opinions were juſt. For this purpoſe I determined to open and examine it thoroughly. It was ſituated on the low grounds of the Rivanna, about two miles above its principal fork, and oppoſite to ſome hills, on which had been an Indian town. It was of a ſpheroidical form, of about 40 feet diameter at the baſe, and had been of about 12 feet altitude, though now reduced by the plough to ſeven and a half, having been under cultivation about a dozen years. Before this it was covered with trees of 12 inches diameter, and round the baſe was an excavation of five feet depth and width, from whence the earth had been taken of which the hillock was formed. I firſt dug ſuperficially in ſeveral parts of it, and came to collections of human bones, at different depths, from ſix inches to three feet below the ſurface. Theſe were lying in the utmoſt confuſion, ſome vertical, ſome oblique, ſome horizontal, and directed to every point of the compaſs, entangled, and held together in cluſters by the earth. Bones of the moſt diſtant parts were found together; as, for inſtance, the ſmall bones of the foot in the hollow of a ſkull, many ſkulls would ſometimes be in contact, lying on the face, on the ſide, on the back, top or bottom, ſo as on the whole to give the idea of bones emptied promiſcuouſly from a bag or baſket, and covered over with earth, without any attention to their order. The bones of which the greateſt numbers remained, were ſkulls, jaw-bones, teeth, the bones of the arms, the thighs, legs, feet, and hands. A few ribs remained, ſome vertebræ of the neck and ſpine, without their proceſſes, and one inſtance only of the bone which ſerves as a baſe to the vertebral column. The ſkulls were ſo tender, that they generally fell to pieces on being touched. The other bones were ſtronger. There were ſome teeth which were judged to be ſmaller than thoſe of an adult; a ſkull which, on a ſlight view, appeared to be that of an infant, but it fell to pieces on being taken out, ſo as to prevent ſatisfactory examination; a rib, and a fragment of the under-jaw of a perſon about half-grown; another rib of an infant; and part of the jaw of a child, which had not yet cut its teeth. This laſt furniſhing the moſt deciſive proof of the burial of children here, I was particular in my attention to it. It was part of the right half of the under jaw. The proceſſes by which it was articulated to the temporal bones were entire; and the bone itſelf firm to where it had been broken off, which, as nearly as I could judge, was about the place of the eye-tooth. Its upper edge, wherein would have been the ſockets of the teeth, was perfectly ſmooth. Meaſuring it with that of an adult, by placing their hinder proceſſes together, its broken end extended to the penultimate grinder of the adult. This bone was white, all the others of a ſand colour. The bones of infants being ſoft, they probably decay ſooner, which might be the cauſe ſo few were found here. I proceeded then to make a perpendicular cut through the body of the barrow, that I might examine its internal ſtructure. This paſſed about three feet from its centre, was opened to the former ſurface of the earth, and was wide enough for a man to walk through and examine its ſides. At the bottom, that is, on the level of the circumjacent plain, I found bones; above theſe a few ſtones, brought from a cliff a quarter of a mile off, and from the river one-eighth of a mile off; then a large interval of earth, then a ſtratum of bones, and ſo on. At one end of the ſection were four ſtrata of bones plainly diſtinguiſhable; at the other, three; the ſtrata in one part not ranging with thoſe in another. The bones neareſt the ſurface were leaſt decayed. No holes were diſcovered in any of them, as if made with bullets, arrows, or other weapons. I conjectured that in this barrow might have been a thouſand ſkeletons. Every one will readily ſeize the circumſtances above related, which militate againſt the opinion that it covered the bones only of perſons fallen in battle; and againſt the tradition alſo which would make it the common ſepulchre of a town, in which the bodies were placed upright, and touching each other. Appearances certainly indicate that it has derived both origin and growth from the accuſtomary collection of bones, and depoſition of them together; that the firſt collection had been depoſited on the common ſurface of the earth, a few ſtones put over it, and then a covering of earth; that the ſecond had been laid on this, had covered more or leſs of it in proportion to

Barrows.

* *Notes on the State of Virginia*, p. 156.

Barrows || Barry.

the number of bones, and was then alſo covered with earth, and ſo on. The following are the particular circumſtances which give it this aſpect. 1. The number of bones. 2. Their confuſed poſition. 3. Their being in different ſtrata. 4. The ſtrata in one part having no correſpondence with thoſe in another. 5. The different ſtates of decay in theſe ſtrata, which ſeem to indicate a difference in the time of inhumation. 6. The exiſtence of infant bones among them. But on whatever occaſion they may have been made, they are of conſiderable notoriety among the Indians: for a party paſſing, about thirty years ago, through the part of the country where this barrow is, went through the woods directly to it, without any inſtructions or enquiry; and having ſtaid about it ſome time, with expreſſions which were conſtrued to be thoſe of ſorrow, they returned to the high road, which they had left about half a dozen miles to pay this viſit, and purſued their journey. There is another barrow, much reſembling this in the low grounds of the ſouth branch of Shenandoah, where it is croſſed by the road leading from the Rock-fiſh gap to Staunton. Both of theſe have, within theſe dozen years, been cleared of their trees and put under cultivation, are much reduced in their height, and ſpread in width, by the plough, and will probably diſappear in time. There is another on a hill in the Blue ridge of mountains, a few miles north of Wood's gap, which is made up of ſmall ſtones thrown together. This has been opened and found to contain human bones as the others do. There are alſo many others in other parts of the country."

BARROW, in the ſalt-works, are wicker caſes, almoſt in the ſhape of a ſugar-loaf, wherein the ſalt is put to drain.

BARRULET, in *Heraldry*, the fourth part of the bar, or the one half of the cloſſet; an uſual bearing in coat-armour.

BARRULY, in *Heraldry*, is when the field is divided bar-ways, that is, acroſs from ſide to ſide, into ſeveral parts.

BARRY, GIRALD, commonly called *Giraldus Cambrenſis*, i. e. *Girald of Wales*, an hiſtorian and eccleſiaſtic in the reigns of Henry II. and Richard I. was born at the caſtle of Mainarper, near Pembroke, A.D. 1146. By his mother he was deſcended from the princes of South Wales; and his father, William Barry, was one of the chief men of that principality. Being a younger brother, and intended for the church, he was ſent to St David's and educated in the family of his uncle, who was biſhop of that ſee. He acknowledges, in his hiſtory of his own life and actions, that in his early youth he was too playful; but being ſeverely reproached for it by his preceptors, he became a very hard ſtudent, and greatly excelled all his ſchool-fellows in learning. When he was about 20 years of age, he was ſent A. D. 1166, for his further improvement, to the univerſity of Paris; where he continued for three years, and became, according to his own account, a moſt excellent rhetorician; which rendered him very famous. On his return into Britain, he entered into holy orders, and obtained ſeveral benefices both in England and Wales. Obſerving, with much concern, that his countrymen, the Welch, were very backward in paying the tithes of wool and cheeſe, which he was afraid would involve them in eternal damnation, he applied to Richard archbiſhop of Canterbury, and was appointed his legate in Wales for rectifying that diſorder, and for other purpoſes. He executed this commiſſion with great ſpirit; excommunicating all, without diſtinction, who refuſed to ſave their ſouls by ſurrendering the tithes of their cheeſe and wool. Not ſatisfied with enriching, he alſo attempted to reform, the clergy; and dilated the archdeacon of Brecon to the archbiſhop, for the unpardonable crime of matrimony; and the poor old man, refuſing to put away his wife, was deprived of his archdeaconry; which was beſtowed upon our zealous legate. In diſcharging the duties of this new office, he acted with great vigour, which involved him in many quarrels; but, if we may believe himſelf, he was always in the right, and always victorious. His uncle, the biſhop of St David's, dying A. D. 1176, he was elected his ſucceſſor by the chapter: but this election having been made without the permiſſion, and contrary to the inclination of Henry II. our author prudently declined to inſiſt upon it, and went again to Paris to proſecute his ſtudies, particularly in the civil and canon law, and theology. He ſpeaks with great raptures of the prodigious fame he acquired by his eloquent declamations in the ſchools, and of the crowded audiences who attended them, who were at a loſs to know whether the ſweetneſs of his voice, the beauty of his language, or the irreſiſtible force of his arguments, were moſt to be admired. Having ſpent about four years at Paris, he returned to St David's; where he found every thing in confuſion; and the biſhop being expelled by the people, he was appointed adminiſtrator by the archbiſhop of Canterbury, and governed the dioceſe in that capacity to A. D. 1184, when the biſhop was reſtored. About the ſame time he was called to court by Henry II. appointed one of his chaplains, and ſent into Ireland A.D. 1185, with Prince John. By this prince he was offered the united biſhoprics of Fernes and Leighlin; but declined them, and employed his time in collecting materials for his Topography of Ireland, and his Hiſtory of the conqueſt of that iſland. Having finiſhed his Topography, which conſiſted of three books, he publiſhed it at Oxford, A. D. 1187, in the following manner, in three days. On the firſt day he read the firſt book to a great concourſe of people, and afterwards entertained all the poor of the town; on the ſecond day he read the ſecond book, and entertained all the doctors and chief ſcholars; and, on the third day, he read the third book, and entertained the young ſcholars, ſoldiers, and burgeſſes. "A moſt glorious ſpectacle! (ſays he) which revived the ancient times of the poets, and of which no example had been ſeen in England." He attended Baldwin archbiſhop of Canterbury, in his progreſs through Wales, A. D. 1186, in preaching a croiſade for the recovery of the Holy Land; in which, he tells us, he was far more ſucceſsful than the primate; and particularly, that the people were prodigiouſly affected with his Latin ſermons, which they did not underſtand, melting into tears, and coming in crowds to take the croſs. Although Henry II. as our author aſſures us, entertained the higheſt opinion of his virtues and abilities; yet he would never advance him to any higher dignity in the church, on account of his relation to the princes and great men of Wales. But on the acceſſion of Richard I. (A. D. 1189), his projects of preferment became

Barry.

Barry || Barſalli.

became better: for he was ſent for by that prince into Wales to preſerve the peace of that country, and was even joined in commiſſion with William Longchamp, biſhop of Ely, as one of the regents of the kingdom. He did not, however, improve this favourable opportunity; refuſing the biſhopric of Bangor in A. D. 1190, and that of Landaff the year after, having fixed his heart on the ſee of St David's, the biſhop of which was very old and infirm. In A. D. 1192, the ſtate of public affairs, and the courſe of intereſt at court, became ſo unfavourable to our author's views, that he determined to retire. At firſt he reſolved to return to Paris to proſecute his ſtudies; but meeting with ſome difficulties in this, he went to Lincoln, where William de Monte read lectures in theology with great applauſe. Here he ſpent about ſix years in the ſtudy of divinity, and in compoſing ſeveral works. The ſee of St David's, which had long been the great object of his ambition, became vacant, A. D. 1198, and brought him again upon the ſtage. He was unanimouſly elected by the chapter; but met with ſo powerful an adverſary in Hubert archbiſhop of Canterbury (who oppoſed his promotion with great violence), that it involved him in a litigation which laſted five years, coſt him three journeys to Rome, at a great expence, and in which he was at laſt defeated, A. D. 1203. Soon after this he retired from the world, and ſpent the laſt 17 years of his life in a ſtudious privacy, compoſing many books, of which we have a very correct catalogue in the Biographia Britannica. That Girald of Wales was a man of uncommon activity, genius, and learning, is undeniable; but theſe and his other good qualities were much tarniſhed by his inſufferable vanity, which muſt have been very offenſive to his contemporaries, as it is highly diſguſting to his readers.

BARRY, in *Heraldry*, is when an eſcutcheon is divided bar-ways, that is, acroſs from ſide to ſide, into an even number of partitions, conſiſting of two or more tinctures, interchangeably diſpoſed: it is to be expreſſed in the blazon by the word *barry*, and the number of pieces muſt be ſpecified; but if the diviſions be odd, the field muſt be firſt named, and the number of bars expreſſed.

Barry-Bendy is when an eſcutcheon is divided evenly, bar and bend-ways, by lines drawn tranſverſe and diagonal, interchangeably varying the tinctures of which it conſiſts.

Barry-Pily is when a coat is divided by ſeveral lines drawn obliquely from ſide to ſide, where they form acute angles.

BARSA, in *Ancient Geography*, an iſland on the coaſt of France, in the Engliſh channel, (Itinerary): *Baſepool* according to ſome; but according to others, *Bardſey*.

BARSALLI, a kingdom of Africa, bordering on the river Gambia, inhabited by a tribe of negroes called *Jaloffs*. The government of this kingdom is a moſt deſpotic monarchy: all people being obliged to proſtrate themſelves on the earth when any of the royal family makes his appearance. In time of war, every ſoldier has his ſhare of the booty, and the king but a certain proportion, which is moderate, conſidering that if he pleaſed he might keep the whole. The kingdom is divided into a number of provinces, over which governors called *bumeys* are appointed by the king. Theſe bumeys are abſolute within their juriſdictions; but they ſeldom carry their prerogative ſo far as to incur the diſlike of the people, which would quickly prove fatal to them. The Mahometan religion is profeſſed by the king and his court; though little regard is paid to that part of the impoſtor's creed which forbids the uſe of wine; for the king cannot live without brandy, nor is he ever more devout than when he is drunk. When his majeſty is in want of brandy or other neceſſaries, he ſends to beg of the governor of James-fort that he will deſpatch a boat with the merchandiſe he has occaſion for; and to purchaſe this he plunders the neighbouring towns, and ſeizes a certain number of his ſubjects, whom he ſells for ſlaves to the Europeans in exchange for their commodities. This is his method of ſupplying himſelf if he happens to be at peace with his neighbours; for which reaſon the people are never ſo happy as when at war; and hence they purſue war with great vigour, and continue it with obſtinacy.—The general dreſs of the people is a kind of looſe calico ſurplice, that hangs down below the knee; which they ſometimes plait about the waiſt in a very agreeable manner. They wear a great number of gold trinkets in their hair, ears, noſes, and round their necks, arms, and legs; but the women eſpecially are fond of theſe ornaments. The king of Barſalli, whom Moor ſaw in 1732, had a prodigious number of women: but when he went abroad he was ſeldom attended by more than two, who ſeemed to be dreſſed out in the whole finery and jewels of the ſeraglio. He had likewiſe a number of brethren; but it was ſeldom that he deigned to ſpeak to them: if ever he did them that honour, they were forced to treat him with the ſame reſpect as other ſubjects, and fall proſtrate on the earth the moment they came into his preſence, notwithſtanding they were the preſumptive heirs of the crown. It is indeed uſual for the king's children to diſpute the right of ſucceſſion with his brethren, and the longeſt ſword generally carries away the prize.

Barſanti.

BARSANTI, Francisco, an eminent muſical performer and compoſer, was born at Lucca about the year 1690. He ſtudied the civil law in the univerſity of Padua; but, after a ſhort ſtay there, choſe muſic for his profeſſion. Accordingly he put himſelf under the tuition of ſome of the ableſt maſters in Italy; and having attained to a conſiderable degree of proficiency in the ſcience of practical compoſition, took a reſolution to ſettle in England, and came thither with Geminiani, who was alſo a Luccheſe, in the year 1714. He was a good performer on the hautboy, and alſo on the flute; in the former capacity he found employment in the opera band, and in the latter derived conſiderable advantages by teaching. He publiſhed, with a dedication to the earl of Burlington, ſix ſolos for a flute with a thorough-baſs, and afterwards ſix ſolos for a German flute and a baſs. He alſo made into ſonatas, for two violins and a baſs, the firſt ſix ſolos of Geminiani. He continued many years a performer at the opera houſe: at length, reflecting that there was a proſpect of advantage for one of his profeſſion in Scotland, he went thither; and, with greater truth than the ſame is aſſerted of David Rizzio, may be ſaid to have meliorated the muſic of this country, by collecting and making baſſes to a great number of the moſt popular Scots tunes. About the year 1750 Barſanti

Bartas, Bartar.

ſanti returned to England; but, being advanced in years, he was glad to be taken into the opera band as a performer on the tenor violin; and in the ſummer ſeaſon into that of Vauxhall. At this time he publiſhed 12 concertos for violins; and ſhortly after, Sei Antifone, in which he endeavoured to imitate the ſtyle of Paleſtrina, and the old compoſers of motets; but from theſe publications ſo little profit reſulted, that, towards the end of his life, the induſtry and economy of an excellent wife, whom he had married in Scotland, and the ſtudies and labours of a daughter, whom he had qualified for the profeſſion of a ſinger, but who is now an actreſs at Covent-Garden, were his chief ſupport.

BARTAS, William de Salluste du, a French poet, who lived in the 16th century. He was employed by Henry IV. of France, in England, Denmark, and Scotland; and commanded a troop of horſe in Gaſcony, under the marſhal de Martignan. He was a Calviniſt; and died in 1560, aged 46. He wrote a great number of poems; the moſt famous of which are, 1. The Week, or the Creation of the World, in ſeven books. 2. The Poem of Judith; and 3. the battle of Ivry, gained by Henry IV. in 1590. Du Bartas wrote in a bombaſt ſtyle.

BARTAR, or Truck, is the exchanging of one commodity for another. The word comes from the Spaniſh *barator*, to deceive or circumvent in bargaining, perhaps becauſe thoſe who deal this way uſually endeavour to over-reach one another.

To tranſact properly, the price of one of the commodities and an equivalent quantity of the other, muſt be found either by practice or by the rule of three.

Queſt. 1. How many pounds of cotton, at 9d. per lb. muſt be given in bartar for 13 C. 3. Q. 14. lb. of pepper, at 2l. 16s. per C.?

Firſt. Find the price or value of the commodity whoſe quantity is given as follows:

	C.	Q.	lb.	L.	s.
	13	3	14	at 2	16
	26				
2l.	10	8			
16s.	1	8			
2Q.		14			
1Q.		7			
14lb.					
	L. 38	17			

Secondly, Find how much cotton, at 9d. per lb, 38l. 17s. will purchaſe as under:

d.	lb.	L.	s.
If 9	: 1 ::	38	17
		20	
		777	
		12	
	9)9324(		
		C.	Q.
Anſ.	1036 lb. =	9	1

If the above queſtion be wrought decimally, the operation may ſtand as follows:

Barth, Barthelemy.

C.	L.	C.
If 1	: 2.8 ::	13.875
		2.8
		111000
		27750
		lb. C. Q.
.0375)38.8500(		1036=9 1 *Anſ.*
		37.5...
		1350
		1125
		2250
		2250

The value or price of the goods received and delivered in bartar being always equal, it is obvious that the product of the quantities received and delivered, multiplied in their reſpective rates, will be equal.

Hence ariſes a rule which may be uſed with advantage in working ſeveral queſtions; namely, Multiply the given quantity and rate of the one commodity, and the product divided by the rate of the other commodity quotes the quantity ſought; or divided by the quantity quotes the rate.

Queſt. 2. How many yards of linen, at 4s. per yard, ſhould I have in barter for 120 yards of velvet, at 15s. 6d.?

Yds,	Sixp.	Sixp.	Yds.
120 ×	31 = 3720, and	8)3720(	459 *Anſ.*

BARTH, or Bart, *John*, a brave fiſherman of Dunkirk, who roſe to the rank of an admiral; and is celebrated for his ſignal valour and naval exploits, in the annals of France. He died in 1702, aged 51.

BARTHELEMY, John James, a celebrated literary character, born at Caſſis, a little ſea-port on the ſhores of the Mediterranean, January 1716.

At twelve years of age he was ſent to ſchool at Marſeilles. Being admitted into the college of the oratory, he was put under the care of Father Renaud, a perſon of taſte and wit, who ſoon diſcovered ſimilar qualities in his pupil, and became uncommonly attentive to his progreſs. M. de Viſclede, a man of letters, and friend to the former, alſo concurred with him in his endeavours, and young Barthelemy's career ſoon became equally rapid and brilliant.

He had reſolved to dedicate himſelf to the church; but, in order to prepare for this, it became neceſſary to change his place of reſidence, for M. de Belzunce, then biſhop of Marſeilles, being actuated by a narrow jealouſy, refuſed to admit the ſtudents of the oratory to holy orders. Barthelemy, therefore, quitting his old maſters with regret, found himſelf under the neceſſity of ſtudying philoſophy and theology with the Jeſuits.

As he had not at firſt the good fortune to fall into able hands, he determined to follow a private plan of education, independent of the profeſſors. He accordingly applied himſelf to the ancient languages, and was indefatigable in obtaining a knowledge of the Greek, Hebrew, Chaldean, and Syriac. His paſſion for learning had, however, nearly coſt him his life, for he fell dangerouſly ill, and did not recover his ſtrength until he had entered the ſeminary where he received the *tonſure*.

In

Barthelemy. In this retreat he dedicated his leiſure hours to the ſtudy of Arabic. A young Maronite, who had been educated at Rome, afforded him his aſſiſtance, and enabled him not only to read, but even to ſpeak it. On this, his new friend propoſed to him to render all the ſervices in his power to the Maronites, Armenians, and other catholic Arabians, who were but ſlightly acquainted with the language of the country in which they reſided; in other words, he wiſhed that he would announce the word of God to them in their native tongue, and accordingly preſented him with ſome Arabic ſermons, compoſed by a Jeſuit who belonged to the *propaganda*.

Barthelemy got one or two of them by heart, and pronounced them in a ſpacious hall belonging to the ſeminary, to the entire ſatisfaction of his oriental auditors.

His reputation now roſe high, and he began to be conſidered as a youth of uncommon promiſe, when a trifling incident occurred which tended not a little to increaſe it. Ten or twelve of the principal merchants of Marſeilles one day introduced a perſon to him who had implored their charity on the exchange, obſerving that he was by birth a Jew, and had been raiſed, on account of his great learning, to the dignity of a rabbin; but having perceived, in conſequence of his ſtudies, that the Chriſtian was the true religion, he had become a convert. He at the ſame time added, that he was profoundly inſtructed in the oriental languages, and demanded to be put to the proof, by being confronted with ſome learned man.

Barthelemy, not then 21 years of age, was immediately pitched upon. It was in vain he aſſured them, that although he could read, he was unable to ſpeak the languages in queſtion; they preſſed him to enter into converſation with the native of the caſt; and the ſtranger himſelf entreated that the conference might immediately commence.

The challenge was at length accepted, and the foreigner began the conteſt, from which Barthelemy retired with the character of a prodigy of eaſtern erudition.

Barthelemy having now finiſhed his education at the ſeminary, retired to Aubagne, and ſpent ſome time in the boſom of his family, by all the members of which he was greatly beloved. He was accuſtomed, however, to repair frequently to Marſeilles, on purpoſe to viſit the academicians, and other learned men reſiding there. Among thoſe to whom he attached himſelf in a particular manner, was a M. Cary, the poſſeſſor of a fine cabinet of medals and a valuable collection of books, which were quite analogous to the favourite ſubject of his purſuits and ſtudies. They ſpent whole days together in converſing on literary ſubjects; after which, Barthelemy, as if inſatiable of knowledge, would retire to the Minims, where Father Sigaloux, a correſpondent of the academy of ſciences, was employed in making aſtronomical obſervations. In theſe labours the young Abbé became his aſſociate, for he was ambitious of improving in every kind of knowledge.

But he began at length to perceive, that in order to render his ſtudies profitable, it would be neceſſary to circumſcribe them, as mediocrity of knowledge, the inevitable reſult of a diverſity of applications, was but little preferable to ignorance itſelf. Occupied with theſe ſentiments, he repaired to Paris in 1744, with a view to devote himſelf entirely to literature. He was furniſhed with a letter to M. de Boze, keeper of the medals, and perpetual ſecretary of inſcriptions and belles lettres. This learned man, ſo eſtimable in every point of view, received him with great politeneſs, and introduced him to the acquaintance of the moſt diſtinguiſhed members of the three academies, who dined twice a week at his apartments. Mixing with ſociety of this kind, Barthelemy became more deeply enamoured than ever with a love of letters, and a reſpect for thoſe who cultivated them. Barthelemy.

M. de Boze, in the mean time, carefully ſtudied the character and diſpoſition of the young man, and at length favoured him with his friendſhip, and even with his confidence; at leaſt he conferred as much of theſe as it was poſſible for a man of ſo much circumſpection and reſerve.

As the increaſing age, and declining health, of M. de Boze would not permit him to apply any longer with the intenſe inveſtigation neceſſary for the completion of the cabinet of medals, he had entertained ſome thoughts of aſſociating M. de Baſtie, a learned antiquary belonging to the academy of inſcriptions, as a partner in his labours. That gentleman loſt the appointment, however, in conſequence of an unlucky expreſſion, and Barthelemy was ſelected a few months afterwards: this nomination was approved both by M. Bignon the librarian, and Maurepas the miniſter of the department. From that moment the Abbé dedicated both his days and nights to the ſtudy of thoſe medals which his colleague had been prevented, by his infirmities, from arranging.

Amidſt his multiplied occupations, Barthelemy began to enjoy a mode of life ſo conformable to his taſte and his talents, when he beheld with affright a new career preſent itſelf. In the courſe of his journey to the capital he had ſeen M. de Bauſſet, then a canon, at Aix. They were friends and countrymen; for M. de Bauſſet was born at Aubagne, where his family had been long eſtabliſhed. As he was a young man of conſiderable expectations, he had promiſed that Barthelemy ſhould become his vicar-general the moment he himſelf was decorated with the mitre. Such a flattering offer was not to be rejected; and as the canon was now nominated to the biſhopric of Bezieres, he did not fail to remind his old acquaintance of their mutual engagement. The ſorrow of the medaliſt on this occaſion was too great to be concealed: he was, however, too ſcrupulous an obſerver of his word to break his promiſe; but the prelate, who ſaw and felt for the embarraſſment of Barthelemy, immediately deſiſted from his importunities.

On the death of M. de Boze, keeper of the cabinet of medals, in 1753, Barthelemy, who had been his colleague during ſeven years, of courſe expected to ſucceed him in that honourable ſituation. One perſon, however, ſtarted as a candidate; but notwithſtanding the Abbé, relying on the juſtice of his pretenſions, took no ſtep whatever to obtain the appointment, yet the zeal of his friends rendered all ſolicitation on his part unneceſſary, for they were both numerous and powerful. M. de Maleſherbes, whoſe unfortunate and tragical death all worthy men deplore; M. de Stainville,

Barthelemy. ville, afterwards a duke and minister; and M. de Gontaut, brother of the last Marshal de Biron, supported his pretensions, and he was accordingly nominated successor to his friend in 1753.

M. de Stainville, afterwards better known during his administration by the title of duke de Choiseul, in 1754 was appointed ambassador to Rome. Madame de Stainville, a lady both young and beautiful, being passionately attached to learning and learned men, conceived a particular regard for the Abbé, and it was proposed that he should occupy a place in their carriage, on this occasion, and make the tour of Italy along with them. Such a proposition could not fail to be highly flattering; but he was obliged, from principles of duty, to refrain for a time from complying with their wishes. He set out soon after, however, and arrived in November at Rome, where he and his companion were received and treated in the kindest manner by the French plenipotentiary, who lived in a magnificent style. Pope Benedict XIV. who then wore the tiara, being a learned man himself, did not fail to distinguish Barthelemy by the most courteous reception. But his stay at Rome was not long, for he was desirous of visiting Naples, rendered particularly interesting to an antiquary, at that period, by the recent discoveries made in its neighbourhood. He and his fellow-traveller were occupied during a whole month in admiring the curiosities of that capital, and in studying ancient literature; after which they took a journey of 30 leagues, to behold the monuments of Grecian architecture, still existing on the site of the ancient city of Pæstum.

The spacious apartments of the palace of Portici, containing the antiquities of Herculaneum and Pompeia, were still more interesting, and excited a far greater degree of curiosity in the breasts of the French philosophers. There they beheld an immense quantity of paintings, statues, busts, vases, and utensils of every kind; objects peculiarly calculated to engage their attention and excite their applause. It was not, however, without a certain mixture of grief and surprise that they noticed the four or five hundred manuscripts, saved from the ruins of Herculaneum, lying in the same forlorn state in which they were discovered. Two or three only had been unrolled, of which the learned Mazocchi has given an explanation: as these contained nothing important the operation was abandoned.

But Barthelemy was not so easily discouraged, for he unceasingly solicited, he almost condescended to intrigue, with a view to engage the possessors of these treasures to turn them to the best advantage. He, at length, perceived his labours about to be crowned with success a few years afterwards, but he was finally disappointed by the death of the marquis Caraccioli, the minister of Naples, who had entered most cordially into his views.

Another subject about this time also engaged the attention of the Abbé. He was exceedingly desirous of presenting the learned men of France with a specimen of the ancient writing employed in the Greek manuscripts. He accordingly addressed himself, on this subject, to his friend Mazocchi, and also to M. Paderno, who superintended the treasures of Portici: both, however, replied that they were expressly enjoined not to communicate any thing. On this he solicited permission to look, for a few minutes only, on a page of a manuscript which had been cut from top to bottom since its discovery. It contained 28 lines, and Barthelemy read it over six different times with extreme attention; after this he retired to a corner and transcribed the precious fragment, on a piece of paper, from memory. He then returned, and having made a mental collation between the copy and the original, he corrected two or three trifling errors that had escaped his attention. Barthelemy.

Having thus rendered himself master of a *fac-simile* of the MS. which related to the persecution of the Greek philosophers during the time of Pericles, he transmitted the literary plunder, in the course of that very day, to the academy of belles lettres, strictly enjoining secrecy, however, that Mazocchi and Paderno might escape all manner of blame.

M. de Stainville having been appointed ambassador to the court of Vienna, in 1757, the Abbé accompanied his lady thither. On his arrival he found that his friend and protector had made certain arrangements with the French ministry, on purpose to gratify his passion for antiquities. In consequence of this he had leave to visit Greece and the sea ports of the Mediterranean, at the king's expence, where he was to amass new treasures, and return with them to his native country by Marseilles. But, notwithstanding all the attractions that this project presented, his scrupulous attachment to his duty prevailed over his passion for knowledge; as he deemed it highly improper that the cabinet of medals should be so long shut.

At length, towards the end of 1758, M. de Stainville, now become duke de Choiseul, was nominated minister for foreign affairs in the room of the Abbé de Bernis, who had retired with a cardinal's hat. No sooner did this event take place, than both he and his lady determined to provide for their friend. They accordingly requested Barthelemy to state the sum that would make him easy for life, and he instantly mentioned 6000 livres a-year; blushing at the same time at the largeness of the demand.

As the purse of the nation was now open to the patron, he distributed his favours with a liberal hand; and it must be owned that, on this occasion, an object worthy of remuneration presented itself in the person of the learned Abbé. Accordingly, in 1759, he presented him with a pension on the archbishopric of Alby; in 1765 he conferred on him the treasurership of St Martin de Tours, and in 1768 he made him secretary-general to the Swiss guards. In addition to these the Abbé also enjoyed a pension of 5000 livres on the Mercury. His income was now very large, but he employed it nobly; for he distributed the surplus, which was considerable, among indigent men of letters.

In 1771 M. de Choiseul was disgraced, being succeeded in his office by his enemy the duke d'Aiguillon, and exiled to his estate at Chanteloupe. On this occasion he was forsaken as usual by the courtiers, who had basked in the sunshine of his favour; but he was not deserted by the grateful antiquary, who instantly repaired thither to pay his respects; nay, when the king demanded the duke's resignation of the post of colonel-general of the Swiss guards, the Abbé, with a

spirit

Barthelemy. spirit that does honour to his memory, insisted on sending in his own resignation of the secretaryship; but the ex-minister interfered, and prevailed upon him not to deliver it up without an indemnification, which should be sanctioned by the great seal, and authorized by letters patent enregistered in parliament. Barthelemy.

Barthelemy was now in possession of more than 1200l. sterling per annum; of this he distributed between three and four hundred in the manner before related; the remainder was not dissipated in pomp and ostentation, but employed in such a manner as to enable him to enjoy philosophic ease. He also educated and established three nephews in life, one of whom has been successively ambassador and director; he at the same time supported the rest of his family in Provence, and selected a noble library, which he disposed of some years before his death.

After having thus possessed an ample income during more than twenty years, the abbé Barthelemy found himself, towards the latter end of his existence, reduced to live on a pittance calculated merely to furnish the indispensable necessaries of life, in consequence of the suppression of places and appointments that ensued immediately after the revolution. He was never heard, however, to complain; nay, he did not seem to perceive the change; and, while he was still permitted by his age and infirmities to walk from one end of Paris to the other, to pay his respects to Madame de Choiseul, he seemed to the full as happy as before.

In 1788 appeared his celebrated work, entitled *Voyage du jeune Anacharsis en Grece, dans le milieu du quatrieme siecle avant l'ere Chretienne.* He had begun it in 1757, and, during an uninterrupted succession of 30 years, occupied his leisure hours in bringing it to maturity.

His hero, a young Scythian, descended from the famous philosopher Anacharsis, whose name he bears, is supposed to repair to Greece, for his instruction, in his early youth, and, after making a tour of her republics, her colonies, and her islands, he returns to his native country and writes this book, in his old age, after the hero of Macedon had overturned the Persian empire. In the manner of modern travellers, he gives an account of the customs, government, and antiquities, of the country he has visited; a copious introduction supplies whatever may be wanting in respect to historical details; while various dissertations on the music of the Greeks, on the library of the Athenians, and on the economy, pursuits, ruling passions, manners and customs, of all the surrounding states, afford ample gratification to the reader of taste.

In 1789 the author became a candidate for a chair in the French academy; and such was the reputation he had obtained by his labours, that this learned body became particularly anxious to enrol him among its members; he was accordingly elected by acclamation. The speech delivered by the Abbé on his inauguration has been equally celebrated for its simplicity and modesty.

In 1790 M. de St Priest, minister of the department of Paris, made him an offer of the place of librarian to the king, then vacant by the resignation of M. le Noir. This was, at that period, a very flattering proposal, but it was not accepted; for the Abbé imagined that it might interfere with his literary occupations, and therefore, after expressing his gratitude, he declined the intended favour. Barthelemy.

In the mean time, while Barthelemy was thus refusing one of the most honourable offices that a man of letters could at that time aspire to, he did not neglect the department which had so long been confided to his charge. His ardour, in respect to every thing that concerned the cabinet of medals, remained unabated and unaltered through life, and he now found means to have his nephew, Barthelemy Courçy, associated with him in his labours. This grand collection had received a considerable increase, and been embellished with a number of fine specimens since it was confided to his care. To enrich it still more he carried on a correspondence, not only with the various provinces of France, but also with all parts of Europe.

In the mean time, the health of the learned medallist declined daily, and, in 1792, his strength began to fail him. Towards the beginning of the next year he became subject to fainting fits, which deprived him of the exercise of his faculties for several hours together. Being naturally calm and courageous, he did not appear, however, to be in the least affected by these accidents, but his friends considered them as symptoms of a speedy dissolution.

He was now seventy-eight years of age, sixty of which had been spent in literary toils, when an event occurred, calculated to excite the most bitter indignation. On the 30th August, 1793, this feeble old man was denounced as an aristocrat, and his nephew and several other young men employed about the library were included in the supposed guilt. The accusation proceeded from a person of the name of Duby, a clerk in the library, and was conveyed in a letter written by him to a person of the name of Chrétien, a pastry-cook, who happened to be a member of the section, before which it was first read, and then transmitted to the municipality. It ought not to be omitted here that Duby did not know Chrétien, or Chrétien Duby, and that Barthelemy was not acquainted with either of them!

A warrant was immediately issued against the supposed culprits, and this was signified by the officers of justice to the Abbé, who happened to be at Madame de Choiseul's, on the morning of the 2d of September. On this he instantly arose, and, without discovering any symptoms of fear, took his leave of that lady, and was conducted to the Magdelonettes, where he found his nephew Courçy. Such, however, was the respect paid to his virtues and his talents, even within the walls of a prison, that, on entering the gate, he was received with every expression of regard by the inhabitants of this dreary mansion, and the gaoler, whose name was Vanbertrand, paid the utmost attention to him. He was accordingly lodged in a little apartment along with his relation, and in the course of that evening he received a visit from Madame de Choiseul, who had taken care to intimate the event to the government. No sooner was the committee informed that the Abbé Barthelemy had been included in the order that was meant only to extend to some of the subalterns employed in the library, than orders were instantly issued for his release, and we are assured by his friend the duke de Nivernois, that the clerks in the public offices displayed the utmost zeal in forwarding the necessary papers for his

Barthelemy, Barthius.

beration: accordingly at eleven o'clock at night he was awaked from his ſleep, and conducted to the houſe of his fair friend.

But the attention of the government did not ſtop here; for in a few weeks afterwards, the place of national librarian being vacant by the death of Carra, and the reſignation of Chamfort, who had held it jointly, it was offered to the Abbé, with the moſt flattering marks of attention. His age and infirmities, however, afforded but too good a pretext for his refuſal.

In 1794 his approaching diſſolution was apparent to every one but himſelf, for his fainting fits became longer and more frequent; however, as he did not retain any remembrance of them, he occupied his time as uſual; in other words, he devoted all his hours to friendſhip and literature.

He had now reached the eightieth year of a life which had been entirely ſpent in a laborious and inceſſant application to ſtudy, which had ſecretly weakened the ſprings of exiſtence. The rigour of the winter of 1795, againſt which he had adopted no precautions, is ſuppoſed to have haſtened the cataſtrophe; this did not occur, however, until the ſpring.

On the 25th of April he dined with Madame de Choiſeul. In the courſe of the night he became ſo weak that he was unable to ring his bell; and in the morning, when his ſervant entered, he was found with his feet in the bed and his head on the floor, entirely deprived of ſenſation. After being replaced, his recollection returned, but he grew gradually worſe, and he was carried off without experiencing any pain, April 30. 1795.

He retained full poſſeſſion of all his ſenſes until the very laſt moment. At one o'clock he read Horace as if nothing extraordinary had occurred; but his hands turning cold, in conſequence of the approach of death, became unable to ſupport the book, which fell to the ground. His head ſoon after was ſeen to incline on one ſide, he appeared to ſleep, and it was believed by his nephew and his attendants that this was really the caſe; but it was ſoon diſcovered that his reſpiration had ceaſed, and that this learned man was no more!

Thus died, without any of the uſual ſtruggles that accompany death, John James Barthelemy, one of the greateſt ornaments of his age, regretted by all his relations as if he had been their common father, whoſe life preſented an example, and whoſe works form a model for literary men. In perſon he was above the middle ſize, and, if we are to give credit to his admirers, his countenance diſplayed an air of antiquity wonderfully correſpondent to his ſtudies. His buſt, carved by the chiſſel of Houdon, is allowed to be a maſterpiece of art, and that able ſculptor has contrived to infuſe into the phyſiognomy a mixture of the mildneſs, ſimplicity, good-nature, and grandeur, ſo viſible in the original.

BARTHIUS, Gaspar, a very learned and copious writer, born at Cuſtrin in Brandenburg, the 22d of June 1576. Mr Baillet has inſerted him in his *Enfans Celebres*; where he tells us, that at 12 years of age he tranſlated David's Pſalms into Latin verſe of every meaſure, and publiſhed ſeveral Latin poems. Upon the death of his father (who was profeſſor of civil law at Francfort, counſellor to the elector of Brandenburg, and his chancellor at Cuſtrin), he was ſent to Gotha, then to Eiſenach, and afterwards, according to cuſtom, went through all the different univerſities in Germany. When he had finiſhed his ſtudies, he began his travels; he viſited Italy, France, Spain, England, and Holland, improving himſelf by the converſation and works of the learned in every country. He ſtudied the modern as well as ancient languages, and his tranſlations from the Spaniſh and French ſhow that he was not content with a ſuperficial knowledge. Upon his return to Germany, he took up his reſidence at Leipſic, where he led a retired life, his paſſion for ſtudy having made him renounce all ſort of employment. He wrote a vaſt number of books; the principal of which are, 1. His *Adverſaria*, a large volume in folio; the ſecond and third volumes of which he left in manuſcript. 2. A Tranſlation of Æneas Gazæus. 3. A large volume of Notes upon Claudian, in 4to. 4. Three large volumes upon Statius; &c. He died at Leipſic, in 1658, aged 71. Bartholinus.

BARTHOLINUS Caspar, a learned phyſician and anatomiſt in the 17th century, was born at Malmoe, a town in the province of Schonen, which then belonged to Denmark. At three years of age he had ſuch a quick capacity, that in 14 days he learned to read; and in his 13th year he compoſed Greek and Latin orations, and pronounced them in public. When he was about 18 he went to the univerſity of Copenhagen, and afterwards ſtudied at Roſtock and Wirtemberg. He next ſet out upon his travels; during which he neglected no opportunity of improving himſelf at the different univerſities to which he came, and everywhere receiving marks of reſpect. He was in 1613 choſen profeſſor of phyſic in that univerſity, which he enjoyed 11 years; when, falling into a dangerous illneſs, he made a vow, that if it ſhould pleaſe God to reſtore him, he would ſolely apply himſelf to the ſtudy of divinity. He recovered, and kept his word; and ſoon after obtained the profeſſorſhip of divinity, and the canonry of Roſchild. He died on the 13th of July 1629, after having written ſeveral ſmall works chiefly on metaphyſics, logic, and rhetoric.

Bartholinus, *Thomas*, a celebrated phyſician, ſon of the former, was born at Copenhagen in 1616. After ſtudying ſome years in his own country, he in 1637 went to Leyden, where he ſtudied phyſic during three years. He then travelled into France; and reſided two years at Paris and Montpelier, in order to improve himſelf under the famous phyſicians of thoſe univerſities. Afterwards going to Italy, he continued three years at Padua; and at length went to Baſil, where he obtained the degree of doctor of philoſophy. Soon after, he returned to Copenhagen; where in 1647 he was appointed profeſſor of the mathematics; and next year was nominated to the anatomical chair, an employment better ſuited to his genius and inclination; which he diſcharged with great aſſiduity for 13 years, and diſtinguiſhed himſelf by making ſeveral diſcoveries with reſpect to the lacteal veins and lymphatic veſſels. His cloſe application, however, having rendered his conſtitution very infirm, he, in 1661, reſigned his chair; but the king of Denmark allowed him the title of *honorary profeſſor*. He now retired to a little eſtate he had purchaſed at Hageſted, near Copenhagen, where he hoped to have ſpent the remainder of his days in peace and tranquillity: but his houſe being burnt in

1650,

St Bartholomew's day || Bartolomeo.

1650, his library, with all his books and manuſcripts, was deſtroyed. In conſideration of this loſs the king appointed him his phyſician with a handſome ſalary, and exempted his land from all taxes; the univerſity of Copenhagen alſo appointed him their librarian; and, in 1675, the king did him the honour to give him a ſeat in the grand council of Denmark. He wrote, 1. *Anatomia Caſpari Bartholini Parentis, novis Obſervationibus primum locupletata*, 8vo. 2. *De Monſtris in Natura et Medicina*, 4to. 3. *De Armillis Veterum, præſertim Danorum Schedion*, 8vo; and ſeveral other works. This great man died on the 4th of December 1680.

St BARTHOLOMEW'S DAY, a feſtival of the Chriſtian church, celebrated on the 24th of Auguſt. St Bartholomew was one of the twelve apoſtles; and is eſteemed to be the ſame as Nathanael, one of the firſt diſciples that came to Chriſt.

It is thought this apoſtle travelled as far as India, to propagate the goſpel; for Euſebius relates, that a famous philoſopher and Chriſtian, named *Pantænus*, deſiring to imitate the apoſtolical zeal in propagating the faith, and travelling for that purpoſe as far as India, found there, among thoſe who yet retained the knowledge of Chriſt, the goſpel of St Matthew, written, as the tradition aſſerts, by St Bartholomew, one of the twelve apoſtles, when he preached the goſpel in that country. From thence he returned to the more northern and weſtern parts of Aſia, and preached to the people of Hierapolis; then in Lycaonia; and laſtly at Albania, a city upon the Caſpian ſea, where his endeavours to reclaim the people from idolatry were crowned with martyrdom, he being (according to ſome writers) flayed alive, and crucified with his head downwards.—There is mention made of a Goſpel of St Bartholomew, in the preface to Origen's Homilies on St Luke, and in the preface to St Jerome's Commentary on St Matthew: but it is generally looked upon as ſpurious, and is placed by Pope Gelaſius among the apocryphal books.

BARTHOLOMEW, *St*, one of the Caribbee iſlands, belonging to the French, who ſent a colony thither in 1648. It is about 24 miles in compaſs, and has a good haven. W. Long. 62. 15. N. Lat. 18. 16.

BARTHOLOMITES, a religious order founded at Genoa in the year 1307; but the monks leading very irregular lives, the order was ſuppreſſed by Pope Innocent X. in 1650, and their effects were confiſcated. In the church of the monaſtery of this order at Genoa is preſerved the image which it is pretended Chriſt ſent to King Abgarus. See ABGARUS.

BARTOLOCCI, JULIUS, a learned monk, and profeſſor of Hebrew at Rome, was born at Celeno, in 1613; and diſtinguiſhed himſelf by writing an excellent Hebrew and Latin catalogue of the Hebrew writers and writings, in 4 vols folio, a continuation of which was performed by Imbonati his diſciple. He died in 1687.

BARTOLOMEO, FRANCISCO, a celebrated painter, born at Savignano, a village 10 miles from Florence, in the year 1469, was the diſciple of Coſimo Roſſelli, but was much more beholden to the works of Leonardo da Vinci for his extraordinary ſkill in painting. He was well verſed in the fundamentals of deſign. Raphael, after quitting the ſchool of Perugino, applied to this maſter; and under him ſtudied the rules of perſpective, with the art of managing and uniting his colours. In the year 1500, he turned Dominican friar; and ſome time after was ſent by his ſuperiors to the convent of St Martin, in Florence. He painted both portraits and hiſtories; but his ſcrupulous conſcience would hardly ever ſuffer him to draw naked figures, though nobody underſtood them better. He died in 1517, aged 48.

Barton || Baſaltes.

BARTON, a town of Lincolnſhire, ſeated on the river Humber, where there is a conſiderable ferry to paſs over into Yorkſhire. W. Long. 0. 10. N. Lat. 53. 40.

BARTSIA, PAINTED CUP: See *Botany Index*.

BARUCH, THE PROPHECY OF, one of the apocryphal books, ſubjoined to the canon of the Old Teſtament. Baruch was the ſon of Neriah, who was the diſciple and amanuenſis of the prophet Jeremiah. It has been reckoned part of Jeremiah's prophecy, and is often cited by the ancient fathers as ſuch. Joſephus tells us, Baruch was deſcended of a noble family; and it is ſaid in the book itſelf, that he wrote this prophecy at Babylon; but at what time is uncertain. It is difficult to determine in what language this prophecy was originally written. There are extant three copies of it; one in Greek, the other two in Syriac; but which of theſe, or whether any one of them, be the original, is uncertain.

BARULES, in church hiſtory, certain heretics, who held, that the Son of God had only a phantom of a body; that ſouls were created before the world, and that they lived all at one time.

BARUTH, an ancient town of Turkey in Syria, with a Chriſtian church of the Neſtorian perſuaſion. It is ſituated in a fine fertile ſoil, but is inconſiderable now to what it was formerly. E. Long. 34. 20. N. Lat. 33. 30.

BARUTH, an Indian meaſure, containing 17 gantans: It ought to weigh about three pounds and a half Engliſh avoirdupois.

BARYTONUM, in the Greek grammar, denotes a verb, which having no accent marked on the laſt ſyllable, a grave accent is to be underſtood. In Italian muſic, *barytona* anſwers to our common pitch of baſs.

BAS CHEVALIER. See BACHELOR.

Bas-Relief. See *Basso-Relievo*.

BAS, *James Philip le*, a modern French engraver, by whom we have ſome excellent prints. His great force ſeems to lie in landſcapes and ſmall figures, which he executed in a ſuperior manner. His ſtyle of engraving is extremely neat; but yet he proves the freedom of the etching, and harmonizes the whole with the graver and dry point. We have alſo a variety of pretty vignettes by this artiſt. He flouriſhed about the middle of the preſent century; but we have no account of the time of his birth or death.

BASALTES, (from *baſal*, "iron," or βασανιζω, *diligenter examino*), in *Natural Hiſtory*, a heavy, hard ſtone, chiefly black or green, conſiſting of priſmatic cryſtals, the number of whoſe ſides is uncertain. The Engliſh miners call it *cockle;* the German *ſchoerl*. Its ſpecific gravity is to that of water as 3000 or upwards to 1000. It frequently contains iron; and conſiſts either of particles of an indeterminate figure, or of a ſparry, ſtriated, or fibrous texture. It has a flinty hardneſs, is inſoluble by acids, and is fuſible by fire.

1 Name, derivation, &c.

Baſaltes. The following is an analyſis of ſome baſaltes by Mr Bergman; and as the reſemblance of it to lava will be frequently mentioned in the ſucceeding part of this article, we ſhall here contraſt this analyſis with that of lava by the ſame author.

2 Comparative analyſis of baſaltes and lava.

Baſaltes, 100 parts contains		Lava, 100 parts contains	
Siliceous earth	50	Siliceous earth	49
Argillaceous	15	Argillaceous	35
Calcareous	8	Calcareous	4
Magneſia	2	Iron	12
Iron	25		

Phil. Tran. Edin. vol. v. Dr Kennedy, an ingenious chemiſt, analyzed ſeveral ſpecies of baſalt, whinſtone, and lava, of which the following are the reſults.

Baſalt from Staffa contains, in 100 parts,

Silex	48
Argil	16
Oxyd of iron	16
Lime	9
Moiſture and other volatile matter	5
Soda, about	4
Muriatic acid about	1
	99

Whinſtone of Saliſbury rock near Edinburgh contains, in 100 parts,

Silex	46
Argil	19
Oxyd of iron	17
Lime	8
Moiſture and other volatile matter	4
Soda, about	3.5
Muriatic acid about	1
	98.5

Whinſtone from Caltonhill near Edinburgh contains, in 100 parts,

Silex	50
Argil	18.5
Oxyd of iron	16.75
Carbonate of lime	3
Moiſture and other volatile matter	5
Soda, about	4
Muriatic acid, about	1
	98.25

Lava from Catania, Mount Ætna, contains in 100 parts

Silex	51
Argil	19
Oxyd of iron	14.5
Lime	9.5
Soda, about	4
Muriatic acid, about	1
	99

Lava from Sta Venere, Ætna, contains in 100 parts, Baſaltes.

Silex	50.75
Argil	17.5
Oxyd of iron	14.25
Lime	10
Soda, about	4
Muriatic acid, about	1
	97.5

The moſt remarkable property of this ſubſtance is its figure, being never found in ſtrata, like other marbles, but always ſtanding up in the form of regular angular columns, compoſed of a number of joints, one placed upon, and nicely fitted to another, as if formed by the hands of a ſkilful workman. See Plate LXXXV. fig. 15.

3 Baſaltes, where found.

Baſaltes was originally found in columns in Ethiopia, and fragments of it in the river Tmolus, and ſome other places. We now have it frequently, both in columns and ſmall pieces, in Spain, Ruſſia, Poland, near Dreſden, and in Sileſia; but the nobleſt ſtore in the world ſeems to be that called the Giant's Cauſeway in Ireland, and Staffa, one of the weſtern iſles of Scotland *. Great quantities of baſaltes are likewiſe found in the neighbourhood of Mount Ætna in Sicily, of Hecla in Iceland, and of the volcano in the iſland of Bourbon. Theſe are the only three active volcanoes in whoſe neighbourhood it is to be met with; but it is alſo found in the extinguiſhed volcanoes in Italy, though not in the neighbourhood of Veſuvius.

* See *Giant's Cauſeway* and *Staffa*.

4 Of the Giant's Cauſeway in Ireland.

In Ireland the baſaltes riſes far up the country, runs into the ſea, croſſes at the bottom, and riſes again on the oppoſite land. In Staffa the whole end of the iſland is ſupported by natural ranges of pillars, moſtly above 50 feet high, ſtanding in natural colonnades, according as the bays and points of land have formed themſelves, upon a firm baſis of ſolid unformed rock. Above theſe, the ſtratum, which reaches to the ſoil or ſurface of the iſland, varies in thickneſs, as the iſland itſelf is formed into hills or valleys, each hill, which hangs over the valleys below, forming an ample pediment. Some of theſe, above 60 feet in thickneſs from the baſe to the point, are formed by the ſloping of the hill on each ſide, almoſt into the ſhape of thoſe uſed in architecture.

The pillars of the Giant's Cauſeway have been very particularly deſcribed and examined. The moſt accurate account of them is to be met with in a work entitled, "Letters concerning the northern coaſt of the county of Antrim;" from which the following particulars relative to the preſent ſubject are extracted.

5 Particular account of the pillars.

"1. The pillars of the Cauſeway are ſmall, not very much exceeding 1 foot in breadth and 30 in length; ſharply defined, neat in their articulation, with concave or convex terminations to each point. In many of the capes and hills they are of a larger ſize; more imperfect and irregular in their figure and articulation, having often flat terminations to their joints. At Fairhead they are of a gigantic magnitude, ſometimes exceeding 5 feet in breadth and 100 in length; oftentimes apparently deſtitute of joints altogether. Through many parts of the country, this ſpecies of ſtone is entirely rude and unformed, ſeparating in looſe blocks; in

Plate LXXXVI. fig. 1.

Baſaltes. in which ſtate, it reſembles the ſtone known in Sweden by the name of *trappe*.

" 2. The pillars of the Giant's Cauſeway ſtand on the level of the beach; from whence they may be traced through all degrees of elevation to the ſummit of the higheſt grounds in the neighbourhood.

" 3. At the Cauſeway, and in moſt other places, they ſtand perpendicular to the horizon. In ſome of the capes, and particularly near Uſhet harbour, in the iſle of Baghery, they lie in an oblique poſition. At Doon point in the ſame iſland, and along the Balintoy ſhore, they form a variety of regular curves.

" 4. The ſtone is black, cloſe, and uniform; the varieties of colour are blue, reddiſh, and gray; and of all kinds of grain, from extreme fineneſs to the coarſe granulated appearance of a ſtone which reſembles imperfect granite, abounding in cryſtals of ſchorl chiefly black, though ſometimes of various colours.

" 5. Though the ſtone of the Giant's Cauſeway be in general compact and homogeneous; yet it is remarkable, that the upper joint of each pillar, where it can be aſcertained with any certainty, is always rudely formed and cellular. The groſs pillars alſo in the capes and mountains frequently abound in theſe air-holes through all their parts, which ſometimes contain fine clay, and other apparently foreign bodies: and the irregular baſaltes beginning where the pillars ceaſe, or lying over them, is in general extremely honey-combed; containing in its cells cryſtals of zeolite, little morſels of fine brown clay, ſometimes very pure ſteatite, and in a few inſtances bits of agate."

6 Account of thoſe in Staffa. Sir Joſeph Banks obſerves, that the bending pillars of Staffa differ conſiderably from thoſe of the Giant's Cauſeway. In Staffa they lie down on their ſides, each forming the ſegment of a circle; and in one place, a ſmall maſs of them very much reſembles the ribs of a ſhip. Thoſe of the Giant's Cauſeway which he ſaw, ran along the face of a high cliff, bent ſtrangely in the middle, as if unable, at their firſt formation, while in a ſoft ſtate, to ſupport the maſs of incumbent earth.

7 Rocks of the Cyclops deſcribed. The rocks of the Cyclops, in the neighbourhood of Ætna, exhibit very magnificent baſaltic pillars. A general view of them is given on Plate LXXXVI. fig. 2. where *a*, *b*, *c*, are the three principal rocks; *e* is the extremity of an iſland, one half of which is compoſed of lava, on a baſe of baſaltes, of no uncommon nature; above which there is a cruſt of pozzolana, combined with a certain white calcareous matter, which is pretty hard and compact; and which, as it is compoſed by the action of the air, appears like a piece of knotty porous wood. That rock, at ſome former period, became ſo hard as to ſplit; and the clefts were then filled up with a very hard and porous matter like ſcoriæ. This matter afterwards acquiring new hardneſs, alſo ſplit, leaving large interſtices, which in their turn have been filled up with a ſpecies of compound yellow matter. The iſland was formerly inhabited; and there ſtill remains a flight of ſteps leading from the ſhore to the ruins of ſome houſes which appear to have been hewn in the rock.

The rock *b* has the ſtraighteſt and moſt regular columns of any. It is repreſented diſtinctly in Plate LXXXVII. fig. 1. and likewiſe a general view of *c* and *d*, with the foot of Ætna leading to Catanea. Theſe baſaltic columns, at firſt view, ſeem to reſemble thoſe of the Giant's Cauſeway, and others commonly met with: but on a nearer inſpection, we find a remarkable difference; being aſſembled in groups of five or ſix about one, which ſerves as their common centre. They are of various ſizes and forms; ſome ſquare, others hexagonal, heptagonal, or octagonal. One half of this rock is compoſed of perpendicular columns; the other of another ſpecies of baſaltes diſpoſed in inclined, and almoſt rectilinear, layers. Theſe are in contact with the columns, and are as cloſely connected with them as they are with one another. The layers are longer at the baſe than towards the top of the rock. It is further to be remarked, that moſt of theſe layers are ſubdivided as they riſe upwards; ſo that towards theſe upper extremities, one layer preſents to the eye ſometimes one, ſometimes two, and ſometimes three, diviſions. The fragments of baſaltes taken off from theſe layers are of a rhomboidal figure, becauſe the layers break obliquely. Baſaltes.

Theſe layers, though inclined towards the baſe, become almoſt perpendicular towards the upper part of the rock, where they appear united in a point, and overtop moſt of the viſible and elevated parts of the priſmatic columns. Theſe columns terminate in ſuch a manner as to form a kind of ſtaircaſe. They appear even to riſe under a ſpecies of clay with which they are covered at one extremity, till they reunite themſelves with the point which is formed by the moſt elevated parts of the layers of baſaltes beſide them.

This extraneous matter with which theſe columns are covered, and of which the ſummit of this pyramid conſiſts, appears to be of the ſame ſpecies with the former, compoſing the upper part of the iſland already deſcribed.

The baſaltes of that iſland has one particularity, viz. that it is full of ſmall cryſtals of about the ſize of peas. Theſe appear no leſs beautiful than rock-cryſtal; but they are much ſofter, and yield even to the action of the air. We ſee here large fragments of baſaltes which were formerly full of cryſtals, but deſtroyed by time. They are now not unlike a ſponge, from the great number of holes which appear all over their ſurface. Thoſe pieces of baſaltes which contain moſt of theſe cryſtals are not ſo hard as thoſe which contain fewer of them.

8 Baſaltes on the promontory of the Caſtel d'Iaci deſcribed. The promontory of Caſtel d'Iaci, which terminates the baſis of Ætna, is almoſt entirely compoſed of baſaltes, but of a kind very different from the former. It conſiſts of a great number of cylinders, from the diameter of ſix inches to that of twenty feet. Some of theſe are ſolid, others hollow like cannon; ſome extended in layers, others ſimilar to carrots of tobacco conſiſting of a number of pieces ſqueezed together. Some of theſe cylinders are ſtraight, others curved into a variety of forms. Some look like globes encloſed in the rocks; and in the fractures of theſe globes we perceive the ſtrata of which they are compoſed.

Fig. 2. repreſents the baſaltes at the foot of this promontory on the ſouth ſide. The little mounts into which it appears to be collected, are ſometimes only one French foot in diameter, ſometimes ſix. They are compoſed of ſmall priſms or needles, or of cubic trapezoids, and conſiſt of a matter diſtinguiſhed by the name of *dirty lava*. It is made up of pozzolana, conſolidated

Baſaltes. ſolidated by a certain liquid, which, while it has communicated ſolidity to the pozzolano, has at the ſame time ſuffered that ſubſtance to ſhrink conſiderably, in ſuch a manner as to leave large chinks between the pieces of baſaltes, which are thus formed by the operation of the liquid on the pozzolana. It appears alſo to have inſinuated itſelf into the clay with which the promontory is covered; which is become hard in its turn, and which has alſo ſplit into chinks that appear to contain a kind of hard matter.

Theſe deſcriptions and figures will ſerve to give an idea of the appearance of the baſaltes, which is now generally accounted a kind of marble. Wallerius conſiders it as a ſpecies of the corneous or horn-rock; and Cronſtedt enumerates it among thoſe ſubſtances which he calls *garnet earths*. The largeſt block of this ſtone that ever was ſeen, was placed according to Pliny, by Veſpaſian in the temple of Peace, It repreſented the figure of Nilus, with 16 children playing about it, denoting as many cubits of the riſe of the river. The ſtatue of Memnon, in the temple of Serapis at Thebes, which ſounded at the riſing of the ſun, was alſo made of the ſame material, if we may believe this author. Moſt of the Egyptian figures are likewiſe made of baſaltes. Some of the ancients call it *lapis Lydius*, from Lydia, where it ſeems it was formerly found in greateſt abundance. The moderns denominate it the *touch-ſtone*, as being uſed for the trial of gold and ſilver.

9 Baſaltes uſed in different ancient works.

10 Subſtances mixed with baſaltes.

Various ſubſtances are found intermixed with baſaltes; of which Mr Hamilton, in the letters above-mentioned, enumerates the following: 1. Extenſive layers of red ochre, varying in all degrees from a dull ferruginous colour to a bright red, anſwering very well for coarſe painting. 2. Veins of iron ore, ſometimes very rich, commonly of a very brown or reddiſh caſt, at other times of a blue colour. 3. Steatites, generally of a greeniſh ſoapy appearance, more rarely of a pure white, and raiſing an imperfect ſaponaceous froth when agitated with water. 4. Zeolite, of a bright and pure white colour; in maſſes, varying in weight from a grain to a pound; generally diſpoſed in cavities of the cellular baſaltes; often affecting a cryſtallization, in which the fibres proceed as rays from a centre; and in ſome inſtances have a beautiful ſpangled appearance, reſembling that of thiſtle-down. The moſt remarkable property of this ſubſtance is, that with any of the mineral acids, but eſpecially with that of nitre, it forms a gelatinous mixture in the courſe of a few hours. 5. Peperino ſtone, a friable matrix of indurated clay and iron, ſtudded with little bits of zeolite or other ſubſtances; and which is often of a reddiſh burnt colour. 6. Pumice-ſtone of a black colour, containing iron not entirely dephlogiſticated, but ſtill acting on the magnetical needle.

11 Of the nature of baſaltes.

Theſe ſubſtances are met with among the baſaltes of the Giant's Cauſeway in Ireland. In other places its attendants may perhaps vary according to circumſtances. The baſaltes itſelf has been conſidered by ſome as a cryſtallization from water; but others ſtrenuouſly maintain that it is only a ſpecies of lava, and in defence of theſe opinions very conſiderable diſputes have been carried on. The following is a ſtate of the arguments on both ſides from Mr Hamilton's treatiſe already mentioned.

12 Mr Hamilton's ſtate of the arguments concerning it.

In ſupport of the volcanic origin of the baſaltes it has been argued, Baſaltes.

1. That it agrees almoſt entirely with lava in its elementary principles, in its grain, the ſpecies of the foreign bodies it includes, and all the diverſities of its texture.

2. The iron of the baſaltes is found to be in a metallic ſtate, capable of acting on the magnetical needle, which is alſo the caſe with that found in compact lava.

3. The baſaltes is fuſible *per ſe*; a property which has in common with lavas.

4. The baſaltes is a foreign ſubſtance ſuperinduced on the original limeſtone-ſoil of the country, in a ſtate of ſoftneſs capable of allowing the flints to penetrate conſiderably within its lower ſurface.

5. Thoſe extenſive beds of red ochre which abound among our baſaltes are ſuppoſed to be an iron earth reduced to that ſtate by the powerful action of heat; for ſuch a change may be produced on iron in our common furnaces, provided there be a ſufficient afflux of freſh air; and the baſaltes itſelf, in ſuch circumſtances, is eaſily reducible to an impure ochre. This is alſo found to take place in the living volcanoes, particularly within their craters; and is therefore ſuppoſed to afford a preſumptive argument of the action of fire in the neighbourhood of baſaltes.

6. Though zeolite is not yet proved to be the actual production of a volcano, yet its preſence is always ſuppoſed to give countenance to this hypotheſis; becauſe zeolite is found in countries where the action of ſubterraneous fire is ſtill viſible, and where there is reaſon to believe that the whole ſoil has been ravaged by that principle. Thus it abounds in Iceland, where the flames of Hecla yet continue to blaze; and in the iſle of Bourbon, where there is ſtill a volcano in force. It is therefore ſuppoſed to ariſe from the decompoſition of the products of a volcano, where the fires have been long extinct.

7. Cryſtals of ſchorl appear in great plenty among many kinds of our baſaltes; and theſe, though not abſolutely limited to volcanic countries, yet being found in great abundance among the Italian lavas, in circumſtances exactly correſponding to thoſe of our baſaltes, are thought to ſupply a good probable argument in the preſent caſe.

8. The peperino ſtone is thought to be undoubtedly of a volcanic origin. It has frequently the burnt and ſpongy appearance of many of the volcanic products; and that of the Giant's Cauſeway agrees exactly with the peperino of Iceland and Bourbon.

9. Puzzolane earth is met with among the baſaltes of France; and there is very little reaſon to doubt that our baſaltes, if pulverized, would agree with it in every reſpect; that is, it would produce a fine ſharp powder, containing the ſame elementary parts, and probably agreeing with it in its valuable uſes as a cement. This earth is alſo found in the Canary iſlands, which are thought to have other marks of fire; it is met with in all the volcanized parts of Italy, and is never found excepting where there are other evident marks of fire.

10. Pumice ſtone is univerſally allowed to be produced by fire, and indeed bears the reſemblance of a cin-

der

Baſaltes. der ſo obviouſly, that one muſt be inſtantly convinced of its original. This is alſo found among the baſaltes of Ireland.

11. There are three living volcanoes, within whoſe neighbourhood the baſaltes and moſt of its uſual attendant foſſils have been obſerved, viz. Ætna in Sicily, Hecla in Iceland, and the iſland of Bourbon on the coaſt of Africa. To which it may be added, that it is found throughout all the volcanized parts of Italy, though not anywhere immediately in the neighbourhood of Veſuvius. Sir William Hamilton, however, informs us, that in the year 1779 he "picked up ſome fragments of large and regular cryſtals of cloſe-grained lava or baſalt; the diameter of which, when the priſms are complete, might have been eight or nine inches." He obſerves, that Veſuvius does not exhibit any lavas regularly cryſtallized, and forming what are called *Giants Cauſeways*, except a lava that ran into the ſea, near Torre del Græco, in the year 1631, which has a ſmall degree of ſuch an appearance. As the fragments of baſaltes which he found on this mountain, however, had been evidently thrown out of the crater in their proper form, he puts the queſtion, "May not lavas be more ready to cryſtallize within the bowels of a volcano than after their emiſſion? And may not many of the Giants Cauſeways already diſcovered be the nuclei of volcanic mountains, whoſe lighter and leſs ſolid parts may have been worn away by the hand of time? Mr Faujas de St Fond gives an example of baſalt columns placed deep within the crater of an extinguiſhed volcano.

13 Of the baſaltes thrown out by Veſuvius

12. It is well aſcertained by experience, that there are vaſt beds of pyrites diſperſed through the interior parts of the earth at all depths; and it is alſo a certain fact, that this compound ſubſtance may be decompounded by the accidental effuſion of water, in ſuch a manner as to become hot, and at laſt to burn with great fury. This acceſſion of pyrites is by many ſuppoſed to be the true origin of the volcanic fire; and an argument for this is, that the preſent volcanoes do pour forth great quantities of the component parts of pyrites, particularly ſulphur, iron, and clay. Now, among the ſuperinduced ſubſtances of the county of Antrim, and the ſame may probably be ſaid of every other baſaltic country, it is certain that the quantity of iron and clay diffuſed through almoſt every ſpecies of foſſil, amounts to more than one-half of the whole material; ſo that two of the pricipal elements of the pyrites are ſtill found there, reduced in many inſtances to a ſlag or ſcoria. The third principle, viz. the ſulphur cannot be expected to remain; becauſe ſulphur is totally conſumed by combuſtion; and what might perhaps eſcape and be ſublimed would no doubt have ſince periſhed by decompoſition, in conſequence of being expoſed to the air.

14 Glaſs ſometimes appears in the form of priſmatic cryſtals.

13. Another argument, which to Sir William Hamilton appears very convincing, is, that glaſs ſometimes takes on the appearance of priſms, or cryſtallizes in cooling. He received ſome ſpecimens of this kind from Mr Parker of Fleet-ſtreet, who informed him that a quantity of his glaſs had been rendered unſerviceable by taking ſuch a form. Some of theſe were in laminæ which may be eaſily ſeparated, and others reſemble baſaltic columns in miniature, having regular faces. "Many of the rocks of lava in the iſland of Ponza (ſays he) are, with reſpect to their configurations, ſtrikingly like the ſpecimens of Mr Parker's glaſs above mentioned; none being very regularly formed baſaltes, but all having a tendency towards it. Mr Parker could not account for the accident that occaſioned his glaſs to take the baſaltic form; but I have remarked, both in Naples and Sicily, that ſuch lavas as have run into the ſea are either formed into regular baſaltes, or have a great tendency towards ſuch a form. The lavas of Mount Ætna, which ran into the ſea near Jacic, are perfect baſaltes; and a lava that ran into the ſea from Veſuvius, near Torre del Græco in 1631, has an evident tendency to the baſaltic form."

Baſaltes.

15 Lavas which runs into the ſea have a tendency to run into baſaltes.

In oppoſition to theſe arguments it is urged, that in many of the countries where baſaltes moſt abound, there are none of the characteriſtics of volcanic mountains. They aſſert, therefore, that the baſaltes is a foſſil, very extenſively ſpread over the ſurface of the earth; and that, where it is found in the neighbourhood of volcanic mountains, we ought to ſuppoſe theſe to be accidentally raiſed on a baſaltic ſoil rather than to have created it. But the advocates for the volcanic ſyſtem are not much embarraſſed with this argument. According to them, the baſaltes has been formed under the earth itſelf, and within the bowels of theſe very mountains; where it could never have been expoſed to view until, by length of time or ſome violent ſhock of nature, the incumbent maſs muſt have undergone a very conſiderable alteration, ſuch as ſhould go near to deſtroy every exterior volcanic feature. In ſupport of this it may alſo be obſerved, that the promontories of Antrim do bear evident marks of ſome very violent convulſion, which has left them in their preſent ſituation; and that the iſland of Bagherry, and ſome of the weſtern iſles of Scotland, do really appear like the ſurviving fragments of a country, great part of which might have been buried in the ocean. It is further added, that though the exterior volcanic character be in a great meaſure loſt in the baſaltic countries; yet this negative evidence can be of little weight, when we conſider, that the few inſtances where the features have been preſerved afford a ſufficient anſwer to this objection. Thus the Montagne de la Coupe in France ſtill bears the marks of its having been formerly a volcano: and this mountain is obſerved to ſtand on a baſe of baſaltic pillars, not diſpoſed in the tumultuary heap into which they muſt have been thrown by the furious action of a volcanic eruption, tearing up the natural ſoil of the country; but arranged in all the regularity of a Giant's Cauſeway, ſuch as might be ſuppoſed to reſult from the cryſtalliization of a bed of melted lava, where reſt and a gradual refrigeration contributed to render the phenomenon as perfect as poſſible.

16 Arguments in oppoſition to the volcanic theory.

17 Anſwered.

To theſe arguments ſtated by Mr Hamilton we ſhall add another from Mr Ferber: viz. That at the time he went from Rome to Oſtia they were paving the road with a ſpecies of black lava. In ſome of the broken pieces he obſerved little empty holes, of the bigneſs of a walnut, incruſtated all around their ſides by white or amethyſtine, ſemipellucid, pointed, or truncated pyramidal cryſtallizations, entirely reſembling the agate nodules or geodes, which are commonly filled with quartz cryſtallizations. There was no crack or fiſſure

18 Mr Ferber's argument from the cryſtals found in black lava.

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Baſaltes. in the ambient compact lava; the cryſtal ſherls were pretty hard, and might rather be called *quartz*. Some fine browniſh duſt lay in the reſt of the holes, as impalpable and light as aſhes. He tells us alſo, that in the greateſt part of the Paduan, Veroneſe, and Vicentine lavas, we meet with an infinite quantity of white polygonal ſherl cryſtallizations, whoſe figure is as regular, and ſtill more polygonal, than the baſaltes.

These may be conſidered as the principal arguments
19 Mr Bergman's theory. in favour of the volcanic theory of baſaltes. On the other hand, the late celebrated Mr Bergman expreſſes himſelf to the following purpoſe.

"Ten years ago it was a general opinion, that the ſurface of the earth, together with the mountains, had been produced by moiſture. It is true that ſome declared fire to be the firſt original cauſe, but the greater number paid little attention to this opinion. Now, on the contrary, the opinion that ſubterraneous fire had been the principal agent gains ground daily; and every thing is ſuppoſed to have been melted, even to the
20 Both fire and water contribute to form baſaltes. granite. It is not improbable, that both the fire and water have contributed their ſhare in this operation; though in ſuch a proportion, that the force of the former extends much farther than the latter; and, on the contrary, that the fire has only worked in ſome parts of the ſurface of the earth. It cannot be doubted that there has been ſome connection betwixt the baſaltic pillars and ſubterraneous fire; as they are found in places where the marks of fire are yet viſible; and as they are even found mixed with lava, tophus, and other ſubſtances produced by fire.

21 Of the methods by which mineral cryſtals are naturally formed. "As far as we know, nature makes uſe of three methods to produce regular forms in the mineral kingdom. 1. That of cryſtallization or precipitation; 2. The cruſting or ſettling of the external ſurface of a liquid maſs while it is cooling; and, 3. The burſting of a moiſt ſubſtance while it is drying.

"The firſt method is the moſt common; but to all appearance, nature has not made uſe of it in the preſent caſe. Cryſtals are ſeldom or never found in any quantity running in the ſame direction; but either inclining from one another, or, what is ſtill more common, placed towards one another in ſloping directions. They are alſo generally ſeparated a little from one another when they are regular. The nature of the thing requires this, becauſe the ſeveral particles of which the cryſtals are compoſed muſt have the liberty of obeying that power which affects their conſtitution. The baſaltic columns, on the contrary, whoſe height is frequently from 30 to 40 feet, are placed parallel to one another in conſiderable numbers, and ſo cloſe together that the point of a knife can hardly be introduced between them. Beſides, in moſt places, each pillar is divided into ſeveral parts or joints, which ſeem to be placed on one another. And indeed it is not uncommon for cryſtals to be formed above one another in different layers, while the ſolvent has been viſibly diminiſhed at different times: but then the upper cryſtals never fit ſo exactly upon one another as to produce connected priſms of the ſame length or depth in all the ſtrata taken together; but each ſtratum, ſeparately taken, produces its own cryſtals.

"Precipitation, both in the wet and dry way, requires that the particles ſhould be free enough to arrange themſelves in a certain order; and as this is not practicable in a large melted maſs, no cryſtallizations appear, excepting on its ſurface or in its cavities. Add to this, that the baſaltes in a freſh fracture do not ſhow a plain ſmooth ſurface under the microſcope; but appear ſometimes like grains of different magnitude, and at other times reſemble fine rays running in different directions, which does not correſpond with the internal ſtructure of cryſtals. Baſaltes.

"Hence the opinion of baſaltes being formed by cryſtallization either in the wet or dry method muſt become leſs probable; but it muſt not be omitted, that the ſpars exhibit a kind of cryſtallization, which at firſt ſight reſembles a heap of baſaltes, but upon a cloſer examination a very great difference is to be found. The form of the ſpar is everywhere alike, but the baſaltes differ from one another in ſize and the number of their ſides. The former, when broken, conſiſts of many ſmall unequal cubes; but the baſalt does not ſeparate in regular parts, &c. &c.

"Nature's ſecond method of producing regular forms is that of cruſting the outer ſurface of a melted maſs. By a ſudden refrigeration, nature, to effect this purpoſe, makes uſe of polyhedrous and irregular forms. If we ſuppoſe a conſiderable bed which is made fluid by fire, and ſpread over a plain, it evidently appears, that the ſurface muſt firſt of all loſe the degree of heat requiſite for melting, and begin to congeal. But the cold requiſite for this purpoſe likewiſe contracts the uppermoſt congealed ſtratum into a narrower ſpace; and conſequently cauſes it to ſeparate from the remaining liquid maſs, as the ſide expoſed to the air is already too ſtiff to give way. In this manner a ſtratum is produced, running in a parallel direction with the whole maſs; others are ſtill produced by the ſame cauſe in proportion as the refrigeration penetrates deeper. Hence we may very plainly ſee how a bed may be divided into ſtrata. In the ſame manner the refrigeration advances on the ſides; which conſequently divides the ſtrata into polyhedrous pillars, which can hardly ever be exactly ſquare, as the ſtrongeſt refrigeration in the inner parts of the maſs advances almoſt in a diagonal line from the corners. If we add to this, that a large maſs cannot be equal through its compoſition, nor everywhere liquid in the ſame degree, it will be eaſy to diſcover the cauſe of ſeveral irregularities. If the depth of the bed be very conſiderable in proportion to its breadth, priſmatic pillars without croſs diviſions will be formed at leaſt lengthwiſe from the uppermoſt ſurface downwards.

"The third way is perfectly ſimilar to the preceding in its effect; but it is different from it by the maſs being ſoaked in water, and by the burſting of it aſunder, being the effect of the contraction while it is drying. If we ſuppoſe ſuch a bed to be ſpread over a level ſpace, the drying advances in the ſame manner as the refrigeration in the former caſe. This ſeparation into ſtrata properly happens when a conſiderable quantity of clay enters into the whole compoſition, becauſe the clay decreaſes more than any other kind of earth in drying.

22 How the baſaltes have been formed, according to this theory. "It is moſt probable, therefore, that the pillars have been produced out of the baſaltic ſubſtance while it was yet ſoft, or at leaſt not too hard to be ſoftened by exhalations. If we therefore ſuppoſe a bed to be ſpread over a place where a volcano begins to work, it

Baſaltes. it is evident that a great quantity of the water always preſent on ſuch occaſions muſt be driven upwards in exhalations or vapours; which, it is well known, poſſeſs a penetrating ſoftening power, by means of which they produce their firſt effect: but when they are increaſed to a ſufficient quantity, they force this tough moiſt ſubſtance upwards; which then gradually falls, and during this time burſts in the manner above deſcribed.

23 Reaſons for ſuppoſing that the baſaltes has not been melted.

"The reaſons for this ſuppoſition are as follows: 1. We do not find the internal ſubſtance of the baſaltes melted or vitrified; which, however, ſoon happens by fuſion; and for which only a very ſmall degree of fire is requiſite. It is of conſequence very hard to explain how this ſubſtance could have been ſo fluid that no traces of bubbles appear in it; and yet, when broken, ſeem dull and uneven. Lava is ſeldom vitrified within; but the great number of bubbles and pores which are found in the whole maſs, are more than ſufficient proofs, that it has not been perfectly melted to its ſmalleſt parts, but has only been brought to be near fluid. Secondly, the baſaltes ſo much reſemble the finer trapp, both in their grain and original compoſition, that they can hardly be diſtinguiſhed in ſmall fragments."

24 Mr Kirwan's opinion.

Mr Kirwan is of opinion, that the baſaltes owe their origin both to fire and water: they ſeem to have been at firſt a lava; but this, while immerſed in water, was ſo diffuſed or diſſolved in it with the aſſiſtance of heat, as to cryſtallize when cold, or coaleſce into regular forms. That baſaltes is not the effect of mere fuſion he concludes from comparing its form with its texture. Its form, if produced by fuſion, ought to be the effect of having flowed very thin; but in that caſe its texture ſhould be glaſſy: whereas it is merely earthy and devoid of cavities. Hence we may underſtand how it comes to paſs that lava perfectly vitrified, and even water, have been found encloſed in baſaltes.

25 Mr Houel's theory.

Mr Houel in his *Voyage Pittoreſque*, is at conſiderable pains to account for the origin of the different ſpecies of baſaltes he met with in the neighbourhood of Ætna. "Some modern writers (ſays he) attribute the configuration of the baſaltes to the ſudden cooling of the lava in conſequence of the effects produced upon it by the coldneſs of ſea-water, when it reaches the ſea in a ſtate of fuſion. They ſuppoſe that the ſhock, which it then receives, is the cauſe of thoſe different configurations which this ſubſtance aſſumes; the moſt remarkable of which have been already mentioned. This aſſertion, however, ſeems to be ill founded. By conſidering the baſaltic rock, the firſt of the Cyclops repreſented in the plate, we find that the pile is not in its original ſtate, and that the ſeries of columns is at preſent incomplete. It is very probable, that the ſpecies of clay found there, and which is extraneous to the baſaltes, has by ſome means taken poſſeſſion of its place; and it likewiſe appears, that not one of the baſaltes here deſcribed is entire.

"It ſeems incredible, however, that a maſs of matter reduced by fire to a ſtate of liquefaction, and flowing into the ſea, ſhould be ſuddenly changed into regular figures by the ſhock of coming into contact with cold water; and that all the figures which are thus formed ſhould be diſpoſed in the ſame manner with regard to one another. For if we ſuppoſe that the water made its way into the cavity of the lava at the inſtant when it retreated backwards, then might the ſame quantity of water penetrate into the moſt remote parts of the maſs; and by that means prolong the cavity which it had begun to form when it firſt entered the maſs. The water then being lodged within this burning maſs, and being in a ſtate of dilatation, would have expelled whatever oppoſed it, and ſwelled the whole maſs in ſuch a manner as to form much larger interſtices than thoſe which appear between the baſaltic columns; ſince theſe are everywhere in cloſe contact with one another. Beſides, how could the ſudden cooling of the lava divide the upper part and ſides of ſuch an enormous maſs as exactly as if they had been caſt in a mould made on purpoſe? Baſaltes.

"It remains alſo for thoſe who adopt the hypotheſis in queſtion to explain how the ſhock occaſioned by the cold water ſhould make itſelf felt beyond a certain depth; ſince the very firſt moment it comes into contact with the liquid lava, it muſt ceaſe to be cold; for the lava cannot but communicate to it a greater degree of heat than it communicates of cold in return, as the water is more eaſily penetrable by the burning lava than the maſs of lava by the ſurrounding water. But farther, if at the firſt moment after the lava enters the water it were cooled and contracted, the water would ſoon prevent, by the contraction of its whole ſurface, any continuation of the effect which it had firſt occaſioned.

"This ſeems to be the great difficulty: for how is it thus poſſible for the water to extend its influence to the centre of any very conſiderable maſs; and even ſuppoſing it to act at the centre, how could it be able to fix the common centre of all the different columns?

"Let us next conſider what a degree of ebullition muſt take place in the water when it receives ſuch a vaſt quantity of lava heated not only more intenſely than common fire, but than red-hot iron! Though that maſs, 100 fathoms in diameter, were to proceed from the bottom of the ſea; or though it were immerſed in it, the degree of ebullition would ſtill be the ſame; and it is difficult to conceive what ſhock can be occaſioned by a cold which does not exiſt, on a maſs which burns, or cauſes to boil, whatever comes near it.

"One peculiarity attending the baſaltes is, that it remains fixed in the receſs which it has once occupied. Another, not leſs eſſential, is its power of dividing itſelf in the midſt of any one of its hardeſt parts, and to form two diſtinct pieces, one of which is always concave, and the other convex; a diviſion which ſeems the moſt ſingular curioſity of the whole.

"A third peculiarity might ſtill be found in the interior part of theſe columns, if we were to meet with any that had ſuffered more by the lapſe of time than thoſe already deſcribed; but it is impoſſible for all this to be effected by water. How can water, which is everywhere the ſame, and which may be expected always to produce the ſame effects, produce ſuch a variety on baſaltes by mere contact?

"The cauſe of all theſe varieties, therefore, ſeems to be this, that theſe lavas are originally compoſed of materials extremely different in their natures, and from which ſuch a variety of effects naturally proceed. The

Baſaltes. ſame ſpecies of matter, when actuated by the ſame cauſe, will conſtantly produce the ſame effects. This variety of effects therefore is much leſs owing to the influence of the water, than to the variety of materials of which thoſe lavas are compoſed; and theſe are combined in different forms and quantities, according to the nature and quantity of the various materials which have been reduced by the volcano to a ſtate of fuſion.

"The forms of the baſaltes therefore proceed from two cauſes. One of them, viz. the cooling, belongs indifferently to every ſpecies, independent of its meeting with water. The other is the diverſity of the quantities and of the materials of which the lava is compoſed. From theſe cauſes alone proceed all the beauties and varieties which are beheld with admiration in this claſs of bodies. Theſe take place, from the moſt irregular fractures in the lava, to thoſe which diſplay the greateſt exactneſs and ſymmetry. Every new erupted lava differs from thoſe which preceded it, and from thoſe which will follow. In the various principles of theſe lavas we muſt ſeek for the cauſes of thoſe cavities diſcoverable in the baſaltes, and for the cauſes which produce thoſe baſaltes, at the time when the matter of which it is compoſed contracted itſelf, and conſolidated all its parts. In the act of condenſation, it appears to have formed various foci, around which we may diſtinguiſh the line which ſets bounds to the power of each of them; and this is the line which marks the ſpaces intervening between the different pieces; becauſe all of them are poſſeſſed of the ſame attractive force. The fire emitted by the lava, at the time the baſaltes is formed, produces upon it the ſame effect that is produced by the evaporation of the aqueous moiſture from thoſe bodies where water forms a part of the original conſtitution; which bodies harden in proportion as they become dry, by reaſon of the approach of their conſtituent parts to one another. The abſtraction of fire produces the ſame effect upon baſaltes, by ſuffering its component parts to come into cloſer union.

"A new proof of this theory is deducible from the form of the baſaltes repreſented Plate LXXXVII. fig. 2. The interſtices there are pretty numerous; becauſe the lava being of that ſpecies denominated *dirty*, and conſiſting of parts, moſt of which have but little ſolidity, they have left much larger ſpaces between them at their contraction. From this want of ſolidity we may perceive how much the baſaltic maſs loſt of the fire by which it was dilated while in a ſtate of fuſion.

"The void ſpaces left by the contraction of the baſaltes, are filled with a ſpongy matter, which by drying has alſo left large interſtices; and theſe have been filled in their turn with a kind of yellow matter ſimilar to that which covers the promontory of Caſtel d'Iaci.

"Whatever variety of forms we meet with among the baſaltes, and whatever diviſions and ſubdiviſions may be obſervable among theſe varieties, they are owing, 1. To the minuteneſs, 2. To the homogeneous nature, or, 3. To the diverſity among the particles which compoſe the baſaltes. Among the varieties already enumerated, we find reddiſh, earthy, ſoft and porous ſubſtances, together with the zeolite cryſtals. We ſee others extremely hard and compact, very finely grained, and containing likewiſe ſchoerl and zeolite cryſtals. Others are very hard and denſe, which appear to be a mixture of ſmall gray and white bodies; and of each of theſe colours many different ſhades, from light to darker, containing alſo zeolite cryſtals. Laſtly, we find ſome conſiſting of a matter ſimilar to clay, mixed with round black ſand. Baſan || Baſe.

"It may be objected, that the late eruptions of Ætna afford no baſaltes, nor have they any diviſions ſimilar to thoſe above mentioned. But to this we may reply, that if they afford neither ſuch baſaltes, nor ſuch regular diviſions, the reaſon is, that neither their quantity, nor the ingredients of which they are compoſed, are ſuch as are neceſſary for the production of baſaltes: and for a proof of this we may refer to lavas of the moſt remote antiquity, which have no more reſemblance to baſaltes than thoſe that are more modern.

"Laſtly, an argument, to which no plauſible reply can be made, that the baſaltes are not formed by ſea-water, is, that in the year 1669, the lava of Mount Ætna ran into the ſea for two leagues and a half, without having the leaſt appearance of being converted into baſaltes."

BASAN, or BASHAN in *Ancient Grography*, a territory beyond Jordan, mentioned in Scripture. By Joſephus, Euſebius, and Jerome, it is called *Batanæa*. On the entering of the Iſraelites into the land of Canaan, the whole of the country beyond Jordan, from that of the Moabites, or Arabia, as far as Mount Hermon and Lebanon, was divided into two kingdoms, viz. that of Sihon king of the Amorites, and of Og king of Baſan or *Baſhan*; the former to the ſouth, and the latter to the north. The kingdom of Sihon extended from the river Arnon and the country of Moab, to the river Jabbok; which running in an oblique courſe from the eaſt, was at the ſame time the boundary of the Ammonites, as appears from Numb. xxi. 24. and Deut. ii. 37. and iii. 16. The kingdom of Sihon fell to the lot of the Reubenites and Gadites, and Baſan to the half-tribe of Manaſſeth. To this was annexed a part of the hilly country of Gilead, and the diſtrict of Argob; yet ſo that Baſan continued to be the principal and greateſt part: but, after the Babyloniſh captivity, Baſan was ſubdivided; ſo that only a part was called *Batanea* or *Baſan*, another *Trachonitis*, a third *Auranitis* or *Ituræa*, and ſome part alſo *Gaulonitis*; but to ſettle the limits of each of theſe parts is a thing now impoſſible.—Baſhan was a country famous for its paſtures and breed of large cattle.

BASARTSCHIK, a conſiderable town of Romania, in Turkey in Europe. It is pretty well built, and hath clean and broad ſtreets; has a great trade; and is ſituated on the river Meritz, in E. Long. 24. 30. N. Lat. 41. 49.

BASARUCO in *Commerce*, a ſmall baſe coin in the Eaſt Indies, being made only of very bad tin. There are, however, two ſorts of this coin, a good and a bad; the bad is one-ſixth in value lower than the good.

BASE, in *Geometry*, the loweſt ſide of the perimeter of a figure: Thus, the baſe of the triangle may be ſaid of any of its ſides, but more properly of the loweſt, or that which is parallel to the horizon. In rectangled

BASALTES.

Plate LXXXVI.

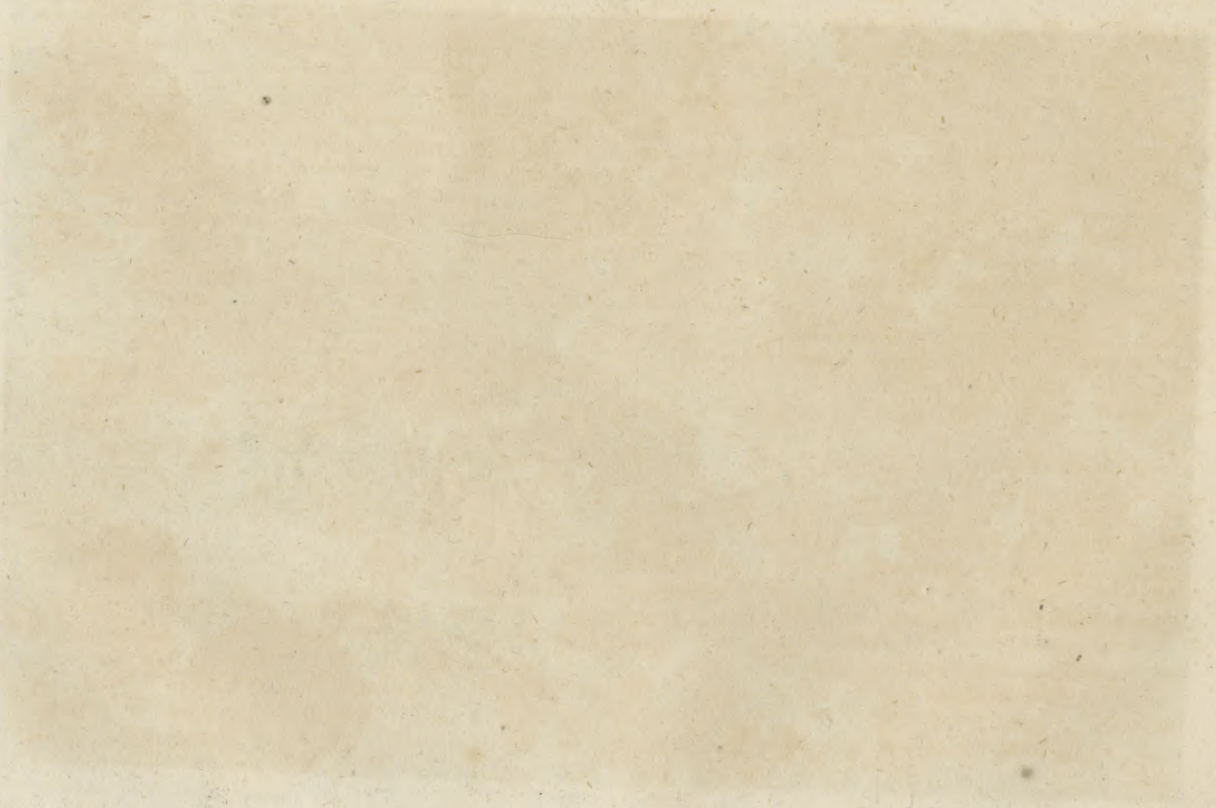
Fig. 1.

Fig. 2.

A. Bell Prin. Wal. Sculptor fecit.

Fig. 2.

Adlard Prin. Wal. Sculptor fecit.



Baſe || Baſhaw.

led triangles, the baſe is properly that ſide oppoſite to the right angle.

Base of a Solid Figure, the loweſt ſide, or that on which it ſtands.

Base of a Conic Section, a right line in the hyperbola and parabola, ariſing from the common interſection of the ſecant plane and the baſe of the cone.

Base, in *Architecture*, is uſed for any body which bears another, but particularly for the lower part of a column and pedeſtal.—The ancients, in the early times of architecture, uſed no baſes. The Doric columns in the temple of Minerva at Athens have none, but ſtand immediately upon the floor of the porch. Columns afterwards came to be ſupported on ſquare pieces called *plinths*, and after that on pedeſtals. When we ſee a column, of whatſoever order, on a pedeſtal, the baſe is that part which comes between the top of the pedeſtal and the bottom of the ſhaft of the column; when there is no pedeſtal, it is the part between the bottom of the column and the plinth: ſome have included the plinth as a part of the baſe; but it is properly the piece on which the baſe ſtands, as the column ſtands upon that.—The pedeſtal alſo has its baſe as well as the column, and the pilaſter. The baſe of columns is differently formed in the different orders; but in general it is compoſed of certain ſpires or circles, and was thence in early times called the *ſpire of a column*. Theſe circles were in this caſe ſuppoſed to repreſent the folds of a ſnake as it lies rolled up; but they are properly the repreſentations of ſeveral larger and ſmaller rings or circles of iron, with which the trunk of trees, which were the ancient columns, were ſurrounded to prevent their burſting: theſe were rude and irregular, but the ſculptor who imitated them in ſtone found the way to make them elegant.

Base, in *Fortification*, the exterior ſide of the polygon, or that imaginary line which is drawn from the flanked angle of a baſtion to the angle oppoſite to it.

Base, in *Gunnery*, the leaſt ſort of ordnance, the diameter of whoſe bore is $1\frac{1}{4}$ inch, weight 200 pound, length 4 feet, load 5 pound, ſhot $1\frac{1}{2}$ pound weight, and diameter $1\frac{1}{8}$ inch.

Base, in *Chemiſtry*. See Basis.

Base, in *Law*. *Baſe eſtate*, ſuch as baſe tenants have in their hands. *Baſe tenure*, the holding by villenage, or other cuſtomary ſervices; as diſtinguiſhed from the higher tenures *in capite*, or by military ſervice. *Baſe fee*, is to hold in fee at the will of the lord, as diſtinguiſhed from ſoccage tenure. *Baſe court*, any court not of record.

BASELLA, climbing nightshade. See Botany *Index*.

BASEMENT, in *Architecture*. See Architecture.

BASHARIANS, a ſect of Mahometans, being a branch or ſubdiviſion of the Motazalites. The Baſharians are thoſe who maintain the tenets of Baſhar Ebn Motamer, a principal man among the Motazalites, who varied, in ſome points, from the general tenets of the ſect, as carrying man's free agency to a great length, and even to the making him independent.

BASHAW, a Turkiſh governor of a provice, city, or other diſtrict.

A baſhaw is made with the ſolemnity of carrying a ſlag or banner before him, accompanied with muſic and ſongs, by the mirialem, an officer on purpoſe for the inveſtiture of baſhaws. *Baſhaw*, uſed abſolutely, denotes the prime vizier; the reſt of the denomination being diſtinguiſhed by the addition of the province, city, or the like, which they have the command of; as the baſhaw of Egypt, of Paleſtine, &c. The baſhaws are the emperor's ſponges. We find loud complaints among Chriſtians of their avarice and extortions. As they buy their governments, every thing is venal with them. When glutted with wealth, the emperor frequently makes them a preſent of a bow ſtring, and becomes heir to all their ſpoils. Baſh.

The appellation *Baſhaw* is given by way of courteſy to almoſt every perſon of any figure at the grand ſignior's court.

BASIL, St, the Great, one of the moſt learned and eloquent doctors of the church, was born at Cæſarea, in Cappadocia, about the year 328; and went to finiſh his ſtudies at Athens, where he contracted a ſtrict friendſhip with St Gregory Nazianzen. He returned to his native country in 355, where he taught rhetoric. Some time after, he travelled into Syria, Egypt, and Lybia, to viſit the monaſteries of theſe countries; and the monaſtic life ſo much ſuited his diſpoſition, that upon his return home he reſolved to follow it, and he was the firſt inſtitutor thereof in Pontus and Cappadocia. His reputation became ſo great, that, upon the death of Euſebius biſhop of Cæſarea, in 370, he was choſen his ſucceſſor. It was with ſome difficulty that he accepted of this dignity; and no ſooner was he raiſed to it, than the emperor Valens began to perſecute him becauſe he refuſed to embrace the doctrine of the Arians. Being at length let alone, he began to uſe his utmoſt endeavours to bring about a reunion betwixt the eaſtern and weſtern churches, who were then much divided about ſome points of faith, and in regard to Meletius and Paulinus two biſhops of Antiochia. But all his efforts were ineffectual, this diſpute not being terminated till nine months after his death. Baſil had a ſhare in all the diſputes which happened in his time in the eaſt in regard to the doctrine of the church; and died the firſt of January, 379.—There have been ſeveral editions of his works in Greek and Latin. The beſt is that of Father Garnier, printed in Greek and Latin, in three volumes folio. St Baſil's ſtyle is pure and elegant, his expreſſions are grand and ſublime, and his thoughts noble and full of majeſty. Eraſmus places him among the greateſt orators of antiquity.

Basil, a canton of Switzerland, which joined the confederacy in 1501. It is bounded on the ſouth by the canton of Solothurn; on the north by part of the margravate of Baden-Dourlach, and the territory of Rheinfelden; on the eaſt by Frickthal; and on the weſt by part of Solothurn, the dioceſe of Baſil, and the Sundgare; being upwards of 20 miles in length, and about 18 in breadth. It is entirely proteſtant; and contains 27 pariſhes, and ſeven bailiwics. The lower parts of it are fruitful in corn and wine, and alſo fit for paſture; but the mountains are extremely barren. Here are many medicinal ſprings and baths, and the air is wholeſome and temperate. Both men and women for the moſt part wear the French dreſs; but the language commonly ſpoken is the High-Dutch, though the

Basil. French is also much used. The government is aristocratical; and its revenues arise chiefly from secularized abbeys, and imposts on goods carried through the country, to and from France, Italy, and Germany. Besides the military establishment of the city of Basil, there are two provincial regiments, consisting each of ten companies, and a troop of dragoons.—The places of most note are Basil the capital, Wallenburg, St Jacob, Neue-Haus, &c.

Basil, the capital of the canton of that name, is the largest city in all Switzerland, having 220 streets, and six market-places or squares. Its environs are exceeding beautiful, consisting of a fine level tract of fields and meadows. The city is divided into two parts by the Rhine, over which there is a handsome bridge. It it is thought by some to have risen on the ruins of the old Augusta Rauracorum. For its name of *Basilia* it is indebted to Julian the Apostate, who would have it so called in honour of his mother Basilina. It is fortified with walls, moats, towers, and bastions, and contains several churches, besides the cathedral, which is an old Gothic structure; a commandery of the order of St John, and another of the Teutonic order; a public granary and arsenal; a stately townhouse, in which is an exquisite piece of the sufferings of Christ, by Holbein, and a statue of Munatius Plancus, a Roman general, who about 50 years before Christ, built the ancient city of Augusta Rauracorum; an university, which was founded in 1459, and has a curious physic-garden, library, and museum; a gymnasium; a stately palace, belonging to the margrave of Baden-Dourlach; besides a chamber of curiosities, several hospitals, &c. In the arsenal is shown the armour in which Charles the Bald lost his life, with the furniture of his horse, and the kettle-drums and trumpets of his army. On the stair-case of the council-house, is a picture of the last judgment, in which, though drawn before the reformation, popes, cardinals, monks, and priests, are represented in the torments of hell. Over-against the French church, on a long covered wall, is painted the dance of death; where the king of terrors is represented as mixing with all ranks and ages, and complimenting them, in German verses, on their arrival at the grave. St Peter's square, planted with elm and lime-trees, makes a pleasant walk; but a spot regularly planted with trees, close by the river, and near the minster, makes still a finer, as commanding a most beautiful and extensive prospect. The celebrated Erasmus died here in 1536, in the 70th year of his age, and was buried in the great church. He left his library and cabinet of rarities to one Amberbach, a learned lawyer of this city, of whose heirs they were purchased by the university. Besides this cabinet, there are several other curious private ones. The clocks of this city go an hour faster than elsewhere, except at Constance; a circumstance which some ascribe to the famous councils held there, when it was thought the best expedient to bring the fathers early to the assembly, for the quicker despatch of business; but others say, that, in Basil, it was owing to an assault being defeated by that means. About 400 years ago, according to the story, the city was threatened with an assault by surprise. The enemy was to begin the attack when the large clock of the tower at one end of the bridge should strike one after midnight. The artist who had the care of the clock, being informed that this was the expected signal, caused the clock to be altered, and it struck two instead of one; so the enemy thinking they were an hour too late, gave up the attempt: and in commemoration of this deliverance, all the clocks in Basil have ever since struck two at one o'clock, and so on. In case this account of the matter should not be satisfactory, they show, by way of confirmation, a head, which is placed near to this patriotic clock, with the face turned to the road by which the enemy was to have entered. This same head lolls out its tongue every minute, in the most insulting manner possible. This was originally a piece of mechanical wit of the famous clockmaker's who saved the town. He framed it in the derision of the enemy, whom he had so dexterously deceived. It has been repaired, renewed, and enabled to thrust out its tongue every minute for these four hundred years, by the care of the magistrates, who think so excellent a joke cannot be too often repeated. Trade still flourishes here, especially in silk, ribbons, and wines; and the police is under excellent regulations. Most of the offices are bestowed by lot among well qualified persons. No person, without the city, must wear lace of gold or silver. All young women are prohibited from wearing silks; and the nearest relations only are to be invited to a marriage-feast. For the government of the city there are several councils or colleges, and officers. Of the last, the two burgomasters, and two wardens of trades, are the chief. The great council is composed of the representatives of the several companies of the greater and lesser city. Basil was the see of a bishop till the Reformation; but though there is one that still bears the title, he has now no jurisdiction here, and lives at Porentru, near the Upper Alsace. The two Buxtorffs, father and son, and the famous painter Holbein, were natives of this place. The council held here, in 1431, sat in the vestry of the cathedral.

Basil || Basilian.

Basil, in *Botany*. See Ocymum, Botany *Index*.

Basil, among joiners, the sloping edge of a chissel, or of the iron of a plane, to work on soft wood: they usually make the basil 12 degrees, and for hard wood 18; it being remarked, that the more acute the basil is, the better the instrument cuts; and the more obtuse, the stronger, and fitter it is for service.

BASILEUS, *βασιλευς*, a title assumed by the emperors of Constantinople, exclusive of all other princes, to whom they give the title *rex*, "king." The same quality was afterwards given by them to the kings of Bulgaria, and to Charlemagne, from the successors of which last they endeavoured to wrest it back again.

The title *basileus* has been since assumed by other kings, particularly the kings of England, *Ego Edgar totius Angliæ basileus confirmavi.* Hence also the queen of England was entitled *Basilea* and *Basiliſſa*.

BASILIAN monks; religious of the order of St Basil. That saint, having retired into a desert, in the province of Pontus, founded a monastery for the convenience of himself and his numerous followers: and for the better regulation of this new society, he drew up in writing the orders and rules he would have them follow. This new order soon spread all over the east; nor was it long before it passed into the west. The rule of St Basil was approved by Pope Liberius, the same

year,

Basilic. year in which it was written and published; and afterwards by several other popes; and, in these last ages, by Pope Gregory XIII. who approved the abridgement made of it by Cardinal Bessarion, in the pontificate of Eugenius IV.—Some authors pretend, that St Basil, before he died, saw himself the spiritual father of more than 90,000 monks, in the east only. But this order, which flourished so greatly for more than three centuries, was afterwards considerably diminished by heresy, schism, and a change of empire. The greatest storm it felt, was in the reign of Constantine Copronymus; who persecuted the monks of St Basil, imprisoning some, and banishing others; insomuch that the monasteries were abandoned and spoiled of all their goods.

The historians of this order tell us, that it has produced 1805 bishops; and beatified, or acknowledged as saints, 3010 abbots, 11,805 martyrs, and an infinite number of confessors and virgins. They likewise place among the religious of the order of St Basil 14 popes, some cardinals, and a very great number of patriarchs, archbishops, and bishops. This order likewise boasts of several emperors and empresses, kings and queens, princes and princesses, who have embraced its rule.

This order was introduced in the west in 1057; and was reformed in 1569, by Pope Gregory XIII. who united the religious of this order in Italy, Spain, and Sicily, into one congregation; of which the monastery of St Saviour at Messina is the chief, and enjoys preeminence over the rest. Each community has its particular rule, besides the rule of St Basil, which is very general, and prescribes little more than the common duties of a Christian life.

BASILIC, or Basilica, in the ancient architecture, denotes a kind of public hall or court of judicature, where the princes or magistrates sat to administer justice. The word is originally Greek, βασιλικη, *q. d. royal house, palace.*

The basilics consisted of a great hall, with ailes, porticos, tribunes, and tribunals. The bankers too had one part of the basilica allotted for their residence. The scholars also went thither to make their declamations, according to the testimony of Quintilian. In after-times the denomination *basilica* was also given to other buildings of public use, as town-houses, exchanges, burses, and the like. The Roman *basilicæ* were covered, by which they were distinguished from the *fora*, which were public places open to the air. The first basilica was built at Rome by Cato the elder, whence it was called *Porcia:* the second was called *Opimia;* the third was that of Paulus, built with a great expence, and with much magnificence, whence it was called by some *regia Pauli;* another was built by Julius Cæsar, called *basilica Julia;* of which Vitruvius tells us he had the direction. There were others also, to the number of eighteen or twenty. The *basilica Julia* not only served for the hearing of causes, but for the reception and audience of foreign ambassadors. It was supported by a hundred marble pillars in four rows, and enriched with decorations of gold and precious stones. In it were 13 tribunals or judgment-seats, where the prætors sat to despatch causes.

Basilic is also used, in ecclesiastical writers, for a church. In which sense, this name frequently occurs in St Ambrose, St Austin, St Jerome, Sidonius Apollinaris, and other writers of the fourth and fifth centuries. It is thought that the name was thus applied, from many of the ancient churches having been formed of the Roman halls mentioned in the preceding article. In reality, on the conversion of Constantine, many of the ancient *basilicæ* were given to the church, and turned to another use, viz. for Christian assemblies to meet in, as may be collected from that passage of Ausonius, where speaking to the emperor Gratian, he tells him, the *basilicæ*, which heretofore were wont to be filled with men of business, were now thronged with votaries praying for his safety. By which he must needs mean, that the Roman halls or courts were turned into Christian churches: and hence, we conceive, the name *basilicæ* came to be a general name for churches in after ages.

Basilic || Basilicata.

Basilic is chiefly applied, in modern times, to churches of royal foundation; as those of St John de Lateran, and St Peter of the Vatican at Rome, founded by the emperor Constantine.

Basilics were also little chapels built by the ancient Franks over the tombs of their great men, so called, as resembling the figure of the sacred *basilicæ* or churches. Persons of inferior condition had only *tumbæ* or *porticuli* erected over them. By an article in the Salic law, he that robbed a *tumba* or *porticulus*, was to be fined fifteen *solidi;* but he that robbed a basilica, thirty *solidi.*

Basilics, in literary history, a name supposed to have been given by the emperor Leo to a collection of laws in honour of his father Basilius Macedo, who began it in the year 867, and in the execution chiefly made use of Sabbathius Protospatharius, who carried the work as far as 40 books. Leo added 20 books more, and published the work in 880. The whole, 30 years after, was corrected and improved by Constantin Porphyrogenitus, son of Leo; whence many have held him the author of the Basilica. Six books of the Basilica were translated into Latin in 1557, by Gentian Hervetus. An edition of the Greek Basilics, with a Latin version, has been since published at Paris, in 1647, by Annib. Fabrottus, in 7 volumes. There are still wanting 19 books, which are supposed to be lost. Fabrottus has endeavoured to supply in some measure the defect from the synopsis of the Basilica, and the glosses; of which several had been made under the succeeding emperors, and contained the whole Justinian law, excepting the superfluities, in a new and more consistent order, together with the later constitutions of the emperors posterior to Justinian.

BASILICA, in *Anatomy*, the interior branch of the axillary vein, running the whole length of the arm.

BASILICATA, a territory of Italy, bounded on the north by the Otranto, Bari, and Capitanata; on the west by the Principato, and a small part of the Tuscan sea; on the south by Calabria; and on the east by the gulf of Taranto. It is watered by several rivers: but as it is almost all occupied by the Apennine mountains, it is neither very populous nor fertile; however it produces enough to maintain its inhabitants, and has a small quantity of cotton. The principal towns

Baſilici || Baſiliſk.

towns are Cirenza the capital, Meſi, Turſi, Rapollo, Muro, Lavello, Tracarico, Monte Peloſe, and Venoſo, which are all epiſcopal ſees.

BASILICI, a denomination given in the Greek empire to thoſe who carried the emperor's orders and commands.

BASILICON, in *Pharmacy*, a name given to ſeveral compoſitions to be found in ancient medicinal writers. At preſent it is confined to three officinal ointments, diſtinguiſhed by the epithets black, yellow, and green. See PHARMACY.

BASILIDIANS, ancient heretics, the followers of Baſilides, an Egyptian, who lived near the beginning of the ſecond century. He was educated in the Gnoſtic ſchool, over which Simon Magus preſided; with whom he agreed that Chriſt was a man in appearance, that his body was a phantom, and that he gave his form to Simon the Cyrenian, who was crucified in his ſtead. We learn from Euſebius, that this hereſiarch wrote 24 books upon the goſpel, and that he forged ſeveral prophets; to two of which he gave the names *Barcaba* and *Barcoph*. We have ſtill the fragment of a Baſilidian goſpel. His diſciples ſuppoſed there were particular virtues in names; and taught with Pythagoras and Plato, that names were not formed by chance, but naturally ſignified ſomething.—Baſilides, to imitate Pythagoras, made his diſciples keep ſilence for five years.

In general, the Baſilidians held much the ſame opinions with the Valentinians, another branch of the Gnoſtic family. They aſſerted, that all the actions of men are neceſſary; that faith is a natural gift, to which men are forcibly determined, and ſhould therefore be ſaved though their lives were ever ſo irregular. Irenæus and others aſſure us, they acted conſiſtently with their principle; committing all manner of villanies and impurities, in confidence of their natural election. They had a particular hierarchy of divine perſons, or Æons. Under the name *Abraxas*, they are ſaid to have worſhipped the ſupreme God, from whom as a principle, all other things proceeded. There are ſeveral gems ſtill ſuſtiſting, inſcribed with the name *Abraxas*, which were uſed by the Baſilidians as amulets againſt diſeaſes and evil ſpirits. See ABRASAX and ABRAX.

BASILIPPUM, in *Ancient Geography*, a town of Bætica in Spain; now *Cantillana*, a citadel of Andaluſia, above Seville, on the Guadalquivir.

BASILISCUS, in *Zoology*, the trivial name of a ſpecies of lacerta. See LACERTA, ERPETOLOGY *Index*.

BASILISK, a fabulous kind of ſerpent, ſaid to kill by its breath or ſight only. Galen ſays, that it is of a colour inclining to yellow; and that it has three little eminences upon its head, ſpeckled with whitiſh ſpots, which have the appearance of a ſort of crown. Ælian ſays, that its poiſon is ſo penetrating, as to kill the largeſt ſerpents with its vapour only; and that if it but bite the end of any man's ſtick, it kills him. It drives away all other ſerpents by the noiſe of its hiſſing. Pliny ſays, it kills thoſe who look upon it.—The generation of the baſiliſk is not leſs marvellous, being ſaid to be produced from a cock's egg, brooded on by a ſerpent. Theſe, and other things equally ridiculous, are related by Matthiolus, Galen, Dioſcorides, Pliny, and Eraſiſtratus. Hirchmayer and Vander Wiel have given the hiſtory of the baſiliſk, and detected the folly and impoſture of the traditions concerning it.—In ſome apothecaries ſhops there are little dead ſerpents ſhown, which are ſaid to be baſiliſks. But theſe ſeem rather to be a kind of ſmall bird, almoſt like a cock, but without feathers: its head is lofty, its wings are almoſt like a bat's, its eyes large, and its neck is very ſhort. As to thoſe which are ſhown and ſold at Venice, and in other places, they are nothing but little thornbacks artificially put into a form like that of a young cock, by ſtretching out their fins, and contriving them with a little head and hollow eyes: and this, Calmet ſays, he has in reality obſerved in a ſuppoſed baſiliſk, at an apothecary's ſhop at Paris, and in another at the Jeſuits of Pont-a-Mouſſon.

Baſiliſk || Baſis.

BASILISK, in military affairs, a large piece of ordnance, thus denominated from its reſemblance to the ſuppoſed ſerpent of that name. The baſiliſk throws an iron ball of 200 pound weight. It was much talked of in the time of Solyman emperor of the Turks, in the wars of Hungary; but ſeems now out of uſe. Paulus Jovius relates the terrible ſlaughter made by a ſingle ball from one of theſe baſiliſks in a Spaniſh ſhip; after penetrating the boards and planks in the ſhip's head, it killed above 30 men. Maffeus ſpeaks of baſiliſks made of braſs, which were drawn each by 100 yoke of oxen.—Modern writers alſo give the name *baſiliſk* to a much ſmaller and ſizeable piece of ordnance, which the Dutch make 15 feet long, and the French only 10. It carries 48 pounds.

BASILIUS, ſurnamed the *Macedonian*, emperor of the Greeks. He was a common ſoldier, and of an obſcure family in Macedonia, and yet raiſed himſelf to the throne; for having pleaſed the emperor Michael by his addreſs in the management of his horſes, he became his firſt equerry, and then his great chamberlain. He at length aſſaſſinated the famous Bardas, and was aſſociated to the empire in 849. He held the eighth general council at Conſtantinople; depoſed the partriarch Photius, but in 858 reſtored him to the patriarchate; and declared againſt the popes, who refuſed to admit him into their communion. He was dreaded by his enemies the Saracens, whom he frequently vanquiſhed; and loved by his ſubjects, for his juſtice and clemency. He died in 886. Under his reign the Ruſſians embraced Chriſtianity, and the doctrine of the Greek church. He ought not to be confounded with Baſilius the Younger, who ſucceeded Zemiſces in 975, and after a reign of 50 years died in 1025.

BASINGSTOKE, a corporation town of Hampſhire in England, and a great thoroughfare on the weſtern road. It is ſeated on a ſmall brook, in W. Long. 1. 10. N. Lat. 51. 20.

BASIOGLOSSUS, a muſcle ariſing from the baſe of the os hyoides. See ANATOMY, *Table of the Muſcles*.

BASIS, or baſe, in *Geometry*. See BASE.

BASIS, or *Baſe*, in *Chemiſtry*. Any body which is diſſolved by another body, which it receives and fixes, and with which it forms a compound, may be called the *baſis* of that compound. Thus, for example, the baſis of neutral ſalts are the alkaline, earthy, and metallic matters which are ſaturated by the ſeveral acids, and form with them theſe neutral ſalts. In this ſenſe it is that theſe neutral ſalts are called *ſalts with earthy*

baſes,

Baſkerville || Baſket.

baſes, ſalts with alkaline baſes, ſalts with metallic baſes; alſo the appellations *baſis of alum, baſis of nitre, baſis of Glauber's ſalt, baſis of vitriol*, &c. ſignify the argillaceous earth, which, with the ſulphuric acid, forms alum; the vegetable alkali, which, with the nitric acid, forms nitre; the mineral alkali, which, with the ſulphuric acid, forms Glauber's ſalt; and the metal which with the ſulphuric acid, forms a ſulphate; becauſe theſe ſubſtances are ſuppoſed to be fixed, unactive, and only yielding to the action of the acids, which they fix, and to which they give a body and conſiſtence.

Basis, among *Phyſicians*, denotes the principal ingredients in compound medicines.

BASKERVILLE, John, an eminent artiſt, eſpecially in letter-founding and printing, of the preſent century. He was born in 1706 at Woverley in Worceſterſhire, and was heir to an eſtate of about 60l. a-year; the whole of which income he allowed to his parents till their deaths. In his early years he conceived a love for fine writing and cutting in ſtone; and being brought up to no particular profeſſion, he commenced writing maſter in Birmingham when about 20 years of age. The improvements in different manufactures there ſoon drew his attention, and he applied to the japan buſineſs, which he carried on for a long time with diſtinguiſhed excellence and ſucceſs. In 1750 he applied himſelf to letter founding, the bringing of which to perfection coſt him much labour and expence. In a few years he proceeded to printing: and his firſt work was an edition of Virgil on royal quarto, which now ſells for three guineas. In a ſhort time he obtained leave from the univerſity of Cambridge to print a Bible in royal folio, and editions of the Common Prayer in three ſizes: for which he paid a large ſum to the univerſity. He afterwards printed Horace, Terence, Catullus, Lucretius, Juvenal, Salluſt, and Florus, in royal quarto; Virgil in octavo; and ſeveral books in duodecimo. He publiſhed likewiſe ſome of the Engliſh claſſics. The beſt teſtimonies of the merit of theſe performances are themſelves; and Mr Baſkerville's name is deſervedly ranked among thoſe who, in modern times, have brought the art of printing to its greateſt perfection. Not meeting, however, with that encouragement from the bookſellers which he expected, he ſet up his letter-foundery for ſale a little before his death. He died without iſſue in July 1776.

BASKET, an utenſil made of twigs interwoven together, in order to hold fruit, earth, &c. As a meaſure, it denotes an uncertain quantity; as, a baſket of medlars is two buſhels, of aſafœtida from 20 to 50 pound weight. The ancient Britons were noted for their ingenuity in making baſkets, which they exported in large quantities. Theſe baſkets were of very elegant workmanſhip, and bore a high price; and are mentioned by Juvenal among the extravagant expenſive furniture of the Roman tables in his time.

Adde et baſcaudas et mille eſcaria.

Add baſkets, and a thouſand other diſhes.

That theſe baſkets were manufactured in Britain, we learn from the following epigram of Martial:

Barbara de pictis veni baſcauda Britannis,
Sed me jam mavult dicere Roma ſuam.

A baſket I, by painted Britons wrought,
And now to Rome's imperial city brought.

Baſket || Baſnage.

Baskets of Earth, in the *Military Art*, called by the French *corbeillers*, are ſmall baſkets uſed in ſieges, on the parapet of a trench, being filled with earth. They are about a foot and a half high, about a foot and a half in diameter at the top, and 8 or 10 inches at bottom; ſo that, being ſet together, there is a ſort of embraſures left at their bottoms, through which the ſoldiers fire, without expoſing themſelves.

Basket-Fiſh, a ſpecies of ſea-ſtar. See Asterias.

Basket-Salt, that made from ſalt-ſprings, being purer, whiter, and compoſed of finer grains than the common brine-ſalt. See Salt.

BASKING-shark, or *Sun-Fiſh of the Iriſh*. See Squalus.

BASNAGE, James, a learned and accompliſhed author, and paſtor of the Walloon church at the Hague, was born at Rouen in Normandy, Auguſt 8. 1653. He was the ſon of Henry Baſnage, one of the ableſt advocates in the parliament of Normandy. At 17 years of age, after he had made himſelf maſter of the Greek and Latin authors, as well as the Engliſh, Spaniſh, and Italian languages, he went to Geneva, where he began his divinity ſtudies under Meſtrezat, Turretin, and Tronchin; and finiſhed them at Sedan, under the profeſſors Jurieu and Le Blanc de Beaulieu. He then returned to Rouen, where he was received as miniſter, September 1676; in which capacity he remained till the year 1685, when, the exerciſe of the Proteſtant religion being ſuppreſſed at Rouen, he obtained leave of the king to retire to Holland. He ſettled at Rotterdam, and was a miniſter penſionary there till 1691, when he was choſen paſtor of the Walloon church of that city. In 1709 Penſionary Heinſius got him choſen one of the paſtors of the Walloon church at the Hague, intending not only to employ him in religious but in ſtate affairs. He was employed in a ſecret negociation with Marſhal d'Uxelles, plenipotentiary of France at the congreſs of Utrecht; and he executed it with ſo much ſucceſs, that he was afterwards entruſted with ſeveral important commiſſions, all which he diſcharged in ſuch a manner as to gain a great character for his abilities and addreſs; a celebrated modern writer has therefore ſaid of him, that he was fitter to be miniſter of ſtate than of a pariſh. The Abbé du Bois, who was at the Hague in 1716, as ambaſſador plenipotentiary from his moſt Chriſtian majeſty, to negociate a defenſive alliance between France, England, and the States General, was ordered by the duke of Orleans, regent of France, to apply himſelf to M. Baſnage, and to follow his advice: they accordingly acted in concert, and the alliance was concluded in January 1717. He kept an epiſtolary correſpondence with ſeveral princes, noblemen of high rank, and miniſters of ſtate, both Catholic and Proteſtant, and with a great many learned men in France, Italy, Germany, and England. The Catholics eſteemed him no leſs than the Proteſtants; and the works he wrote, which are moſtly in French, ſpread his reputation almoſt all over Europe: among theſe are, 1. The Hiſtory of the Religion of the Reformed Churches. 2. Jewiſh Antiquities. 3. The Hiſtory of the Old and New Teſtament;

Bason || Bass.

Teſtament; and many others. He died September 22. 1723.

Basnage, *Henry, Sieur de Beauval*, ſecond ſon to Henry Baſnage, and brother to James mentioned in the laſt article. He applied himſelf to the ſtudy of the law, and was admitted advocate in the parliament of Rouen in the year 1679. He did not follow the bar immediately upon his admiſſion; but went to Valencia, where he ſtudied under M. de Marville. Upon his return from thence, he practiſed with great reputation till the year 1687, when the revocation of the edict of Nantz obliged him to fly to Holland, where he compoſed the greateſt prrt of his works, and died there the 29th of March 1710. His chief work is *Hiſtoire des Ouvrages des Sçavans*. Rotterd. 24 vol. in duodecimo. This work was begun in the month of September 1687, and continued till June 1709. When he arrived in Holland, Mr Bayle, through indiſpoſition, had been obliged to drop his *Nouvelles de la Republique des Lettres*, which induced Mr Baſnage to undertake a work of the ſame kind under a different title.

BASON, in *Hydraulics*, a reſervoir of water, uſed for various purpoſes: thus we ſay, *The baſon of a jet d'eau*, *the baſon of a fountain*, and likewiſe *the baſon of a port* or *harbour*.

Bason, in Jewiſh antiquities, the laver of the tabernacle, made of the braſs looking-glaſſes belonging to thoſe devout women who watched and ſtood centinels at the door of the tabernacle.

Bason, or *Diſh*, among glaſs-grinders. Theſe artificers uſe various kinds of baſons, of copper, iron, &c. and of various forms, ſome deeper, others ſhallower, according to the focus of the glaſſes that are to be ground. In theſe baſons is is that convex glaſſes are formed, as concave ones are formed on ſpheres or bowls.

Glaſſes are worked in baſons two ways. In the firſt, the baſon is fitted to the arbor or tree of a lath, and the glaſs (fixed with cement to a handle of wood) preſented and held faſt in the right hand within the baſon, while the proper motion is given by the foot to the baſon. In the other, the baſon is fixed to a ſtand or block, and the glaſs with its wooden handle moved. The moveable baſons are very ſmall, ſeldom exceeding five or ſix inches in diameter; the others are larger, ſometimes above ten feet diameter. After the glaſs has been ground in the baſon, it is brought ſmoother with greaſe and emery; and poliſhed firſt with tripoli, and finiſhed with paper cemented to the bottom of the baſon.

Bason, among hatters, is a large round ſhell or caſe, ordinarily of iron, placed over a furnace; wherein the matter of the hat is moulded into form. The hatters have alſo baſons for the brims of hats, uſually of lead, having an aperture in the middle, of a diameter ſufficient for the largeſt block to go through.

BASQUES, a ſmall territory of France, towards the Pyrenean mountains. It comprehends Labourd, Lower Navarre, and the diſtrict of Soule, which, with Bearn, form the department of the Lower Pyrenees.

BASS, the loweſt in the four parts of muſic: of uncertain etymology; whether from the Greek word βασις, "a foundation;" or from the Italian adjective *baſſo*, ſignifying "low." Of all the parts it is the moſt important, and it is upon this that the chords proper to conſtitute a particular harmony are determined. Hence the maxim among muſicians, that when the baſs is properly formed, the harmony can ſcarcely be bad. Baſs || Baſſan.

Baſſes are of different kinds. Of which in their order.

Thorough-Bass is the harmony made by the baſs-viols, or theorbos, continuing to play both while the voices ſing and the other inſtruments perform their parts, and alſo filling up the intervals when any of the other parts ſtop. It is played by figures marked over the notes, on the organ, ſpinet, harpſichord, &c. and frequently ſimply and without figures on the baſs-viol and baſſoon.

Counter-Bass is a ſecond or double baſs, where there are ſeveral in the ſame concert.

Bass-Viol, a muſical inſtrument of the like form with that of a violin, but much larger. It is ſtruck with a bow as that is; has the ſame number of ſtrings; and has eight ſtops, which are ſubdivided into ſemi-ſtops. Its ſound is grave, and has a much nobler effect in a concert than that of the violin.

Bass, *Iſle of*, a rock, about a mile in circumference, in the mouth of the Frith of Forth, at a ſmall diſtance from the town of North Berwick in Eaſt Lothian. It is ſteep and inacceſſible on all ſides, except to the ſouth-weſt; and even there it is with great difficulty that a ſingle man can climb up with the help of a rope or ladder. It was formerly kept as a garriſon. A party of King James's adherents ſurpriſed it at the Revolution, and it was the laſt place in the three kingdoms that ſubmitted to the new government; upon which its fortifications were ordered to be neglected. In ſummer, this remarkable rock, which riſes to a great height above the water, in form of a cone, is quite covered with ſea-fowl which come hither to breed. The chief of theſe are the ſolan geeſe *, which arrive in June, and retire in September. It alſo contains a ſmall warren for rabbits, and affords paſture for a few ſheep. The force of the tides has now almoſt worn a hole quite through this rock. W. Long. 2. 15. N. Lat. 56. 3.

* See *Pelicanus, Ornithology Index.*

BASSAN, Giacomo de Pont, or Le Bassan, a celebrated Venetian painter, was born in 1510. His ſubjects generally were peaſants and villagers, buſy at their different rural occupations, according to the various ſeaſons of the year; cattle, landſcapes, and hiſtorical deſigns; and in all thoſe ſubjects the figures were well deſigned, and the animals and landſcapes have an agreeable reſemblance of ſimple nature. His compoſitions cannot boaſt of much elegance or grandeur of taſte, not even thoſe which are hiſtorical; but they have abundance of force and truth. His local colours are very well obſerved, his carnations are freſh and brilliant, and the chiaro-ſcuro and perſpective well underſtood. His touch is free and ſpirited; and the diſtances in his landſcapes are always true, if not ſometimes too dark in the nearer parts. His works are ſpread all over Europe: many of them were purchaſed by Titian; and there are ſeveral in the French king's cabinet, the royal palace, and the Hotel de Toulouſe. They are more readily known than thoſe of moſt other painters; from the ſimilitude of characters and countenances in the figures and animals; from the taſte in the buildings, utenſils, and draperies; and, beſides,

Baſſani, Baſſantin.

from a violet or purple tint that predominates in every one of his pictures. But the genuine pictures of his hand are not ſo eaſily aſcertained; becauſe he frequently repeated the ſame deſign, and his ſons were moſtly employed in copying the works of their father, which he ſometimes retouched. As he lived to be very old, he finiſhed a great number of pictures; yet notwithſtanding his application and years, the real pictures of Giacomo are not commonly met with. Many of thoſe which are called originals by purchaſers as well as dealers, being at beſt no more than copies by the ſons of Baſſan, who were far inferior to him; or perhaps by ſome painter of ſtill meaner abilities. But the true pictures of Giacomo always bear a conſiderable price if they happen to be undamaged. He died in 1592, aged 82.—Francis and Leander, his ſons, diſtinguiſhed themſelves in the ſame art; but inheriting a ſpecies of lunacy from their mother, both came to an untimely end.

BASSANI, Giovanni Battista, maeſtro di cappella of the cathedral church of Bologna about the middle of the laſt century, was a very voluminous compoſer of muſic, having given to the world no fewer than 31 different works. He is equally celebrated both as a compoſer for the church and for concerts; and was beſides a celebrated performer on the violin, and, as it is ſaid, taught Corelli on that inſtrument. His compoſitions conſiſt of maſſes, pſalms, motets with inſtrumental parts, and ſonatas for violins: his fifth opera in particular, containing 12 ſonatas for two violins and a baſs, is moſt eſteemed; it is written in a ſtyle wonderfully grave and pathetic, and abounds with evidences of great learning and fine invention. The firſt and third operas of Corelli are apparently formed after the model of this work. Baſſani was one of the firſt who compoſed motets for a ſingle voice, with accompaniments of violins; a practice which is liable to objection, as it aſſimilates church-muſic too nearly to that of the chamber; and of his ſolo-motets it muſt be confeſſed that they differ in ſtyle but little from opera airs and cantatas: two operas of them, viz. the eighth and thirteenth, were printed in London by Pearſon above 50 years ago, with the title of *Harmonia Feſtiva*.

BASSANTIN, James, a Scotch aſtronomer, ſon of the laird of Baſſantin in Mers, was born in the reign of James IV. He was educated at the univerſity of Glaſgow, travelled through Germany and Italy, and then fixed his abode in the univerſity of Paris, where he taught mathematics with great applauſe. Having acquired ſome fortune in this occupation, in 1562 he returned to Scotland, where he died in the year 1568. From his writings, he appears to have been no contemptible aſtronomer, conſidering the times; but, like moſt of the mathematicians of that age, he was not a little addicted to judicial aſtrology. Sir James Melvil, in his Memoirs, ſays that his brother Sir Robert, when he was exerting his abilities to reconcile the two queens Elizabeth and Mary, met with one Baſſantin, a man learned in the high ſciences, who told him, "that all his travel would be in vain; for, ſaid he, they will never meet together; and next, there will never be any thing but diſſembling and ſecret hatred for a while, and at length captivity and utter wreck to our queen from England." He added, "that the kingdom of England at length ſhall fall, of right, to the crown of Scotland: but it ſhall coſt many bloody battles; and the Spaniards ſhall be helpers, and take a part to themſelves for their labour." Sir James Melvil is an author of credit; therefore it is probable that our aſtrologer ventured to utter his prediction: but, as it proved true only in part, either he miſunderſtood the ſtars, or they deceived the aſtrologer. His works are, 1. *Aſtronomia Jacobi Baſſantini Scoti, opus abſolutiſſimum, &c. ter editum Latinè et Gallicè.* Genev. 1599. fol. This is the title given it by Tornæſius, who tranſlated it into Latin from the French, in which language it was firſt publiſhed. 2. *Paraphraſe de l'Aſtrolabe, avec un amplification de l'uſage de l'Aſtrolabe.* Lyons 1555. Paris 1617, 8vo. 3. *Mathematic. genethliaca.* 4. *Arithmetica.* 5. *Muſica ſecundum Platonem.* 6. *De Matheſi in genere.*

Baſſe. Baſſet.

BASSE, or Bass, a town of the French Netherlands, in the county of Flanders, on the confines of Artois, remarkable on account of the many ſieges it has ſuſtained; but its fortifications are now demoliſhed. It is ſeated on a canal which runs as far as Deule. E. Long. 3. 0. N. Lat. 50. 53.

Basse Terre, part of the iſland of St Chriſtopher's, one of the Caribbee iſlands, formerly occupied by the French, but ceded to Great Britain by the treaty of Utrecht in 1713.

BASSET, or Basette, a game with cards, ſaid to have been invented by a noble Venetian, for which he was baniſhed. It was firſt introduced in France by Signior Juſtiniani, ambaſſador of Venice, in 1674. Severe laws were made againſt it by Louis XIV. to elude which they diſguiſed baſſet under the name of *pour et contre*, that is, "for and againſt," which occaſioned new arrets and prohibitions of parliament. The parties concerned in it are, a dealer or banker; his aſſiſtant, who ſupervíſes the loſing cards; and the punter, or any one who plays againſt the banker.

Beſides theſe, there are other terms uſed in this game; as, 1. The *faſſe* or *face*, which is the firſt card turned up by the tailleur belonging to the pack, by which he gains half the value of the money laid down on every card of that ſort by the punters. 2. The *couch*, or firſt money which every punter puts on each card; each perſon that plays having a book of 13 ſeveral cards before him, on which he may lay his money, more or leſs, at diſcretion. 3. The *paroli;* which is, when a punter having won the firſt ſtake, and having a mind to purſue his good fortune, crooks the corner of his card, and lets his prize lie, aiming at a *ſept et le va*. 4. The *maſſe;* when having won the firſt ſtake, the punter is willing to venture more money on the ſame card. 5. The *pay;* when the punter having won the firſt ſtake, be it a ſhilling, half crown, guinea, or whatever he laid down on his card, and not caring to hazard the paroli, leaves off, or *goes the pay:* in which caſe, if the card turn up wrong, he loſes nothing, having won the couch before; whereas, if it turn right, he by this adventure wons double the money ſtaked. 6. The *alpiew;* much the ſame with paroli, and uſed when a couch is won by turning up or crooking the corner of the winning card. 7. *Sept et le va*, the firſt great chance or prize, when the punter, having won the couch, makes a paroli, and goes on to a ſecond chance; ſo that if his winning card turns up again, it comes to *ſept et le va*, which is ſeven

Baſſet. times as much as he laid down on his card. 8. *Quinze et le va* is the next higher prize, when the punter having won the former, is reſolved to puſh his fortune, and lay his money a ſecond time on the ſame card by crooking another corner; in which caſe, if it comes up, he wins fifteen times the money he laid down. 9. *Trent et le va* is the next higher prize, when the punter, crooking the fourth corner of his winning card, if it turn up, wins 33 times the money he firſt ſtaked. 10. *Soixant et le va* is the higheſt prize, and entitles the winner to 67 times his firſt money; which, if it were conſiderable, ſtands a chance to break the bank: but the bank ſtands many chances firſt of breaking the punter. This cannot be won but by the tailleur's dealing the cards over again.

The rules of the game of baſſet are as follow: 1. The banker holds a pack of 52 cards, and having ſhuffled them he turns the whole pack at once, ſo as to diſcover the laſt card; after which he lays down all the cards by couples. 2. The punter has his book of 13 cards in his hand, from the king to the ace; out of theſe he takes one card, or more at pleaſure, upon which he lays a ſtake. 3. The punter may, at his choice, either lay down his ſtake before the pack is turned, or immediately after it is turned, or after any number of couples are down. 4. Suppoſing the punter to lay down his ſtake after the pack is turned, and calling 1, 2, 3, 4, 5, &c. the places of thoſe cards which follow the card in view, either immediately after the pack is turned, or after any number of couples are drawn. Then, 5. If the card upon which the punter has laid a ſtake comes out in any even place, except the firſt, he wins a ſtake equal to his own. 6. If the card upon which the punter has laid a ſtake comes out in any even place, except the ſecond, he loſes his ſtake. 7. If the card of the punter comes out in the firſt place, he neither wins nor loſes, but takes his own ſtake again. 8. If the card of the punter comes out in the ſecond place, he does not loſe his whole ſtake, but only one half; and this is the caſe in which the punter is ſaid to be *faced*. 9. When the punter chooſes to come in after any number of couples are down, if his card happens to be but once in the pack, and is the laſt of all, there is an exception from the general rule; for though it comes out in an odd place, which ſhould entitle him to win a ſtake equal to his own, yet he neither wins nor loſes from that circumſtance, but takes back his own ſtake.

This game has been the object of mathematical calculations. M. de Moivre ſolves this problem; to eſtimate at baſſet the loſs of the punter under any circumſtance of cards remaining in the ſtock when he lays his ſtake, and of any number of times that his card is repeated in the ſtock. From this ſolution he has formed a table ſhowing the ſeveral loſſes of the punter in whatſoever circumſtances he may happen to be. From this table it appears, 1. That the fewer the cards are in the ſtock, the greater is the loſs of the punter. 2. That the leaſt loſs of the punter, under the ſame circumſtances of cards remaining in the ſtock, is when his card is but twice in it; the next greater when but three times; ſtill greater when four times; and the greateſt when but once. The gain of the banker upon all the money adventured at baſſet is 15s. 3d. per cent.

Basset, *Peter*, a gentleman of a good family, was chamberlain or gentleman of the privy chamber to King Henry V. a conſtant attendant on that brave prince, and an eye-witneſs of his moſt glorious actions both at home and abroad; all which he particularly deſcribed in a volume entitled, *The Acts of King Henry V.* which remains in MS. in the college of heralds. Baſſia ‖ Baſſora.

BASSETING, in the coal mines, denotes the riſe of the vein of coal towards the ſurface of the earth, till it come within two or three feet of the ſurface itſelf. This is alſo called by the workmen *croping*; and ſtands oppoſed to *dipping*, which is the deſcent of the vein to ſuch a depth that it is rarely, if ever, followed to the end.

BASSIA. See Botany *Index*.

BASSO RELIEVO, or Bass RELIEF; a piece of ſculpture, where the figures or images do not protuberate, jet, or ſtand out, far above the plane on which they are formed.—Whatever figures or repreſentations are thus cut, ſtamped, or otherwiſe wrought, ſo that not the entire body, but only part of it, is raiſed above the plane, are ſaid to be done in *relief* or *relievo*: and when that work is low, flat, and but little raiſed, it is called *low relief*. When a piece of ſculpture, a coin, or a medal, has its figure raiſed ſo as to be well diſtinguiſhed, it is called *bold*, and we ſay its *relief is ſtrong*.

BASSOON, a muſical inſtrument of the wind-ſort, blown with a reed, furniſhed with 11 holes, and uſed as a baſs in a concert of hautboys, flutes, &c. To render this inſtrument more portable, it is divided into two parts, whence it is alſo called a *fagot*. Its diameter at bottom is nine inches, and its holes are ſtopped like thoſe of a large flute.

BASSORA, Balsora, or *Baſrah*, a city between Arabia and Perſia, ſituated in the extremity of the deſerts of Irak, a little to the weſt of the Tigris, in about 57° eaſt longitude, and 30° north latitude. It was built by the command of the caliph Omar, in the 15th year of the Hegira, for the ſake of carrying on more commodiouſly an extenſive commerce between the Syrians, Arabians, Perſians, and Indians. It is at preſent a very famous empory of the Eaſt; and ſtands upon a thick ſtony ſoil, as the word *baſra* imports, about a day and a half's journey from one of the mouths of the Tigris, where it empties itſelf into the Perſian gulf, denominated likewiſe from this town the *Bay of Baſra*. The circumjacent tract is looked upon by the Arabs to be one of the moſt delightful ſpots in Aſia, and even as one of the moſt beautiful gardens in the world; however, the hot winds that frequently blow there are very troubleſome to travellers, and ſometimes overwhelm them with ſand driven by the force of theſe winds out of the neighbouring deſerts. The city is inhabited by Jacobites, Neſtorians, Jews, Mahometans, and Chaldean Chriſtians, commonly called *Chriſtians of St John*, which laſt are pretty numerous here.

The Abbé Raynal values the merchandiſe annually brought to Baſſora at 525,000l.: of which the Engliſh furniſh 175,000l.; the Dutch 87,500l.; and the Moors, Banians, Armenians, and Arabs, furniſh the remainder. "The cargoes of theſe nations (ſays he) conſiſt of rice, ſugar; plain, ſtriped, and flowered muſlins from Bengal; ſpices from Ceylon and the Molucca iſlands; coarſe, white, and blue cottons from Coromandel; cardamum, pepper, ſanders wood, from Malabar; gold and ſilver ſtuffs, turbans, ſhawls, indigo, from

Baſtard. from Surat; pearls from Baharan, and coffee from Mocha; iron, lead, and woollen cloth, from Europe. Other articles of leſs conſequence are imported from different places. Some of theſe commodities are ſhipped on board ſmall Arabian veſſels; but the greater part is brought by European ſhips, which have the advantage of a conſiderable freight.

"This merchandiſe is ſold for ready money; and paſſes through the hands of the Greeks, Jews, and Armenians. The Banians are employed in changing the coin current at Baſſora, for that which is of higher value in India.

"The different commodities collected at Baſſora are diſtributed into three channels. One half of them goes to Perſia, whither they are conveyed by the caravans; there being no navigable river in the whole empire. The chief conſumption is in the northern provinces, which have not been ſo much ravaged as thoſe of the ſouth. Both of them formerly made their payments in precious ſtones, which were become common by the plunder of India. They had afterwards recourſe to copper utenſils, which had been exceedingly multiplied from the great abundance of copper mines. At laſt they gave gold and ſilver in exchange, which had been concealed during a long ſcene of tyranny, and are continually dug out of the bowels of the earth. If they do not allow time for the trees that produce gum, and have been cut to make freſh ſhoots; if they neglect to multiply the breed of goats which afford ſuch fine wool, and if the ſilks, which are hardly ſufficient to ſupply the few manufactures remaining in Perſia, continue in be ſo ſcarce;—in a word, if this empire does not riſe again from its aſhes, the mines will be exhauſted, and this ſource of commerce muſt be given up.

BASTARD, a natural child, or one begotten and born out of lawful wedlock.

Blackſt. Comment. The civil and canon laws do not allow a child to remain a baſtard, if the parents afterwards intermarry; and herein they differ moſt materially from our law; which, though not ſo ſtrict as to require that a child ſhall be *begotten*, yet makes it an indiſpenſible condition that it ſhall be *born*, after lawful wedlock. And the reaſon of our law is ſurely much ſuperior to that of the Roman, if we conſider the principal end and deſign of eſtabliſhing the contract of marriage, taken in a civil light; abſtractedly from aay religious views, which has nothing to do with the legitimacy or illegitimacy of the children. The main end and deſign of marriage, therefore, being to aſcertain and fix upon ſome certain perſon, to whom the care, the protection, the maintenance, and the education of the children, ſhould belong: this end is undoubtedly better anſwered by legitimating all iſſue born after wedlock, than by legitimating all iſſue of the ſame parties, even born before wedlock, ſo as wedlock afterwards enſues: 1. Becauſe of the very great uncertainty there will generally be, in the proof that the iſſue was really begotten by the ſame man; whereas, by confining the proof to the birth, and not to the begetting, our law has rendered it perfectly certain, what child is legitimate, and who is to take care of the child. 2. Becauſe, by the Roman law, a child may be continued a baſtard, or made legitimate, at the option of the father and mother, by a marriage *ex poſt facto;* thereby opening a door to many frauds and partialities, which by our law are prevented. 3. Becauſe by thoſe laws a man may remain a baſtard till 40 years of age, and then become legitimate by the ſubſequent marriage of his parents; whereby the main end of marriage, the protection of infants, is totally fruſtrated. 4. Becauſe this rule of the Roman law admits of no limitation as to the time, or number of baſtards to be ſo legitimated; but a dozen of them may, 20 years after their birth, by the ſubſequent marriage of their parents, be admitted to all the privileges of legitimate children. This is plainly a great diſcouragement to the matrimonial ſtate; to which one main inducement is uſually not only the deſire of having children, but alſo the deſire of procreating lawful heirs. Whereas, our conſtitution guards againſt this indecency, and, at the ſame time, gives ſufficient allowance to the frailties of human nature. For if a child be begotten while the parents are ſingle, and they will endeavour to make an early reparation for the offence, by marrying within a few months after, our law is ſo indulgent as not to baſtardize the child, if it be born, though not begotten, in lawful wedlock; for this is an incident that can happen but once; ſince all future children will be begotten, as well as born, within the rules of honour and civil ſociety. Baſtard.

From what has been ſaid it appears, that all children born before matrimony are baſtards by our law: and ſo it is of all children born ſo long after the death of the huſband, that by the uſual courſe of geſtation, they could not be begotten by him. But this being a matter of ſome uncertainty, the law is not exact as to a few days. But if a man dies, and his widow ſoon after marries again, and a child is born within ſuch a time as that by the courſe of nature it might have been the child of either huſband: in this caſe, he is ſaid to be more than ordinarily legitimate; for he may, when he arrives to years of diſcretion, chooſe which of the fathers he pleaſes. To prevent this, among other inconveniences, the civil law ordained that no widow ſhould marry *infra annum luctus;* a rule which obtained ſo early as the reign of Auguſtus, if not of Romulus: and the ſame conſtitution was probably handed down to our early anceſtors from the Romans, during their ſtay in this iſland; for we find it eſtabliſhed under the Saxon and Daniſh governments.

As baſtards may be born before the coverture or marriage-ſtate is begun, or after it is determined, ſo alſo children born during wedlock may in ſome circumſtances be baſtards. As if the huſband be out of the kingdom of England (or as the law looſely phraſes it, *extra quatuor maria*) for above nine months, ſo that no acceſs to his wife can be preſumed, her iſſue during that period ſhall be baſtards. But generally during the coverture, acceſs of the huſband ſhall be preſumed, unleſs the contrary ſhall be ſhown; which is ſuch a negative as can only be proved by ſhowing him to be elſewhere; for the general rule is, *præſumitur pro legitimatione.* In a divorce *a menſa et thoro*, if the wife breeds children, they are baſtards; for the law will preſume the huſband and wife conformable to the ſentence of ſeparation, unleſs acceſs be proved: but in a voluntary ſeparation by agreement, the law will ſuppoſe acceſs, unleſs the negative be ſhown. So alſo, if there is an apparent impoſſibility of procreation on the part of the huſband, as if he be only eight years old, or the like, there the iſſue of the wife ſhall be baſtard. Likewiſe,

Baſtard. in caſe of divorce in the ſpiritua lcourt *a vinculo matrimonii*, all the iſſue born during the coverture are baſtards; becauſe ſuch divorce is always upon ſome cauſe that rendered the marriage unlawful and null from the beginning.

As to the *duty* of parents to their baſtard children, by our law, it is principally that of maintenance. For though baſtards are not looked upon as children to any civil purpoſes, yet the ties of nature, of which maintenance is one, are not ſo eaſily diſſolved; and they hold indeed as to many other intentions; as particularly that a man ſhall not marry his baſtard ſiſter or daughter. The method in which the Engliſh law provides maintenance for them is as follows: When a woman is delivered, or declares herſelf with child, of a baſtard, and will by oath before a juſtice of the peace charge any perſon having got her with child, the juſtice ſhall cauſe ſuch perſon to be apprehended, and commit him till he gives ſecurity, either to maintain the child, or appear at the next quarter ſeſſions to diſpute and try the fact. But, if the woman dies, or is married, before delivery, or miſcarries, or proves not to have been with child, the perſon ſhall be diſcharged; otherwiſe the ſeſſions, or two juſtices out of ſeſſions, upon original application to them, may take order for the keeping of the baſtard, by charging the mother or the reputed father with the payment of money or other ſuſtentation for that purpoſe. And if ſuch putative father, or lewd mother, run away from the pariſh, the overſeers, by direction of two juſtices, may ſeize their rent, goods, and chattels, in order to bring up the ſaid baſtard child. Yet ſuch is the humanity of our laws, that no woman can be compulſively queſtioned concerning the father of her child till one month after her delivery; which indulgence is, however, very frequently a hardſhip upon pariſhes, by giving the parents opportunity to eſcape.

As to the *rights* and *incapacities* which appertain to a baſtard: The former are very few, being only ſuch as he can *acquire;* for he can *inherit* nothing, being looked upon as the ſon of nobody, and ſometimes called *filius nullius*, ſometimes *filius populi*. Yet he may gain a ſurname by reputation, though he has none by inheritance. All other children have their primary ſettlement in their father's pariſh; but a baſtard in the pariſh where born, for he hath no father. However, in caſe of fraud, as if a women either be ſent by order of juſtices, or comes to beg as a vagrant, to a pariſh which ſhe does not belong to, and drops her baſtard there; the baſtard ſhall, in the firſt caſe, be ſettled in the pariſh from whence ſhe was illegally removed; or in the latter caſe, in the mother's own pariſh, if the mother be apprehended for her vagrancy. Baſtards alſo, born in any licenſed hoſpital for pregnant women, are ſettled in the pariſhes to which the mothers belong.—The *incapacity* of a baſtard conſiſts principally in this, that he cannot be heir to any one; for being *nullius filius*, he is therefore of kin to nobody, and has no anceſtor from whom any inheritable blood can be derived: Therefore, if there be no other claimant upon an inheritance than ſuch illegitimate child, it ſhall eſcheat to the lord. And as baſtards cannot be heirs themſelves, ſo neither can they have any heirs but thoſe of their own bodies. For as all collateral kindred conſiſts in being derived from the ſame common anceſtor, and as a baſtard has no legal anceſtor, he can have no collateral kindred; and conſequently can have no legal heirs, but ſuch as claim by a lineal deſcent from himſelf. And therefore, if a baſtard purchaſes land, and dies ſeized thereof without iſſue, and inteſtate, the land ſhall eſcheat to the lord of the fee. A baſtard was alſo, in ſtrictneſs, incapable of holy orders; and though that were diſpenſed with, yet he was utterly diſqualified from holding any dignity in the church; but this doctrine ſeems now obſolete; and in all other reſpects there is no diſtinction between a baſtard and another man. And really any other diſtinction but that of not inheriting, which civil policy renders neceſſary, would, with regard to the innocent offspring of his parent's crimes, be odious, unjuſt, and cruel, to the laſt degree; and yet the civil law, ſo boaſted of for its equitable deciſions, made baſtards in ſome caſes incapable even of a gift from their parents. A baſtard may, laſtly, be made legitimate, and capable of inheriting, by the tranſcendant power of an act of parliament, and not otherwiſe: as was done in the caſe of John of Gaunt's baſtard children, by a ſtatute of Richard II. Baſtard.

As to the *puniſhment* for having baſtard children: By the ſtatute 18 Eliz. c. 3. two juſtices may take order for the puniſhment of the mother and reputed father: but what that puniſhment ſhall be is not therein aſcertained: though the cotemporary expoſition was, that a corporeal puniſhment was intended. By ſtatute 7 Jac. I. c. 4. a ſpecific puniſhment (viz. commitment to the houſe of correction) is inflicted on the woman only. But in both caſes it ſeems that the penalty can only be inflicted, if the baſtard becomes chargeable to the pariſh; for otherwiſe the very maintenance of the child is conſidered as a degree of puniſhment. By the laſt mentioned ſtatute the juſtices may commit the mother to the houſe of correction, there to be puniſhed and ſet on work for one year: and in caſe of a ſecond offence, till ſhe find ſureties never to to offend again.

He that gets a baſtard in the hundred of Middleton in Kent, forfeits all his goods and chattels to the king *.

* *Chamb. Dict.*

If a baſtard be got under the umbrage of a certain oak in Knollwood in Staffordſhire, belonging to the manor of Terley-caſtle, no puniſhment can be inflicted, nor can the lord nor the biſhop take cognizance of it †.

† *Plot. Nat. Hiſt. Staff.* p. 279.

It is enacted by ſtatute 21 Jac. I. c. 27. that if any woman be delivered of a child, which, if born alive, ſhould by law be a baſtard; and endeavours privately to conceal its death, by burying the child or the like; the mother ſo offending ſhall ſuffer death, as in the caſe of murder, unleſs ſhe can prove by one witneſs at leaſt that the child was actually born dead. This law, which ſavours pretty ſtrongly of ſeverity, in making the concealment of the death almoſt concluſive evidence of the child's being murdered by the mother, is nevertheleſs to be alſo met with in the criminal codes of many other nations of Europe; as the Danes, the Swedes, and the French; but it has of late years been uſual with us, upon trials for this offence, to require ſome ſort of preſumptive evidence that the child was born alive, before the other conſtrained preſumption

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Baſtard, Baſtardy.

tion (that the child, whoſe death is concealed, was therefore killed by its parent) is admitted to convict the priſoner.

Concerning baſtards in Scotland, and the laws with regard to them, ſee LAW.

BASTARD, in reſpect of artillery, is applied to thoſe pieces which are of an unuſual or illegitimate make or proportion. Theſe are of two kinds, long and ſhort, according as the defect is on the redundant or defective ſide. The long baſtards again, are either common or uncommon. To the common kind belong the double culverin extraordinary, half culverin extraordinary, quarter culverin extraordinary, falcon extraordinary, &c. The ordinary baſtard culverin carries a ball of eight pounds.

BASTARDS are alſo an appellation given to a kind of faction or troop of banditti who roſe in Guienne about the beginning of the fourteenth century, and joining with ſome Engliſh parties, ravaged the country, and ſet fire to the towns.——Mezeray ſuppoſes them to have conſiſted of the natural ſons of the nobility of Guienne, who being excluded the right of inheriting from their fathers, put themſelves at the head of robbers and plunderers to maintain themſelves.

BASTARD Flower-fence. See ADENANTHERA.—The flowers of this plant bruiſed and ſteeped in milk are ſaid to be gently anodyne; for which purpoſe they are often given in the Weſt Indies to quiet very young children. The leaves are uſed inſtead of ſena in Barbadoes and the Leeward Iſlands. In Jamaica, the plant is called *ſena*.

BASTARD Hemp. See DATISCA, BOTANY *Index*.

BASTARD Rocket, Dyers-Weed, or *Wild Woad.* See RESEDA, BOTANY *Index*.

BASTARD Star-of-Bethlehem. See ALBUCA, BOTANY *Index*.

BASTARD-Scarlet is a name given to red dyed with bale madder, as coming neareſt the bow-dye, or new ſcarlet.

BASTARDY, is a defect of birth objected to one born out of wedlock. Euſtathius will have baſtards among the Greeks to have been in equal favour with legitimate children, as low as the Trojan war; but the courſe of antiquity ſeems againſt him. Potter and others ſhow, that there never was a time when baſtardy was not in diſgrace.

In the time of William the Conqueror, however, baſtardy ſeems not to have implied any reproach, if we may judge from the circumſtance of that monarch himſelf not ſcrupling to aſſume the appellation of baſtard. His epiſtle to Alan count of Bretagne begins, *Ego Willielmus cognomento baſtardus* *.

* *Du Cange, Gloſſ. Lat. T. 1. p. 502*

BASTARDY, in relation to its trial in law, is diſtinguiſhed into general and ſpecial. *General* baſtardy is a certificate from the biſhop of the dioceſe, to the king's juſtices, after inquiry made, whether the party is a baſtard or not, upon ſome queſtion of inheritance. Baſtardy *ſpecial* is a ſuit commenced in the king's courts againſt a perſon that calls another a baſtard.

Arms of BASTARDY ſhould be croſſed with a bar, fillet, or traverſe, from the left to the right. They were not formerly allowed to carry the arms of their father, and therefore they invented arms for themſelves; and this is ſtill done by the natural ſons of a king.

Right of BASTARDY, Droit de batardiſe, in the *French Laws*, is a right, in virtue whereof the effects of baſtards dying inteſtate devolve to the king or the lord.

Baſtarnæ || Baſtile.

BASTARNÆ, or BASTERNÆ, a people of German original, manners, and language; who extended themſelves a great way to the eaſt of the Viſtula, the eaſt boundary of Germany, among the Sarmatæ, as far as the mouth of the Iſter and the Euxine; and were divided into ſeveral nations.

BASTARNICÆ ALPES, in *Ancient Geography*, mountains extending between Poland, Hungary, and Tranſylvania, called alſo the *Carpates*, and now the *Carpathian* mountains.

BASTI, in *Ancient Geography*, a town of the province of Bætica in Spain, ſituated to the weſt of the Campus Spartarius. Now *Baza* in Granada.

BASTIA, a ſea-port town of Albania in Turkey in Europe, over againſt the iſland of Corfu, at the mouth of the river Calamu. E. Long. 16. 35. N. Lat. 39. 40.

BASTIA, the capital of the iſland of Corſica in the Mediterranean. It has a good harbour, and is ſtrongly fortified. It is ſituated on the eaſtern part of the coaſt, 70 miles ſouth-ſouth-weſt of Leghorn, in E. Long. 9. 42. N. Lat. 42. 35.

BASTILE, denotes a ſmall antique caſtle, fortified with turrets. Such was the Baſtile of Paris, which ſeems to have been the laſt caſtle that retained the name: it was begun to be built in 1369 by order of Charles V. and was finiſhed in 1383 under the reign of his ſucceſſor.—Its chief uſe was for the cuſtody of ſtate priſoners; or, more properly ſpeaking, for the clandeſtine purpoſes of unfeeling deſpotiſm.

The lieutenant-general of the police of Paris was the ſub-delegate of the miniſtry for the department of the Baſtile. He had under him a titular commiſſary, who was called the commiſſary of the Baſtile. He had a fixed ſalary for drawing up what were called inſtructions, but he did not do this excluſively. He had no inſpection or function but in caſes where he received orders: the reaſon of which was that all that was done in this caſtle was arbitrary.

Each priſoner on coming to the Baſtile had an inventory made of every thing about him. His trunks, clothes, linens, and pockets were ſearched, to diſcover whether there were any papers in them relative to the matter for which he was apprehended. It was not uſual to ſearch perſons of a certain rank; but they were aſked for their knives, razors, ſciſſars, watches, canes, jewels, and money. After this examination, the priſoner was conducted into an apartment, where he was locked up within three doors. They who had no ſervants made their own bed and fire. The hour of dining was eleven, and of ſupping ſix.

At the beginning of their confinement they had neither books, ink, or paper; they went neither to maſs, nor on the walks; they were not allowed to write to any one, not even to the lieutenant of the police, on whom all depended, and of whom permiſſion muſt firſt have been aſked by means of the major, who ſeldom refuſed. At firſt they went to maſs only every other Sunday. When a perſon had obtained leave to write to the lieutenant of the police, he might have aſked his permiſſion to write to his family, and to receive their anſwers; to have with him his ſervant or an attendant,

Baſtile. tendant, &c. which requeſts were either granted or refuſed according to circumſtances. Nothing could be obtained but through this channel.

The officers of the ſtaff took the charge of conveying the letters of the priſoners to the police. They were ſent regularly at noon and at night: but if they deſired it, their letters were ſent at any hour by expreſſes, who were paid out of the money of thoſe who were confined. The anſwers were always addreſſed to the major, who communicated them to the priſoner. If no notice was taken of any requeſt contained in the letter of the priſoner, it was a refuſal. The attendants whom they appointed for thoſe who were not allowed their own ſervants, or who had none of their own, were commonly invalid ſoldiers.

Sometimes a priſoner obtained permiſſion of having books, his watch, knife, and razors, and even paper and ink. He might have aſked to ſee the lieutenant of the police when he came to the Baſtile. This officer commonly cauſed priſoners to be brought down ſome days after their arrival. Sometimes he went to viſit them in their chambers.

When the lieutenant of the police ſaw a priſoner, the converſation turned upon the cauſe of his confinement. He ſometimes aſked for written and ſigned declarations. In general, as much circumſpection was neceſſary in theſe conferences as in the examination itſelf, ſince nothing that a perſon might have ſaid or written was forgotten.

When a priſoner wanted to tranſmit any thing to the lieutenant of the police, it was always by means of the major. Notes might have been ſent to this officer by the turnkeys. A perſon was never anticipated in any thing—he muſt have aſked for every thing; even for permiſſion to be ſhaved. This office was performed by the ſurgeon; who alſo furniſhed ſick or indiſpoſed priſoners with ſugar, coffee, tea, chocolate, confections, and the neceſſary remedies.

The time for walking was an hour a-day; ſometimes an hour in the morning and an hour in the evening, in the great court.

A priſoner might have been interrogated a few days after his entrance into the Baſtile, but frequently this was not done till after ſome weeks. Sometimes he was previouſly informed of the day when this was to be done; often he was only acquainted with it the moment he was brought down to the council-chamber. This commiſſion of interrogatory was executed by the lieutenant of the police, a counſellor of ſtate, a maſter of requeſts, a counſellor or a commiſſioner of the Chatelet. When the lieutenant of the police did not himſelf interrogate, he uſually came at the end of the examination.

Theſe commiſſioners were purely paſſive beings. Frequently they attempted to frighten a priſoner; they laid ſnares for him, and employed the meaneſt artifices to get a confeſſion from him. They pretended proofs, exhibited papers, without ſuffering him to read them: aſſerting that they were inſtruments of unavoidable conviction. Their interrogatories were always vague. They turned not only on the priſoner's words and actions, but on his moſt ſecret thoughts, and on the diſcourſe and conduct of perſons of his acquaintance, whom it was wiſhed to bring into queſtion.

The examiners told a priſoner that his life was at ſtake; that his fate depended upon himſelf; that if he would make a fair declaration, they were authorized to promiſe him a ſpeedy releaſe; but if he refuſed to confeſs, he would be given up to a ſpecial commiſſion: that they were in poſſeſſion of deciſive documents, of authentic proofs, more than ſufficient to ruin him; that his accomplices had diſcovered all; that the government had unknown reſources, of which he could have no ſuſpicion. They fatigued priſoners by varied and infinitely multiplied interrogatories. According to the perſons, they employed promiſes, careſſes, and menaces. Sometimes they uſed inſults, and treated the unhappy ſufferers with an inſolence that filled up the meaſure of that tyranny of which they were the baſe inſtruments. Baſtile.

If the priſoner made the required confeſſion, the commiſſioners then told him that they had no preciſe authority for his enlargement, but that they had every reaſon to expect it; that they were going to ſolicit it, &c. The priſoner's confeſſions, far from bettering his condition, gave occaſion to new interrogatories, often lengthened his confinement, drew in the perſons with whom he had connexions, and expoſed himſelf to new vexations.

Although there were rules for all occaſions, yet every thing was ſubject to exceptions ariſing from influence, recommendations, protection, intrigue, &c. becauſe the firſt principle in this place was arbitrary will. Very frequently, perſons confined on the ſame account were treated very differently, according as their recommendations were more or leſs conſiderable.

There was a library, founded by a foreign priſoner who died in the Baſtile in the beginning of the laſt century. Some priſoners obtained leave to go to it; others, to have the books carried to their chambers.

The falſeſt things were told the priſoners with an air of ſincerity and concern. "It is very unfortunate that the king has been prejudiced againſt you. His majeſty cannot hear your name mentioned without being irritated. The affair for which you have loſt your liberty is only a pretext—they had deſigns againſt you before—you have powerful enemies." Theſe diſcourſes were the etiquette of the place.

It would have been in vain for a priſoner to aſk leave to write to the king—he could never obtain it.

The perpetual and moſt inſupportable torment of this cruel and odious inquiſition, were vague, indeterminate, falſe, or equivocal promiſes, inexhauſtible and conſtantly deceitful hopes of a ſpeedy releaſe, exhortations to patience, and blind conjectures, of which the lieutenant of the police and officers were very laviſh.

To cover the odium of the barbarities exerciſed here, and ſlacken the zeal of relations or patrons, the moſt abſurd and contradictory ſlanders againſt a priſoner were frequently publiſhed. The true cauſes of impriſonment, and real obſtacles to releaſe, were concealed. Theſe reſources, which were infinitely varied, were inexhauſtible.

When a priſoner who was known and protected had entirely loſt his health, and his life was thought in danger, he was always ſent out. The miniſtry did not chooſe that perſons well known ſhould die in the Baſtile. If a priſoner did die there, he was interred in the pariſh of St Paul, under the name of a domeſ-

tic;

Baſtile. tic; and this falſity was written in the regiſter of deaths, in order to deceive poſterity. There was another regiſter in which the true names of the deceaſed were entered; but it was not without great difficulty that extracts could be procured from it. The commiſſary of the Baſtile muſt firſt have been informed of the uſe the family intended to make of the extract.

In 1674 the baggage of Louis chevalier de Rohan, grand huntſman of France, having been taken and rummaged in a ſkirmiſh, ſome letters were found which cauſed a ſuſpicion that he had treated with the Engliſh for the ſurrender of Havre de Grace. He was arreſted and put into the Baſtile. The Sieur de la Tuanderie his agent, concealed himſelf. The proof was not ſufficient. A commiſſion was named to proceed againſt the accuſed for treaſon. La Tuanderie was diſcovered at Rouen: an attempt was made to arreſt him; but he fired on the aſſailants, and obliged them to kill him on the ſpot. Perſons attached to the chevalier de Rohan went every evening round the Baſtile, crying through a ſpeaking trumpet, "La Tuanderie is dead, and has ſaid nothing;" but the chevalier did not hear them. The commiſſioners, not being able to get any thing from him, told him, "that the king knew all, that they had proofs, but only wiſhed for his own confeſſion, and that they were authorized to promiſe him pardon if he would declare the truth." The chevalier, too credulous, confeſſed the whole. Then the perfidious commiſſioners changed their language. They ſaid, "that with reſpect to the pardon, they could not anſwer for it; but that they had hopes of obtaining it, and would go and ſolicit it." This they troubled themſelves very little about, and condemned the criminal to loſe his head. He was conducted on a platform to the ſcaffold, by means of a gallery raiſed to the height of the window of the armoury in the arſenal, which looks towards the little ſquare at the end of the *Rue des Tournelles*. He was beheaded on November 27. 1674.

The Jeſuits of the college of Clermont, in the *Rue St Jacques*, Paris, having this ſame year (1674) invited the king (Louis XIV.) to honour with his preſence a tragedy to be performed by their ſcholars, that prince accepted the invitation. Theſe able courtiers took care to inſert in the piece ſeveral ſtrokes of flattery, with which the monarch, greedy of ſuch incenſe, was greatly pleaſed. When the rector of the college was conducting the king home, a nobleman in the train applauded the ſucceſs of the tragedy. Louis ſaid, "Do you wonder at it? *this is my college*." The Jeſuits did not loſe a word of this. The very ſame night they got engraved in large golden letters on black marble, *Collegium Lodovici Magni*, inſtead of the former inſcription which was placed beneath the name of Jeſus on the principal gate of the college (*Collegium Claramontanum Societatis Jeſus*); and in the morning the new inſcription was put up in place of the old one. A young ſcholar of quality, aged 13, who was witneſs to the zeal of the reverend fathers, made the two following verſes, which he poſted up at night on the college gate:

Abſtulit hinc Jeſum, poſuitque inſignia regis
Impia gens: alium non colit illa Deum.

The Jeſuits did not fail to cry out ſacrilege: the young author was diſcovered, taken up, and put into the Baſtile. The implacable ſociety cauſed him, as a matter of *favour*, to be condemned to perpetual impriſonment; and he was transferred to the citadel of the iſle St Marguerite. Several years after, he was brought back to the Baſtile. In 1705 he had been a priſoner 31 years. Having become heir to all his family, who poſſeſſed great property, the Jeſuit Riquelet, then confeſſor of the Baſtile, remonſtrated to his brethren on the neceſſity of reſtoring the priſoner to liberty. The golden ſhower which forced the tower of Danaë had the ſame effect on the caſtle of the Baſtile. The Jeſuits made a merit with the priſoner of the protection they granted him; and this man of rank, whoſe family would have become extinct without the aid of the ſociety, did not fail to give them extenſive proofs of his gratitude. Baſtile.

Nowhere elſe on earth, perhaps, has human miſery, by human means, been rendered ſo laſting, ſo complete, or ſo remedileſs. This the following caſe may ſuffice to evince; the particulars of which are tranſlated from that elegant and energetic writer M. Mercier. The heinous offence which merited an impriſonment ſurpaſſing torture and rendering death a bleſſing, though for obvious reaſons not ſpecified by our author, is known from other ſources to have conſiſted in ſome unguarded expreſſions implying diſreſpect concerning the late Gallic monarch Louis XV.

Upon the acceſſion of Louis XVI. to the throne, the miniſters then in office, moved by humanity, began their adminiſtration with an act of clemency and juſtice; they inſpected the regiſters of the Baſtile, and ſet many priſoners at liberty. Among thoſe there was an old man who had groaned in confinement for 47 years between four thick and cold ſtone-walls. Hardened by adverſity, which ſtrengthens both the mind and the conſtitution, when they are not overpowered by it, he had reſiſted the horrors of his long impriſonment with an invincible and manly ſpirit. His locks white, thin, and ſcattered, had almoſt acquired the rigidity of iron; whilſt his body, environed for ſo long a time by a coffin of ſtone, had borrowed from it a firm and compact habit. The narrow door of his tomb, turning upon its grating hinges, opened not as uſual by halves; and an unknown voice announced his liberty, and bade him depart. Believing this to be a dream, he heſitated; but at length roſe up and walked forth with trembling ſteps, amazed at the ſpace he traverſed: The ſtairs of the priſon, the halls, the court, ſeemed to him vaſt, immenſe, and almoſt without bounds. He ſtopped from time to time, and gazed around like a bewildered traveller: His viſion was with difficulty reconciled to the clear light of day: He contemplated the heavens as a new object: His eyes remained fixed, and he could not even weep. Stupified with the newly acquired power of changing his poſition, his limbs, like his tongue, refuſed, in ſpite of his efforts, to perform their office; at length he got through the formidable gate.

When he felt the motion of the carriage prepared to tranſport him to his former habitation, he ſcreamed out, and uttered ſome inarticulate ſounds; and as he could not bear this new movement, he was obliged to deſcend. Supported by a benevolent arm, he ſought out the ſtreet where he had formerly reſided: he found it, but no trace of his houſe remained; one of the pub-

lic

Baſtile. lic edifices occupied the ſpot where it had ſtood. He now ſaw nothing that brought to his recollection, either that particular quarter, the city itſelf, or the objects with which he had formerly been acquainted. The houſes of his neareſt neighbours, which were freſh in his memory, had aſſumed a new appearance. In vain were his looks directed to all the objects around him; he could diſcover nothing of which he had the ſmalleſt remembrance. Terrified, he ſtopped and fetched a deep ſigh. To him, what did it import that the city was peopled with living creatures? None of them were alive to him; he was unknown to all the world, and he knew nobody: And whilſt he wept, he regretted his dungeon.

At the name of the Baſtile, which he often pronounced and even claimed as an aſylum, and the ſight of his clothes that marked a former age, the crowd gathered round him: curioſity, blended with pity excited their attention. The moſt aged aſked him many queſtions, but had no remembrance of the circumſtances he recapitulated. At length accident brought in his way an ancient domeſtic, now a ſuperannuated porter, who, confined to his lodge for 15 years, had barely ſufficient ſtrength to open the gate:—Even he did not know the maſter he had ſerved; but informed him that grief and misfortune had brought his wife to the grave 30 years before, that his children were gone abroad to diſtant climes, and that of all his relations and friends none now remained. This recital was made with the indifference which people diſcover for events long paſſed, and almoſt forgot. The miſerable man groaned, and groaned alone. The crowd around, offering only unknown features to his view, made him feel the exceſs of his calamities even more than he would have done in the dreadful ſolitude that he had left.

Overcome with ſorrow, he preſented himſelf before the miniſter to whoſe humanity he owed that liberty which was now a burden to him. Bowing down, he ſaid, "Reſtore me again to that priſon from which you have taken me: I cannot ſurvive the loſs of my neareſt relations; of my friends; and, in one word, of a whole generation: Is it poſſible in the ſame moment to be informed of this univerſal deſtruction, and not to wiſh for death? This general mortality, which to the reſt of mankind comes ſlowly and by degrees, has to me been inſtantaneous, the operation of a moment. Whilſt ſecluded from ſociety, I lived with myſelf only; but here I neither can live with myſelf nor with this new race, to whom my anguiſh and deſpair appear only as a dream. There is nothing terrible in dying; but it is dreadful indeed to be the laſt." The miniſter was melted; he cauſed the old domeſtic to attend this unfortunate perſon, as only he could talk to him of his family. This diſcourſe was the ſingle conſolation that he received: for he ſhunned all intercourſe with a new race, born ſince he had been exiled from the world; and he paſſed his time in the midſt of Paris in the ſame ſolitude as he had done whilſt confined in a dungeon for almoſt half a century. But the chagrin and mortification of meeting no perſon who could ſay to him, We were formerly known to one another, ſoon put an end to his exiſtence.

Such was the nature of this celebrated fortreſs. Many of our readers will probably recollect that it was attacked and taken by the Pariſian mob on the 14th July 1789. At that time only ſeven priſoners were found in it, and it did not appear that any of them were the victims of tyranny or wanton oppreſſion.

Baſtimentos || Baſton.

BASTIMENTOS, the name of ſome ſmall iſlands near Terra Firma in South America, at the mouth of the bay of Nombre de Dios.

BASTINADO. See BASTONADO.

BASTION, in the modern fortification, a huge maſs of earth, faced uſually with ſods, ſometimes with brick, and rarely with ſtone, ſtanding out from a rampart whereof it is a principal part, and is what, in the ancient fortification, was called a *bulwark*.

Solid BASTIONS, are thoſe that have the void ſpace within them filled up entirely, and raiſed of an equal height with the rampart.

Void and Hollow BASTIONS, are thoſe that are only ſurrounded with a rampart and parapet, having the ſpace within void and empty, where the ground is ſo low, that, if the rampart be taken, no retrenchment can be made in the centre, but what will lie under the fire of the beſieged.

Flat BASTION, is a baſtion built in the middle of the curtain, when it is too long to be defended by the baſtion at its extremes.

Cut BASTION, is that whoſe point is cut off, and inſtead thereof has a re-entering angle, or an angle inwards, with two points outwards; and is uſed either when without ſuch a contrivance the angle would be too acute, or when water or ſome other impediment hinders the carrying on the baſtion to its full extent.

Compoſed BASTION, is when two ſides of the interior polygon are very unequal, which makes the gorges alſo unequal.

Deformed BASTION, is when the irregularity of the lines and angles makes the baſtion out of ſhape; as when it wants one of its demigorges, one ſide of the interior polygon being too ſhort.

Demi BASTION, is compoſed of one face only, and but one flank, and a demigorge.

Double BASTION, is that which is raiſed on the plane of another baſtion.

Regular BASTION, is that which has its true proportion of faces, flanks, and gorges.

Bastion of France, a fortreſs on the coaſt of Barbary, belonging to the French.

BASTITANI, in *Ancient Geography*, a people of the province of Bætica in Spain. See BÆTICA.

BASTOIGNE, a ſmall town of the Netherlands, in the duchy of Luxemburgh. E. Long. 6. 0. N. Lat. 50. 10.

BASTON, in *Law*, one of the ſervants to the warden of the Fleet-priſon, who attended the king's courts with a red ſtaff, for taking into cuſtody ſuch as are committed by the court. He alſo attends on ſuch priſoners as are permitted to go at large by licenſe.

BASTON, or *Battoon*, in *Architecture*, a moulding in the baſe of a column, called alſo a *tore*.

BASTON, *Baton*, or *Batune*. This word is French, and ſignifies a ſtaff or cudgel: it ſhould be ſpelt *Bâton;* but is, by moſt Engliſh writers, corruptly ſpelt as above. It is only borne in Engliſh coats of arms, as a badge of illegitimacy; but French heralds introduce it in arms as a difference, or mark of conſanguinity.

BASTON, ROBERT, a Carmelite monk, afterwards prior

Baſtonado ‖ Bat-Fowling.

prior of the convent of that order at Scarborough, and alſo poet laureat and public orator at Oxford, flouriſhed in the fourteenth century. King Edward I. in his expedition into Scotland in 1304, took Robert Baſton with him, in order to celebrate his victories over the Scots; but our poet being taken priſoner, was obliged to change his note, and ſing the ſucceſſes of Robert Bruce. He wrote ſeveral books in Latin, on the Wars of Scotland, the Luxury of Prieſts, Synodical Sermons, &c.; and alſo a volume of tragedies and comedies, in Engliſh. He died about the year 1310.

BASTONADO, Bastonade, the puniſhment of beating or drubbing a criminal with a ſtick. The word is formed of the French *baſton*, a "ſtick" or "ſtaff." The baſtonade was a puniſhment uſed both among the ancient Greeks, Romans, and Jews, and ſtill obtains among the Turks. The Romans called it *fuſtigatio*, *fuſtium admonitio*, or *fuſtibus cædi*; which differed from the *flagellatio*, as the former was done with a ſtick, the latter with a rod, or ſcourge. The fuſtigation was a lighter puniſhment, and inflicted on freemen; the flagellation a ſeverer, and reſerved for ſlaves. It was alſo called *tympanum*, becauſe the patient here was beat with ſticks, like a drum.—The puniſhment is much in uſe in the eaſt to this day. The method there practiſed is thus: the criminal being laid on his belly, his feet are raiſed, and tied to a ſtake, held faſt by officers for the purpoſe; in which poſture he is beaten by a cudgel on the ſoles of his feet, back, chin, &c. to the number of 100 or more blows.

BASTWICK, Dr John, born at Writtle in Eſſex, in 1593; practiſed phyſic at Colcheſter; but being a man of warm imagination, and a good Latin ſcholar, applied himſelf to writing books againſt popery. About the year 1633, he printed in Holland a Latin treatiſe, entitled, *Elenchus religionis Papiſticæ*, with *Flagellum pontificis et epiſcoporum Latialium*, in which the Engliſh prelates thinking themſelves alſo aimed at, he was fined 1000l. in the high commiſſion court, excommunicated, prohibited practiſing phyſic, his books ordered to be burnt, and himſelf to remain in priſon until he made a recantation. Inſtead of recanting, he wrote in priſon, *Apologeticus ad præſules Anglicanos*; and another book called, *The Litany*; wherein he ſeverely exclaimed againſt the proceedings of that court, and taxed the biſhops with an inclination towards popery. Prynne and Burton coming under the laſh of the ſtar-chamber court at the ſame time, they were all cenſured as ſcandalous ſeditious perſons, condemned to a fine of 5000l. each, to be pilloried, to loſe their ears, and to perpetual impriſonment in three remote parts of the kingdom. The parliament in 1640 reverſed theſe proceedings; and ordered Dr Baſtwick a reparation of 5000l. out of the eſtates of the commiſſioners and lords who had proſecuted him, which the enſuing confuſions prevented his receiving: however, his wife had, in 1644, an allowance ordered for her and her huſband's maintenance. What became of him afterward is not known.

BAT, in *Zoology*. See Vespertilio, Mammalia *Index*.

Bat-Fowling, a method of catching birds in the night, by lighting ſome ſtraw, or torches, near the place where they are at rooſt; for upon beating them up, they fly to the flame, where, being amazed, they are eaſily caught in nets, or beat down with buſhes fixed to the end of poles, &c.

Bat ‖ Batavorum.

Bat, *Bate*, or *Batz*, a ſmall copper coin, mixed with a little ſilver, current in ſeveral cities of Germany: it is worth four crutzers. It is alſo a coin in Switzerland, current at five livres, or 100 ſols, French money.

BATABLE, or Debatable, ground, that land which lay between Scotland and England, when the kingdoms were diſtinct, to which both nations pretended a right.

BATACALA, a ſmall kingdom on the coaſt of Malabar in the Eaſt Indies. It had a very large town of the ſame name; but there is nothing now left, except 11 or 12 ſmall pagods covered with copper and ſtone. The country produces a good deal of pepper: the Engliſh formerly had a factory here; but were all maſſacred by the natives, becauſe one of their bulldogs had killed a conſecrated cow.

Batacala, a fortified town and caſtle on the eaſt coaſt of the iſland of Ceylon in the Eaſt Indies. The Dutch drove away the Portugueſe, and poſſeſſed themſelves of part of the adjacent country. E. Long. 18. 3. N. Lat. 7. 55.

BATANISTS, or Batenites. See Batenites.

BATASEK, a town of Lower Hungary, ſeated on the Danube, in E. Long. 19. 50. N. Lat. 46. 30.

BATAVA (*Caſtra* underſtood), a citadel of Vindelicia, ſo called from the Cohors Batava, in garriſon under the commander in Rhætia: now *Paſſau*: being firſt called *Batau*, from the Batavi; then *Baſſau*, and *Paſſau*; ſituated in Bavaria, at the confluence of the Danube, Inn, and Ills. See Passau.

BATAVIA, the capital of the Dutch ſettlements in the Eaſt Indies; a city of the kingdom of Bantam in the iſland of Java. See Java.

BATAVORUM insula, the iſland of the Batavians, in *Ancient Geography*. Of this iſland Tacitus gives the following deſcription. "The Rhine flowing in one channel, or only broken by ſmall iſlands, is divided at its entering Batavia, as it were into two rivers. One continues its courſe through Germany, retaining the ſame name, and violent current, till it falls into the ocean. The other waſhing the coaſt of Gaul, with a broader and more gentle ſtream, is called by the inhabitants *Vahalis*; which name it ſoon changes for that of *Moſa*, by the immenſe mouth of which river it diſcharges itſelf into the ſame ocean." According to Tacitus, therefore, the iſland of the Batavians was bounded by the ocean, the Rhine, and the Vahalis, now the *Wale*. Cæſar extends it to the Moſa, or *Meuſe*; but Pliny agrees with Tacitus. However, this iſland was of greater extent in Tacitus's time than in Cæſar's; Druſus, the father of Germanicus, having by a new canal conveyed the waters of the Rhine into the ocean a conſiderable way north of the former mouth of that river. The Batavi were a branch of the Catti, who in a domeſtic ſedition, being expelled their country, occupied the extremity of the coaſt of Gaul, at that time uninhabited, together with this iſland ſituated among ſhoals. Their name *Batavi* they carried with them from Germany; there being ſome towns in the territory of the Catti called *Battenberg*, and *Battenhauſen*. The bravery of the Batavi, eſpecially the

Batavorum || Bates.

horſe, procured them not only great honour from the Romans, being called their *brothers* and *friends;* but an exemption from taxes, being obliged only to furniſh men and arms. The modern name of this iſland is *Betu*, or *Betaw*.

Batavorum Oppidum, in *Ancient Geography*, a town in the iſland of the Batavi, mentioned by Tacitus, without any particular name; which has given riſe to ſeveral ſurmiſes about it, ſome ſuppoſing it to be *Nimeguen*, but Cluverius, *Batavadurum* or *Batemburg*, both without the iſland; which ſituation renders both theſe places inadmiſſible, ſince Tacitus places this nameleſs town within the iſland.

BATCHELOR. See Bachelor.

BATE, George, an eminent phyſician, born at Maid's Morton, near Buckingham, in the year 1608. In 1629 he obtained a licenſe, and for ſome years practiſed in and about Oxford: his practice was chiefly amongſt the Puritans, who at that time conſidered him as one of their party. In 1637, he took his degree of doctor in phyſic, and became very eminent in his profeſſion, ſo that when King Charles kept his court at Oxford, he was his principal phyſician. When the king's affairs declined, Dr Bate removed to London, where he accommodated himſelf ſo well to the times, that he became phyſician to the Charter-houſe, fellow of the college of phyſicians, and afterwards principal phyſician to Oliver Cromwell. Upon the Reſtoration, he got into favour with the royal party, was made principal phyſician to the king, and fellow of the Royal Society; and this, we are told, was owing to a report raiſed on purpoſe by his friends, according to Mr Wood, that he gave the protector a doſe which haſtened his death. Dr Bate wrote in Latin an account of the late commotions in England, and ſome other pieces. He died at his houſe in Hatton-garden, and was buried at Kingſton upon Thames in Surry.—There was another George Bate, who wrote a work entitled, "The Lives, Actions, and Execution, of the prime Actors and principal Contrivers of that horrid Murther of our late pious and ſacred King Charles I."

BATENITES, a ſect of apoſtates from Mahometaniſm diſperſed through the Eaſt, who profeſſed the ſame abominable practices with the Iſmaelians and Karmatians. The word properly ſignifies *eſoteric*, or people of inward or hidden light.

BATES, William, D. D. an eminent Preſbyterian divine, born in November 1625. He was admitted in Emanuel college, Cambridge, and from thence removed to King's college in 1644. He was one of the commiſſioners, at the conference in the Savoy, for reviewing the public liturgy, and was concerned in drawing up the exceptions againſt the common Prayer: however, ſoon after the Reſtoration, he was appointed chaplain to King Charles II. and became miniſter of St Dunſtan's in the weſt, but was deprived of that benefice for nonconformity. Dr Bates bore a good and amiable character; and was honoured with the friendſhip of the lord keeper Bridgman, the lord chancellor Finch, the earl of Nottingham, and Archbiſhop Tillotſon. He was offered, at the Reſtoration, the deanery of Litchfield; which he refuſed. He publiſhed Select Lives of illuſtrious and pious perſons, in Latin; and ſince his death, all his works, except his Select Lives, have been printed in one volume in folio. He died in July 1699, in the 74th year of his age.

Bath.

BATH, a city of Somerſetſhire in England, ſeated in W. Long. 2. 30. N. Lat. 51. 27. All the different names that this city has borne in different ages and languages have been taken from its medicinal waters, as the ὑδατα θερμα, or "hot waters," of Ptolemy; the *Aquæ Solis*, or "waters of the ſun," of Antoninus; the *Caer Baden*, and *Caer Ennant*, i. e. "the city of baths," and "the city of ointment," of the Britons; and the *Ackmancheſter*, i. e. "the city of valetudinarians," of the Saxons. The baths conſiſt of the King's bath, the Queen's bath, the Croſs-bath, the Hot-bath, the Leper's bath, and the duke of Kingſton's bath. This place was of old a reſort only for cripples and diſeaſed perſons; but now it is more frequented by the ſound for pleaſure than by the ſick for health. The waters are very pleaſant to the taſte; and impregnated with a vitriolic principle, yielding, upon evaporation, a little neutral ſalt, and a calcareous earth and iron. They are very efficacious in ſtrengthening the bowels and ſtomach, bracing the relaxed fibres, and invigorating the circulation. In bilious complaints they are counted ſpecific; and prove ſerviceable in moſt nervous, paralytic, rheumatic, and gouty, complaints. At the King's bath is a handſome pump-room, where the gentlemen and ladies go in a morning to drink the waters; and there is a band of muſic that plays all the the time. In the Croſs-bath is a monument of marble, repreſenting the deſcent of the Holy Ghoſt attended by angels, erected by the earl of Melfort (who was ſecretary of ſtate for Scotland) when King James II. met his queen here. The King's bath is a large baſon of 65 feet 10 inches by 40 feet 10 inches, containing 346 tons 2 hogſheads and 36 gallons of water when filled to its uſual height. In the middle is a wooden building with niches and ſeats for the accommodation of the bathers. There are alſo iron rings all round for them to hold by; and guides, both male and female, to attend them in the bath. The perſon intending to bathe puts on, at his own lodgings, a bathing dreſs of brown canvas hired for the purpoſe; and is carried in a cloſe chair, of a particular make, to one of the ſlips which open into the bath. There he deſcends by ſteps into the water, where he is attended by a guide. Having ſtaid his ſtated time in the bath, he aſcends again into the ſlip, where he puts off his bathing-dreſs, and being wrapt up in blankets, is carried home to bed, where he lies for ſome time to encourage perſpiration. The King's-bath is overlooked by the company in the pump-room; and adjoining to it are places furniſhed with pumps to pour the hot ſtreams on any particular part of the body. The Queen's-bath communicates with the King's, from which it is filled; therefore the water of it is not ſo hot, being at a greater diſtance from the ſource. As the heat is here more moderate, the bathers deſcend firſt into the Queen's-bath, and advance gradually to the centre of the other. In the year 1755, the abbey-houſe, or priory, belonging to the duke of Kingſton, was taken down, in order to erect a more commodious pile of building; and in digging for the foundation, the workmen diſcovered, about twenty feet below the ſurface of the earth, the remains of Roman baths and ſudatories conſtructed upon

Bath. on an elegant plan, with floors ſuſpended on pillars, and ſurrounded with tubulated bricks, for the conveyance of heat and vapour. Theſe were ſupplied by a ſpring of hot water, of the ſame properties and temperature with thoſe of the King's-bath; and the ſewer was found ſtill entire, that conveyed the waſte water into the river. The duke, having cleared the ſpring and the ſewer, has erected ſeveral convenient baths and ſudatories on the ſpot, where invalids may be accommodated at all hours, by night as well as by day. The two ſeaſons are the ſpring and fall; but thoſe who take the waters purely for their health do not regard the ſeaſons, but drink them all the year round. There are a number of genteel ſedan chairs, which carry people to any diſtance, not exceeding half a mile, for ſixpence. The company aſſemble in the afternoon alternately at two ſtately rooms, to converſe together, or play at cards. At a very pretty new theatre near the parades, plays are acted every other night; and there are balls twice a-week; for which and the rooms, and books at the libraries, the gentry generally ſubſcribe. The city is ſurrounded with hills on all ſides, except a little opening to the eaſt and weſt, through which the Avon runs. This river, which has been made navigable to Briſtol by act of parliament, waſhes the city on the eaſt and ſouth ſides, and there is an elegant bridge over it. This city hath formerly had a ſlight wall, of which ſome part ſtill remains, as well as one or two of its gates; but almoſt all the new buildings, and much the greateſt and fineſt part of the city, is without the walls, particularly the fine ſquare called *Queen's-ſquare*, in the middle of which is a ſmall garden, with gravel walks, and an obeliſk in the centre. But the greateſt ornament at Bath is the circus: it is of a circular form, conſiſting of houſes built on an uniform plan, with three openings at equal diſtances to the ſouth, eaſt, and weſt, leading into as many ſtreets. The fronts of the houſes, which are all three ſtories high, are adorned with three rows of columns in pairs, of the Doric, Ionic, and Corinthian orders, the frize embelliſhed with ſculpture. The whole has an air of magnificence, which cannot fail to ſtrike the moſt indifferent ſpectator. In the centre of the area is a reſervoir, or baſon, filled by two or three ſprings riſing in the neighbouring hills; whence the ſtreets in this diſtrict are ſupplied with water. On the ſouth ſide of the town are the north and ſouth parades, two noble walks, paved with hewn ſtone, raiſed upon arches, facing each an elegant row of houſes on one ſide, and having a ſtone baluſtrade on the other. Theſe, with the two ſtreets that join them, were planned and executed by one Mr Wood, an able architect, who likewiſe built the ſquare and projected the circus. The two public rooms ſtand betwixt the north parade and Orange-grove; which laſt is a ſquare planted with trees, having in the middle a ſtone obeliſk, inſcribed in Latin to the late prince of Orange, who recovered his health in conſequence of drinking the Bath waters, and gave his name to this part of the town. Several new ſtreets and rows have of late years been built on the north ſide of Bath, in the neighbourhood of the ſquare, ſuch as Gay-ſtreet, Milſom-ſtreet, Edgar-row, Harlequin-row, Bladud's-buildings, King's-mead-ſtreet, and Brock-ſtreet. Their advantages for building here are very great, having excellent freeſtone, limeſtone, and ſlate, in the neighbourhood. One ſort of their lime is as white as ſnow. The guild-hall of Bath ſtands in the market-place, and is ſaid to be built on a plan of Inigo Jones, which, however, exhibits nothing worthy of that great architect: beſides, one end of it has been rebuilt in a different ſtyle. The hall is ornamented with ſome portraits of the late prince of Wales and other remarkable perſonages: but the greateſt curioſity of the place is a Minerva's head in bronze, a real antique, dug up in Stall-ſtreet, in the year 1725. Bath boaſts a noble infirmary, or general hoſpital, for the reception of the ſick and lame from all parts of the three kingdoms. It extends 100 feet in front, and 90 in depth, being capable of receiving 150 patients. Here was anciently a monaſtery, of which the preſent cathedral was the church. It is a venerable pile; the principal front of which is adorned with angels aſcending and deſcending. There are three other churches in Bath, and ſeveral chapels and meeting-houſes. Beſides the infirmary, there are ſeveral other hoſpitals, alms-houſes, and charity ſchools. The corporation conſiſts of a mayor; eight aldermen, of whom two are juſtices of the peace; and 24 common-council men. The city is extremely well provided with ſtage coaches, poſt coaches, chaiſes, machines, and waggons. Bath is the general hoſpital of the nation, and a great number of invalids find benefit from the waters: but as the city lies in a bottom ſurrounded by very high hills, the air is conſtantly ſurcharged with damps; and indeed this place is more ſubject to rain than any other part in England. The markets are remarkably well ſupplied with proviſions of all kinds at reaſonable rates, particularly fiſh and poultry. They alſo afford excellent mutton fed upon Lanſdown, one of the higheſt hills that overlook the city. This down, remarkable for its pure air, extends about three miles; and at the extremity of it there is a ſtone monument, with an inſcription, erected to the memory of Sir Beville Granville, who was here killed in a battle which he fought with the parliament's army in the reign of Charles I. Bath ſends two members to parliament. The earldom of Bath was beſtowed on William Pultney in the end of Sir Robert Walpole's adminiſtration as a reward for his patriotiſm, but is now extinct for want of heirs-male. Bath.

Bath is joined with Wells to form a biſhopric, called the dioceſe of Bath and Wells. The biſhop's ſeat is at Wells, whoſe cathedral church was built by Ina, king of the Weſt Saxons in 704, and by him dedicated to St Andrew. Several other of the Weſt Saxon kings endowed it, and it was erected into a biſhopric in 905, during the reign of King Edward the Elder. The preſent church was begun by Robert the 18th biſhop of this ſee, and completed by his immediate ſucceſſor. John de Villula, the 16th biſhop, having purchaſed the city of Bath for 500 merks of King Henry I. tranſferred his ſeat to that city in 1088. From this, diſputes aroſe between the monks of Bath and the canons of Wells, about the election of a biſhop; but they were at laſt compromiſed by Robert the 18th biſhop, who decreed, that from henceforward the biſhop ſhould be ſtyled from both places, and that the precedency ſhould be given to Bath; that in the vacancy of the ſee, the biſhop ſhould be elected by a certain number of delegates from both churches; and that he ſhould be in-

Bath. ſtalled in them both; both of them to conſtitute the biſhop's chapter; and all his grants and patents to be confirmed in both. So it ſtood till the reformation. But in the 35th of King Henry VIII. an act of parliament paſſed for the dean and chapter of Wells to make one ſole chapter for the biſhop. This dioceſe hath yielded to the church of Rome one cardinal, and to the civil ſtate of England ſix lord chancellors, five lord treaſurers, one lord privy ſeal, one lord preſident of Wales, and principal ſecretary of ſtate. The dioceſe contains the whole county of Somerſet, except a few churches in the city of Briſtol; the number of pariſhes amounting to 388, and the churches and chapels to 503. Of the pariſhes 160 are impropriate. It is valued in the king's books at 535l. 1s. 3d, and computed to be worth annually 2200l. The clergy's tenth is 353l. 18s. 0¾d. To the cathedral belong a biſhop, a dean, three archdeacons, a chancellor, a treaſurer, a ſub-dean, fifty-nine prebendaries, four prieſt-vicars, eight lay vicars, an organiſt, ſix choriſters, and other officers.

Knights of the Bath, a military order in England, concerning the origin of which antiquaries differ in their accounts. The moſt probable deduction ſeems to be the following.

The knighthood of the Bath is ſuppoſed to have been practiſed by the ancient Franks, the inhabitants of Lower Germany, with whom it is highly probable the Saxons, who invaded England, had the ſame common deſcent, and, with other cuſtoms, upon their ſettling here, introduced the ſame method of knighthood. Theſe ancient Franks, when they conferred knighthood, obſerved, amongſt other ſolemn rites, bathing before they performed their vigils; which cuſtom continues to be practiſed in England: they were from thence denominated *Knights of the Bath*.

In the reign of Henry IV. there was a degree of knighthood ſpecified under the expreſs appellation of *the Bath*. That king, on the day of his coronation in the tower of London, conferred the ſame upon 46 eſquires, who had watched all the night before, and had bathed themſelves. From that time it was cuſtomary with our kings to confer this dignity preceding their coronations, the coronations of their queens, the birth and marriage of the royal iſſue, and their firſt advancement to honours, upon their deſigned expeditions againſt their foreign enemies, upon inſtallations of knights of the garter, and when ſome grand anniverſary feſtivals were celebrated. The laſt knights of the Bath ſo made were at the coronation of King Charles II. in 1661; after which the order was neglected until the year 1725, when George I. was pleaſed to revive it, and to order a book of ſtatutes for the government of the order. By this the number of knights is fixed to 38, viz. the ſovereign, and 37 knights-companions.

The apparel of a knight of the Bath is a red ſurcoat, lined and edged with white, girded about with a white girdle, without any ornament thereon; the mantle is of the ſame colour and lining, made faſt about the neck with a lace of white ſilk, having a pair of white gloves tied therein, with taſſels of ſilk and gold at the end; which mantles are adorned upon the left ſhoulders with the enſign of the order, being three imperial crowns *or*, ſurrounded with the ancient motto of this knighthood, *Tria junctia in uno*, wrought upon a circle *gules*, with a glory or rays iſſuing from the centre, and under it the lace of white ſilk heretofore worn by the knights of the Bath. They have red breeches and ſtockings, and have white hats, with a plume of white feathers thereon. The king allowed the chapel of King Henry VII. to be the chapel of the order, and ordered that each knight's banner, with plates of his arms and ſtyle, ſhould be placed over their ſeveral ſtalls, in like manner as the knights of the Garter in St George chapel in the caſtle of Windſor; and he allowed them ſupporters to their arms. His Royal Highneſs Prince William, ſecond ſon to the prince of Wales, on this occaſion, was made the firſt knight-companion, and his grace the duke of Montagu grand maſter of the order, the dean of Weſtminſter (for the time being) dean of the order; the other officers of which are, Bath king of arms, a genealogiſt, regiſter and ſecretary, gentleman uſher, and meſſenger. Bath.

Bath, *Balneum*, a convenient receptacle of water for perſons to waſh or plunge in, either for health or pleaſure.—Baths are diſtinguiſhed into *hot* and *cold*; and theſe again are either natural or artificial. The natural hot baths are formed of the water of hot ſprings, of which there are many in different parts of the world; eſpecially in thoſe countries where there are or have evidently been volcanoes. The artificial hot baths conſiſt either of water or of ſome other fluid made hot by art. The cold bath conſiſts of water, either freſh or ſalt, in its natural degree of heat; or it may be made colder by art, as by a mixture of nitre, ſal-ammoniac, &c. The chief hot baths in our country are thoſe of Bath and Briſtol, in Somerſetſhire; and thoſe others of Buxton and Matlock, in Derbyſhire; which latter, however, are rather warm or tepid than hot. The uſe of theſe baths is found beneficial in diſeaſes of the head, as palſies, &c. in cuticular diſeaſes, as leproſies, &c. obſtructions and conſtipations of the bowels, the ſcurvy and ſtone, and in moſt diſeaſes of women and children. The baths have performed many cures, and are commonly uſed as a laſt remedy in obſtinate chronic diſeaſes; where they ſucceed well, if they agree with the conſtitution of the patient: but whether they will agree or not, cannot be known without trial.

As to the origin of thoſe hot waters, of which the natural hot baths are formed, we are very much in the dark. All that can be affirmed with certainty is, that where there are volcanoes, there alſo there are hot ſprings in great abundance; but how the heat of the volcano ſhould be conſtantly communicated to the waters of a ſpring for many ages, during a great part of which the volcano itſelf has lain in a dormant ſtate, ſeems almoſt beyond the reach of inveſtigation. Another thing that creates a great difficulty is, that the fire of a volcano muſt certainly lie very deep in the earth, and moſt probably ſhifts from place to place; but the waters of a ſpring muſt always iſſue from a place ſituated lower than the origin of the ſpring itſelf. Beſides, though we ſhould ſuppoſe the water to come from the top of a volcano itſelf, and conſequently boiling hot, it could not be ſuppoſed to percolate far through cold earth, without loſing all the heat it acquired from the volcano. From ſome obſervations, however,

Baths. however, it certainly does appear, that there are ſome ſpots on the earth which have a power of producing heat within themſelves, independent of any thing foreign; and that water is ſo far from being able to deſtroy this power, that it ſeems rather to promote and continue it. We know that water hath this effect upon a mixture of iron filings and ſulphur; but whatever quantities of ſimilar ſubſtances we may ſuppoſe to be contained in the earth, we muſt alſo ſuppoſe to be deſtroyed by one great conflagration ſoon after they have begun to act upon each other, ſo that by their means no laſting heat in waters could be produced. Dr Stukely indeed would ſolve this, and ſeveral other phenomena, by making the fire and ſmoke of volcanoes the effects of electricity: but here ſufficient proof is wanting; for electricity, even in its moſt powerful ſtate, is not very apt to ſet bodies on fire. The thought, however, deſerves attention; for if electricity is capable of ſetting a volcano on fire, it is undoubtedly capable of producing ſolfaterras where it meets with proper materials, and from them ſprings of any degree of heat.

The cold bath is found one of the moſt univerſal and innocent remedies yet diſcovered, though ſtill its uſe is not to be adopted without precautions.

Baths in vapour, the fume or ſteam of ſome decoction is received upon the body to promote a perſpiration.—Theſe are alſo by ſome called *Balnea Laconica*.

Vapour baths are, when the patient is not plunged into what is prepared for the bath, but only receives its ſteam upon thoſe parts of his body which require it: as in ſome diſtempers of the fundament and womb, where the patient ſits and receives the fumes of ſome proper fomentation, &c. To theſe may be added the bagnio; where people are made to ſweat by the heat of a room, and pouring on of hot water; after which they generally go into a hot bath or bagnio.

A peculiar ſort of vapour-bath was much uſed by the ancient Mexicans, and is ſtill in uſe among the preſent Indians their deſcendants. According to the Abbé Clavigero, theſe baths are built of raw bricks, and their form is ſimilar to that of ovens for baking bread: but with this difference, that the pavement of the bath is a little convex, and lower than the ſurface of the earth; whereas that of moſt ovens is plain, and a little elevated for the accommodation of the baker. The greateſt diameter of a bath is about eight feet, and its greateſt height ſix. The entrance, like the mouth of an oven, is wide enough to allow a man to creep eaſily in. In the place oppoſite to the entrance there is a furnace of ſtone or raw bricks, with its mouth outwards to receive the fire, and a hole above it to carry off the ſmoke. The part which unites the furnace to the bath, and which is about two feet and a half ſquare, is ſhut with a certain dry ſtone of a porous texture. In the upper part of the vault there is an air-hole, like that to the furnace. This is the uſual ſtructure of the temazcalli; but there are others that are without vault or furnace, mere little ſquare chambers, yet well covered and defended from the air.—When any perſon goes to bathe, he firſt lays a mat within the temazcalli, a pitcher of water, and a bunch of herbs or leaves of maize. He then cauſes a fire to be made in the furnace, which is kept burning until the ſtones which join the bath and furnace are quite hot. The perſon who is to uſe the bath enters commonly naked, and generally accompanied for the ſake of convenience, or on account of infirmity, by one of his domeſtics. As ſoon as he enters, he ſhuts the entrance cloſe, but leaves the air-hole at top for a little time open, to let out any ſmoke which may have been introduced through the chinks of the ſtone; when it is all out he likewiſe ſtops up the air-hole. He then throws water upon the hot ſtones, from which immediately ariſes a thick ſteam to the top of the temazcalli. While the ſick perſon lies upon the mat, the domeſtic drives the vapour downwards, and gently beats the ſick perſon, particularly on the ailing part, with the bunch of herbs which are dipped for a little while in the water of the pitcher, which has then become a little warm. The ſick perſon falls immediately into a ſoft and copious ſweat, which is increaſed or diminiſhed at pleaſure, according as the caſe requires. When the evacuation deſired is obtained, the vapour is let off, the entrance is cleared, and the ſick perſon clothes himſelf, or is tranſported on the mat to his chamber; as the entrance to the bath is uſually within ſome chamber of his habitation.—This ſort of bath, called *temazcalli* by the natives, has been regularly uſed in ſeveral diſorders, particularly in fevers occaſioned by coſtiveneſs. The Indian women uſe it commonly after childbirth, and alſo thoſe perſons who have been ſtung or wounded by any poiſonous animal. It is undoubtedly a powerful remedy for all thoſe who have occaſion to carry off groſs humours; and certainly it would be moſt uſeful in Italy, where the rheumatiſm is ſo frequent and afflicting. When a very copious ſweat is deſired, the ſick perſon is raiſed up and held in the vapour; as he ſweats the more nearer he is to it. The temazcalli is ſo common, that in every place inhabited by the Indians there are many of them.

Baths, Dry, are thoſe made of aſhes, ſalt, ſand, ſhreds of leather, and the like.—The ancients had divers ways of ſweating by a dry heat; as by the means of a hot ſand, ſtove-rooms, or artificial bagnios, and certain natural hot ſteams of the earth, received under a proper arch, or hot-houſe, as we learn from Celſus. They alſo had another kind of bath by inſolation, where the body was expoſed to the ſun for ſome time, in order to draw forth the ſuperfluous moiſture from the inward parts; and to this day it is a practice in ſome nations to cover the body over with horſe-dung, eſpecially in chronical diſeaſes, to digeſt and breathe out the humour that cauſes the diſtemper. In New England they make a kind of ſtoves of turf, wherein the ſick are ſhut up to bathe or ſweat.

The ſame name is ſometimes alſo given to another kind of bath, made of kindled coals, or burning ſpirit of wine; the patient being placed in a convenient cloſe chair for the reception of the fume, which riſes and provokes ſweat in a plentiful manner: care is here taken to keep the head out, and to ſecure reſpiration. This bath has been found very effectual in removing old obſtinate pains in the limbs, and venereal complaints; and will often complete a cure left unperformed by ſalivation.

Some authors ſpeak of bloody baths, *balnea ſanguinolenta*,

Baths. *nolenta*, prepared eſpecially of the blood of infants, anciently ſuppoſed to be a kind of ſpecific for the leproſy.

Baths, *Metalline*, thoſe made of water impregnated with the *ſcoriæ* of metals. The moſt common and uſeful of this kind are thoſe prepared with the *ſcoriæ* of iron, which abound with the earthy, ſaline, and ſulphureous ſubſtance of the metal; and theſe are of excellent ſervice for ſtrengthening and bracing up the part to which they are applied, and recovering weak and decayed limbs; ſtopping various kinds of bleeding; and reſtoring the menſtrual and hemorrhoidal flux where obſtructed; inſomuch, that they may well be ſubſtituted for the natural iron baths.

Adjacent to the ſmelting huts where metals are run from their ore, are to be found large quantities of the ſlag of copper, antimony, and cobalt, which abounding with ſulphur, vitriolic ſalt, and an earthy principle, make ſerviceable baths for ſtrengthening the loſt tone of the fibres, and relaxing them when they are too ſtiff. Theſe baths have likewiſe a deterſive and cleanſing virtue; ſo that with prudence, and due regard to circumſtances, they may be uſed on many occaſions. The way of making theſe artificial baths is, either to take the ſlags as they come hot from the furnace, or elſe to heat them afreſh, and throw them into hot water; which is afterwards to be uſed either in the way of bath, or fomentation, occaſionally. There are other artificial baths, prepared of alum and quicklime, by boiling them together in fine rain-water. Such baths are highly ſerviceable in paralytic diſorders and weakneſs of the limbs.

The pepper bath, or peffer waſſer, on the Alps, is one of the moſt celebrated in Europe, and has been the ſubject of particular treatiſes, beſides what has been ſaid of it occaſionally by Scheuchzer and others. It was firſt diſcovered in the year 1240, and is of the periodical kind. The water breaks forth in a dreadful place, ſcarce acceſſible to the ſunbeams, or indeed to men, unleſs of the greateſt boldneſs, and ſuch as are not in the leaſt ſubject to dizzineſs. Theſe baths have this ſingularity above all others, that they commonly break forth in May, and that with a ſort of impetuoſity, bringing with them beech-leaves, crabs, or other wood-fruit; and that their courſe deſiſts in September or October. Scheuchzer profeſſes himſelf of opinion, that theſe waters are not impregnated with any minerals, or if they do contain any, that their virtues in curing diſtempers and preſerving health do not proceed from them. They are exceeding clear, deſtitute of colour, taſte, or ſmell.

Baths, *Balnea*, in *Architecture*, denote large pompous buildings among the ancients, erected for the ſake of bathing. Baths made a part of the ancient *gymnaſia*, though they were frequented more for the ſake of pleaſure than health.

The moſt magnificent baths were thoſe of Titus, Paulus Æmilius, and Dioclefian, of which there are ſome ruins ſtill remaining. It is ſaid that at Rome there were 856 public baths. Fabricius adds, that the exceſſive luxury of the Romans appeared in nothing more viſible than in their baths. Seneca complains, that the baths of plebeians were filled from ſilver pumps; and that the freedmen trod on gems. Macrobius tells us of one Sergius Oratus, a voluptuary, who had pendant baths hanging in the air. Baths.

According to Dion, Mæcenas was the firſt who made a bath at Rome: yet there are inſtances of public baths prior to this; but they were of cold water, ſmall, and poorly decorated. Agrippa, in his ædilate, built 160 places for bathing, where the citizens might be accommodated, either with hot or cold, *gratis*. After this example, Nero, Veſpaſian, Titus, Domitian, Severus, Gordian, Aurelian, Maximian, Dioclefian, and moſt of the emperors who ſtudied to gain the affections of the people, erected baths laid with the richeſt marble, and wrought according to the rules of the moſt delicate architecture. The rich had baths at home, and frequently very magnificent ones, eſpecially after the time that the practice of pillaging the provinces had begun; but they only uſed them on extraordinary occaſions. The great men, and even emperors themſelves, ſometimes bathed in public with the reſt of the people. Alexander Severus was the firſt who allowed the public baths to be opened in the night-time during the heats of ſummer.

The Greek baths were uſually annexed to *paleſtræ* or *gymnaſia*, of which they were conſidered as a part. Theſe baths conſiſted of ſeven different apartments, uſually ſeparated from each other, and intermixed with other buildings belonging to the other ſorts of exerciſes. Theſe were, 1ſt, The cold bath, *frigida lavatio*; 2dly, The *elæotheſium*, or room where they were anointed with oil; 3dly, The *frigidarium*, or cooling room; 4thly, The *propnigeum*, or entrance of the *hypocauſtum*, or ſtove; 5thly, The vaulted room for ſweating in, or vapour-bath, called *concamerata ſudatio*, or *tepidarium*; 6thly, The *laconicum*, or dry ſtove; 7thly, The hot bath, called *callida lavatio*.

As for the baths ſeparate from the *paleſtræ*, they appear to have been uſually double, one for men, the other for women; but ſo near, that the ſame furnace heated both. The middle part was poſſeſſed by a large baſon that received water by ſeveral pipes, and was ſurrounded by a baluſtrade, behind which there was an area for the reception of thoſe who waited to uſe the bath. They were vaulted over, and only received light from the top.

In the Roman baths, the firſt part that appeared was a large baſon, called κολυμβηθρα in Greek, and *natatio* or *piſcina* in Latin. In the middle was the *hypocauſtum*, which had a row of four apartments on each ſide, called *balnearia*: theſe were the ſtove, the bath, cold bath, and *tepidarium*. The two ſtoves, called *laconicum* and *tepidarium*, were circular and joined together. Their floor was hollow and ſuſpended, in order to receive the heat of a large furnace, which was communicated to the ſtoves through the vacuities of their floor. This furnace alſo heated another room called *vaſarium*, in which were three large brazen veſſels called *milliaria*, reſpectively containing hot, warm, and cold water; which were ſo diſpoſed, that the water might be made to paſs by ſyphons and pipes out of one or other of them into the bath, in order to adjuſt its temperature. The deſcription is given by Vitruvius. At three in the afternoon, which is what Pliny calls *hora octava et nona*, the Romans all repaired to the baths, either the public or the private ones this

Baths, Bath.

was called the *bath hour*, *hora balnei*, which in winter was at nine, in ſummer at eight. The public baths were all opened by the ſound of a bell, and always at the ſame hour. Thoſe who came too late, ſtood a chance for bathing in cold water.

They began with hot water; after which, as the pores were now opened, and might give room for too plentiful a perſpiration, they thought it neceſſary for their health to cloſe them again, either with the cold bath, or at leaſt with a ſprinkling of cold water. During the bath, the body was ſcraped with a kind of knives, or ſmall ſtrigils, ſuch as are ſtill found in the cabinets of the curious. After bathing ſucceeded unction and perfuming, from which they went freſh to ſupper.

The Romans, when they found their ſtomachs overcharged with meat, went to the bath, as we learn from Juvenal, who inveighs againſt thoſe who, having gorged themſelves with eating, were forced to go into the baths to give themſelves relief. They found alſo that a bath was good to refreſh themſelves after ſome conſiderable fatigue or travel, as Celſus tells us; which makes Plautus ſay, that all the baths in this world were not ſufficient to remove the wearineſs he felt. After Pompey's time, the humour of bathing was carried to great exceſs, by which many were ruined, ſeveral having brought themſelves to ſuch a pitch, that they could not bear food without bathing firſt. The emperor Titus is ſaid to have loſt his life thereby. Hence Pliny inveighs ſeverely againſt thoſe phyſicians who held, that hot baths digeſted the food. The emperor Hadrian firſt laid a reſtraint on the immoderate humour of bathing, by a public edict, prohibiting all perſons to bathe before the eighth hour.

Baths of Agrippa, (*thermæ Agrippinæ*,) were built of brick, but painted in enamel: thoſe of Nero, *thermæ Neronianæ*, were not only furniſhed with freſh water, but even had the ſea brought into them: thoſe of Caracalla were adorned with 200 marble columns, and furniſhed with 1600 ſeats of the ſame matter. Lipſius aſſures us they were ſo large, that 1800 perſons might conveniently bathe in them at the ſame time. But the baths of Diocleſian, *thermæ Diocleſianæ*, ſurpaſſed all the reſt in magnificence. One hundred and forty thouſand men were employed many years in building them. Great part of theſe, as well as thoſe of Caracalla, are ſtill ſtanding; and with the vaſt high arches, the beautiful and ſtately pillars, the extraordinary plenty of foreign marble, the curious vaulting of the roofs, the prodigious number of ſpacious apartments, and a thouſand other ornaments, make one of the greateſt curioſities of modern Rome.

Bath, in *Chemiſtry*. Several kinds of apparatus employed to tranſmit heat are called baths; but the ſubſtances moſt frequently uſed by chemiſts for this purpoſe are water and ſand. When water is employed, it is called *Balneum Mariæ*, or *water bath*; which is very much uſed, very convenient for many operations, and may be employed ſucceſsfully for all degrees of heat interior to that of boiling water. As water, when expoſed to fire in any veſſel from which it can evaporate, does only receive a determinate degree of heat, which always remains the ſame when once it has arrived to the boiling heat, it follows, that by the water bath, a degree of heat always equal may be tranſmitted with certainty. Farther, this degree of heat being incapable of burning, or of communicating an empyreumatic quality to matters ſuſceptible of it, the water bath has alſo the advantage of not expoſing ſubſtances to this inconvenience. When veſſels in which diſtillations and digeſtions are made, are placed in ſand, then a ſand bath is formed. This intermediate ſubſtance of ſand is very convenient, to moderate the too great activity of the naked fire, and to tranſmit any degree of heat, from the weakeſt to a red heat. As this bath is attended with leſs trouble, and requires leſs apparatus than the water bath, it is much uſed in laboratories. Nothing is requiſite for the ſand bath, but an earthen or iron veſſel filled with fine ſand, which is ſitted into a furnace, and capable of containing the cucurbits, retorts, matraſſes, or other veſſels containing the matter to be operated upon.

Bath, in *Metallurgy*, is uſed to ſignify the fuſion of metallic matter in certain operations. In refining or cupelling, for example, the metals are ſaid to be in bath when they are melted. When gold is purified by antimony, this ſemi-metal melted, is called by ſome the *bath of gold*; alchemiſts, who conſider gold as the king of metals, call antimony the *bath of the king only*; becauſe in fact gold only can reſiſt the action of antimony.

Bath, in Hebrew antiquity, a meaſure of capacity, containing the tenth part of an omar, or ſeven gallons and four pints, as a meaſure for things liquid; or three pecks and three pints, as a meaſure for things dry.

Bath, Bath-Kol.

Bath-Kol, the daughter of a voice. So the Jews call one of their oracles, which is frequently mentioned in their books, eſpecially the Talmud; being a fantaſtical way of divination invented by the Jews themſelves, though called by them a revelation from God's will, which he made to his choſen people, after all verbal prophecies had ceaſed in Iſrael. It was in fact a method of divination ſimilar to the *ſortes Virgilianæ* of the Heathens. For as, with them, the firſt words they happened to dip into, in the works of that poet, were a kind of oracle whereby they predicted future events; ſo, with the Jews, when they appealed to Bath-kol, the firſt words they heard from any man's mouth were looked upon as a voice from heaven, directing them in the matter they inquired about. The Chriſtians were not quite free from this ſuperſtition, making the ſame uſe of the book of the Scriptures as the Pagans did of the works of Virgil. It was practiſed by Heraclius, emperor of the eaſt, in the beginning of the ſeventh century: for, being at war with Choſroes king of Perſia, and in doubt, after a ſucceſsful campaign, where to take up his winter quarters, he conſulted the book of the ſcriptures in this way of divination, and was determined thereby. In France, it was the practice for ſeveral ages to uſe this kind of divination at the conſecration of a biſhop, in order to diſcover his life, manners, and future behaviour. This uſage came into England with the Norman conqueſt; for we are told, that at the conſecration of William the ſecond Norman biſhop of the dioceſe of Norwich, the words which firſt occurred on dipping into the Bible were, *Not this man, but Barabbas*: ſoon after which, William died, and Herbert de Lozinga, chief ſimony broker to King William Rufus, ſucceeded him; at whoſe conſecration the words at which the Bible opened were the ſame which

Batha, Bathing. which Jeſus ſpoke to Judas the traitor; *Friend, wherefore art thou come?* This circumſtance ſo affected Herbert, that it brought him to a thorough repentance of his crime; in expiation of which he built the cathedral church of Norwich, the firſt ſtone of which he laid in the year 1096.

BATHA, Bath, or *Bachia*, a town of Hungary, and capital of a county of the ſame name, ſeated on the Danube. E. Long. 20. 40. N. Lat. 46. 40.

BATHING, the act of uſing or applying a bath; that is, of immerging the body, or part of it, in water or other fluid.

Bathing is a practice of great antiquity. The Greeks, as early as the heroic age, are ſaid to have bathed themſelves in the ſea, in rivers, &c. We even find mention in Homer of hot baths in the Trojan times; but theſe ſeem to have been very rare, and only uſed on extraordinary occaſions. Athenæus ſpeaks of hot baths as unuſual even in his age. In reality, public baths appear to have been diſcouraged, and even prohibited, by the ancient Greeks, who were contented to waſh themſelves at home in a ſort of bathing tubs. The method of bathing among the ancient Greeks was, by heating water in a large veſſel with three feet, and thence pouring it on the head and ſhoulders of the perſon ſeated in a tub for that purpoſe, who at coming out was anointed with oil.

The Romans were alſo long before they came into the uſe of baths; the very name of which, *thermæ*, ſhows they borrowed it from the Greeks. As the ancient Romans were chiefly employed in agriculture, their cuſtom was, every evening after work, to waſh their arms and legs, that they might ſit down to ſupper with more decency: for it is to be obſerved, the uſe of linen was then unknown; and the people of that age went with their arms and legs bare, and conſequently expoſed to duſt and filth. But this was not all; for every ninth day, when they repaired to the city, either to the nundinæ or to attend at the aſſemblies of the people, they bathed all over in the Tiber, or ſome other river which happened to be neareſt them. This ſeems to have been all the bathing known till the time of Pompey, when the cuſtom began of bathing every day. See Bath.

The Celtic nations were not without the uſe of bathing: the ancient Germans bathed every day in warm water in winter, and in ſummer in cold. In England, the famous bath in Somerſetſhire is ſaid by ſome to have been in uſe 800 years before Chiſt. Of this, however, it muſt be owned, we have but very ſlender evidence; but Dr Muſgrave makes it probable that it was a place of conſiderable reſort in Geta's time; there being ſtill the remains of a ſtatue erected to that general, in gratitude for ſome benefactions he had conferred upon it.

Although bathing, among the ancients, made, as it were, a part of diet, and was uſed as familiarly as eating or ſleep; yet it was in high eſteem among their phyſicians for the cure of diſeaſes, as appears from Strabo, Plinv, Hippocrates, and Oribaſius; whence frequent exhortations to waſhing in the ſea, and plunging into cold water. The firſt inſtance of cold bathing, as a medicine, is Melampus's bathing the daughters of the king of Argos: and the firſt inſtance of warm bathing is Medea's uſe of it, who was ſaid to boil people alive, becauſe Pelias king of Theſſaly died in a warm bath under her hands. The cold bath was uſed with ſucceſs by Antonius Muſa, phyſician to the emperor Auguſtus, for the recovery of that prince; but fell into neglect after the death of Marcellus, who was thought to have been deſtroyed by the improper uſe of it. It was again brought into requeſt towards the cloſe of the reign of Nero, by means of a phyſician of Marſeilles named *Charmis;* but during the ignorance of the ſucceeding ages, the practice was again baniſhed for a long time.—Both hot and cold bathing are now preſcribed in many caſes by the phyſicians, though they are not agreed as to the manner in which they operate on the human body. See Medicine *Index*. Bathing.

Bathing among the Turks, as among the ancients, makes a part of diet and luxury; and in every town, and even village, there is a public bath. Indeed, the neceſſity of cleanlineſs, in a climate where one perſpires ſo copiouſly, has rendered bathing indiſpenſable; the comfort it produces preſerves the uſe of it; and Mahomet, who knew its utility, has reduced it to a precept. Of theſe baths, and the manner of bathing, particularly at Cairo, the following account is given by M. Savary in his Letters on Egypt.

"The firſt apartment one finds in going to the bath, is a large hall, which riſes in the form of a rotunda. It is open at the top, to give a free circulation to the air. A ſpacious eſtrade, or raiſed floor, covered with a carpet, and divided into compartments, goes round it, on which one lays one's clothes. In the middle of the building, a jet-d'eau ſpouts up from a baſon, and agreeably entertains the eye. When you are undreſſed, you tie a napkin round your loins, take a pair of ſandals, and enter into a narrow paſſage, where you begin to be ſenſible of the heat. The door ſhuts to; and, at 20 paces off, you open a ſecond, and go along a paſſage, which forms a right angle with the former. Here the heat increaſes. They who are afraid of ſuddenly expoſing themſelves to a ſtronger degree of it, ſtop in a marble hall, in the way to the bath properly ſo called. The bath is a ſpacious and vaulted apartment, paved and lined with marble, around which there are four cloſets. The vapour inceſſantly ariſing from a fountain and ciſtern of hot water, mixes itſelf with the burning perfumes. Theſe, however, are never burnt except the perſons who are in the bath deſire it. They are mixed with the ſteam of the water, and produce a moſt agreeable effect.

"The bathers are not impriſoned here, as in Europe, in a ſort of tub, where one is never at one's eaſe. Extended on a cloth ſpread out, the head ſupported by a ſmall cuſhion, they ſtretch themſelves freely in every poſture, whilſt they are wrapped up in a cloud of odoriferous vapours, which penetrate into all their pores. After repoſing there ſome time, until there is a gentle moiſture over the whole body, a ſervant comes, preſſes you gently, turns you over, and when the limbs are become ſupple and flexible he makes all the joints crack without any difficulty. He maſſes * and ſeems to knead the fleſh without making you feel the ſmalleſt pain. This operation finiſhed, he puts on a ſtuff glove, and rubs you a long time. During this operation, he detaches from the body of the patient, which is running with ſweat, a ſort of ſmall ſcales, and removes even the

* "Maſs" comes from the Arabic verb *maſt*, which ſignifies touching in a delicate manner.

Bathing. the imperceptible dirt that ſtops the pores. The ſkin becomes ſoft and ſmooth like ſatin. He then conducts you into a cloſet, pours the lather of perfumed ſoap upon your head, and withdraws. The ancients did more honour to their gueſts, and treated them in a more voluptuous manner. Whilſt Telemachus was at the court of Neſtor, 'the beautiful Polycaſta, the handſomeſt of the daughters of the king of Pylos, led the ſon of Ulyſſes to the bath; waſhed him with her own hands; and, after anointing his body with precious oils, covered him with rich habits and a ſplendid cloak.' Piſiſtratus and Telemachus were not worſe treated in the palace of Menelaus. 'When they had admired its beauties, they were conducted to baſons of marble, where a bath was prepared: Beautiful female ſlaves waſhed them; and, after anointing them with oil, covered them with rich tunics and ſuperb pellices.

"The cloſet to which one is conducted is furniſhed with a ciſtern and two cocks: one for cold and the other for hot water. There you waſh yourſelf. Soon after the ſervant returns with a depilatory pomatum, which in an inſtant makes the hair fall off the places it is applied to. Both men and women make general uſe of it in Egypt. It is compoſed of a mineral called *ruſma*, which is of a deep brown. The Egyptians burn it lightly, knead it with water, mixing it with half the quantity of ſlaked lime. This grayiſh paſte applied to the hair, makes it fall off in two or three minutes, without giving the ſlighteſt pain.

"After being well waſhed and purified, you are wrapped up in hot linen, and follow the guide through the windings that lead to the outer apartment. This inſenſible tranſition from heat to cold prevents one from ſuffering any inconvenience from it. On arriving at the eſtrade, you find a bed prepared for you; and ſcarcely are you laid down before a child comes to preſs every part of your body with his delicate fingers, in order to dry you thoroughly. You change linen a ſecond time, and the child gently grates the calloſity of your feet with pumice ſtone. He then brings you a pipe and Moka coffee.

"Coming out of a ſtove where one was ſurrounded by a hot and moiſt fog, where the ſweat guſhed from every limb, and tranſported into a ſpacious apartment open to the external air, the breaſt dilates, and one breathes with voluptuouſneſs. Perfectly maſſed, and as it were regenerated, one experiences an univerſal comfort. The blood circulates with freedom; and one feels as if diſengaged from an enormous weight, together with a ſuppleneſs and lightneſs to which one has been hitherto a ſtranger. A lively ſenſation of exiſtence diffuſes itſelf to the very extremities of the body. Whilſt it is loſt in delicate ſenſations, the ſoul, ſympathizing with the delight, enjoys the moſt agreeable ideas. The imagination, wandering over the univerſe, which it embelliſhes, ſees on every ſide the moſt enchanting pictures, everywhere the image of happineſs. If life be nothing but the ſucceſſion of our ideas, the rapidity with which they then recur to the memory, the vigour with which the mind runs over the extended chain of them, would induce a belief that in the two hours of that delicious calm that ſucceeds the bath, one has lived a number of years."

Such are the baths, the uſe of which were ſo ſtrongly recommended by the ancients, and which are ſtill the delight of the Egyptians. It is by means of them that they prevent or diſpel rheumatiſms, catarrhs, and ſuch cutaneous diſorders as are produced by want of perſpiration. Hence likewiſe they find a radical cure for that fatal evil which attacks the ſources of generation, the remedy for which is ſo dangerous in Europe. By the ſame reſource they get rid of that uncomfortable feeling ſo common to all nations who do not pay ſo much attention to the cleanlineſs of their bodies.—M. Tournefort, indeed, who had uſed ſteam baths at Conſtantinople, where there is leſs refinement in them than at Cairo, is of opinion that they injure the breaſt. But, according to M. Savary, this is an error which further experience would have corrected. There are no people who make more frequent uſe of them than the Egyptians, and there is no country where there are fewer aſthmatic people. The aſthma is ſcarcely known there. Bathing, Bathurſt.

The women are paſſionately fond of theſe baths. They frequent them at leaſt once a week, and take with them ſlaves properly qualified for the purpoſe. More luxurious than the men, after undergoing the uſual preparations, they waſh their bodies, and above all their heads, with roſe-water. It is there that female head-dreſſers form their long black hair into treſſes, which they mix with precious eſſences inſtead of powder and pomatum. It is there that they blacken the edge of their eye-lids, and lengthen their eyebrows with cohel, a preparation of tin burnt with gallnuts; it is there they ſtain the finger and toe nails with the leaves of henne, a ſhrub common in Egypt, and which gives them a golden colour. The linen and clothing they make uſe of are paſſed through the ſweet ſteam of the wood of aloes; and when the work of the toilet is at an end, they remain in the outer apartment, and paſs the day in entertainments. Females entertain them with voluptuous ſongs and dances, or tell them tales of love.

BATHURST, Ralph, M. D. an eminent phyſician, poet, and divine, born in the year 1620. He ſtudied divinity in Trinity college, Oxford; but the times of confuſion coming on, he changed the courſe of his ſtudies, and applied himſelf to phyſic. He took a doctor's degree in that faculty; in which he roſe to ſuch eminence, that he was, in the time of the uſurpation, appointed phyſician to the ſtate. Upon the reſtoration, he quitted his profeſſion of phyſic; was elected a fellow of the Royal Society, and preſident of his college; and having entered into holy orders, he was made chaplain to the king, and afterwards dean of Wells. Soon after, he ſerved the office of vice-chancellor of Oxford, and was nominated by King William and Queen Mary to the ſee of Briſtol; which he refuſed to accept. His learning and talents were various. He was an orator, a philoſopher, and a poet: he poſſeſſed an inexhauſtible fund of wit, and was a facetious companion at 80 years of age. Ridicule was the weapon with which he uſed to correct the delinquents of his college; and he was ſo abſolute a maſter of it, that he had it always at hand. His poetical pieces in the *Muſæ Anglicanæ* are excellent in their kind. He wrote ſeveral poems, both in Engliſh and Latin; and died June 14. 1704, in the 84th year of his age.

Bathurst, *Allen*, earl of Bathurſt, one of the laſt

Bathurſt. worthies of Queen Anne's reign, that ſhining period of triumphs, taſte, genius, and elegance, was born in the year 1684. His ſtudies and his education were equally conducive to the brilliant figure he was deſtined to make in ſocial life and in the ſenate, as a polite ſcholar, a patriot, and a ſtateſman. Theſe talents he had an opportunity to diſplay as early as the year 1705; when, at the requeſt of his father Sir Benjamin Bathurſt, and the ſolicitation of the conſtituents of Cirenceſter, he ſerved in parliament for that borough, his native ſoil, with reputation and integrity. He diſtinguiſhed himſelf particularly in the ſtruggles and debates relative to the union between the two kingdoms, firmly ſupporting this meaſure, calculated to ſtrengthen the vigour of government by uniting its force. Though he was contented to act a ſubordinate character in the great oppoſition planned by Mr Harley and Mr St John, his intimate friends, to ſap the credit of the duke of Marlborough and his adherents, he was of infinite ſervice to his party in arraigning, with ſpirit and eloquence, the conduct of the general and the earl of Godolphin, who had long governed the queen, and laviſhed the treaſures of the nation on conqueſts more ſplendid than ſerviceable. The loſs of the battle of Almanza ſeconded his efforts to diſpel the intoxication of former ſucceſſes. His perſonal regard for Lord Somers, preſident of the council, was never altered, though they were of different opinions in politics; and when he was diveſted of his office, Mr Bathurſt acted with ſuch tenderneſs and delicacy, as to preſerve the eſteem of Lord Somers in a private ſtation. In conſideration of his zeal and ſervices, the queen advanced him, in 1711, to the dignity of a peer, by the title of Baron Bathurſt, of Battleſden, in Bedfordſhire.

His lordſhip continued to ſpeak his ſentiments with an undaunted freedom in the upper houſe; and ſtept forth as a formidable opponent to the court-meaſures in the reign of George I. and during Sir Robert Walpole's adminiſtration. The acrimony of the proſecution carried on againſt the earl of Oxford, Lord Bolingbroke, and the duke of Ormond, ſtimulated his indignation and his eloquence againſt ſuch vindictive proceedings; and he obſerved, "that the king of a faction was but the ſovereign of half his ſubjects."

The South-ſea ſcheme having infected the whole nation with a ſpirit of avaricious enterpriſe, the people awaked from their delirium, and an infinite number of families was involved in ruin. Lord Bathurſt publicly impeached the directors, whoſe arts had enabled them by theſe vain expectations to amaſs ſurpriſing fortunes: he repreſented that the national honour was concerned in ſtripping them of their ill acquired wealth; and moved for having all the directors of the South-ſea company puniſhed by a forfeiture of their eſtates, for ſuch a notorious act of ſordid knavery.

When the bill was brought into the houſe of lords againſt Dr Atterbury biſhop of Rocheſter, that learned prelate, who joined to the graces of ſtyle and elocution all the elegance of a juſt delivery; among the many friends the biſhop's eloquence, politeneſs, and ingenuity had procured him, was Lord Bathurſt. He ſpoke againſt the bill with great vehemence and propriety; obſerving, "that if ſuch extraordinary proceedings were countenanced, he ſaw nothing remaining for him and others to do, but to retire to their country-houſes, and there, if poſſible, quietly enjoy their eſtates within their own families, ſince the leaſt correſpondence, or intercepted letter, might be made criminal." Then turning to the biſhops, he ſaid, he "could hardly account for the inveterate hatred and malice ſome perſons bore the ingenious biſhop of Rocheſter, unleſs it was that they were infatuated like the wild Americans, who fondly believe they inherit not only the ſpoils, but even the abilities, of the man they deſtroy." He was one of the lords who entered his proteſt againſt the bill. Bathurſt.

His lordſhip was entirely averſe to continental connections; and animadverted ſeverely upon the monarch whoſe thoughts were turned to foreign concerns and alliances which could never be uſeful; complaining of the immenſe ſums laviſhed in ſubſidies to needy and rapacious princes.

The directors of the charitable corporation having embezzled 500,000l. of the proprietors capital, Lord Bathurſt declared, in the houſe of lords, his abhorrence of this moſt iniquitous ſcene of fraud; aſſerting that not one ſhilling of the money was ever applied to the proper ſervice, but became the reward of avarice and venality.

His lordſhip concurred, with all his power, in the oppoſition to Sir Robert Walpole, who now tottered on the brink of ruin. This miniſter, after obſtinate ſtruggles, having been forced to reſign all his employments, Lord Bathurſt was ſworn of the privy-council, and made captain of the gentlemen-penſioners, which poſt he reſigned in 1744. He was appointed treaſurer to the preſent king, then prince of Wales, in 1757, and continued in the liſt of privy-counſellors at his acceſſion to the throne; but, on account of his great age, he choſe to enjoy *otium cum dignitate*.

Lord Bathurſt's integrity gained him the eſteem even of his opponents; and his humanity and benevolence, the affection of all that knew him more intimately. He added to his public virtues all the good breeding, politeneſs, and elegance, of ſocial intercourſe. Dr Freind, Congreve, Vanbrugh, Swift, Prior, Rowe, Addiſon, Pope, Arbuthnot, Gay, and moſt men of genius in his own time, cultivated his friendſhip, and were proud of his correſpondence.

Pope, in his Epiſtle to him on the Uſe of Riches, thus addreſſes him:

> The ſenſe to value riches, with the art
> T'enjoy them, and the virtue to impart;
> To balance fortune by a juſt expence,
> Join with economy magnificence;
> With ſplendor, charity; with plenty, health:
> O teach us, Bathurſt, yet unſpoil'd by wealth!
> That ſecret rare, between th' extremes to move,
> Of mad good nature, and of mean ſelf-love.

And Sterne, in his letters to Eliza, thus ſpeaks of him: "This nobleman is an old friend of mine: he was always the protector of men of wit and genius; and has had thoſe of the laſt century always at his table. The manner in which his notice began of me, was as ſingular as it was polite.—He came up to me one day as I was at the Princeſs of Wales's court. 'I want to know you, Mr Sterne; but it is fit you ſhould know alſo who it is that wiſhes this pleaſure: you have heard (continued he) of an old Lord Bathurſt, of whom

Bathurſt || Batis.

whom your Popes and Swifts have ſung and ſpoken ſo much: I have lived my life with geniuſes of that caſt, but have ſurvived them; and deſpairing ever to find their equals, it is ſome years ſince I have cloſed my accounts, and ſhut up my books, with thoughts of never opening them again: but you have kindled a deſire in me of opening them once more before I die, which I now do; ſo go home, and dine with me.' This nobleman, I ſay, is a prodigy: for at 85 he has all the wit and promptneſs of a man of 30; a diſpoſition to be pleaſed, and a power to pleaſe others beyond whatever I knew! added to which, a man of learning, courteſy, and feeling."

His lordſhip, in the latter part of his life, preſerved his natural cheerfulneſs and vivacity, always acceſſible, hoſpitable, and beneficent. Lately he delighted in rural amuſements; and enjoyed, with a philoſophical ſatisfaction, the ſhade of the lofty trees he had planted himſelf. Till within a month of his death he conſtantly rode out on horſeback two hours before dinner, and conſtantly drank his bottle of claret or Madeira after dinner. He uſed to declare, in a jocoſe manner, he never could think of adopting Dr Cadogan's method, as Dr Cheyne had aſſured him, 50 years ago, he would never live ſeven years longer unleſs he abridged himſelf of his wine. Purſuant to this maxim, his lordſhip having, ſome years ago, invited ſeveral of his friends to ſpend a few cheerful days with him at his ſeat at Cirenceſter, and being one evening very loth to part with them; on his ſon the late chancellor's objecting to their ſitting up any longer, and adding that health and long life were beſt ſecured by regularity, he ſuffered him to retire: but, as ſoon as he was gone, the cheerful father ſaid, "Come, my good friends, ſince the old gentleman is gone to bed, I think we may venture to crack another bottle."

His lordſhip was advanced to the dignity of earl in 1772; and lived to ſee the above nobleman, his eldeſt ſon, ſeveral years lord high chancellor of Great Britain, and promoted to the peerage in 1771 by the title of Baron Apſley. Lord Bathurſt married Catharine daughter of Sir Peter Apſley, by whom he had two other ſons and five daughters. His death happened, after a few days illneſs, at his ſeat near Cirenceſter, in the 91ſt year of his age, and on the 16th of September 1775.

BATHYLLUS *and* PYLADES, inventors of pantomime entertainments on the ſtage. Bathyllus ſucceeded in repreſenting comedy; Pylades in tragedy. The art conſiſted in expreſſing the paſſions by geſtures, attitudes, and dumb ſhow; not, as in modern times, in machinery, and the fooleries of Harlequin. They flouriſhed at Rome, under Auguſtus, about A. D. 10. Each of them kept ſcholars, who perpetuated their maſter's name: for the followers of Bathyllus, who excelled in the comic part, called themſelves *Bathylli*; and thoſe of Pylades, who excelled in the tragic, called themſelves *Pyladæ*.

BATILLUS, a muſical inſtrument made of metal, in the form of a ſtaff, furniſhed with metalline rings, which being ſtruck, yielded a kind of harmonical ſounds; uſed by the Armenians in their church-ſervice.

BATIS. See BOTANY *Index*.

BATISTE, in *Commerce*, a fine white kind of linen cloth, manufactured in Flanders and Picardy.

Batiſte || Battæ.

There are three kinds of batiſte; the firſt very thin; the ſecond leſs thin; and the third much thicker, called *Holland Batiſte*, as coming very near the goodneſs of Hollands.

The chief uſe of batiſte is for neck-clothes, head-clothes, ſurplices, &c.

BATMAN, in *Commerce*, a kind of weight uſed at Smyrna, containing ſix okes of 400 drams each, which amount to 16 pounds 6 ounces and 15 drams of Engliſh weight.

BATMANSON, JOHN, prior of the Carthuſian monaſtery, or Charter-houſe in the ſuburbs of London. He was ſome time a ſtudent at Oxford, but it does not appear that he took any degree in that univerſity. He was intimately acquainted with Edward Lee archbiſhop of York, at whoſe requeſt he wrote againſt Eraſmus and Luther. He died in the year 1531, and was buried in the chapel belonging to the Charter-houſe. According to Bale, he was a proud forward perſon; and he ſays that Eraſmus, in one of his letters to the biſhop of Wincheſter, calls him an ignorant fellow. Pits, on the contrary, gives him the character of a man of ſingular genius, zeal, piety, and learning. He wrote, 1. *Animadverſiones in annotationes Eraſmi in Nov. Teſtamentum.* 2. *A treatiſe againſt ſome of Luther's works.* Theſe two he afterwards retracted. 3. *Commentaria in proverbia Solomonis.* 4. *In cantica canticorum.* 5. *De unica Magdalena.* 6. *Inſtitutiones noviciorum.* 7. *De contemptu mundi.* 8. *De Chriſto duodenni.* 9. *On the words*, Miſſus eſt, &c.

BATON, or BASTON. See BASTON.

BATRACHOMYOMACHIA, the battle of the frogs and the mice, the title of a fine burleſque poem generally aſcribed to Homer.—The ſubject of the work is the death of Pſycharpax, a mouſe, ſon to Toxartes, who being mounted on the back of Phyſignathus, a frog, on a voyage to her palace, to which ſhe had invited him, was ſeized with fear when he ſaw himſelf in the middle of the pond, ſo that he tumbled off and was drowned. Phyſignathus being ſuſpected to have ſhaken him off with deſign, the mice demanded ſatisfaction, and unanimouſly declared war againſt the frogs.

BATTÆ, in *Ancient Geography*, a people of Germany, formerly inhabitants of what is now called *Heſſe*. Being diſſatisfied with their ſituation there, they ſettled on the iſland formed by the Vahalis and Rhine, which from them took the name of *Batavia*, or *Batavorum Inſula*. Their government was a mixture of monarchy, ariſtocracy, and democracy. Their chief was properly ſpeaking, nothing more than a principal citizen, whoſe buſineſs was rather to adviſe than to command. The principal men who exerciſed juriſdiction, and commanded the troops, in their reſpective diſtricts, were choſen, as well as the kings, in an aſſembly of the people. A hundred perſons ſelected from among the people preſided over every county, and acted as chiefs in the different hamlets. The whole nation was, in ſome meaſure, an army always in readineſs. Each family compoſed a body of militia, which ſerved under a captain of their own chooſing. See BATAVORUM *Inſula*.

Battalia || Battel.

BATTALIA, an army ranged in order of battle, or ready for engagement. The word ſeems formed from the Latin *batualia*, ſometimes alſo written *batalia*, denoting a ſort of military or gladiatorial exerciſe, as fighting with foils, or tilting at a poſt. In this ſenſe, we meet with the depth of a battalia; to march in battalia, with the baggage in the middle; to break the battalia, &c. In the Roman battalia, the *haſtati* made the front.

BATTALION, a ſmall body of infantry, ranged in form of battle, and ready to engage.

A battalion uſually contains from 500 to 800 men; but the number it conſiſts of is not determined. They are armed with firelocks, ſwords, and bayonets; and divided into 13 companies, one of which is grenadiers. They are uſually drawn up three men deep. Some regiments conſiſt of but one battalion, others are divided into four or five.

BATTATAS, the Indian name of the potato. See Convolvulus.

BATTEL, a town of Suſſex, five miles north-weſt of Haſtings, ſituated in E. Long. 0. 35. N. Lat. 50. 55. It was formerly called *Epiton;* and is the place where William the Conqueror vanquiſhed Harold king of England on October 14. 1066. William, in memory of this victory, erected an abbey, which he called *Battel Abbey;* and if a criminal could but reach this abbey, he was diſmiſſed from thence, and was afterwards in no danger for his paſt faults. The abbey was a large and noble ſtructure, as may be judged by the gateway which is ſtill entire, as well as from the other remains. This place is noted for making gunpowder equal to that of Dantzick; and the beſt goes by the name of *Battel gunpowder*.

Battel, in *Law*, or *Trial by wager of battle*, a ſpecies of trial of great antiquity, but now much diſuſed. It ſeems to have owed its original to the military ſpirit of our anceſtors, joined to a ſuperſtitious frame of mind; it being in the nature of an appeal to Providence, under an apprehenſion and hope (however preſumptuous and unwarrantable), that heaven would give the victory to him who had the right. The deciſion of ſuits, by this appeal to the God of battles, is by ſome ſaid to have been invented by the Burgundi, one of the northern or German clans that planted themſelves in Gaul. And it is true, that the firſt written injunction of judiciary combats that we meet with, is in the laws of Gundebal, A. D. 501, which are preſerved in the Burgundian code. Yet it does not ſeem to have been merely a local cuſtom of this or that particular tribe, but to have been the common uſage of all thoſe warlike people from the earlieſt times. And it may alſo ſeem, from a paſſage in Velleius Paterculus, that the Germans, when firſt they became known to the Romans, were wont to decide all conteſts of right by the ſword: for when Quintilius Varus endeavoured to introduce among them the Roman laws and method of trial, it was looked upon (ſays the hiſtorian) as a *novitas incognitæ diſciplinæ, ut ſolita armis decerni jure terminarentur*. And among the ancient Goths in Sweden we find the practice of judiciary duels eſtabliſhed upon much the ſame footing as they formerly were in our own country.

This trial was introduced in England among other Norman cuſtoms by William the Conqueror; but was only uſed in three caſes, one military, one criminal, and the third civil. The firſt in the court martial, or court of chivalry and honour; the ſecond in appeals of felony; and the third upon iſſue joined in a writ of right, the laſt and moſt ſolemn deciſion of real property. For in writs of right the *jus proprietatis*, which is frequently a matter of difficulty, is in queſtion; but other real actions being merely queſtions of the *jus poſſeſſionis*, which are uſually more plain and obvious, our anceſtors did not in them appeal to the deciſion of Providence. Another pretext for allowing it, upon theſe final writs of right, was alſo for the ſake of ſuch claimants as might have the true right, but yet by the death of witneſſes or other defect of evidence be unable to prove it to a jury. But the moſt curious reaſon of all is given in the Mirror, that it is allowable upon warrant of the combat between David for the people of Iſrael of the one party, and Goliah for the Philiſtines of the other party: a reaſon which Pope Nicholas I. very ſeriouſly decides to be inconcluſive. Of battel therefore on a writ of right we ſhall firſt ſpeak: and although the writ of right itſelf, and of courſe this trial thereof, be at preſent diſuſed; yet, as it is law at this day, it may be matter of curioſity, at leaſt, to inquire into the forms of this proceeding, as we may gather them from ancient authors. Battel.

1. The laſt trial of battel that was waged in the court of common pleas at Weſtminſter (though there was afterwards one in the court of chivalry in 1631, and another in the county palatine of Durham in 1638) was in the 13th year of Queen Elizabeth, A. D. 1571, as reported by Sir James Dyer; and was held in Tothill-fields, Weſtminſter, "*non ſine magna juris conſultorum perturbatione*," ſaith Sir Henry Spelman, who was himſelf a witneſs of the ceremony. The form, as appears from the authors before cited, is as follows.

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

A piece of ground is then in due time ſet out, of 60 feet ſquare, encloſed with liſts, and on one ſide a court erected for the judges of the court of common pleas, who attend there in their ſcarlet robes; and alſo a bar is prepared for the learned ſerjeants at law. When the court ſits, which ought to be by ſunriſing, proclamation is made for the parties and their champions; who are introduced by two knights, and are dreſſed in a coat of armour, with red ſandals, barelegged from the knee downwards, bareheaded, and with bare arms to the elbows. The weapons allowed them are only batons,

Battel. or ſtaves, of an ell long, and a four-cornered leather target; ſo that death very ſeldom enſued this civil combat. In the court military, indeed, they fought with ſword and lance, according to Spelman and Ruſhworth; as likewiſe in France: only villeins fought with the buckler and baton, gentlemen armed at all points. And upon this, and other circumſtances, the preſident Monteſquieu hath with great ingenuity not only deduced the impious cuſtom of private duels upon imaginary points of honour, but hath alſo traced the heroic madneſs of knight-errantry from the ſame original of judicial combats. But to proceed:

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

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

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

2. In appeal * of felony, the trial by battel may be demanded, at the election of the appellee, in either an appeal or an improvement; and it is carried on with equal ſolemnity as that on a writ of right; but with this difference, that there each party hires a champion, but here they muſt fight in their proper perſons. And therefore, if the appellant or approver be a woman, a prieſt, an infant, or of the age of 60, or lame, or blind, he or ſhe may counterplead and refuſe the wager of battel; and compel the appellee to put himſelf upon the country. Alſo peers of the realm, bringing an appeal, ſhall not be challenged to wage battel, on account of the dignity of their perſons; nor the citizens of London, by ſpecial charter, becauſe fighting ſeems foreign to their education and employment. So likewiſe, if the crime be notorious; as if the thief be taken with the *mainour*, or the murderer in the room with a bloody knife, the appellant may refuſe the tender of battel from the appellee; and it is unreaſonable an innocent man ſhould ſtake his life againſt one who is already half-convicted.

* See *Appeal.*

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

Batten || Battering-Ram.

only of the appeal, but of all indictments likewiſe for the ſame offence.

BATTEN, a name that workmen give to a ſcantling of wooden ſtuff, from two to four inches broad, and about one inch thick; the length is pretty conſiderable, but undetermined.—This term is chiefly uſed in ſpeaking of doors and windows of ſhops, &c. which are not framed of whole deal, &c. with ſtiles, rails, and pannels like wainſcot, but are made to appear as if they were by means of theſe battens braded on the plain board round the edges, and ſometimes croſs them, and up and down.

BATTENBURG, a town of Dutch Guelderland, ſeated on the north bank of the Meuſe, almoſt oppoſite to Ravenſtein. E. Long. 5. 35. N. Lat. 50. 55.

BATTERING, the attacking a place, work, or the like, with heavy artillery.

To batter in breach, is to play furiouſly on a work, as the angle of a half-moon, in order to demoliſh and make a gape therein. In this they obſerve never to fire a piece at the top, but all at the bottom, from three to ſix feet from the ground.

The battery of a camp is uſually ſurrounded with a trench, and palliſadoes at the bottom, with two redoubts on the wings, or certain places of arms, capable of covering the troops which are appointed for their defence. See BATTERY.

BATTERING-Ram, in *Antiquity*, a military engine uſed to batter and beat down the walls of places beſieged. It is ſaid to have been invented by Artemanes of Clazomene, a Greek architect who flouriſhed 441 B. C.—The machine is thus deſcribed by Joſephus: It is a vaſt beam, like the maſt of a ſhip, ſtrengthened at the one end with a head of iron, ſomething reſembling that of a ram, whence it took its name. This was hung by the middle with ropes to another beam, which lay acroſs two poſts; and hanging thus equally balanced, it was by a great number of men drawn backwards and puſhed forwards, ſtriking the wall with its iron head. But this engine did moſt execution when it was mounted on wheels, which is ſaid to have been firſt done at the ſiege of Byzantium under Philip of Macedon.

Plutarch informs us, that Mark Anthony, in the Parthian war, made uſe of a ram fourſcore feet long: and Vitruvius tells us, that they were ſometimes 106, and ſometimes 120, feet in length; and to this perhaps the force and ſtrength of the engine was in a great meaſure owing. The ram was managed at one time by a whole century of ſoldiers; and they being ſpent were ſeconded by another century, ſo that it played continually without any intermiſſion.

Plate LXXXVIII. fig. 1. repreſents the battering-ram ſuſpended. 2. The ram. 3. The form of its head, faſtened to the enormous beam by three or four bands of iron, four feet in breadth. At the extremity of each of theſe bands (4) was a chain (5) of the ſame metal, one end of which was faſtened to a hook (6), and at the other extremity of each of theſe chains was a cable firmly bound to the laſt link. Theſe cables ran the whole length of the beam to the end of the ram (7), where they were all bound together as faſt as poſſible with ſmall ropes. To the end of theſe cables another was fixed, compoſed of ſeveral ſtrong cords plaited together to a certain length, and then running ſingle (8). At each of theſe ſeveral men were placed, to balance and work the machine. 10. The chain or cable by which it hung to the croſs beam (11), fixed on the top of the frame. 12. The baſe of the machine.—The unſuſpended ram differed from this only in the manner of working it: for inſtead of being ſlung by a chain or cable, it moved on ſmall wheels on another large beam.

Battering-Rams || Battery.

BATTERING-Rams, in *Heraldry*, a bearing or coat of arms reſembling the military engine of the ſame name.

BATTERY, in the military art, a parapet thrown up to cover the gunners and men employed about the guns from the enemy's ſhot. This parapet is cut into embraſures, for the cannon to fire through. The height of the embraſures on the inſide is about three feet; but they go ſloping lower to the outſide. Their wideneſs is two or three feet, but open to ſix or ſeven on the outſide. The maſs of earth that is betwixt two embraſures, is called the *merlon*. The platform of a battery is a floor of planks and ſleepers, to keep the wheels of the guns from ſinking into the earth; and is always made ſloping towards the embraſures, both to hinder the reverſe, and to facilitate the bringing back of the gun.

BATTERY of Mortars differs from a battery of guns; for it is ſunk into the ground, and has no embraſures.

Croſs-BATTERIES, are two batteries which play athwart one another upon the ſame object, forming there an angle, and beating with more violence and deſtruction; becauſe what one bullet ſhakes, the other beats down.

BATTERY, ſunk or *buried*, is when its platform is ſunk or let down into the ground, ſo that there muſt be trenches cut in the earth, againſt the muzzles of the guns, for them to fire out at, and to ſerve for embraſures.

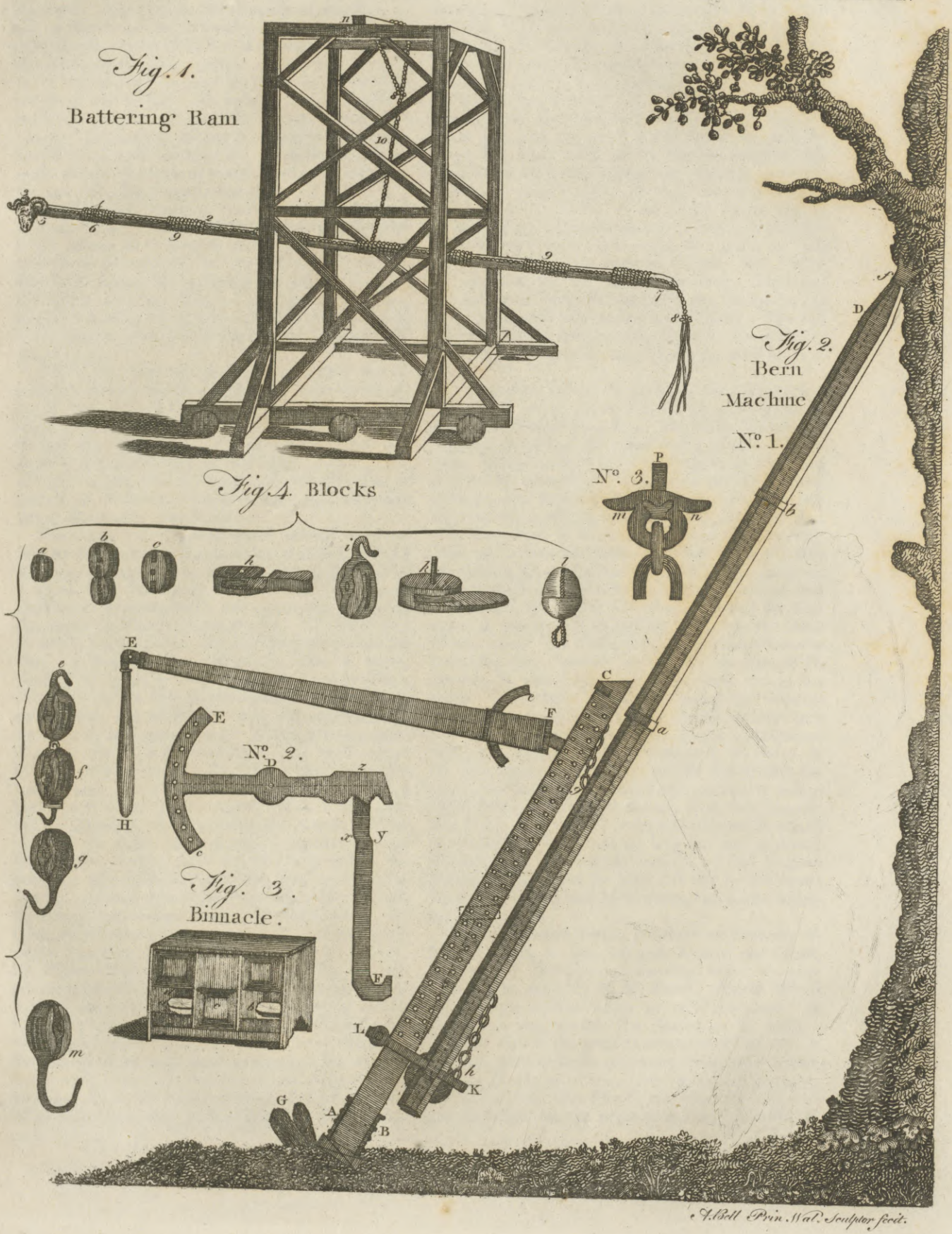
BATTERY d' Enfilade, is one that ſcours or ſweeps the whole length of a ſtraight line.

BATTERY en Echarpe is that which plays obliquely.

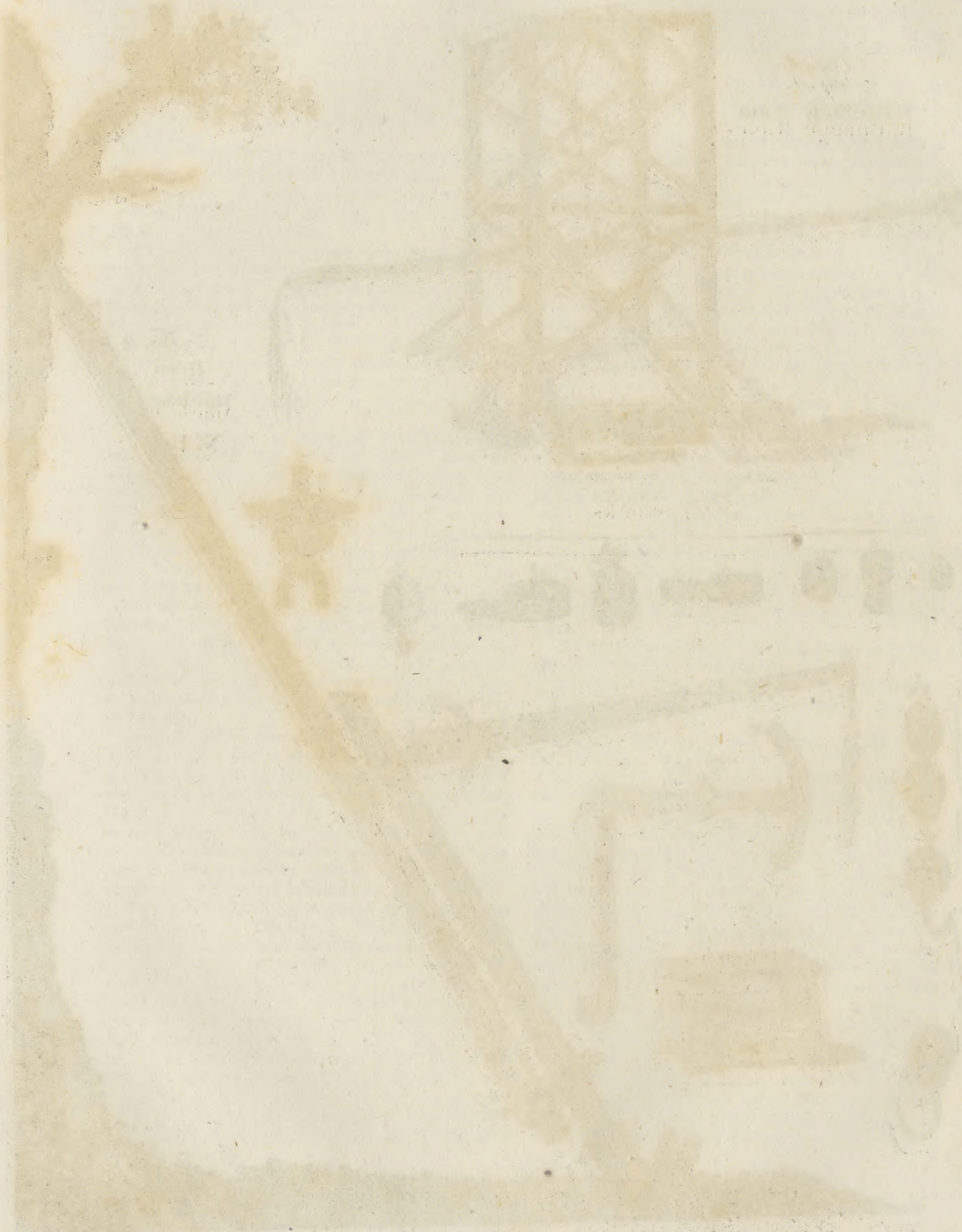
BATTERY de Reverſe, that which plays upon the enemy's back.

Camerade BATTERY, is when ſeveral guns play at the ſame time upon one place.

BATTERY, in *Law*, is the unlawful beating of another. The leaſt touching of another's perſon wilfully, or in anger, is a battery, for the law cannot draw the line between different degrees of violence, and therefore totally prohibits the firſt and loweſt ſtage of it; every man's perſon being ſacred, and no other having a right to meddle with it, in any the ſlighteſt manner. And therefore, upon a ſimilar principle, the Cornelian law *de injuriis* prohibited *pulſation* as well as *verberation*; diſtinguiſhing verberation, which was accompanied with pain, from pulſation which was attended with none. But battery is in ſome caſes juſtifiable or lawful; as where one who hath authority, a parent or maſter, gives moderate correction to his child, his ſcholar, or his apprentice. So alſo on the principle of ſelf-defence: for if one ſtrikes me firſt, or even only aſſaults me, I may ſtrike in my own defence; and if ſued for it, may plead *ſon aſſault demeſne*, or that it was the plaintiff's own original aſſault that occaſioned it. So likewiſe in defence of my goods or poſſeſſion,



J. Bell Prin. Mar. Sculptor fecit.



Battiſta, Battle

if a man endeavours to deprive me of them, I may juſtify laying hands upon him to prevent him; and in caſe he perſiſts with violence, I may proceed to beat him away. Thus too in the exerciſe of an office, as that of church-warden or beadle, a man may lay hands upon another to turn him out of church, and prevent his diſturbing the congregation. And if ſued for this or the like battery, he may ſet forth the whole caſe, and plead that he laid hands upon him gently, *molliter manus impoſuit*, for this purpoſe. On account of theſe cauſes of juſtification, battery is defined to be the unlawful beating of another; for which the remedy is, as for aſſault, by action of *trepaſs vi et armis*: wherein the jury will give adequate damages.

BATTISTA, Franco, a celebrated painter, born at Venice, was one of the diſciples of Michael Angelo, whoſe manner he followed ſo cloſely, that, in the correctneſs of his outlines, he ſurpaſſed moſt of the maſters of his time. His paintings are pretty numerous, and diſperſed all over Italy and other parts of Europe; but his colouring being very dry, they are not much more eſteemed than the prints etched by his hand. He died in 1561.

BATTLE, a general engagement between two armies in a country ſufficiently open for them to encounter in front and at the ſame time (ſee War). The word is alſo written *battel*, *battell*, and *battail*. It is formed from the French *battaille*, of the Latin verb *batuere*, to *fence* or *exerciſe with arms*: whence *batualia* and *batalia*, which properly denoted the action or exerciſe of thoſe who learned to fence, and who were hence alſo denominated *batuatores*,

The ancients never joined battle without much ceremony and preparation; as taking auguries, offering ſacrifice, haranguing the ſoldiers, giving the word or a *teſſera*, &c. The ſignals of battle were, ſounding the *claſſicum* or general charge, and diſplaying a peculiar flag called by Plutarch a *purple robe*. To which may be added, ſinging pæans, raiſing military ſhouts, and the like. A Roman legion, ranged in order of battle, conſiſted of *haſtati*, placed in the front; of *principes*, who were all old experienced ſoldiers, placed behind the former; and of *triarii*, heavy armed with large bucklers, behind the *principes*. The *haſtati* were ranked cloſe; the ranks of the *principes* were much opener ſo that they could receive the *haſtati*; and thoſe of the *triarii* opener ſtill, inſomuch that they could receive both the *principes* and the *haſtati* within them, without any diſorder, and ſtill facing the enemy. When therefore the *haſtati* found themſelves unable to ſtand the enemy's charge, they retired gently within the *principes*, where joining with them they renewed the combat. If theſe found themſelves too weak to ſuſtain the enemy, both retired among the *triarii*, where rallying, they formed a new corps, and charged with more vigour than ever. If theſe failed, the battle was loſt: the Romans had no farther reſource. The moderns are unacquainted with this method of inſerting or embattling one company into another; without which the former cannot be well ſuccoured or defended, and their places taken by others; which was a thing the Romans practiſed with great exactneſs. For the *velites*, and in later times the archers and ſlingers, were not drawn up in this regular manner, but either diſpoſed of before the front of the *haſtati*, or ſcattered up and down among the void ſpaces of the *haſtati*, or ſometimes placed in two bodies in the wings. Theſe always began the combat, ſkirmiſhing in flying parties with the foremoſt troops of the enemy. If they were repulſed, which was uſually the caſe, they fell back to the flanks of the army, or retired again in the rear. When they retired, the *haſtati* advanced to the charge. As to the cavalry, it was poſted at the two corners of the army, like the wings on a body; and fought ſometimes on foot, ſometimes on horſeback. The auxiliary forces compoſed the two points of the battle, and covered the whole body of the Romans.—Other leſs uſual forms of battle among the Romans were the *cuneus*, or wedge; *globus*, or round form; *forfex*, or pair of ſheers; *turris*; or an oblong ſquare figure; *ſerra*, or ſaw. The Greeks were inferior to the Romans in marſhalling their armies for battle, as they drew up their whole army in a front, and truſted the ſucceſs of the day to a ſingle force. They had three forms of battle for the horſe, viz. the ſquare, the wedge, and the rhombus or diamond form. The firſt held beſt for the defenſive; the latter for the offenſive; the wedge being preferred as bringing moſt hands to fight.

Battle.

The Greeks notified the places of their battles and victories by adding the word Νικη; whence Nicomedia Nicopolis, Theſſalonica, &c. The ancient Britons did the like, by adding the word *mais*; whence Maiſſeveth, Malmaiſbury, &c. The Engliſh by the word *field*.—The Romans had their particular days, called *præliares dies*, in which alone it was lawful to join battle, and others wherein it was unlawful, called *dies atri*. The Athenians, by the ancient laws of their country, were not to draw out their forces for battle till after the ſeventh day of the month: And Lucian relates of the Lacedemonians, that by the laws of Lycurgus, they were not to fight before full moon. Among the Germans, it was reputed an impiety to fight in the wane of the moon; and Cæſar tells us, that Arioviſtus was beaten by him, becauſe, contrary to the laws of his country, he had fought when the moon was in her wane. The German ſoldiers were intimidated with the apprehenſion, and afforded Cæſar an eaſy victory; *acie commiſſa, impeditos religione hoſtes vicit*. It is well known that Jeruſalem was taken by Pompey in an attack on the Sabbath-day, when by the Jewiſh ſuperſtitious notions, they were not allowed to fight, or even to defend themſelves. The Romans did not carry their ſuperſtition ſo far: their *atri dies* were only obſerved in reſpect of attacking; no day was too holy for them to defend themſelves in. Among the ancients, we find frequent inſtances of battles in the night; is was by the moonlight that Pompey beat Mithridates, and Scipio Aſdrubal and Syphax.

The firſt pitched battle, of which we have any diſtinct account, is that between Crœſus and Cyrus, deſcribed by Xenophon, concerning which we have a diſſertation expreſsly by M. Freret, wherein ſeveral points of the ancient tactics are well explained. In the modern war, we find few pitched or ſet battles: the chief view of the great commanders of late days is rather to haraſs or ſtarve the enemy by frequent alarms, cutting off his proviſions, carrying off his baggage, ſeizing his poſts, &c. than to join iſſue with him, and put the whole on the event of one day; a battle generally

Battle-Axe || Bavaria.

nerally deciding the fate of a campaign, ſometimes of a whole war. Hence is is a rule, never to venture a general battle, unleſs either you fight to advantage, or be forced to it. Joining or giving battle ſhould always be by deſign: a general ſhould never ſuffer himſelf to be forced to fight. All the meaſures, movements, encampments, he makes, are to lead to the execution of his great deſign, which is to fight to advantage, till by ſome miſtake of the enemy, he at length find the favourable opportunity. It is in this that a ſuperior genius will at length prevail over an inferior: in the courſe of a campaign, he will take a number of advantages over him, which together are equivalent to a battle, the event of which is ever doubtful.

Battle-Axe, an ancient military weapon. Axes were a principal part of the offenſive armour of the Celtæ. At the ſiege of the Roman Capitol by the Gauls under Brennus, we find one of the moſt diſtinguiſhed of their warriors armed with a battle-axe. And Ammianus Marcellinus, many centuries afterwards, deſcribing a body of Gauls, furniſhes them all with battle-axes and ſwords. Some of theſe weapons have been found in the ſepulchres of the Britons, on the downs of Wiltſhire, and in the north of Scotland. Within theſe four or five centuries the Iriſh went conſtantly armed with an axe. At the battle of Bannockburn, King Robert Bruce clave an Engliſh champion down to the chine, at one blow, with a battle-axe. The axe of Lochaber hath remained a formidable implement of deſtruction in the hands of our Highlanders, even nearly to the preſent period; and it is ſtill uſed by the city-guard of Edinburgh in quelling mobs, &c.

BATTLEMENTS, in *Architecture*, are indentures or notches in the top of a wall or other building, in the form of embraſures, for the ſake of looking through them.

BATTOLOGY, in *Grammar*, a ſuperfluous repetition of ſome words or things.

BATTON, in *Merchandiſe*, a name given to certain pieces of wood or deal for flooring or other purpoſes.

BATTORY, a name given by the Hans Towns to their magazines or factories abroad. The chief of theſe battories are thoſe at Archangel, Novogrod, Berghmen, Liſbon, Venice, and Antwerp.

BATUA, Butua, *Buthoe*, or *Buthoece*, in *Ancient Geography*, a town of Dalmatia ſituated on the Adriatic; now *Budoa*; which ſee.

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

BATZ, a copper coin mixed with ſome ſilver, and current at different rates, according to the alloy, in Nuremberg, Baſil, Fribourg, Lucerne, and other cities of Germany and Switzerland.

BAVARIA, a duchy and formerly electorate of Germany. This duchy was once a kingdom, which extended from the mountains of Franconia to the frontiers of Hungary and the Adriatic gulf. It comprehended the countries of Tirol, Carinthia, Carniola, Stiria, Auſtria, and other ſtates, which are now fallen to different princes. At preſent it is bounded on the eaſt by Bohemia and Auſtria, on the weſt by Suabia, on the north by Franconia, and on the ſouth by Tirol. But the duke of Bavaria is not abſolute maſter of all this country; for within its bounds are ſituated many free cities, among which is Ratiſbon, and ſeveral lordſhips both eccleſiaſtical and ſecular. It is divided into Upper and Lower Bavaria; and theſe two provinces conſiſt of 12 counties, which formerly ſufficed to make a duchy, according to the laws of Franconia. The country is watered by five navigable rivers, beſides ſeveral ſmall ones, and 16 lakes. It contains 35 cities, of which Munich is the capital; 94 towns; 720 caſtles; 4700 villages; eight great abbeys; and 75 cloiſters or monaſteries, beſides thoſe of the mendicants. It is divided into four great bailliages called *governments*. Theſe are Munich, Landſhut, Straubing, and Burkhauſen. The principal cities are Ingolſtadt, Donawert, Landſberg, Freiberg, Straubingen, Wilſhauſen, Waſlerberg, Eling, Rain, &c. Bavaria.

Beſides theſe two provinces, the duke of Bavaria poſſeſſes the upper palatinate of Weſtphalia, which has been united to Bavaria, and comprehends ſeveral counties, cities, towns, and villages. On the other ſide of this province is Chamb, the chief city of the county of the ſame name, belonging likewiſe to the duke of Bavaria. He alſo poſſeſſes the landgraviate of Leitchtenber, which fell to him by the death of Maximilian Adam, in conſequence of family pacts made between the houſe of Bavaria and that of Leitchtenberg for their mutual ſucceſſion. In 1567, the county of Kaag fell to the duke of Bavaria by the death of Ladiſlaus the laſt count of that name. There are likewiſe family pacts of mutual ſucceſſion eſtabliſhed betwixt the houſe of Bavaria and the Palatine of the Rhine. The inhabitants of this country are ſtrong and laborious, exerciſing themſelves in ſhooting with rifled muſkets at a mark, in order to render themſelves more expert in war.

The houſe of Bavaria is univerſally allowed to be one of the moſt ancient in Germany. The counts of Scheyren, whoſe caſtle at preſent is a cloiſter, gave them the name. At that place are ſhown the tombs of more than 26 lords of Scheyren. The emperor Otho I. eſtabliſhed as counts-palatine of Bavaria and landgraves of Scheyren, Arnolph, and Herman, ſons of Arnolph brother to the duke of Berchtold of Carinthia, marquis of the county upon the Ens. After the death of Berchtold, the ſame emperor, inſtead of giving Bavaria to his ſon, gave it to Duke Henry his brother, who had married Judith ſiſter to Arnolph and Herman. This Duke Henry of Bavaria had by his marriage Henry Hezillon, who was ſucceeded by his ſon Henry, afterwards choſen emperor by the name of Henry II. This emperor having no children by Saint Cunegond his wife, Bavaria paſſed again to the family of Franconia, and afterwards to that of Suabia under Henry IV. who poſſeſſed it till the year 1071, when this laſt emperor gave that county to Count Wolf, or Guelf, of Ravenſburg in Suabia. To this Guelph, who died in the iſland of Cyprus, ſucceeded Guelph II. and to him his brother Duke Henry IX. who was ſucceeded by his ſon Henry the Proud. This laſt had married the only daughter of the emperor Lotharius, and after the death of his father-in-law became alſo duke of Saxony; but refuſing to deliver up the imperial ornaments of his father-in-law to the emperor Conrad III. duke of Suabia,

Bavay || Baudius.

bia, or to acknowledge him for emperor, he was put to the ban of the empire, and loſt his ſtates. After the death of Henry, Conrad made his brother Leopold marquis of Auſtria and duke of Bavaria; who, dying without iſſue, was ſucceeded by his brother Henry XI. whom the emperor Frederic I. made duke of Auſtria, joining together the two counties above and below the Ens, and declaring them free and independent of the government of Bavaria. The ſame emperor gave Bavaria thus diſmembered, with Saxony, to Henry the Lion, ſon of Henry the Proud. But Henry the Lion afterwards loſing the favour of this emperor, was put to the ban of the empire: and loſt all his poſſeſſions except Brunſwick and Lunenburg, which ſtill remain to his deſcendants. In 1180, the duchy of Bavaria was given by the emperor to Otho the landgrave of Wittelſbach, count-palatine of the houſe of Bavaria. In the time of this Otho, the caſtle of Scheyren was changed into a monaſtery, in which the duke was buried. From him are deſcended the two great families that remain to this day in Germany; viz. the counts-palatine of the Rhine, and till lately electors of Bavaria. The elector of Bavaria is now extinct, and ſunk in the elector-palatine; ſo that there are now only eight inſtead of nine electoral princes in Germany.

BAVAY, a ſmall town of the late province of Hainault, now the department of the North, in France, which has been often ruined by the wars of the Low Countries. It was taken by the Auſtrians in 1792, but retaken the ſame year. E. Long. 3. 45. N. Lat. 50. 25.

BAUCIS, in fabulous hiſtory, an old woman who lived with Philemon her huſband in a cottage in Phrygia. Jupiter and Mercury, travelling over that country, were well received by them, after having been refuſed entertainment by every body elſe. To puniſh the people for their inhumanity, theſe gods laid the country waſte with water; but took Baucis and Philemon with them to the top of a mountain, where they ſaw the deluge, and their own little hut above the waters turned into a temple. Having a wiſh granted them, they deſired to officiate in this temple as prieſt and prieſteſs, and alſo that they might die both together; which was granted them.

BAUCONICA, in *Ancient Geography*, a town of the Vangiones in Gallia Belgica; nine miles from Mogontiacum, and eleven from Borbitomagum; and therefore ſuppoſed to be *Oppenheim*, a town in the palatinate of the Rhine, and ſituated on that river.

BAUDELOT, Charles Cæsar, a learned advocate in the parliament of Paris, diſtinguiſhed himſelf by his ſkill in ancient monuments, and was received into the Academy of Belles Lettres in 1705. He wrote a Treatiſe on the Advantages of Travelling; many Letters and Diſſertations on Medals, &c; and died in 1722, aged 74.

BAUDIER, Michael, a gentleman of Languedoc, lived in the reign of Louis XIII. and publiſhed ſeveral books, which procured him the character of a copious and laborious author; among which are, 1. An Inventory of the General Hiſtory of the Turks. 2. The Hiſtory of the Seraglio. 3. That of the Religion of the Turks. 4. That of the Court of the King of China. 5. The Life of Cardinal Ximenes, &c.

BAUDIUS, Dominic, profeſſor of hiſtory in he univerſity of Leyden, born at Liſle the 8th of Auguſt 1561. He began his ſtudies at Aix-la-Chapelle, and continued them at Leyden. He removed from thence to Geneva, where he ſtudied divinity. After reſiding here ſome time, he returned to Ghent, and from thence to Leyden, where he applied to the civil law, and was admitted doctor of law in June 1585. Soon after his admiſſion, he accompanied the ambaſſadors from the States to England; and during his reſidence here became acquainted with ſeveral perſons of diſtinction, particularly the famous Sir Philip Sidney. He was admitted advocate at the Hague the 5th of January 1587; but being ſoon tired of the bar, went to travel in France, where he remained 10 years. He was much eſteemed in that kingdom, and gained many friends there. Achilles de Harlai, firſt preſident of the parliament of Paris, got him to be admitted advocate of the parliament of Paris in the year 1592. In 1602, he went to England with Chriſtopher de Harlai, the preſident's ſon, who was ſent ambaſſador to the court of London by Henry the Great. This ſame year Baudius having been named profeſſor of eloquence at Leyden, went and ſettled in that univerſity. He read lectures on hiſtory after the death of Morula, and was permitted alſo to do the ſame on the civil law. In 1611, the States conferred upon him the office of hiſtoriographer in conjunction with Meurſius; and in conſequence thereof he wrote The Hiſtory of the Truce. Baudius is an elegant proſe writer, as appears from his letters, many of which were publiſhed after his death. He was alſo an excellent Latin poet. The firſt edition of his poems was printed in the year 1587: they conſiſt of verſes of all the different meaſures. He publiſhed ſeparately a book of iambics in 1591, dedicated to Cardinal Bourbon. Some of his poems he dedicated to the king of England; others to the prince of Wales, in the edition of 1607, and went over to England to preſent them. He died at Leyden in 1613.

Baudius || Bauhin.

BAUDOBRIGA, in *Ancient Geography*, a town of the Treviri in Germany; now *Boppart*, in the electorate of Triers. See Boppart.

BAUDRAND, Michael Anthony, a celebrated geographer, born at Paris July 18. 1633. He travelled into ſeveral countries; and then applied himſelf to the reviſal of Ferrarius's Geographical Dictionary, which he enlarged by one half. He wrote, 1. Notes to Papirius Maſſo's deſcription of the Rivers of France. 2. A Geographical and Hiſtorical Dictionary. 3. Chriſtian Geography, or an Account of the Archbiſhoprics and Biſhoprics of the whole world; and made ſeveral maps. He died at Paris, May 29. 1700.

BAUGE, a drugget manufactured in Burgundy, with thread ſpun thick and coarſe wool.

Bauge, a ſmall town of Anjou in France, in the department of Maine and Loire, ſeated on the river Coeſnon. E. Long. 0. 10. N. Lat. 47. 30.

BAUHIN, John, a diſtinguiſhed botaniſt, was born at Lyons in the year 1541. He was the ſon of an eminent phyſician, who quitted France, his native country, on account of religion, and ſettled at Baſil. In early life he travelled with Geſner, the celebrated naturaliſt, and collected plants in the Alps, in France, and Italy, for the purpoſe of the great botanical work which he afterwards accompliſhed. He practiſed medicine firſt at Baſil, where he was alſo elected profeſ-

Bauhin. for of rhetoric in 1566. He reſided ſome time at Yverdun; and was afterwards invited to be phyſician to the duke of Wirtemberg at Montbelliard, and in this ſituation he ſpent the remaining forty years of his life. He devoted his ſtudies chiefly to botany, on which he beſtowed great labour, comparing authors ancient and modern with each other, and with nature, and collecting information from all quarters. He likewiſe proſecuted other branches of natural hiſtory, and publiſhed an account of "Medicinal Waters throughout Europe," and eſpecially in the duchy of Wirtemberg; and a particular account of the mineral ſpring of Boll, and the natural hiſtory of the place. His great work on plants was not completed at his death, which happened in 1613. A ſociety at Yverdun publiſhed in 1619 the *Prodromus* of it; but it was not till 1650 and 1651 that the work itſelf appeared in three vols. fol. entitled *Hiſtoria Plantarum nova et abſolutiſſima, cum auctorum conſenſu et diſſenſu circa eas.* Bauhin's ſon-in-law, Henry Cherler, was alſo a contributor to the work. This is a great performance; and, with all its defects, has been pronounced by Haller to be without an equal. The plants are numerous, generally well deſcribed and diſcriminated, and many new ſpecies are added. It is ſtill conſidered as a ſtandard work; and the names of John Bauhin and his brother rank high among the founders and firſt promoters of botanical ſcience.

Bauhin, *Gaſpard*, brother of the former, was born in 1560. He was early devoted to phyſic, and purſued his ſtudies at Padua, Montpellier, and ſome of the celebrated ſchools of Germany. In his journies he collected a number of plants which had eſcaped his brother's notice. Returning to Baſil in 1580, he was admitted to the degree of doctor, and gave private lectures in botany and anatomy. In 1582 he was appointed to the Greek profeſſorſhip in that univerſity, and in 1588, to the anatomical and botanical chairs. He was at laſt made city-phyſician, profeſſor of the practice of medicine, rector of the univerſity, and dean of his faculty. Thus diſtinguiſhed and honoured, he acquired great reputation. He became eminent as a botaniſt, and was aided in his reſearches by the contributions of his diſciples and friends in various parts of Europe. Haller gives him the character of being aſſiduous and laborious in collecting plants, by which he ſurpaſſed his brother in number of them, and alſo in the accuracy of his figures; but he poſſeſſes leſs acuteneſs of judgment in diſtinguiſhing varieties, and detecting the ſame ſpecies under different names. He publiſhed ſeveral works relative to botany, of which the moſt valuable is his *Pinax Theatri Botanici, ſeu index in Theophraſti, Dioſcoridis, Plinii, et botanicorum qui a ſeculo ſcripſerunt opera, plantarum fere ſex millium nomina cum ſynonimiis et differentiis. Opus* XIV. *annorum*, 4to. The confuſion that began to ariſe at this time from the number of botanical writers who deſcribed the ſame plant under different names, rendered ſuch a taſk as this highly neceſſary; and though there are many defects in the execution, the *Pinax* of Bauhin is ſtill a uſeful key to all writers before his time. Another great work which he planned was a *Theatrum Botanicum*, meant to compriſe twelve parts, fol. of which he finiſhed three, but only one was publiſhed. He alſo gave a very copious catalogue of the plants growing in the environs of Baſil; and he edited the works of Matthiolus, with conſiderable additions. Bauhinia || Bauſk.

Gaſpard alſo wrote on anatomy, which he ſtudied under Hieronymus ab Aquapendente, and purſued with vigour during his youth. The principal is *Theatrum Anatomicum infinitis locis auctum*, 4to. *Frankf.* 1621; which is a kind of pinax of anatomical facts and opinions. He alſo publiſhed a collection of anatomical plates. He died in 1613.

BAUHINIA, MOUNTAIN EBONY. See BOTANY *Index*.

BAVINS, in *War*, bruſh faggots, made with the bruſh at length. See FASCINES; and FIRE-SHIP, note (D).

BAUM, in *Botany*. See MELISSA, BOTANY *Index*.

BAUME, ST, a mountain of Provence in France, between Marſeilles and Toulon. Here Mary Magdalen is ſaid to have died, on which account it is much frequented.

Baume-les-Nomes, a town of France, in the department of Doub, which had a rich nunnery, from whence it takes its name, ſeated on the river Doux, in E. Long. 6. 20. N. Lat. 47. 12. Five miles from this town is a remarkable cavern, whoſe entrance is 20 paces wide; and after deſcending 300 paces, the gate of a grotto is ſeen, twice as large as that of a city. The grotto is 35 paces deep, 60 wide, and is covered with a kind of a vaulted roof, from which water continually drops. There is alſo a ſmall brook, ſaid to be frozen in ſummer, but not in winter; and at the bottom are ſtones that exactly reſemble candied citron peel. When the peaſants perceive a miſt riſing out of this cave, they affirm that it will certainly rain the next day.

BAUMEN, or BAUMAN, a cave of Lower Saxony in Germany, about a mile from Wermigerode, and 18 from Goſlar. The entrance is through a rock; and ſo narrow, that not above one perſon can paſs at a time. There are ſeveral paths in it, which the peaſants have turned up, in ſearching for the bones of animals which they ſell for unicorn's horns. Some think this cave reaches as far as Goſlar; but be this as it will, the ſkeletons of men have been found in it, who are ſuppoſed to have been loſt in the turnings and windings.

BAUR, WILLIAM, an eminent Flemiſh painter, was born at Straſburg, and was the diſciple of Brendel. He was ſome time at Rome, where his ſtudies were wholly employed about architecture and landſcapes, which prevented his ſtudying the antique. He painted ſmall figures in diſtemper on vellum. He etched with great ſpirit. His largeſt works are in the hiſtorical way. He has given us many of the ſieges, and battles, which waſted Flanders in the 16th century. They may be exact, and probably they are: but they are rather plans than pictures; and have little to recommend them but hiſtoric truth, and the freedom of the execution. His beſt prints are ſome characters he has given us of different nations, in which the peculiarities of each are very well preſerved. His Ovid is a poor performance. He died at Vienna in 1640.

BAUSK or BAUTKO, a ſmall but important town in the duchy of Courland, on the frontiers of Poland, with a ſtrong caſtle built on a rock. It was taken by the Swedes in 1625, and by the Ruſſians in 1705, after

Bautry || Baxter.

ter a bloody battle between them and the Swedes. It is ſeated on the river Muſa, in E. Long. 24. 44. N. Lat. 56. 30.

BAUTRY, or BAWTRY, a town in the weſt riding of Yorkſhire, on the road from London to York. It has long been noted for millſtones and grindſtones brought hither by the river Idle, on which it is ſeated. W. Long. 1. 0. N. Lat. 53. 27.

BAUTZEN, or BUDISSEN, a conſiderable town of Germany, and capital of Upper Luſatia, ſubject to the elector of Saxony, with a ſtrong citadel. The Proteſtants at well as Papiſts have here the free exerciſe of their religion. E. Long. 14. 42. N. Lat. 51. 10.

BAUX, a town of Provence in France, now the department of the Mouths of the Rhine, with the title of a marquiſate, ſeated on a rock, at the top of which is a ſtrong caſtle. E. Long. 5. 0. N. Lat. 43. 42.

BAWD, a perſon who keeps a place of proſtitution, or makes a trade of debauching women, and procuring or conducting criminal intrigues. Some think the word is derived from the old French *Baude*, bold or impudent; though Verſtegan has a conjecture which would carry it higher, viz. from *bathe* anciently written *bade*. In which ſenſe *bawd* originally imported no more than bath-holder, as if bagnios had anciently been the chief ſcenes of ſuch proſtitution.

The Romans had their male as well as female bawds; the former denominated *lenones* and *proagogi*, among us *panders;* the latter, *lenæ*. Donatus, ſpeaking of the habits of the ancient characters in comedy, ſays, *Leno paliis varii coloris utitur*. But the ancient *lenones*, it is to be obſerved, furniſhed boys as well as girls for venereal ſervice. Another ſort of theſe merchants or dealers in human fleſh, were called *mangones*, by the Greeks ανδροκαπηλοι, who ſold eunuchs, ſlaves, &c. By a law of Conſtantine, bawds were to be puniſhed by pouring melted lead down their throats. See the next article.

BAWDY-Houſe, a houſe of ill fame, to which lewd perſons of both ſexes reſort, and there have criminal converſation.

The keeping a bawdy-houſe is a common nuiſance, not only on account that it endangers the public peace by drawing together debauched and idle perſons, and promoting quarrels, but likewiſe for its tendency to corrupt the manners of the people. And therefore perſons convicted of keeping bawdy houſes, are puniſhable by fine and impriſonment; alſo liable to ſtand in the pillory, and to ſuch other puniſhment as the court at their diſcretion ſhall inflict. Perſons reſorting to a bawdy-houſe are likewiſe puniſhable, and they may be bound to their good behaviour.—It was always held infamous to keep a bawdy-houſe: yet ſome of our hiſtorians mention bawdy-houſes publicly allowed here in former times till the reign of Henry VIII. and aſſign the number to be 18 thus allowed on the bank-ſide in Southwark. See STEWS and BROTHEL.

Bawdy-howſes are licenſed in Holland, and pay a conſiderable tax to the ſtate.

BAWLING, among ſportſmen, is ſpoke of the dogs when they are too buſy before they find the ſcent good.

BAXTER, RICHARD, an eminent divine among the Nonconformiſts, was born at Rowton in Shropſhire, November 12. 1615; and diſtinguiſhed himſelf by his exemplary life, his pacific and moderate principles, and his numerous writings. He was remarkable for his piety even when he was very young. Upon the opening of the long parliament, he was choſen vicar of Kidderminſter. In the heat of the civil wars he withdrew from that town to Coventry, and preached to the garriſon and inhabitants. When Oliver Cromwell was made protector, he would by no means comply with his meaſures, though he preached once before him. He came to London juſt before the depoſing of Richard Cromwell, and preached before the parliament the day before they voted the return of King Charles II. who upon his reſtoration appointed him one of his chaplains in ordinary. He aſſiſted at the conference in the Savoy, as one of the commiſſioners for ſtating the fundamentals in religion, and then drew up a reformed liturgy. He was offered the biſhoprick of Hereford; which he refuſed; affecting no higher preferment than the liberty of continuing miniſter of Kidderminſter; which he could not obtain, for he was not permitted to preach there above twice or thrice after the Reſtoration. Whereupon he returned to London, and preached occaſionally about the city, till the act of uniformity took place. In 1662, Mr Baxter was married to Margaret Charleton, daughter to Francis Charleton, Eſq. of the county of Salop, who was eſteemed one of the beſt juſtices of the peace in that county. She was a woman of great piety, and entered thoroughly into her huſband's views concerning religion. During the plague in 1665 he retired into Buckinghamſhire; but afterwards returned to Acton, where he ſtaid till the act againſt conventicles expired; and then his audience was ſo large that he wanted room. Upon this he was committed to priſon; but procuring a habeas corpus, he was diſcharged. After the indulgence in 1672, he returned to London; and in 1682 he was ſeized for coming within five miles of a corporation. In 1684 he was ſeized again; and in the reign of King James II. was committed priſoner to the King's Bench, and tried before the lord chief juſtice Jefferies for his Paraphraſe on the New Teſtament, which was called a *ſcandalous* and *ſeditious* book againſt the government. He continued in priſon two years; from whence he was at laſt diſcharged, and had his fine remitted by the king. He died December the 8th 1691; and was buried in Chriſt-church. Baxter.

Mr Sylveſter ſays, that Mr Baxter's "perſon was tall and ſlender, and ſtooped much: his countenance compoſed and grave, ſomewhat inclining to ſmile. He had a piercing eye, a very articulate ſpeech, and deportment rather plain than complimental." There is an original portrait of him at Dr Williams's library, founded for the uſe of Proteſtant Diſſenting Miniſters, in Red-croſs-ſtreet. Mr Sylveſter alſo ſays, that "he had a great command over his thoughts. He had that happy faculty, ſo as to anſwer the character that was given of him by a learned man diſſenting from him, after diſcourſe with him; which was that *he could ſay what he would, and he could prove what he ſaid*. He was moſt intent upon the neceſſary things. Rational learning he moſt valued, and was a very extraordinary maſter of. And as to his expreſſive faculty, he ſpake

Baxter. properly, plainly, pertinently, and pathetically. He could ſpeak ſuitably, both to men's capacities and to the things inſiſted on. He was a perſon wonderful at extemporate preaching." But his common practice appears to have been to preach with notes; though he ſaid, "That he thought it very needful for a miniſter to have a body of divinity in his head." He was honoured with the friendſhip of ſome of the greateſt and beſt men in the kingdom (as the earl of Lauderdale, the earl of Balcarras, Lord Chief Juſtice Hales, Dr Tillotſon, &c.) and held correſpondence with ſome of the moſt eminent foreign divines.—He wrote above 120 books, and had above 60 written againſt him. The former, however, it ſhould ſeem, were greatly preferable to the latter; ſince Dr Barrow, an excellent judge, ſays, that "his practical writings were never mended, his controverſial ſeldom confuted."

Mr Granger's character of him is too ſtriking to be omitted. "Richard Baxter was a man famous for weakneſs of body and ſtrength of mind; for having the ſtrongeſt ſenſe of religion himſelf, and exciting a ſenſe of it in the thoughtleſs and profligate: for preaching more ſermons, engaging in more controverſies, and writing more books, than any other Nonconformiſt of his age. He ſpoke, diſputed, and wrote with eaſe; and diſcovered the ſame intrepidity when he reproved Cromwell and expoſtulated with Charles II. as when he preached to a congregation of mechanics. His zeal for religion was extraordinary; but it ſeems never to have prompted him to faction, or carried him to enthuſiaſm. This champion of the Preſbyterians was the common butt of men of every other religion, and of thoſe who were of no religion at all. But this had very little effect upon him: his preſence and his firmneſs of mind on no occaſion forſook him. He was juſt the ſame man before he went into a priſon, while he was in it, and when he came out of it; and he maintained an uniformity of character to the laſt gaſp of his life. His enemies have placed him in hell; but every man who has not ten times the bigotry that Mr Baxter himſelf had, muſt conclude that he is in a better place. This is a very faint and imperfect ſketch of Mr Baxter's character: men of his ſize are not to be drawn in miniature. His portrait, in full proportion, is in his *Narrative of his own Life and Times*; which though a rhapſody, compoſed in the manner of a diary, contains a great variety of memorable things, and is itſelf, as far as it goes, a Hiſtory of Nonconformity."—Among his moſt famous works were, 1. The Saints Everlaſting Reſt. 2. Call to the Unconverted, of which 20,000 were ſold in one year; and it was tranſlated not only into all the European languages, but into the Indian tongue. 3. Poor Man's Family Book. 4. Dying Thoughts; and, 5. A Paraphraſe on the New Teſtament. His practical works have been printed in four volumes folio.

Baxter, *William*, nephew and heir to the former, was an eminent ſchoolmaſter and critic. He was born at Lanlugany in Shropſhire, in the year 1650; and it is remarkable, that at the age of 18, when he firſt went to ſchool, he knew not one letter nor underſtood one word of any language but Welſh; but he ſo well improved his time, that he became a perſon of great and extenſive knowledge. His genius led him chiefly to the ſtudy of antiquities and philology, in which he compoſed ſeveral books. The firſt he publiſhed was a Grammar, in 1679, entitled *De Analogia ſeu Arte Latinæ Linguæ Commentariolus*. He alſo publiſhed a new and correct edition of Anacreon, with notes; an edition of Horace; a Dictionary of the Britiſh antiquities, in Latin: and ſeveral other books. He was a great maſter of the ancient Britiſh and Iriſh tongues, was particularly ſkilled in the Latin and Greek, and in the northern and eaſtern languages. He died May 31. 1723, after being above 20 years maſter of Mercer's School in London. Baxter.

Baxter, *Andrew*, a very ingenious metaphyſical writer, was born in 1686 or 1687, at Old Aberdeen (where his father was a merchant), and educated in King's College there. His principal employment was that of a private tutor to young gentlemen; and among others of his pupils were Lord Gray, Lord Blantyre, and Mr Hay of Drummelzier. About 1724 he married the daughter of a clergyman in the ſhire of Berwick. A few years after he publiſhed in 4to, "An Inquiry into the Nature of the human Soul, wherein its immateriality is evinced from the principles of reaſon and philoſophy;" without date. In 1741 he went abroad with Mr Hay, and reſided ſome years at Utrecht; having there alſo Lord Blantyre under his care. He made excurſions from thence into Flanders, France, and Germany; his wife and family reſiding, in the mean time, chiefly at Berwick-upon-Tweed. He returned to Scotland in 1747, and reſided till his death at Whittingham, in the ſhire of Eaſt Lothian. He drew up, for the uſe of his pupils and his ſon, a piece entitled *Matho; ſive, Coſmotheoria puerilis, Dialogus. In quo prima elementa de mundi ordine et ornatu proponuntur, &c.* This was afterwards greatly enlarged, and publiſhed in Engliſh, in two volumes 8vo. In 1750 was publiſhed, "An Appendix to his Inquiry into the Nature of the human Soul: wherein he endeavours to remove ſome difficulties which had been ſtarted againſt his notions of the *vis inertiæ* of matter, by Maclaurin, in his "Account of Sir Iſaac Newton's Philoſophical Diſcoveries." To this piece Mr Baxter prefixed a dedication to Mr John Wilkes, with whom he had commenced an acquaintance abroad. He died April the 23d, 1750, after ſuffering for ſome months under a complication of diſorders, of which the gout was the chief. He left a wife, three daughters, and one ſon, Mr Alexander Baxter; from which laſt the authors of Biographia Britannica received, as they inform us, ſundry particulars of his life.

His learning and abilities are ſufficiently diſplayed in his writings. He was extremely ſtudious, and ſometimes ſat up whole nights in reading and writing. His temper at the ſame time was very cheerful, and he was a friend to innocent merriment. It is ſaid of Mr Baxter, that he entered with much good humour into the converſation and pleaſures of young people, when they were of an innocent nature: and that he preſided, all the time of his abode at Utrecht, at the ordinary which was frequented by all the young Engliſh gentlemen there, with much gaiety and politeneſs, and in ſuch a manner as gave univerſal ſatisfaction. He alſo frequented the moſt polite aſſemblies in that city, and his company and converſation were particularly acceptable to the ladies. So that Mr Baxter appears to have ſtudied the graces, though without neglecting

Baxter, Bay.

neglecting more valuable acquiſitions and accompliſhments. He was at once the ſcholar and the gentleman. In converſation he was modeſt, and not apt to make much ſhow of the extenſive knowledge of which he was poſſeſſed. In the diſcharge of the ſeveral ſocial and relative duties of life, his conduct was exemplary. He had the moſt reverential ſentiments of the Deity, of whoſe preſence and immediate ſupport he had always a ſtrong impreſſion upon his mind; and the general tenor of his life appears to have been conformable to the rules of virtue. Mr Baxter paid a ſtrict attention to economy, though he dreſſed elegantly, and was not parſimonious in his other expences. It is known alſo, that there were ſeveral occaſions on which he acted with remarkable diſintereſtedneſs; and ſo far was he from courting preferment, that he has repeatedly declined conſiderable offers of that kind which were made him, if he would have taken orders in the church of England. The French, German, and Dutch languages were ſpoken by him with much eaſe, and the Italian tolerably; and he wrote and read them all, together with the Spaniſh. His friends and correſpondents were numerous and reſpectable; and among them are particularly mentioned Mr Pointz, preceptor to the late duke of Cumberland, and Dr Warburton, biſhop of Glouceſter. He was a man alſo of great benevolence and candour; which appears moſt ſtrikingly from this, inaſmuch as though Mr Wilkes had made himſelf ſo very obnoxious to the Scotiſh nation in general, yet Mr Baxter kept up with him an affectionate correſpondence to the laſt, even after he was unable to write with his own hand. He left many manuſcripts behind him; he would gladly have finiſhed his work upon the human ſoul: "I own," ſays he, in a letter to Mr Wilkes, "if it had been the will of heaven, I would gladly have lived till I had put in order the ſecond part of the Enquiry, ſhowing the immortality of the human ſoul; but Infinite Wiſdom cannot be miſtaken in calling me ſooner. Our blindneſs makes us form wiſhes." It was indeed, what he conſidered it, his capital work: a ſecond edition of it was publiſhed in two volumes 8vo in 1737, and a third in 1745. In another letter, ſpeaking of his endeavours to eſtabliſh the particular providence of the Deity, and to ſhow his inceſſant influence and action on all the parts of matter, through the wide univerſe, from the inactivity of this dead ſubſtance; expreſſes his hope, that when the preſent party-zeal ſubſides a little, men will come more eaſily in to own ſuch a plain truth. "His prediction," the editors of the Biographia Britannica obſerve, "hath not yet been accompliſhed. Several eminent names ſeem rather diſpoſed to increaſe than to leſſen the powers of matter; and they have expreſsly maintained that the ſoul of man is material. However, other names equally eminent have aſſerted the eſſential diſtinction between the mind and the body. Perhaps, in the revolutions of opinion, the doctrine of immateriality may again obtain the general ſuffrage of metaphyſical and philoſophical inquiry.

BAY, in *Geography*, an arm of the ſea ſhooting up into the land, and terminating in a nook. It is a kind of leſſer gulf bigger than a creek, and is larger in its middle within than at its entrance. The largeſt and moſt noted bays in the world are thoſe of Biſcay, Bengal, Hudſon's, Panama, &c.

BAY denotes likewiſe a pond-head made to keep in ſtore of water for driving the wheels of the furnace or hammer belonging to an iron mill, by the ſtream that comes thence through a flood-gate called the *pen-ſtock*.

Bay || Bayard.

Bay-Colour denotes a ſort of red inclining to cheſnut, chiefly uſed in ſpeaking of horſes. In this ſenſe, the word *bay* is formed from the Latin *baius*, or *badius*, and that from the Greek βαιος, a *palm branch*; ſo that *badius* or *bay* properly denotes *color phœniceus*. Hence alſo, among the ancients, thoſe now called *bay* horſes, were denominated *equi palmati*. We have divers ſorts and degrees of bays; as a light bay, a dapple bay, &c. All bay horſes are ſaid to have black manes; which diſtinguiſhes them from ſorrels, which have red or white manes.

BAY, among huntſmen, is when the dogs have earthed a vermin, or brought a deer, boar, or the like, to turn head againſt them. In this caſe, not only the deer, but the dogs, are ſaid to bay. It is dangerous going in to a hart at bay, eſpecially at rutting-time; for then they are fierceſt. There are bays at land, and others in the water.

Bay-Tree. See LAURUS, BOTANY *Index*.

Bay-Salt. See SALT.

BAYA, or BAJA, a town of Lower Hungary, in the county of Bath, ſituated near the Danube. E. Long. 19. 30. N. Lat. 46. 25.

BAYARD, PETER DU TERRAIL DE, eſteemed by his cotemporaries the model of ſoldiers and men of honour, and denominated *The knight without fear and without reproach*, was deſcended from an ancient and noble family in Dauphiné. He was with Charles VIII. at the conqueſt of the kingdom of Naples; where he gave remarkable proofs of his valour, eſpecially at the battle of Fornoue. He was dangerouſly wounded at the taking of the city of Breſcia: and there reſtored to the daughters of his hoſt 2000 piſtoles, which their mother had directed them to give him in order to prevent the houſe from being plundered; an action that has been celebrated by many hiſtorians. At his return to France, he was made lieutenant-general of Dauphiné. He fought by the ſide of Francis I. at the battle of Marignan; and that prince afterwards inſiſted on being knighted by his hand, after the manner of the ancient knights. The chevalier Bayard defended Meziers during ſix weeks, againſt Charles V.'s army. In 1524, at the retreat of Rebec † (the general Bonivet having been wounded and obliged to quit the field, the conduct of the rear was committed to the chevalier Bayard; who, though ſo much a ſtranger to the arts of a court that he never roſe to the chief command, was always called, in times of real danger, to the poſts of greateſt difficulty and importance. He put himſelf at the head of the men at arms; and animating them by his preſence and example to ſuſtain the whole ſhock of the enemy's troops, he gained time for the reſt of his countrymen to make good their retreat. But in this ſervice he received a wound which he immediately perceived to be mortal; and being unable to continue any longer on horſeback, he ordered one of his attendants to place him under a tree, with his face towards the enemy; then fixing his eyes on the guard of his ſword, which he held up inſtead of a croſs, he addreſſed his prayers to God; and in this poſture, which became his character both as a ſoldier and as a Chriſtian, he calmly

† *Hiſt. of Charles V.* book v.

waited

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waited the approach of death. Bourbon, who led the foremoſt of the enemy's troops, found him in this ſituation, and expreſſed regret and pity at the ſight. "Pity not me," cried the high-ſpirited chevalier, "I die as a man of honour ought, in the diſcharge of "my duty: they indeed are objects of pity, who fight "againſt their king, their country, and their oath." The marquis de Peſcara, paſſing ſoon after, manifeſted his admiration of Bayard's virtue, as well as his ſorrow for his fate, with the generoſity of a gallant enemy; and finding that he could not be removed with ſafety from that ſpot, ordered a tent to be pitched there, and appointed proper perſons to attend him. He died, notwithſtanding their care, as his anceſtors for ſeveral generations had done, in the field of battle. Peſcara, ordered his body to be embalmed, and ſent to his relations; and ſuch was the reſpect paid to military merit in that age, that the duke of Savoy commanded it to be received with royal honours in all the cities of his dominions: in Dauphiné, Bayard's native country, the people of all ranks came out in a ſolemn proceſſion to meet it.

BAYEUX, a conſiderable town of France in the department of Calvados, with a rich biſhop's ſee. The cathedral church is accounted the fineſt in that province; and its front and three high ſteeples are ſaid to be the beſt in France. W. Long. 0. 33. N. Lat. 49. 16.

BAYLE, Peter, author of the Hiſtorical and Critical Dictionary, was born November 18. 1657, at Carla, a village in the county of Foix, in France, where his father John Bayle was a Proteſtant miniſter. In 1666, he went to the Proteſtant univerſity at Puylaureus, where he ſtudied with the greateſt application; and in 1669, removed to the univerſity of Toulouſe, whither the Proteſtants at that time frequently ſent their children to ſtudy under the Jeſuits: but here, to the great grief of his father, he embraced the Romiſh religion. However, being ſoon ſenſible of his error, he left that univerſity, and went to ſtudy at Geneva; after which he was choſen profeſſor of philoſophy at Sedan: but that Proteſtant univerſity being ſuppreſſed by Louis XIV. in 1681, he was obliged to leave the city; and was ſoon after choſen profeſſor of philoſophy and hiſtory at Rotterdam, with a ſalary of about 45l. a year. The year following he publiſhed his Letter concerning Comets. And Father Maimbourg having publiſhed about this time his Hiſtory of Calviniſm, wherein he endeavours to draw upon the Proteſtants the contempt and reſentment of the Catholics, Mr Bayle wrote a piece to confute his hiſtory. The reputation which he had now acquired, induced the States of Friezland, in 1684, to offer him a profeſſorſhip in their univerſity; but he wrote them a letter of thanks, and declined the offer. The ſame year he began to publiſh his *Nouvelles de la republique des lettres*.

In 1686, he was drawn into a diſpute in relation to the famous Chriſtina queen of Sweden. In his journal for April, he took notice of a printed letter, ſuppoſed to have been written by her Swediſh majeſty to the chevalier de Terlon, wherein ſhe condemns the perſecution of the Proteſtants in France. He inſerted the letter itſelf in his Journal for May; and in that of June following he ſays, "What we hinted at in our laſt month, is confirmed to us from day to day, that Chriſtina is the real author of the letter concerning the perſecutions in France, which is aſcribed to her: it is a remainder of Proteſtantiſm." Mr Bayle received an anonymous letter; the author of which ſays, that he wrote to him of his own accord, being in duty bound to it as a ſervant of the queen. He complains that Mr Bayle, ſpeaking of her majeſty, called her only *Chriſtina*, without any title; he finds alſo great fault with his calling the letter "a remainder of Proteſtantiſm." He blames him likewiſe for inſerting the words "I am," in the concluſion of the letter, "Theſe words (ſays this anonymous writer) are not her majeſty's; a queen, as ſhe is, cannot employ theſe words but with regard to a very few perſons, and Mr de Terlon is not of that number." Mr Bayle wrote a vindication of himſelf as to theſe particulars, with which the author of the anonymous letter declared himſelf ſatisfied, excepting what related to "the remainder of Proteſtantiſm." He would not admit of the defence with regard to that expreſſion; and in another letter, adviſed him to retract that expreſſion. He adds in a poſtſcript, "You mention, in your Journal of Auguſt, a ſecond letter of the queen, which you ſcruple to publiſh. Her majeſty would be glad to ſee that letter; and you will do a thing agreeable to her if you would ſend it to her. You might take this opportunity of writing to her majeſty. This counſel may be of ſome uſe to you; do not neglect it." Mr Bayle took the hint, and wrote a letter to her majeſty, dated the 14th of November 1686; to which the queen, on the 14th of December, wrote the following anſwer:—"Mr Bayle, I have received your excuſes; and am willing you ſhould know by this letter, that I am ſatisfied with them. I am obliged to the zeal of the perſon who gave you occaſion of writing to me: for I am very glad to know you. You expreſs ſo much reſpect and affection for me, that I pardon you ſincerely; and I would have you know, that nothing gave me offence but that *remainder of Proteſtantiſm*, of which you accuſed me. I am very delicate on that head, becauſe nobody can ſuſpect me of it, without leſſening my glory, and injuring me in the moſt ſenſible manner. You would do well if you ſhould even acquaint the public with the miſtake you have made, and with your regret for it. This is all that remains to be done by you, in order to deſerve my being entirely ſatisfied with you. As to the letter which you have ſent me, it is mine without doubt; and ſince you tell me that it is printed, you will do me a pleaſure if you ſend me ſome copies of it. As I fear nothing in France, ſo neither do I fear any thing at Rome. My fortune, my blood, and even my life, are entirely devoted to the ſervice of the church; but I flatter nobody, and and will never ſpeak any thing but the truth. I am obliged to thoſe who have been pleaſed to publiſh my letter, for I do not at all diſguiſe my ſentiments. I thank God, they are too noble and too honourable to be diſowned. However, it is not true that this letter was written to one of my miniſters. As I have everywhere enemies and perſons who envy me, ſo in all places I have friends and ſervants: and I have poſſibly as many in France, notwithſtanding of the court, as anywhere in the world. This is purely the truth, and you may regulate yourſelf accordingly. But you ſhall not

Bayle.

get

Bayle. get off so cheap as you imagine. I will enjoin you a penance; which is, that you will henceforth take the trouble of sending me all curious books that shall be published in Latin, French, Spanish, or Italian, on whatever subject or science, provided they are worthy of being looked into; I do not even except romances or satires; and above all, if there are any books of chemistry, I desire you may send them to me as soon as possible. Do not forget likewise to send me your Journal. I shall order that you be paid for whatever you lay out, do but send me an account of it. This will be the most agreeable and most important service that can be done me. May God prosper you.

CHRISTINA ALEXANDRA."

It now only remained that Mr Bayle should acquaint the public with the mistake he had made, in order to merit that princess's entire satisfaction; and this he did in the beginning of his Journal of the month of January, 1687.

The persecution which the Protestants at this time suffered in France affected Mr Bayle extremely. He made occasionally some reflections on their sufferings in his Journal; and he wrote a pamphlet also on the subject. Some time afterwards he published his *Commentaire Philosophique* upon these words, "Compel them to come in:" but the great application he gave to this and his other works, threw him into a fit of sickness, which obliged him to discontinue his Literary Journal. Being advised to try a change of air, he left Rotterdam on the 8th of August, and went to Cleves; whence, after having continued some time, he removed to Aix la Chapelle, and from thence returned to Rotterdam on the 18th of October. In the year 1690, the famous book, entitled, *Avis aux Refugiez*, &c. made its appearance. Mr Jurieu, who took Mr Bayle for the author thereof, wrote a piece against it; and he prefixed an advice to the public, wherein he calls Mr Bayle a profane person, and a traitor engaged in a conspiracy against the state. As soon as Mr Bayle had read this libel against him, he went to the grand schout of Rotterdam, and offered to go to prison, provided his accuser would accompany him, and undergo the punishment he deserved if the accusation was found unjust. He published also an answer to Mr Jurieu's charge; and as his reputation, nay his very life, was at stake in case the accusation of treason was proved, he therefore thought himself not obliged to keep any terms with his accuser, and attacked him with the utmost severity. Mr Jurieu lost all patience: he applied himself to the magistrates of Amsterdam; who advised him to a reconciliation with Mr Bayle, and enjoined them not to publish any thing against each other till it was examined by Mr Boyer, the pensioner of Rotterdam. But notwithstanding this prohibition, Mr Jurieu attacked Mr Bayle again with so much passion, that he forced him to write a new vindication of himself.

In November 1690, M. de Beauval advertised in his Journal, *A scheme for a Critical Dictionary*. This was the work of Mr Bayle. The articles of the three first letters of the alphabet were already prepared; but a dispute happening betwixt him and M. de Beauval, obliged him for some time to lay aside the work. Nor did he resume it till May 1692, when he published his scheme: but the public not approving of his plan, he threw it into a different form; and the first volume was published in August 1695, and the second in October following. The work was extremely well received by the public; but it engaged him in fresh disputes, particularly with Mr Jurieu and the Abbé Renaudot. Mr Jurieu published a piece, wherein he endeavoured to engage the ecclesiastical assemblies to condemn the dictionary; he presented it to the senate sitting at Delft, but they took no notice of the affair. The consistory of Rotterdam granted Mr Bayle a hearing; and after having heard his answers to their remarks on his dictionary, declared themselves satisfied, and advised him to communicate this to the public. Mr Jurieu made another attempt with the consistory in 1698; and so far he prevailed with them, that they exhorted Mr Bayle to be more cautious with regard to his principles in the second edition of his dictionary; which was published in 1702, with many additions and improvements. Bayle || Bayon.

Mr Bayle was a most laborious and indefatigable writer. In one of his letters to Maizeux, he says, that since his 20th year he hardly remembers to have had any leisure. His intense application contributed perhaps to impair his constitution, for it soon began to decline. He had a decay of the lungs, which weakened him considerably; and as this was a distemper which had cut off several of his family, he judged it to be mortal, and would take no remedies. He died the 28th of December 1706, after he had been writing the greatest part of the day. He wrote several books besides what we have mentioned, many of which were in his own defence against attacks he had received from the abbé Renaudot, Mr Clerk, M. Jaquelot, and others. Among the productions which do honour to the age of Louis XIV. Mr Voltaire has not omitted the Critical Dictionary of our author: "It is the first work of the kind (he says) in which a man may learn to think." He censures indeed those articles which contain only a detail of minute facts, as unworthy either of Bayle, an understanding reader, or posterity. "In placing him (continues the same author) amongst the writers who do honour to the age of Louis XIV. notwithstanding his being a refugee in Holland, I only conform to the decree of the parliament of Tholouse, which, when it declared his will valid in France, notwithstanding the rigour of the laws, expressly said, *that such a man could not be considered as a foreigner*."

BAYLY, LEWIS, author of that most memorable book, entitled "The Practice of Piety." He was born at Caermarthen in Wales, educated at Oxford, made minister of Evesham in Worcestershire about 1611, became chaplain to King James, and was promoted to the see of Bangor in 1616. His book is dedicated to the high and mighty prince, Charles prince of Wales; and the author tells his highness, "that he had endeavoured to extract out of the chaos of endless controversies the old practice of true piety, which flourished before these controversies were hatched." The design was good; and the reception this book has met with may be known from the number of its editions, that in 8vo, 1734, being the fifty-ninth. This prelate died in 1632.

BAYON, a town of France, in Lorrain, now the department

Bayon || Bayonne.

department of Meurthe, ſeated on the river Moſelle. E. Long. 14. 42. N. Lat. 48. 30.

BAYON, or *Bayona*, a town of Galicia, in Spain, ſeated on a ſmall gulf of the Atlantic ocean, about 12 miles from Tuy. It has a very commodious harbour, and the country about it is fertile. W. Long. 9. 30. N. Lat. 43. 3.

BAYONET, in the military art, a ſhort broad dagger, formerly with a round handle fitted for the bore of a firelock, to be fixed there after the ſoldier had fired; but they are now made with iron handles and rings, that go over the muzzle of the firelock, and are ſcrewed faſt, ſo that the ſoldier fires with his bayonet on the muzzle of his piece, and is ready to act againſt the horſe. This uſe of the bayonet faſtened on the muzzle of the firelock was a great improvement, firſt introduced by the French, and to which, according to M. Folard, they owed a great part of their victories in the laſt century; and to the neglect of this in the next ſucceeding war, and truſting to their fire, the ſame author attributes moſt of the loſſes they ſuſtained. At the ſiege of Malta, a weapon called *pila ignea* was contrived to oppoſe the bayonets, being in ſome meaſure the converſe thereof; as the latter conſiſts of a dagger added to a fire-arm, the former conſiſted of a fire-arm added to a pilum or pike.

Of late the bayonet has come into very general uſe; and battles have been won by it without firing a ſhot. This way of fighting was chiefly reſtored by the late king of Pruſſia, who made his troops ruſh forward at once with bayonets on the enemy.

BAYONNE, a city of Gaſcony, in France, now the department of the Lower Pyrenees; ſeated near the mouth of the river Adour, which forms a good harbour. It is moderately large, and of great importance. It is divided into three parts. The great town is on this ſide the river Nive; the little town is between the Nive and the Adour; and the ſuburb of Saint Eſprit is beyond this laſt river. Both the former are ſurrounded with an old wall and a dry ditch, and there is a ſmall caſtle in each. That of Great Bayonne is flanked with four round towers, and is the place where the governor reſides. The new caſtle is flanked with four towers, in the form of baſtions. The firſt encloſure is covered with another, compoſed of eight baſtions, with a great horn-work, and a half-moon; all which are encompaſſed with a ditch, and a covered way. There is communication between the city and the ſuburbs by a bridge, and the ſuburbs are well fortified. The citadel is ſeated beyond the Adour, on the ſide of the ſuburbs abovementioned. The public buildings have nothing remarkable; it is the only city in the kingdom that has the advantage of two rivers, wherein the tide ebbs and flows. The river Nive is deeper than the Adour, but leſs rapid, by which means ſhips come up into the middle of the city. There are two bridges over the river, by which the old and new towns communicate with each other. The trade of this town is the more conſiderable, on account of its neighbourhood to Spain, and the great quantity of wines which are brought hither from the adjacent country. The Dutch carry off a great number of pipes in exchange for ſpices and other commodities, which they bring thither. The inhabitants had formerly the privilege of guarding two of their three gates, and the third was kept by the king. W. Long. 1. 20. N. Lat. 43. 20.

Bayt || Bazgendges.

BAYS, in *Commerce*, a ſort of open woollen ſtuff, having a long nap, ſometimes friſed, and ſometimes not. This ſtuff is without wale; and is wrought in a loom with two treddles, like flannel. It is chiefly manufactured at Colcheſter and Bockin in Eſſex, where there is a hall called the *Dutch-bay hall* or *raw-hall*. This manufacture was firſt introduced into England, with that of ſays, ſerges, &c. by the Flemings; who being perſecuted by the duke of Alva for their religion, fled thither about the fifth of Queen Elizabeth's reign; and had afterwards peculiar privileges granted them by act of parliament 12 Charles II. 1660, which the bays-makers in the above places ſtill enjoy. The exportation of bays were formerly much more conſiderable than at preſent when the French have learned to imitate them. However, the Engliſh bays are ſtill ſent in great quantities to Spain and Portugal, and even to Italy. Their chief uſe is for dreſſing the monks and nuns, and for linings, eſpecially in the army. The looking-glaſs makers alſo uſe them behind their glaſſes, to preſerve the tin or quickſilver; and the caſemakers to line their caſes. The breadth of bays is commonly a yard and a half, a yard and three quarters, or two yards, by 42 to 48 in length. Thoſe of a yard and three quarters are moſt proper for the Spaniſh trade.

BAZAR, or BASAR, a denomination among the Turks and Perſians, given to a kind of exchanges, or places where their fineſt ſtuffs and other wares are ſold. Theſe are alſo called *bezeſtins*. The word *bazar* ſeems of Arabic origin, where it denotes ſale, or exchange of goods. Some of the eaſtern bazars are open, like the market-places in Europe, and ſerve for the ſame uſes, more particularly for the ſale of the bulky and leſs valuable commodities. Others are covered with lofty ceilings, or even domes, pierced to give light; and it is in theſe the jewellers, goldſmiths, and other dealers in the richer wares, have their ſhops. The bazar or maidan of Iſpahan is one of the fineſt places in Perſia, and even ſurpaſſes all the exchanges in Europe; yet, notwithſtanding its magnificence, it is excelled by the bazar of Tauris, which is the largeſt that is known, having ſeveral times held 30,000 men ranged in order of battle. At Conſtantinople, there is the old and the new bazar, which are large ſquare buildings, covered with domes, and ſuſtained by arches and pilaſters; the former chiefly for arms, harneſſes, and the like; the latter for goldſmiths, jewellers, furriers, and all ſorts of manufactures.

BAZAS, a town of Guienne in France, now the department of Gironde, and formerly a biſhop's ſee. It is built on a rock, five miles from the Garonne, and 42 ſouth-eaſt of Bourdeaux, in W. Long. 0. 30. N. Lat. 44. 20.

BAZAT, or BAZA, in *Commerce*, a long, fine ſpun cotton, which comes from Jeruſalem, whence it is alſo called *Jeruſalem-cotton*.

BAZGENDGES, in *Natural Hiſtory*, the name of a ſubſtance uſed by the Turks and other eaſtern nations in their ſcarlet-dying. They mix it for this purpoſe with cochineal and tartar; the proportions being two ounces of the bazgendges to one ounce of cochineal. Theſe are generally eſteemed a ſort of fruit, that are produced

Bdellium || Beacons.

produced on certain trees in Syria and other places; and it is uſually ſuppoſed, that the ſcarcity and dearneſs of them is the only thing that makes them not uſed in Europe. But the bazgendges ſeem to be no other than the horns of the turpentine tree in the eaſtern parts of the world; and it is not only in Syria that they are found, but China alſo affords them. Many things of this kind were ſent over to Mr Geoffroy at Paris from China as the ſubſtances uſed in the ſcarlet-dying of that country, and they all proved wholly the ſame with the Syrian and Turkiſh bazgendges, and with the common turpentine horns. The lentiſk, or maſtic tree, is alſo frequently found producing many horns of a like kind with theſe, and of the ſame origin, all being owing to the pucerons, which make their way into the leaves to breed their young there.

BDELLIUM, a gummy reſinous juice, produced by a tree in the Eaſt Indies, of which we have no ſatisfactory account. It is brought into Europe both from the Eaſt Indies and Arabia. It is in pieces of different ſizes and figures, externally of a dark reddiſh brown, ſomewhat like myrrh; internally it is clear, and not unlike to glue; to the taſte it is ſlightly bitteriſh and pungent; its odour is very agreeable. If held in the mouth, it ſoon becomes ſoft and tenacious, ſticking to the teeth. Laid on a red-hot iron, it readily catches flame, and burns with a crackling noiſe, and in proportion to its goodneſs it is more or leſs fragrant. Near half of its ſubſtance diſſolves either in water or in ſpirit of wine; but the tincture made with ſpirit is ſomewhat ſtronger, and by much more agreeable. Vinegar, or verjuice, diſſolves it wholly. The ſimple gum is a better medicine than any preparation from it. It is one of the weakeſt of the deobſtruent gums, but is uſed as a pectoral and an emmenagogue.

BEACHY-HEAD, a promontory on the coaſt of Suſſex, between Haſtings and Shoreham, where the French defeated the Engliſh and Dutch fleet in 1690.

BEACON, a ſignal for the better ſecuring the kingdom from foreign invaſions. See SIGNAL.

On certain eminent places of the country are placed long poles erect, whereon are faſtened pitch-barrels to be fired by night, and ſmoke made by day, to give notice in a few hours to the whole kingdom of an approaching invaſion. Theſe are commonly called *beacons;* whence alſo comes *beaconage*.—We find beacons familiarly in uſe among the primitive Britons and Weſtern Highlanders. The beſieged capital of one of our northern iſles in the third century actually lighted up a fire upon a tower; and Fingal inſtantly knew "the green flame edged with ſmoke" to be a token of attack and diſtreſs*. And there are to this day ſeveral cairns or heaps of ſtones upon the heights along the coaſts of the Harries, on which the inhabitants uſed to burn heath as a ſignal of an approaching enemy.

* *Oſſian*, vol. i. p. 198.

BEACONS are alſo marks and ſigns erected on the coaſts, for guiding and preſerving veſſels at ſea, by night as well as by day.

The erection of beacons, light-houſes, and ſea-marks, is a branch of the royal prerogative. The king hath the excluſive power, by commiſſion under his great ſeal, to cauſe them to be erected in fit and convenient places, as well upon the lands of the ſubject as upon the demeſnes of the crown: which power is uſually veſted by letters patent in the office of lord high admiral. And by ſtatute 8 Eliz. c. 13. the corporation of the Trinity-houſe are impowered to ſet up any beacons or ſea-marks wherever they ſhall think them neceſſary; and if the owner of the land or any other perſon ſhall deſtroy them, or ſhall take down any ſteeple, tree, or other known ſea-mark, he ſhall forfeit 100l. or, in caſe of inability to pay it, ſhall be *ipſo facto* outlawed.

Beaconage || Bead-Proof.

BEACONAGE, money paid towards the maintenance of a beacon. See BEACON.—The word is derived from the Saxon *beacnian*, to nod, or ſhow by a ſign; hence alſo the word *beckon*.

BEACONSFIELD, a town of Buckinghamſhire in England, ſeated on a hill in the road between London and Oxford. It has ſeveral good inns, though not above 100 houſes. W. Long. 0. 25. N. Lat. 51. 36.

BEAD, a ſmall globule or ball uſed in necklaces; and made of different materials, as pearl, ſteel, garnet, coral, diamond, amber, cryſtal, paſtes, glaſs, &c.—The Romaniſts make great uſe of beads in rehearſing their *Ave-Marias* and *Pater-noſters;* and the like uſage is found among the derviſes and other religious throughout the Eaſt, as well Mahometan as Heathen. The ancient Druids appear alſo to have had their beads, many of which are ſtill found; at leaſt if the conjecture of an ingenious author may be admitted, who takes thoſe antique glaſs globules, having a ſnake painted round them, and called *adder-beads*, or *ſnake-buttons*, to have been the beads of our ancient Druids. See ANGUIS.

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

The common black glaſs of which beads are made for necklaces, &c. is coloured with manganeſe only: one part of manganeſe is ſufficient to give a black colour to near twenty of glaſs.

BEAD, in *Architecture*, a round moulding, commonly made upon the edge of a piece of ſtuff, in the Corinthian and Roman orders, cut or carved in ſhort emboſſments, like beads in necklaces.

BEAD-Makers, called by the French *paternoſtriers*, are thoſe employed in the making, ſtringing, and ſelling of beads. At Paris before the revolution there were three companies of paternoſtriers, or bead-makers; one who made them of glaſs or cryſtal; another in wood and horn; and the third in amber, coral, jet, &c.

BEAD-Proof, a term uſed by our diſtillers to expreſs that ſort of proof of the ſtandard ſtrength of ſpirituous liquors, which conſiſts in their having, when ſhaken in a phial, or poured from on high into a glaſs, a crown of bubbles, which ſtand on the ſurface ſome time after. This is eſteemed a proof that the ſpirit conſiſts of equal parts of rectified ſpirits and phlegm. This is a fallacious rule as to the degree of ſtrength in the goods; becauſe any thing that will increaſe the tenacity of the ſpirit, will give it this proof, though it be under the due ſtrength. Our malt-diſtillers ſpoil the greater part of their goods, by leaving too much of the ſtinking oil of the malt in their ſpirit, in order to give it this proof when ſomewhat under the ſtandard ſtrength. But this is a great deceit on the purchaſers of malt ſpirits, as they have them by this means not only weaker than they ought to be, but ſtinking with an oil that they

Bead-Roll || Beale.

they are not eaſily cleared of afterwards. On the other hand, the dealers in brandy, who uſually have the art of ſophiſticating it to a great nicety, are in the right when they buy it by the ſtrongeſt bead-proof, as the grand mark of the beſt; for being a proof of the brandy containing a large quantity of its oil, it is, at the ſame time, a token of its high flavour, and of its being capable of bearing a very large addition of the common ſpirits of our own produce, without betraying their flavour, or loſing its own. We value the French brandy for the quantity of this eſſential oil of the grape which it contains; and that with good reaſon, as it is with us principally uſed for drinking as an agreeably flavoured cordial: but the French themſelves, when they want it for any curious purpoſes, are as careful in the rectification of it, and take as much pains to clear it from this oil, as we do to free our malt ſpirit from that nauſeous and fetid oil which it originally contains.

Bead-Roll, among Papiſts, a liſt of ſuch perſons, for the reſt of whoſe ſouls they are obliged to repeat a certain number of prayers, which they count by means of their beads.

Bead-Tree. See Melia, Botany *Index*.

BEADLE, (from the Saxon *bydel*, a *meſſenger*), a crier or meſſenger of a court, who cites perſons to appear and anſwer. Called alſo a *ſummoner* or *apparitor*. —*Beadle* is alſo an officer at an univerſity, whoſe chief buſineſs is to walk before the maſters with a mace, at all public proceſſions.—There are alſo *church-beadles*, whoſe office is well known.

BEAGLES, a ſmall ſort of hounds or hunting dogs. Beagles are of divers kinds; as the *ſouthern beagle*, ſomething leſs and ſhorter, but thicker, than the deep-mouthed hound; the *fleet northern* or *cat beagle*, ſmaller, and of a finer ſhape than the ſouthern, and a harder runner. From the two, by croſſing the ſtrains, is bred a third ſort held preferable to either. To theſe may be added a ſtill ſmaller ſort of beagles, ſcarce bigger than lap-dops, which make pretty diverſion in hunting the coney, or even the ſmall hare in dry weather; but otherwiſe unſerviceable, by reaſon of their ſize.

BEAK, the bill or nib of a bird. See Ornithology.

Beak, or *Beak-head*, of a ſhip, that part without the ſhip, before the fore-caſtle, which is faſtened to the ſtem, and is ſupported by the main knee.

The beak, called by the Greeks εμβολον, by the Latins *roſtrum*, was an important part in the ancient ſhips of war, which were hence denominated *naves roſtratæ*. The beak was made of wood; but fortified with braſs, and faſtened to the prow, ſerving to annoy the enemies veſſels. Its invention is attributed to Piſæus an Italian. The firſt beaks were made long and high; but afterwards a Corinthian, named *Ariſto*, contrived to make them ſhort and ſtrong, and placed ſo low, as to pierce the enemies veſſels under water. By the help of theſe great havock was made by the Syracuſians in the Athenian fleet.

BEAKED, in *Heraldry*, a term uſed to expreſs the beak or bill of a bird. When the beak and legs of a fowl are of a different tincture from the body, we ſay *beaked and membered of ſuch a tincture*.

BEALE, Mary, particularly diſtinguiſhed by her ſkill in painting, was the daughter of Mr Craddock, miniſter of Waltham upon Thames, and learned the rudiments of her art from Sir Peter Lely. She painted in oil, water-colours, and crayons, and had much buſineſs; her portraits were in the Italian ſtyle, which ſhe acquired by copying pictures and drawings from Sir Peter Lely's and the royal collections. Her maſter, ſays Mr Walpole, was ſuppoſed to have had a tender attachment to her; but as he was reſerved in communicating to her all the reſources of his pencil, it probably was a gallant rather than a ſucceſsful one. Dr Woodfall wrote ſeveral pieces to her honour, under the name of *Beleſia*. Mrs Beale died in Pall-mall, on the 28th of Dec. 1697, aged 65. Her paintings have much nature, but the colouring is ſtiff and heavy.

Bealt || Bean.

BEALT, Bealth, or *Builth*, a town of Brecknockſhire in South Wales, pleaſantly ſeated on the river Wye. It conſiſts of about 100 houſes. The inhabitants are chiefly employed in the manufacture of ſtockings. W. Long. 4. 10. N. Lat. 52. 4.

BEAM, in *Architecture*, the largeſt piece of wood in a building, which lies croſs the walls, and ſerves to ſupport the principal rafters of the roof, and into which the feet of theſe rafters are framed. No building has leſs than two of theſe beams, viz. one at each end; and into theſe the girders of the garret roof are alſo framed. The proportions of beams in or near London, are fixed by ſtatute, as follows: a beam 15 feet long, muſt be 7 inches on one ſide its ſquare, and 5 on the other; if it be 16 feet long, one ſide muſt be 8 inches, the other 6, and ſo proportionably to their lengths. In the country, where wood is more plenty, they uſually make their beams ſtronger.

Beams of a Ship are the great main croſs-timbers which hold the ſides of the ſhip from falling together, and which alſo ſupport the decks and orlops: the main beam is next the main-maſt, and from it they are reckoned by firſt, ſecond, third beam, &c. the greateſt beam of all is called the *midſhip beam*.

Beam-Compaſs, an inſtrument conſiſting of a ſquare wooden or braſs beam, having ſliding ſockets, that carry ſteel or pencil points; they are uſed for deſcribing large circles, where the common compaſſes are uſeleſs.

Beam-Bird, or *Petty-chaps*. See Motacilla.

Beam alſo denotes the lath, or iron, of a pair of ſcales; ſometimes the whole apparatus for weighing of goods is ſo called: Thus we ſay, it weighs ſo much at the king's beam.

Beam of a Plough, that in which all the parts of the plough-tail are fixed. See Plough, Agriculture *Index*.

Beam, or *Roller*, among weavers, a long and thick wooden cylinder, placed lengthwiſe on the back-part of the loom of thoſe who work with a ſhuttle. That cylinder, on which the ſtuff is rolled as it is weaved, is alſo called the *beam* or *roller*, and is placed on the fore-part of the loom.

BEAMINSTER, a town of Dorſetſhire in England, ſeated on the river Bert, in W. Long. 2. 50. N. Lat. 52. 45.

BEAN, in *Botany*. See Vicia, Botany *Index*.

The ancients made uſe of beans in gathering the votes of the people, and for the election of magiſtrates. A white bean ſignified *abſolution*, and a black one *condemnation*. Beans had a myſterious uſe in the *lemuralia* and *parentalia*; where the maſter of the family, after waſhing, was to throw a ſort of black beans

Beans. beans over his head, ſtill repeating the words, "I redeem myſelf and family by theſe beans." Ovid * gives a lively deſcription of the whole ceremony in verſe.—Abſtinence from beans was enjoined by Pythagoras, one of whoſe ſymbols is, κυαμων απεσχεσθαι, *abſtine a fabis*. The Egyptian prieſts held it a crime to look at beans, judging the very ſight unclean. The *flamen dialis* was not permitted even to mention the name. The precept of Pythagoras has been variouſly interpreted: ſome underſtand it of forbearing to meddle in trials and verdicts, which were then by throwing beans into an urn: others, building on the equivoque of the word κυαμος, which equally ſignifies a *bean* and a human *teſticle*, explain it by abſtaining from venery. Clemens Alexandrinus grounds the abſtinence from beans on this, that they render women barren; which is confirmed by Theophraſtus, who extends the effect even to plants. Cicero ſuggeſts another reaſon for this abſtinence, viz. that beans are great enemies to tranquillity of mind. For a reaſon of this kind it is, that Amphiaraus is ſaid to have abſtained from beans, even before Pythagoras, that he might enjoy a clearer divination by dreams.

* *Faſt.* lib. 5. 4. 435.

BEANS, as food for horſes. See FARRIERY.

BEAN-Caper. See ZYGOPHYLLUM, BOTANY *Index*.

BEAN-Cod, a ſmall fiſhing veſſel, or pilot-boat, common on the ſea-coaſts and in the rivers of Portugal. It is extremely ſharp forward, having its ſtem bent inward above into a great curve: the ſtem is alſo plated on the fore-ſide with iron, into which a number of bolts are driven, to fortify it, and reſiſt the ſtroke of another veſſel, which may fall athwart hauſe. It is commonly navigated with a large lateen ſail, which extends over the whole length of the deck, and is accordingly well fitted to ply to windward.

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

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

BEAN Gooſe. See ANAS, *Ornithology Index*.

Kidney-BEAN. See PHASEOLUS.

Malacca BEANS, or *Anacardia*, the fruit of a tree growing in Malabar and other parts of the Eaſt Indies, ſuppoſed by ſome to be the AVICENNIA *tomentoſa*; by others, the BONTIA *germinans*. The fruit is of a ſhining black colour, of the ſhape of a heart flattened, about an inch long, terminating at one end in an obtuſe point, and adhering by the other to a wrinkled ſtalk: it contains within two ſhells a kernel of a ſweetiſh taſte: betwixt the ſhells is lodged a thick and acrid juice.

The medicinal virtues of anacardia have been greatly diſputed. Many have attributed to them the faculty of comforting the brain and nerves, fortifying the memory, and quickening the intellect: and hence a confection made from them has been dignified with the title of *confectio ſapientum*: others think it better deſerves the name of *confectio ſtultorum*, and mention inſtances of its continued uſe having rendered people maniacal. But the kernel of anacardium is not different in quality from that of almonds. The ill effects attributed to this fruit belong only to the juice contained betwixt the kernels, whoſe acrimony is ſo great, that it is ſaid to be employed by the Indians as a cauſtic. This juice is recommended externally for tetters, freckles, and other cutaneous deformities; which it removes only by exulcerating or excoriating the part, ſo that a new ſkin comes underneath.

Bear || Beard.

BEAR, in *Zoology*. See URSUS, MAMMALIA *Index*.

Sea-BEAR. See PHOCA, MAMMALIA *Index*.

BEAR, in *Aſtronomy*. See URSA, ASTRONOMY *Index*.

Order of the BEAR was a military order in Switzerland, erected by the emperor Frederick II. in 1213, by way of acknowledgement for the ſervice the Swiſs had done him, and in favour of the abbey of St Gal. To the collar of the order hung a medal, on which was repreſented a bear raiſed on an eminence of earth.

BEAR's-Breech. See ACANTHUS, BOTANY *Index*.

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

BEAR's-Greaſe, was formerly eſteemed a ſovereign remedy againſt cold diſorders, eſpecially rheumatiſms. It is now much uſed in dreſſing ladies and gentlemen's hair.

BEAR's Skin makes a fur in great eſteem, and on which depends a conſiderable article of commerce, being uſed in houſings, on coach-boxes, &c. In ſome countries, clothes are made of it, more eſpecially bags wherein to keep the feet warm in ſevere colds. Of the ſkins of bears cubs are made gloves, muffs, and the like.

BEARALSTON, a ſmall town of Devonſhire, which, however, is a borough by preſcription, and ſends two members to parliament.

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

Various have been the ceremonies and cuſtoms of moſt nations in regard of the beard. The Tartars, out of a religious principle, waged a long and bloody war with the Perſians, declaring them infidels, merely becauſe they would not cut their whiſkers after the rite of Tartary: and we find, that a conſiderable branch of the religion of the ancients conſiſted in the management of their beards. The Greeks wore their beards till the time of Alexander the Great; that prince having ordered the Macedonians to be ſhaved, for fear it ſhould give a handle to their enemies. According to Pliny, the Romans did not begin to ſhave till the year of Rome 454, when P. Ticinius brought over a ſtock of barbers from Sicily.—Perſons of quality had their children ſhaved the firſt time by others of the ſame or greater quality, who, by this means, became god-father or adoptive father of the children. Anciently, indeed, a perſon became god-father of the child by barely touching his beard: thus hiſtorians relate, that one of the articles of the treaty between Alaric and Clovis was, that Alaric ſhould touch the beard of Clovis to become his god-father.

As to eccleſiaſtics, the diſcipline has been very different on the article of beards: ſometimes they have been enjoined to wear them, from a notion of too much effeminacy in ſhaving, and that a long beard was more ſuitable to the eccleſiaſtical gravity; and ſometimes again they were forbid it, as imagining pride to lurk

Beard. beneath a venerable beard. The Greek and Roman churches have been long together by the ears about their beards: ſince the time of their ſeparation, the Romaniſts ſeem to have given more into the practice of ſhaving, by way of oppoſition to the Greeks; and have even made ſome expreſs conſtitutions *de radendis barbis*. The Greeks, on the contrary, eſpouſe very zealouſly the cauſe of long beards, and are extremely ſcandalized at the beardleſs images of ſaints in the Roman churches. By the ſtatues of ſome monaſteries it appears, that the lay-monks were to let their beards grow, and the prieſts among them to ſhave; and that the beards of all that were received into the monaſteries, were bleſſed with a great deal of ceremony. There are ſtill extant the prayers uſed in the ſolemnity of conſecrating the beard to God, when an eccleſiaſtic was ſhaven.

Le Comte obſerves, that the Chineſe affect long beards extravagantly; but nature has balked them, and only given them very little ones, which, however, they cultivate with infinite care: the Europeans are ſtrangely envied by them on this account, and eſteemed the greateſt men in the world. Chryſoſtom obſerves, that the kings of Perſia had their beards wove or matted together with gold-thread; and ſome of the firſt kings of France had their beards knotted and buttoned with gold.

Among the Turks, it is more infamous for any one to have his beard cut off, than among us to be publickly whipt or branded with a hot iron. There are abundance in that country, who would prefer death to this kind of puniſhment. The Arabs make the preſervation of their beards a capital point of religion, becauſe Mahomet never cut his. Hence the razor is never drawn over the Grand Signior's face. The Perſians, who clip them, and ſhave above the jaw, are reputed heretics. It is likewiſe a mark of authority and liberty among them, as well as among the Turks. They who ſerve in the ſeraglio, have their beards ſhaven, as a ſign of their ſervitude. They do not ſuffer it to grow till the ſultan has ſet them at liberty, which is beſtowed as a reward upon them, and is always accompanied with ſome employment.

The moſt celebrated ancient writers, and ſeveral modern ones, have ſpoken honourably of the fine beards of antiquity. Homer ſpeaks highly of the white beard of Neſtor and that of old King Priam. Virgil deſcribes Mezentius's to us, which was ſo thick and long as to cover all his breaſt; Chryſippus praiſes the noble beard of Timothy, a famous player on the flute. Pliny the younger tells us of the white beard of Euphrates, a Syrian philoſopher; and he takes pleaſure in relating the reſpect mixed with fear with which it inſpired the people. Plutarch ſpeaks of the long white beard of an old Laconian, who being aſked why he let it grow ſo, replied, *'Tis that, ſeeing continually my white beard, I may do nothing unworthy of its whiteneſs.* Strabo relates that the Indian philoſophers, the Gymnoſophiſts, were particularly attentive to make the length of their beards contribute to captivate the veneration of the people. Diodorus, after him, gives a very particular and circumſtantial hiſtory of the beards of the Indians. Juvenal does not forget that of Antiochus the ſon of Neſtor. Fenelon, in deſcribing a prieſt of Apollo in all his magnificence, tells us that he had a white beard down to his girdle. But Perſius ſeems to outdo all theſe authors: this poet was ſo convinced that a beard was the ſymbol of wiſdom, that he thought he could not beſtow a greater encomium on the divine Socrates, than by calling him the bearded maſter, *Magiſtrum barbatum.* Beard.

While the Gauls were under their ſovereignty none but the nobles and Chriſtian prieſts were permitted to wear long beards. The Franks having made themſelves maſters of Gaul, aſſumed the ſame authority as the Romans: the bondſmen were expreſsly ordered to ſhave their chins; and this law continued in force until the entire aboliſhment of ſervitude in France. So likewiſe, in the time of the firſt race of kings, a long beard was a ſign of nobility and freedom. The kings, as being the higheſt nobles in their kingdom, were emulous likewiſe to have the largeſt beard: Eginard, ſecretary to Charlemagne, ſpeaking of the laſt kings of the firſt race, ſays, they came to the aſſemblies in the Field of Mars in a carriage drawn by oxen, and ſat on the throne with their hair diſhevelled, and a very long beard, *crine profuſo, barba ſubmiſſa, ſolio reſiderent, et ſpeciem dominantis effingerent.*

To touch any one's beard, or cut off a bit of it, was, among the firſt French, the moſt ſacred pledge of protection and confidence. For a long time all letters that came from the ſovereign had, for greater ſanction, three hairs of his beard in the ſeal. There is ſtill in being a charter of 1121, which concludes with the following words: *Quod ut ratum et ſtabile perſeveret in poſterum, præſentis ſcripto ſigilli mei robur appoſui eum tribus pilis barbæ meæ.*

Several great men have honoured themſelves with the ſurname of *Bearded.* The emperor Conſtantine is diſtinguiſhed by the epithet of *Pogonata*, which ſignifies *the Bearded.* In the time of the Cruſades, we find there was a *Geffrey the Bearded:* Baldwin IV. earl of Flanders, was ſurnamed *Handſome-beard;* and, in the illuſtrious houſe of Montmorenci, there was a famous *Bouchard*, who took a pride in the ſurname of *Bearded:* he was always the declared enemy of the monks, without doubt, becauſe of their being ſhaved.

In the tenth century, we find, that King Robert (of France) the rival of Charles the Simple, was not more famous for his exploits than for his long white beard. In order that it might be more conſpicuous to the ſoldiers when he was in the field, he uſed to let it hang down outſide his cuiraſs: this venerable ſight encouraged the troops in battle, and ſerved to rally them when they were defeated.

A celebrated painter in Germany, called *John Mayo*, had ſuch a large beard that he was nicknamed *John the Bearded:* it was ſo long that he wore it faſtened to his girdle; and though he was a very tall man, it would hang upon the ground when he ſtood upright. He took the greateſt care of this extraordinary beard; ſometimes he would untie it before the emperor Charles V. who took great pleaſure to ſee the wind make it fly againſt the faces of the lords of his court.

In England, the famous chancellor Thomas More, one of the greateſt men of his time, being on the point of falling a victim to court intrigues, was able, when on the fatal ſcaffold, to procure reſpect to his beard in preſence of all the people, and ſaved it, as one may ſay,

Beard. ſay, from the fatal ſtroke which he could not eſcape himſelf. When he had laid his head on the block, he perceived that his beard was likely to be hurt by the axe of the executioner; on which he took it away, ſaying, *My beard has not been guilty of treaſon; it would be an injuſtice to puniſh it.*

But let us turn our eyes to a more flattering object, and admire the beard of the beſt of kings, the ever precious beard of the great Henry IV. of France, which diffuſed over the countenance of that prince a majeſtic ſweetneſs and amiable openneſs, a beard ever dear to poſterity, and which ſhould ſerve as a model for that of every great king, as the beard of his illuſtrious miniſter ſhould for that of every miniſter. But what dependence is there to be put on the ſtability of the things of this world? By an event, as fatal as unforeſeen, the beard, which was arrived at its higheſt degree of glory, all of a ſudden loſt its favour, and was at length entirely proſcribed. The unexpected death of Henry the Great, and the youth of his ſucceſſor, were the ſole cauſes of it.

Louis XIII. mounted the throne of his glorious anceſtors without a beard. Every one concluded immediately, that the courtiers, ſeeing their young king with a ſmooth chin, would look upon their own as too rough. The conjecture proved right; for they preſently reduced their beards to whiſkers, and a ſmall tuft of hair under the nether lip.

The people at firſt would not follow this dangerous example. The duke of Sully never would adopt this effeminate cuſtom. This man, great both as a general and a miniſter, was likewiſe ſo in his retirement: he had the courage to keep his long beard, and to appear with it at the court of Louis XIII. where he was called to give his advice in an affair of importance. The young crop-bearded courtiers laughed at the ſight of his grave look and old-faſhioned phiz. The duke, nettled at the affront put on his fine beard, ſaid to the king, "Sir, when your father, of glorious memory, did me the honour to conſult me on his great and important affairs, the firſt thing he did was to ſend away all the buffoons and ſtage-dancers of his court."

The Czar Peter, who had ſo many claims to the ſurname of *Great*, ſeems to have been but little worthy of it on this occaſion. He had the boldneſs to lay a tax on the beards of his ſubjects. He ordered that the noblemen and gentlemen, tradeſmen and artiſans (the prieſts and peaſants excepted) ſhould pay 100 rubles to be able to retain their beards; that the lower claſs of people ſhould pay a copeck for the ſame liberty: and he eſtabliſhed clerks at the gates of the different towns to collect theſe duties. Such a new and ſingular impoſt troubled the vaſt empire of Ruſſia. Both religion and manners were thought in danger. Complaints were heard from all parts; they even went ſo far as to write libels againſt the ſovereign; but he was inflexible, and at that time powerful. Even the fatal ſcenes of St Bartholomew were renewed againſt theſe unfortunate beards, and the moſt unlawful violences were publicly exerciſed. The razor and ſciſſars were everywhere made uſe of. A great number, to avoid theſe cruel extremities, obeyed with reluctant ſighs. Some of them carefully preſerved the ſad trimmings of their chins: and, in order to be never ſeparated from theſe dear locks, ordered that they ſhould be placed with them in their coffins. Beard.

Example, more powerful than authority, produced in Spain what it had not been able to bring about in Ruſſia without great difficulty. Philip V. aſcended the throne with a ſhaved chin. The courtiers imitated the prince, and the people, in turn, the courtiers. However, though this revolution was brought about without violence and by degrees, it cauſed much lamentation and murmuring; the gravity of the Spaniards loſt by the change. The favourite cuſtom of a nation can never be altered without incurring diſpleaſure. They have this old ſaying in Spain: *Deſde que no hay barba, no hay mas alma.* "Since we have loſt our beards, we have loſt our ſouls."

Among the European nations that have been moſt curious in beards and whiſkers, we muſt diſtinguiſh Spain. This grave romantic nation has always regarded the beard as the ornament which ſhould be moſt prized; and the Spaniards have often made the loſs of honour conſiſt in that of their whiſkers. The Portugueſe, whoſe national character is much the ſame, are not the leaſt behind them in that reſpect. In the reign of Catherine queen of Portugal, the brave John de Caſtro had juſt taken in India the caſtle of Diu: victorious, but in want of every thing, he found himſelf obliged to aſk the inhabitants of Goa to lend him a thouſand piſtoles for the maintenance of his fleet; and, as a ſecurity for that ſum, he ſent them one of his whiſkers, telling them, "All the gold in the world cannot equal the value of this natural ornament of my valour; and I depoſite it in your hands as a ſecurity for the money." The whole town was penetrated with this heroiſm, and every one intereſted himſelf about this invaluable whiſker: even the women were deſirous to give marks of their zeal for ſo brave a man: ſeveral ſold their bracelets to increaſe the ſum aſked for; and the inhabitants of Goa ſent him immediately both the money and his whiſker. A number of other examples of this kind might be produced, which do as much honour to whiſkers as to the good faith of thoſe days.

In Louis XIII.'s reign, whiſkers attained the higheſt degree of favour, at the expence of the expiring beards. In thoſe days of gallantry, not yet empoiſoned by wit, they became the favourite occupation of lovers. A fine black whiſker, elegantly turned up, was a very powerful mark of dignity with the fair ſex. Whiſkers were ſtill in faſhion in the beginning of Louis XIV.'s reign. This king, and all the great men of his reign, took a pride in wearing them. They were the ornament of Turenne, Condé, Colbert, Corneille, Moliere, &c. It was then no uncommon thing for a favourite lover to have his whiſkers turned up, combed, and pomatumed, by his miſtreſs; and, for this purpoſe, a man of faſhion took care to be always provided with every little neceſſary article, eſpecially whiſker-wax. It was highly flattering to a lady to have it in her power to praiſe the beauty of her lover's whiſkers; which, far from being diſguſting, gave his perſon an air of vivacity: ſeveral even thought them an incitement to love. It ſeems the levity of the French made them undergo ſeveral changes both in form and name; there were *Spaniſh, Turkiſh, guard-dagger, &c.* whiſkers;

Beard. whiſkers; in ſhort, *royal* ones, which were the laſt worn: their ſmallneſs proclaimed their approaching fall.

Conſecration of the BEARD was a ceremony among the Roman youth, who, when they were ſhaved the firſt time, kept a day of rejoicing, and were particularly careful to put the hair of their beard into a ſilver or gold box, and make an offering of it to ſome god, particularly to Jupiter Capitolinus, as was done by Nero, according to Suetonius.

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

The Faſhion of the BEARD has varied in different ages and countries; ſome cultivating and entertaining one part of it, ſome another. Thus the Hebrews wear a beard on their chin; but not on the upper-lip or cheeks. Moſes forbids them to cut off entirely the angle or extremity of their beard; that is, to manage it after the Egyptian faſhion, who left only a little tuft of beard at the extremity of their chin; whereas the Jews to this day ſuffer a little fillet of hair to grow from the lower end of their ears to their chins, where, as well as on their lower-lips, their beards are in a pretty long bunch. The Jews, in time of mourning, neglected to trim their beards, that is, to cut off what grew ſuperfluous on the upper-lips and cheeks. In time of grief and great affliction they alſo plucked off the hair of their beards.

Anointing the BEARD with unguents was an ancient practice both among the Jews and Romans, and ſtill continues in uſe among the Turks; where one of the principal ceremonies obſerved in ſerious viſits is to throw ſweet-ſcented water on the beard of the viſitant, and to perfume it afterwards with aloes-wood, which ſticks to this moiſture, and gives it an agreeable ſmell, &c. In middle-age writers we meet with *adlentare barbam*, uſed for ſtroking and combing it, to render it ſoft and flexible. The Turks, when they comb their beards, hold a handkerchief on their knees, and gather very carefully the hairs that fall; and when they have got together a certain quantity, they fold them up in paper, and carry them to the place where they bury the dead.

Beard of a Comet, the rays which the comet emits towards that part of the heaven to which its proper motion ſeems to direct it; in which the beard of a comet is diſtinguiſhed from the tail, which is underſtood of the rays emitted towards that part from whence its motion ſeems to carry it.

Beard of a Horſe, that part underneath the lower mandible on the outſide and above the chin, which bears the curb. It is alſo called the *chuck*. It ſhould have but little fleſh upon it, without any chops, hardneſs, or ſwelling; and be neither too high raiſed nor too flat, but ſuch as the curb may reſt in its right place.

Beard of a Muſcle, oyſter, or the like, denotes an aſſemblage of threads or hairs, by which thoſe animals faſten themſelves to ſtones. The hairs of this beard terminate in a flat ſpongy ſubſtance, which being applied to the ſurface of a ſtone, ſticks thereto, like the wet leather uſed by boys.

BEARDS, in the hiſtory of inſects, are two ſmall, oblong, fleſhy bodies, placed juſt above the trunk, as in the gnats, and in the moths and butterflies.

Bearded ‖ Bearing.

BEARDED, denotes a perſon or thing with a beard, or ſome reſemblance thereof. The faces on ancient Greek and Roman medals are generally bearded. Some are denominated *pogonati*, as having long beards, e. g. the Parthian kings. Others have only a lanugo about the chin, as the Seleucid family. Adrian was the firſt of the Roman emperors who nouriſhed his beard: hence all imperial medals before him are *beardleſs*; after him, *bearded*.

Bearded Women have been all obſerved to want the menſtrual diſcharge; and ſeveral inſtances are given by Hippocrates, and other phyſicians, of grown women, eſpecially widows, in whom the menſes coming to ſtop, beards appeared. Euſebius Nicrembergius mentions a woman who had a beard reaching to her navel.

Of women remarkably bearded we have ſeveral inſtances. In the cabinet of curioſities of Stutgard in Germany, there is the portrait of a woman called *Bartel Graetje*, whoſe chin is covered with a very large beard. She was drawn in 1587, at which time ſhe was but 25 years of age. There is likewiſe in the ſame cabinet another portrait of her when ſhe was more advanced in life, but likewiſe with a beard.—It is ſaid, that the duke of Saxony had the portrait of a poor Swiſs woman taken, remarkable for her long buſhy beard; and thoſe who were at the carnival at Venice in 1726, ſaw a female dancer aſtoniſh the ſpectators not more by her talents than by her chin covered with a black buſhy beard.—Charles XII. had in his army a female grenadier: it was neither courage nor a beard that ſhe wanted to be a man. She was taken at the battle of Pultowa, and carried to Peterſburg, where ſhe was preſented to the Czar in 1724: her beard meaſured a yard and a half.—We read in the Trévoux Dictionary, that there was a woman ſeen at Paris, who had not only a buſhy beard on her face, but her body likewiſe covered all over with hair. Among a number of other examples of this nature, that of Margaret, the governeſs of the Netherlands, is very remarkable. She had a very long ſtiff beard, which ſhe prided herſelf on; and being perſuaded that it contributed to give her an air of majeſty, ſhe took care not to loſe a hair of it. This Margaret was a very great woman.—It is ſaid, that the Lombard women, when they were at war, made themſelves beards with the hair of their heads, which they ingeniouſly arranged on their cheeks, in order that the enemy, deceived by the likeneſs, might take them for men. It is aſſerted, after Suidas, that in a ſimilar caſe the Athenian women did as much. Theſe women were more men than our Jemmy-Jeſſamy countrymen.—About a century ago, the French ladies adopted the mode of dreſſing their hair in ſuch a manner that curls hung down their cheeks as far as their boſom. Theſe curls went by the name of *whiſkers*. This cuſtom undoubtedly was not invented, after the example of the Lombard women, to fright the men. Neither is it with intention to carry on a very bloody war, that in our time they have affected to bring forward the hair of the temple on the cheeks.

BEARERS, in *Heraldry*. See SUPPORTERS.

BEARING, in *Navigation*, an arch of the horizon intercepted between the neareſt meridian and any diſtinct

Bearing || Bearn.

ſtinct object, either diſcovered by the eye, or reſulting from the ſinical proportion; as in the firſt caſe, at 4 P. M. Cape Spado, in the iſle of Candia, bore S. by W. by the compaſs. In the ſecond, the longitudes and latitudes of any two places being given, and conſequently the difference of latitude and longitude between them, the bearing from one to the other is diſcovered by the following analogy:

As the meridional difference of latitude
Is to the difference of longitude;
So is radius
To the tangent bearing.

BEARING is alſo the ſituation of any diſtant object, eſtimated from ſome part of the ſhip according to her poſition. In this ſenſe, an object ſo diſcovered muſt be either ahead, aſtern, abreaſt on the bow, or on the quarter. Theſe bearings, therefore, which may be called *mechanical*, are on the beam, before the beam, abaft the beam, on the bow, on the quarter, ahead, or aſtern. If the ſhip ſails with a ſide-wind, it alters the names of ſuch bearings in ſome meaſure, ſince a diſtant object on the beam is then ſaid to be to leeward or to windward; on the lee-quarter or bow, and on the weather-quarter or bow.

BEARING, in the ſea-language. When a ſhip ſails towards the ſhore, before the wind, ſhe is ſaid to *bear in* with the land or harbour. To let the ſhip ſail more before the wind, is to *bear up*. To put her right before the wind, is to *bear round*. A ſhip that keeps off from the land, is ſaid to *bear off*. When a ſhip that was to windward comes under a ſhip's ſtern, and ſo gives her the wind, ſhe is ſaid to *bear under her lee*, &c. There is another ſenſe of this word, in reference to the burden of a ſhip; for they ſay a ſhip bears, when, having too ſlender or lean a quarter, ſhe will ſink too deep into the water with an overlight freight, and thereby can carry but a ſmall quantity of goods.

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

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

BEARING of a Stag, is uſed in reſpect of the ſtate of his head, or the croches which he bears on his horns. If you be aſked what a ſtag bears, you are only to reckon the croches, and never to expreſs an odd number: as, if he have four croches on his near horn and five on his far, you muſt ſay he bears ten; a falſe right on his near horn: if but four on the near horn and ſix on the far horn, you muſt ſay he bears twelve; a double falſe right on the near horn.

BEARN, a late province of France, bounded on the eaſt by Bigorre, on the ſouth by the mountains of Arragon, on the weſt by Soule and part of Navarre, and on the north by Gaſcony and Armagnac. It lies at the foot of the Pyrenean mountains, being about 16 leagues in length and 12 in breadth. It is in general a barren country; yet the plains yield conſiderable quantities of flax, and a good quantity of Indian corn called *mailloc*. The mountains are rich in mines of iron, copper, and lead; ſome of them alſo are covered with vines, and others with pine trees; and they give riſe to ſeveral mineral ſprings, and two conſiderable rivers, the one called the *Gave of Oleron*, and the other the *Gave of Bearn*. Some wine is exported from this country; and the Spaniards buy up great numbers of the horſes and cattle, together with moſt of their linen, of which there is a conſiderable manufactory. The principal places are Pau, Leſcar, Ortez, Novarreins, Sallies, and Oleron. This province, with Baſques, forms the department of the Lower Pyrenees.

Beait || Beat.

BEAST, in a general ſenſe, an appellation given to all four-footed animals, fit either for food, labour, or ſport.

BEASTS of Burden, in a commercial ſenſe, all four-footed animals which ſerve to carry merchandiſes on their backs. The beaſts generally uſed for this purpoſe are, elephants, dromedaries, camels, horſes, mules, aſſes, and the ſheep of Mexico and Peru.

BEASTS of the Chaſe are five, viz. the buck, the doe, the fox, the roe, and the marten.

BEASTS and Fowls of the Warren, are the hare, the coney, the pheaſant, and partridge.

BEASTS of the Foreſt, are the hart, hind, hare, boar, and wolf.

BEAST, among gameſters, a game at cards, played in this manner: The beſt cards are the king, queen, &c. whereof they make three heaps, the king, the play, and troilet. Three, four, or five, may play; and to every one is dealt five cards. However, before the play begins, every one ſtakes to the three heaps. He that wins moſt tricks, takes up the heap called the *play;* he that hath the king takes up the heap ſo called; and he that hath three of any ſort, that is, three fours, three fives, three ſixes, &c. takes up the troilet heap.

BEAT, in a general ſignification, ſignifies to chaſtiſe, ſtrike, knock, or vanquiſh.

This word has ſeveral other ſignifications in the manufactures, and in the arts and trades. Sometimes it ſignifies to forge and hammer; in which ſenſe ſmiths and farriers ſay, to *beat iron*. Sometimes it means to pound, to reduce into powder: Thus we ſay, to *beat drugs*, to *beat pepper*, to *beat ſpices;* that is to ſay, to *pulverize them*.

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

BEAT, in the manege. A horſe is ſaid *to beat the duſt*, when at each ſtroke or motion he does not take in ground or way enough with his fore-legs. He is more particularly ſaid to beat the duſt at *terra à terra*, when he does not take in ground enough with his ſhoulders, making his ſtrokes or motions too ſhort, as if he made them all in one place. He *beats the duſt at curvets*, when he does them too precipitately and too low. He *beats upon a walk*, when he walks too ſhort, and

Beat || Beating.

and thus rids but little ground, whether it be in ſtraight lines, rounds, or paſſings.

Beat of Drum, in the military art, is to give notice by beat of drum of a ſudden danger; or, that ſcattered ſoldiers may repair to their arms and quarters, is to beat an alarm, or to arms. Alſo to ſignify, by different manners of ſounding a drum, that the ſoldiers are to fall on the enemy; to retreat before, in, or after, an attack; to move or march from one place to another; to permit the ſoldiers to come out of their quarters at break of day; to order to repair to their colours, &c.; is to beat a charge, a retreat, a march, &c.

Beat, in clock-making. See Beats.

Beat, *St*, a town of France, in the county of Comminges, at the confluence of the Garonne and the Pique. It is ſeated between two mountains which are cloſe to the town on each ſide. The houſes are chiefly built with marble. W. Long. 1. 6. N. Lat. 42. 50.

BEATER is applied, in matters of commerce, to divers ſorts of workmen, whoſe buſineſs is to hammer or flatten certain matters, particularly metals.

Gold-Beaters, are artiſans, who, by beating gold and ſilver with a hammer on a marble in moulds of vellum and bullocks guts, reduce them to thin leaves fit for gilding, or ſilvering of copper, iron, ſteel, wood, &c. Gold-beaters differ from flatters of gold or ſilver; as the former bring their metal into leaves by the hammer, whereas the latter only flatten it by preſſing it through a mill preparatory to beating.

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

BEATIFICATION, an act by which the pope declares a perſon beatified or bleſſed after his death. It is the firſt ſtep towards canonization, or raiſing any one to the honour and dignity of a ſaint. No perſon can be beatified till 50 years after his or her death. All certificates or atteſtations of virtues and miracles, the neceſſary qualifications for ſainthip, are examined by the congregation of rites. This examination often continues for ſeveral years; after which his holineſs decrees the beatification. The corpſe and relics of the future ſaint are from thenceforth expoſed to the veneration of all good Chriſtians; his images are crowned with rays, and a particular office is ſet apart for him; but his body and relics are not carried in proceſſion: indulgences likewiſe, and remiſſion of ſins, are granted on the day of his beatification; which though not ſo pompous as that of canonization, is however very ſplendid.

BEATING, or Pulsation, in *Medicine*, the reciprocal agitation or palpitation of the heart or pulſe.

Beating Flax or *Hemp*, is an operation in the dreſſing of theſe matters, contrived to render them more ſoft and pliant. When hemp has been ſwingled a ſecond time, and the hurds laid by, they take the ſtrikes, and dividing them into dozens and half dozens, make them up into large thick rolls, which being broached on long ſtrikes, are ſet in the chimney corner to dry; after which they lay them in a round trough made for the purpoſe, and there with beetles beat them well till they handle both without and within as pliant as poſſible, without any hardneſs or roughneſs to be felt: that done, they take them from the trough, open and divide the ſtrikes as before; and if any be found not ſufficiently beaten, they roll them up and beat them over as before. Beating.

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

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

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

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

Beating the Hands or *Feet*, by way of praiſe or approbation. See Applause.

Beating Time, in *Muſic*, a method of meaſuring and marking the time for performers in concert, by a motion of the hand and foot up or down ſucceſſively and in equal times. Knowing the true time of a crotchet, and ſuppoſing the meaſure actually ſubdivided into four crotchets, and the half meaſure into two, 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 with the beginning of the next meaſure; this is called *beating the time;* and, by practice, a habit is acquired of making this motion very equal. Each down and up is ſometimes called a *time* or *meaſure*. The general rule is, to contrive the diviſion of the meaſure ſo, that every down and up of the beating ſhall end with a particular note, on which very much depends the diſtinctneſs, and, as it were, the ſenſe of the melody. Hence the beginning of every time or beating in the meaſure is reckoned the accented part thereof.

Beating time is denoted, in the Italian muſic, by the term *á battuta*, which is uſually put after what they call *recitativo*, where little or no time is obſerved, to denote, that here they are to begin again to mark or beat the time exactly.

The Romans aimed at ſomewhat of harmony in the ſtrokes of their oars; and had an officer called *portiſculus* in each galley, whoſe buſineſs was to beat time to the rowers, ſometimes by a pole or mallet, and ſometimes by his voice alone.

The ancients marked the rhime in their muſical compoſitions; but to make it more obſervable in the practice, they beat the meaſure or time, and this in different manners. The moſt uſual conſiſted in a motion of the foot, which was raiſed from, and ſtruck alternately againſt, the ground, according to the modern method. Doing this was commonly the province of the maſter of the muſic, who was thence called μισοχορος and κορυφαιος, becauſe placed in the middle of the choir of muſicians, and in an elevated ſituation, to be ſeen and heard more eaſily by the whole company. Theſe beaters of meaſure were alſo called by the Greeks

Beating || Beaton.

Greeks ποδοκλυκοι and ποδοψιφοι, becauſe of the noiſe of their feet; and συλλαβιοι, becauſe of the uniformity or monotony of the rhyme. The Latins denominated them *pedarii*, *podarii*, and *pedicularii*. To make the beats or ſtrokes more audible, their feet were generally ſhod with a ſort of ſandals either of wood or iron, called by the Greeks κρουπιζια, κρουπαλα, κρεμπηλα, and by the Latins *pedicula*, *ſcabella*, or *ſcabilla*, becauſe like to little ſtools or footſtools. Sometimes they beat upon ſonorous footſtools, with the foot ſhod with a wooden or iron ſole. They beat the meaſure not only with the foot, but alſo with the right hand, all the fingers whereof they joined together, to ſtrike into the hollow of the left. He who thus marked the rhythm, was called *manuductor*. The ancients alſo beat time or meaſure with ſhells, as oyſter ſhells and bones of animals, which they ſtruck againſt one another, much as the moderns now uſe caſtanets, and the like inſtruments. This the Greeks called κρεμβαλιαζειν, as is noted by Heſychius. The ſcholiaſt on Ariſtophanes ſpeaks much to the ſame purpoſe. Other noiſy inſtruments, as drums, cymbals, citterns, &c. were alſo uſed on the ſame occaſion. They beat the meaſure generally in two equal or unequal times; at leaſt this holds of the uſual rhythm of a piece of muſic, marked either by the noiſe of ſandals, or the flapping of the hands. But the other rhythmic inſtruments laſt-mentioned, and which were uſed principally to excite and animate the dancers, marked the cadence after another manner; that is, the number of their percuſſions equalled, or even ſometimes ſurpaſſed, that of the different ſounds which compoſed the air or ſong played.

BEATING, with hunters, a term uſed of a ſtag, which runs firſt one way and then another. He is then ſaid *to beat up and down*.—The noiſe made by conies in rutting time is alſo called *beating* or *tapping*.

BEATING, in *Navigation*, the operation of making a progreſs at ſea againſt the direction of the wind, in a zig-zag line or traverſe, like that in which we aſcend a ſteep hill. See TACKING.

BEATITUDE imports the ſupreme good, or the higheſt degree of happineſs human nature is ſuſceptible of; or the moſt perfect ſtate of a rational being, wherein the ſoul has attained to the utmoſt excellency and dignity it is framed for. In which ſenſe, it amounts to the ſame with what we otherwiſe call *bleſſedneſs* and *ſovereign felicity*; by the Greeks, ευδαιμονια; and by the Latins, *ſummum bonum*, *beatitudo*, and *beatitas*.

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

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

BEATON, DAVID, archbiſhop of St Andrew's, and a cardinal of Rome, in the early part of the 16th century, was born in 1494. Pope Paul III. raiſed him to the degree of a cardinal in December 1538; and being employed by James V. in negociating his marriage with the court of France, he was there conſecrated biſhop of Mirepoix. Soon after his inſtalment as archbiſhop of St Andrew's, he promoted a furious perſecution of the reformers in Scotland; when the king's death put a ſtop, for a time, to his arbitrary proceedings, he being then excluded from affairs of government, and confined. He raiſed however ſo ſtrong a party, that, upon the coronation of the young Queen Mary, he was admitted of the council, made chancellor, and procured commiſſion as legate *à latere* from the court of Rome. He now began to renew his perſecution of heretics; and among the reſt, of the famous Proteſtant preacher Mr George Wiſhart, whoſe ſufferings at the ſtake the cardinal viewed from his window with apparent exultation. It is pretended, that Wiſhart at his death foretold the murder of Beaton; which indeed happened ſhortly after, he being aſſaſſinated in his chamber, May 29. 1547. He was a haughty bigotted churchman, and thought ſeverity the proper method of ſuppreſſing hereſy; he had great talents, and vices that were no leſs conſpicuous. See SCOTLAND.

Beatorum || Beaver.

BEATORUM INSULA, in *Ancient Geography*, ſeven days journey to the weſt of Thebæ, a diſtrict of the Nomos Oaſites; called an *iſland*, becauſe ſurrounded with ſand, like an iſland in the ſea, (Ulpian); yet abounding in all the neceſſaries of life, though encompaſſed with vaſt ſandy deſerts, (Strabo); which ſome ſuppoſe to be a third Oaſis, in the Regio Ammoniaca; and the ſite of the temple of Ammon anſwers to the above deſcription, as appears from the writers on Alexander's expedition thither. It was a place of relegation or baniſhment for real or pretended criminals, from which there was no eſcape. (Ulpian).

BEATS, in a watch or clock, are the ſtrokes made by the fangs or pallets of the ſpindle of the balance, or of the pads in a royal pendulum. See CLOCK and Watch.

BEAUCAIRE, a town of France, in the department of Gard, on the Rhone, oppoſite Taraſcon, with which it has a communication by a bridge of boats. One of the moſt celebrated fairs in Europe is annually held here. E. Long. 5. 49. N. Lat. 43. 39.

BEAUCE, a late province of France, lying between the Iſle of France, Blaſois, and Orleannois. It is ſo very fertile in wheat, that it is called the *Granary* of Paris. Chartres is the principal town. It now forms the department of Eure and Loire.

BEAVER, in *Zoology*. See CASTOR, MAMMALIA *Index*.

BEAVER Skins, in *Commerce*. Of theſe, merchants diſtinguiſh three ſorts; the new, the dry, and the fat.

The new beaver, which is alſo called the *white beaver*, or *Muſcovy beaver*, becauſe it is commonly kept to be ſent into Muſcovy, is that which the ſavages catch in their winter hunting. It is the beſt, and the moſt proper for making fine furs, becauſe it has loſt none of its hair by ſhedding.

The dry beaver, which is ſometimes called *lean beaver*, comes from the ſummer hunting, which is the time when theſe animals loſe part of their hair. Though this ſort of beaver be much inferior to the former, yet it may alſo be employed in furs; but it is chiefly uſed in the manufacture of hats. The French call it *ſummer caſtor*, or *beaver*.

The fat beaver is that which has contracted a certain groſs and oily humour, from the ſweat which exhales from the bodies of the ſavages, who wear it for

Beaufort || Beaumaris.

ſome time. Though this ſort be better than the dry beaver, yet it is uſed only in the making of hats.

Beſides hats and furs, in which the beaver's hair is commonly uſed, they attempted in France, in the year 1699, to make other manufactures of it: and accordingly they made cloths, flannels, ſtockings, &c. partly of beavers hair, and partly of Segovia wool. This manufactory, which was ſet up at Paris, in the ſuburb of St Anthony, ſucceeded at firſt pretty well; and according to the genius of the French, the novelty of the thing brought into ſome repute the ſtuffs, ſtockings, gloves, and cloth, made of beavers hair. But they went out of faſhion on a ſudden, becauſe it was found, by experience, that they were of a very bad wear, and beſides that the colours faded very much; when they had been wet, they became dry and hard, like felt, which occaſioned the miſcarriage of the manufactory for that time.

When the hair has been cut off from the beavers ſkins, to be uſed in the manufacturing of hats, thoſe ſkins are ſtill employed by ſeveral workmen; namely, by the trunk-makers, to cover trunks and boxes; by the ſhoemakers, to put into ſlippers; and by turners, to make ſieves for ſifting grain and ſeeds.

BEAUFORT, a town of France, in the department of Maine and Loire, with a caſtle, near the river Authion. It contains two pariſhes, and formerly had a convent of Recolets, and yet has not 100 houſes. W. Long. 0. 3. N. Lat. 47. 26.

Beaufort gives title of duke in England to the noble family of Somerſet, who are lineally deſcended from John of Gaunt duke of Lancaſter, whoſe ducheſs reſided in this town.

BEAUFORT, a ſtrong town of Savoy in Italy, on the river Oron. E. Long. 6. 48. N. Lat. 45. 40.

BEAUGENCY, a town of France, in the department of Loire, ſeated on the river Loire. It is famous for its wines. E. Long. 1. 46. N. Lat. 47. 48.

BEAUJEU, a town of France, in the department of Rhone and Loire, with an old caſtle. It is ſeated on the river Ardieres, at the foot of a mountain, in E. Long. 4. 40. N. Lat. 46. 9.

BEAUJOLOIS, a diſtrict of France, now included in the department of Rhone and Loire, is bounded on the ſouth by Lyonois Proper, on the weſt by Forez, on the north by Burgundy, and on the eaſt by the principality of Dombes. It is 25 miles in length, and 20 in breadth: Ville Franche is the capital town.

BEAULIEU, SEBASTIAN DE PONTAULT DE, a celebrated French engineer, and field marſhal under Louis XIV. He publiſhed plans of all the military expeditions of his maſter, with military lectures annexed. He died in 1674.

BEAUMARIS, a market town of Angleſey in North Wales, which ſends one member to parliament. W. Long. 4. 15. N. Lat. 53. 25.

It is, as the name implies, pleaſantly ſeated on a low land at the water's edge; is neat and well built, and one ſtreet is very handſome. Edward I. created the place; for after founding the caſtles of Caernarvon and Conway, he diſcovered that it was neceſſary to put another curb on the Welch. He therefore built a fortreſs here in 1295; and fixed on a marſhy ſpot, near the chapel of St Meugan, ſuch as gave him opportunity of forming a great foſs round the caſtle, and of filling it with water from the ſea. He alſo cut a canal, in order to permit veſſels to diſcharge their lading beneath the walls: and as a proof of the exiſtence of ſuch a conveniency, there were within this century iron rings affixed to them, for the purpoſe of mooring the ſhips or boats. The marſh was in early times of far greater extent than at preſent, and covered with fine bulruſhes. The firſt governor was Sir William Pickmore, a Gaſcon knight appointed by Edward I. There were a conſtable of the caſtle, and a captain of the town. The firſt had an annual fee of forty pounds, the laſt of twelve pounds three ſhillings and four pence; and the porter of the gate of Beaumaris had nine pounds two ſhillings and ſixpence. Twenty-four ſoldiers were allowed for the guard of the caſtle and town, at fourpence a-day to each. The conſtable of the caſtle was always captain of the town, except in one inſtance: in the 36th of Henry VI. Sir John Boteler held the firſt office, and Thomas Norreys the other. The caſtle was extremely burthenſome to the country: quarrels were frequent between the garriſon and the country people. In the time of Henry VI. a bloody fray happened, in which David ap Evan ap Howel of Llwydiarth, and many others, were ſlain. From the time of Sir Rowland Villeville, *alias* Brittayne, reputed baſe ſon of Henry VII. and conſtable of the caſtle, the garriſon was withdrawn till the year 1642, when Thomas Cheadle, deputy to the earl of Dorſet, then conſtable, put into it men and ammunition. In 1643, Thomas Bulkeley, Eſq. ſoon after created Lord Bulkeley, ſucceeded: his ſon Colonel Richard Bulkeley, and ſeveral gentlemen of the county, held it for the king till June 1646, when it ſurrendered on honourable terms to General Mytton, who made Captain Evans his deputy governor. In 1653, the annual expence of the garriſon was ſeventeen hundred and three pounds. Edward I. when he built the town, ſurrounded it with walls, made it a corporation, and endowed it with great privileges, and lands to a conſiderable value. He removed the ancient freeholders by exchange of property into other counties. Henllys, near the town, was the ſeat of Gwerydd ap Rhys Goch, one of fifteen tribes, and of his poſterity till this period, when Edward removed them to Beddle Wyddan in Flintſhire, and beſtowed their ancient patrimony on the corporation. It ſends one member to parliament. Its firſt repreſentative was Maurice Griffydd, who ſat in the ſeventh year of Edward VI. There is very good anchorage for ſhips in the bay which lies before the town; and has ſeven fathom water even at the loweſt ebb. Veſſels often find ſecurity here in hard gales. The town has no trade of any kind, yet has its cuſtomhouſe for the caſual reception of goods. The ferry lies near the town, and is paſſable at low water. It was granted by charter to the corporation in the 4th of Queen Elizabeth. There is an order from Edward II. to Robert Power, chamberlain of North Wales, to inſpect into the ſtate of the boat, which was then out of repair; and in caſe it was feaſible, to cauſe it to be made fit for uſe, at the expence of the baileywick: but if the boat proved paſt repair, a new one was to be built, and the expence allowed by the king. It appeared that the people of Beaumaris paid annually for the privilege of a ferry thirty ſhillings into the exchequer; but by this order it

Beaumaris.

Beaumont. it ſeems that the king was to find the boat. After paſſing the channel, the diſtance over the ſands to Aber in Caernarvonſhire, the point the paſſenger generally makes for, is four miles. The ſands are called *Traeth Telavan*, and *Wylofaen*, or the *place of weeping*, from the ſhrieks and lamentations of the inhabitants when it was overwhelmed by the ſea, in the days of Helig ap Clunog. The church is dependant on Llandegvan, which is in the gift of Lord Bulkeley. The former is called the *chapel of the bleſſed virgin;* yet in ancient writings one aile is called *St Mary's chapel*, and another that of *St Nicholas*.

BEAUMONT, Sir JOHN, the elder brother of Mr Francis Beaumont the famous dramatic poet, was born in the year 1582, and in 1626 had the dignity of a baronet conferred upon him by King Charles I. In his youth he applied himſelf to the Muſes with good ſucceſs; and wrote, The Crown of Thorns, a poem, in eight books: a miſcellany, entitled, *Boſworth Field:* Tranſlations from the Latin poets: and ſeveral poems on religious and political ſubjects; as, On the Feſtivals; On the Bleſſed Trinity; A Dialogue between the World, a Pilgrim, and Virtue; Of the miſerable State of Man; Of Sickneſs. &c. He died in 1628. His poetic genius was celebrated by Ben Johnſon, Michael Drayton, and others.

BEAUMONT and FLETCHER, two celebrated Engliſh dramatic writers, who flouriſhed in the reign of James I. and ſo cloſely connected both as authors and as friends, that it has been judged not improper to give them under one article.

Mr Francis Beaumont was deſcended from an ancient family of his name at Grace-dieu in Leiceſterſhire, where he was born about the year 1585 or 1586, in the reign of Queen Elizabeth. His grandfather, John Beaumont, was maſter of the rolls, and his father Francis Beaumont one of the judges of the commonpleas. He was educated at Cambridge, and afterwards admitted of the Inner Temple. It is not, however, apparent that he made any great proficiency in the law, that being a ſtudy probably too dry and unentertaining to be attended to by a man of his fertile and ſprightly genius. And indeed we ſhould ſcarcely be ſurpriſed to find that he had given no application to any ſtudy but poetry, nor attended on any court but that of the Muſes: but, on the contrary, our admiration might fix itſelf in the oppoſite extreme, and fill us with aſtoniſhment at the extreme aſſiduity of his genius and rapidity of his pen, when we look back on the voluminouſneſs of his works, and then inquire into the time allowed him for them; works that might well have taken up a long life to have executed. For although, out of 53 plays which are collected together as the labours of theſe united authors, Mr Beaumont was concerned in much the greater part of them, yet he did not live to complete his 30th year, the king of terrors ſummoning him away in the beginning of March 1615, on the 9th day of which he was interred in the entrance of St Benedict's chapel in Weſtminſter-Abbey. There is no inſcription on his tomb: But there are two epitaphs to his memory; one by his elder brother Sir John Beaumont:

On death, thy murderer, this revenge I take;
I ſlight his terrors, and juſt queſtion make,
Which of us two the beſt precedence have, Beaumont.
Mine to this wretched world, thine to the grave?
Thou ſhould'ſt have followed me; but death, to blame,
Miſcounted years, and meaſur'd age by fame.
So dearly haſt thou bought thy precious lines;
Their praiſe grew ſwiftly, ſo thy life declines.
Thy muſe, the hearer's queen, the reader's love,
All ears, all hearts (but death's), could pleaſe and move. *Boſworth Field*, p. 164.

The other is by Biſhop Corbet. (*Poems*, p. 68.)

He that hath ſuch acuteneſs and ſuch wit,
As would aſk ten good heads to huſband it:
He that can write ſo well, that no man dare
Reſume it for the beſt; let him beware:
Beaumont is dead; by whoſe ſole death appears,
Wit's a diſeaſe conſumes men in few years.

He left a daughter, Frances Beaumont, who died in Leiceſterſhire ſince the year 1700. She had in her poſſeſſion ſeveral poems of her father's writing; but they were loſt at ſea in her voyage from Ireland, where ſhe had lived for ſome time in the duke of Ormond's family.

Mr John Fletcher was not more meanly deſcended than his poetical colleague; his father, the reverend Dr Fletcher, having been firſt made biſhop of Briſtol by Queen Elizabeth, and afterwards by the ſame monarch, in the year 1593, tranſlated to the rich ſee of London. Our poet was born in 1576; and was, as well as his friend, educated at Cambridge, where he made a great proficiency in his ſtudies, and was accounted a very good ſcholar. His natural vivacity of wit, for which he was remarkable, ſoon rendered him a devotee to the muſes; and his cloſe attention to their ſervice, and fortunate connection with a genius equal to his own, ſoon raiſed him to one of the higheſt places in the temple of poetical fame. As he was born near ten years before Mr Beaumont, ſo did he alſo ſurvive him by an equal number of years; the general calamity of a plague, which happened in the year 1625, involved him in its great deſtruction, he being at that time 49 years of age.

During the joint lives of theſe two great poets, it appears that they wrote nothing ſeparately, excepting one little piece by each, which ſeemed of too trivial a nature for either to require aſſiſtance in, viz. The Faithful Shepherd, a paſtoral, by Fletcher; and The Maſque of Gray's-Inn Gentlemen, by Beaumont. Yet what ſhare each had in the writing or deſigning of the pieces thus compoſed by them jointly, there is no poſſibility of determining. It is however generally allowed, that Fletcher's peculiar talent was *wit*, and Beaumont's, though much the younger man, *judgment*. Nay, ſo extraordinary was the latter property in Mr Beaumont, that it is recorded of the great Ben Johnſon, who ſeems moreover to have had a ſufficient degree of ſelf-opinion of his own abilities, that he conſtantly, ſo long as this gentleman lived, ſubmitted his own writings to his cenſure, and, as it is thought, availed himſelf of his judgment at leaſt in the correcting, if not even in the contriving all his plots. It is probable, therefore, that the forming the plots and contriving the conduct of the fable, the writing of the more ſerious and pathetic parts, and lopping the redundant branches of Fletcher's

Beaumont. wit, whoſe luxuriance, we are told, frequently ſtood in need of caſtigation, might be in general Beaumont's portion in the work: while Fletcher, whoſe converſation with the *beau monde* (which indeed both of them from their births and ſtations in life had been ever accuſtomed to), added to the volatile and lively turn he poſſeſſed, rendered him perfectly maſter of dialogue and polite language, might execute the deſigns formed by the other, and raiſe the ſuperſtructure of thoſe lively and ſpirited ſcenes which Beaumont had only laid the foundation of; and in this he was ſo ſucceſsful, that though his wit and raillery were extremely keen and poignant, yet they were at the ſame time ſo perfectly genteel, that they uſed rather to pleaſe than diſguſt the very perſons on whom they ſeemed to reflect. Yet that Fletcher was not entirely excluded from a ſhare in the conduct of the drama, may be gathered from a ſtory related by Winſtanley, viz. that our two bards having concerted the rough draught of a tragedy over a bottle of wine at a tavern, Fletcher ſaid, he would undertake to *kill the king;* which words being overheard by the waiter, who had not happened to have been witneſs to the context of their converſation, he lodged an information of treaſon againſt them. But on their explanation of it only to mean the deſtruction of a theatrical monarch, their loyalty moreover being unqueſtioned, the affair ended in a jeſt.

On the whole, the works of theſe authors have undoubtedly very great merit, and ſome of their pieces deſervedly ſtand on the liſt of the preſent ornaments of the theatre. The plots are ingenious, intereſting, and well managed; the characters ſtrongly marked; and the dialogue ſprightly and natural: yet there is in the latter a coarſeneſs which is not ſuitable to the politeneſs of the preſent age; and a fondneſs of repartee, which frequently runs into obſcenity; and which we may ſuppoſe was the vice of that time, ſince even the delicate Shakeſpeare himſelf is not entirely free from it. But as theſe authors have more of that kind of wit than the laſt-mentioned writer, it is not to be wondered if their works were in the licentious reign of Charles II. preferred to his. Now, however, to the honour of the preſent taſte be it ſpoken, the tables are entirely turned; and while Shakeſpeare's immortal works are our conſtant and daily fare, thoſe of Beaumont and Fletcher, though delicate in their kind, are only occaſionally ſerved up: and even then great pains are taken to clear them of that *fumet*, which the *haut gout* of their contemporaries conſidered as their ſupremeſt reliſh, but which the more undepraved taſte of ours has been juſtly taught to look on as, what it really is, no more than a corrupt and unwholeſome taint.

Some of their plays were printed in quarto during the lives of the authors; and in the year 1645 there was publiſhed in folio a collection of ſuch plays as had not been printed before, amounting to between thirty and forty. This collection was publiſhed by Mr Shirley, after the ſhutting up of the theatres; and dedicated to the earl of Pembroke by ten of the moſt famous actors. In 1679 there was an edition of all their plays publiſhed in folio; another edition in 1711 by Mr Tonſon in ſeven volumes 8vo, and the laſt in 1751.

Beaumont, a town of the Netherlands, in Hainault, on the confines of the territory of Liege. It was ceded to the French in 1684; and taken in 1691 by the Engliſh, who blew up the caſtle. It is ſituated between the rivers Maeſe and Sambre, in E. Long. 4. 1. N. Lat. 50. 12. Beaumont ‖ Beauty.

Beaumont le Roger, a town of Upper Normandy in France. E. Long. 0. 56. N. Lat. 49. 2.

Beaumont le Vicompte, a town of Maine in France. E. Long. 0. 10. N. Lat. 48. 12.

Beaumont ſur Oiſe, a town in the Iſle of France, ſeated on the declivity of a hill, with a bridge over the river Oiſe. E. Long. 2. 29. N. Lat. 49. 9.

BEAUNE, a handſome town of France, in Burgundy, remarkable for its excellent wine, and for an hoſpital founded here in 1443. Its collegiate church is alſo one of the fineſt in France; the great altar is adorned with a table enriched with jewels; and its organs are placed on a piece of architecture which is the admiration of the curious. E. Long. 4. 50. N. Lat. 47. 2.

BEAUSOBRE, Isaac de, a learned Proteſtant writer of French original, was born at Niort in 1659. He was forced into Holland to avoid the execution of a ſentence upon him, which condemned him to make the *amende honourable;* and this for having broken the royal ſignet, which was put upon the door of a church of the Reformed, to prevent the public profeſſion of their religion. He went to Berlin in 1694; was made chaplain to the king of Pruſſia, and counſellor of the royal conſiſtory. He died in 1738, aged 79, after having publiſhed ſeveral works: as, 1. *Defenſe de la Doctrine des Reformes*. 2. A Tranſlation of the New Teſtament and Notes, jointly with M. Lenfant; much eſteemed by the Reformed. 3. *Diſſertation ſur les Adamites de Boheme;* a curious work. 4. *Hiſtoire Critique de Manichee et du Manicheiſme*, 2 tom. in 4to. This has been deemed by philoſophers an intereſting queſtion, and nobody has developed it better than this author. 5. Several diſſertations in the *Bibliotheque Britannique*.—Mr Beauſobre had ſtrong ſenſe with profound erudition, and was one of the beſt writers among the Reformed; he preached as he wrote, and he did both with warmth and ſpirit.

BEAUTY, in its native ſignification, is appropriated to objects of ſight. Objects of the other ſenſes may be agreeable, ſuch as the ſounds of muſical inſtruments, the ſmoothneſs and ſoftneſs of ſome ſurfaces; but the agreeableneſs called *beauty* belongs to objects of ſight.

Objects of ſight are more complex than thoſe of any other ſenſe: in the ſimpleſt, we perceive colour, figure, length, breadth, thickneſs. A tree is compoſed of a trunk, branches, and leaves; it has colour, figure, ſize, and ſometimes motion: by means of each of theſe particulars, ſeparately conſidered, it appears beautiful; but a complex perception of the whole greatly augments the beauty of the object. The human body is a compoſition of numberleſs beauties ariſing from the parts and qualities of the object, various colours, various motions, figures, ſize, &c. all united in one complex object, and ſtriking the eye with combined force. Hence it is, that beauty, a quality ſo remarkable in viſible objects, lends its name to every thing that is eminently agreeable. Thus, by a figure of ſpeech, we ſay, a *beautiful ſound*, a *beautiful thought*, a *beautiful diſcovery*, *&c.*

Conſidering

Beauty. Conſidering attentively the beauty of viſible objects, two kinds are diſcovered. The firſt may be termed *intrinſic* beauty, becauſe it is diſcovered in a ſingle object, without relation to any other: the other may be termed *relative*, being founded on the relation of objects. Intrinſic beauty is a perception of ſenſe merely; for to perceive the beauty of a ſpreading oak, or of a flowing river, no more is required but ſingly an act of viſion. Relative beauty is accompanied with an act of underſtanding and reflection: for we perceive not the relative beauty of a fine inſtrument or engine until we learn its uſe and deſtination. In a word, intrinſic beauty is ultimate; and relative beauty is that of means relating to ſome good end or purpoſe. Theſe different beauties agree in one capital circumſtance, that both are equally perceived as belonging to the object; which will be readily admitted with reſpect to intrinſic beauty, but is not ſo obvious with reſpect to the other. The utility of the plough, for example, may make it an object of admiration or of deſire; but why ſhould utility make it beautiful? A natural propenſity of the human mind will explain this difficulty: By an eaſy tranſition of ideas, the beauty of the effect is transferred to the cauſe, and is perceived as one of the qualities of the cauſe. Thus a ſubject void of intrinſic beauty appears beautiful by its utility; a dwelling-houſe void of all regularity is however beautiful in the view of convenience; and the want of ſymmetry in a tree will not prevent its appearing beautiful, if it be known to produce good fruit.

When theſe two beauties concur in any object, it appears delightful. Every member of the human body poſſeſſes both in a high degree.

The beauty of utility, being accurately proportioned to the degree of utility, requires no illuſtration: But intrinſic beauty, being more complex, cannot be handled diſtinctly without being analyzed. If a tree be beautiful by means of its colour, figure, motion, ſize, &c. it is in reality poſſeſſed of ſo many different beauties. The beauty of colour is too familiar to need explanation. The beauty of figure is more: for example, viewing any body as a whole, the beauty of its figure ariſes from regularity and ſimplicity; viewing the parts with relation to each other, uniformity, proportion, and order, contribute to its beauty. The beauties of grandeur and motion are conſidered ſeparately. See GRANDEUR and MOTION.

We ſhall here make a few obſervations on ſimplicity, which may be of uſe in examining the beauty of ſingle objects. A multitude of objects crowding into the mind at once, diſturb the attention, and paſs without making any laſting impreſſion: In the ſame manner, even a ſingle object, conſiſting of a multiplicity of parts, equals not, in ſtrength of impreſſion, a more ſimple object comprehended in one view. This juſtifies ſimplicity in works of art, as oppoſed to complicated circumſtances and crowded ornaments.

It would be endleſs to enumerate the effects that are produced by the various combinations of the principles of beauty. A few examples will be ſufficient to give the reader ſome idea of this ſubject. A circle and a ſquare are each perfectly regular: a ſquare, however, is leſs beautiful than a circle; and the reaſon is, that the attention is divided among the ſides and angles of a ſquare; whereas the circumference of a circle, being a ſingle object, makes one entire impreſſion: And thus ſimplicity contributes to beauty. Beauty. For the ſame reaſon a ſquare is more beautiful than a hexagon or octagon. A ſquare is likewiſe more beautiful than a parallelogram, becauſe it is more regular and uniform. But this holds with reſpect to intrinſic beauty only: for in many inſtances, as in the doors and windows of a dwelling houſe, utility turns the ſcales on the ſide of the parallelogram.

Again, a parallelogram depends, for its beauty, on the proportion of its ſides: A great inequality of its ſides annihilates its beauty: Approximation toward equality hath the ſame effect; for proportion there degenerates into imperfect uniformity, and the figure appears an unſucceſsful attempt toward a ſquare. And hence proportion contributes to beauty.

An equilateral triangle yields not to a ſquare in regularity nor in uniformity of parts, and it is more ſimple. But an equilateral triangle is leſs beautiful than a ſquare; which muſt be owing to inferiority of order in the poſition of its parts; the order ariſing from the equal inclination of the ſides of ſuch an angle is more obſcure than the parallelism of the ſides of a ſquare. And hence order contributes to beauty not leſs than ſimplicity, regularity, or proportion.

Uniformity is ſingular in one circumſtance, that it is apt to diſguſt by exceſs. A number of things deſtined for the ſame uſe, as windows, chairs, &c. cannot be too uniform. But a ſcrupulous uniformity of parts in a large garden or field is far from being agreeable.

In all the works of nature ſimplicity makes a capital figure. It alſo makes a figure in works of art: Profuſe ornament in painting, gardening, or architecture, as well as in dreſs or in language, ſhows a mean or corrupted taſte. Simplicity in behaviour and manners has an enchanting effect, and never fails to gain our affection. Very different are the artificial manners of modern times. A gradual progreſs from ſimplicity to complex forms and profuſe ornament, ſeems to be the fate of all the fine arts; reſembling behaviour, which from original candour and ſimplicity has degenerated into duplicity of heart and artificial refinements. At preſent, literary productions are crowded with words, epithets, figures: In muſic, ſentiment is neglected for the luxury of harmony, and for difficult movement.

With regard to the final cauſe of beauty, one thing is evident, that our reliſh of regularity, uniformity, proportion, order, and ſimplicity, contributes greatly to enhance the beauty of the objects that ſurround us, and of courſe tends to our happineſs. We may be confirmed in this thought, upon reflecting, that our taſte for theſe particulars is not accidental, but uniform and univerſal, making a branch of our nature. At the ſame time, regularity, uniformity, order, and ſimplicity, contribute each of them to readineſs of apprehenſion, and enable us to form more diſtinct ideas of objects than can be done where theſe particulars are wanting. In ſome inſtances, as in animals, proportion is evidently connected with utility, and is the more agreeable on that account.

Beauty, in many, inſtances, promotes induſtry; and as it is frequently connected with utility, it proves an additional incitement to enrich our fields and improve our manufactures. Theſe, however, are but ſlight

effects,

Beauty. effects, compared with the connections that are formed among individuals in ſociety by means of beauty. The qualifications of the head and heart are undoubtedly the moſt ſolid and moſt permanent foundations of ſuch connections: But as external beauty lies more in view, and is more obvious to the bulk of mankind, than the qualities now mentioned, the ſenſe of beauty has a more extenſive influence in forming theſe connections. At any rate, it concurs in an eminent degree with mental qualifications, in producing ſocial intercourſe, mutual good will, and conſequently mutual aid and ſupport, which are the life of ſociety; it muſt not however be overlooked, that the ſenſe of beauty does not tend to advance the intereſts of ſociety, but when in a due mean with reſpect to ſtrength. Love, in particular, ariſing from a ſenſe of beauty, loſes, when exceſſive, its ſocial character: the appetite for gratification, prevailing over affection for the beloved object, is ungovernable, and tends violently to its end, regardleſs of the miſery that muſt follow. Love, in this ſtate, is no longer a ſweet agreeable paſſion: it becomes painful, like hunger or thirſt; and produceth no happineſs but in the inſtant of fruition. This ſuggeſts an important leſſon, that moderation in our deſires and appetites, which fits us for doing our duty, contributes at the ſame time the moſt to happineſs; even ſocial paſſions, when moderate, are more pleaſant than when they ſwell beyond proper bounds.

Human or Perſonal BEAUTY, only ſlightly touched upon in the preceding article, merits more particular diſcuſſion; and may be conſidered under theſe four heads: Colour, Form, Expreſſion, and Grace; the two former being, as it were, the Body, the two latter the Soul, of beauty.

1. *Colour.* Although this be the loweſt of all the conſtituent parts of beauty, yet it is vulgarly the moſt ſtriking, and the moſt obſerved. For which there is a very obvious reaſon to be given; that "everybody can ſee, and very few can judge; the beauties of colour requiring much leſs of judgment than either of the other three.

As to the colour of the body in general, the moſt beautiful perhaps that ever was imagined, was that which Apelles expreſſed in his famous Venus; and which, though the picture itſelf be loſt, Cicero has in ſome degree preſerved to us, in his excellent deſcription of it. It was (as we learn from him) a fine red, beautifully intermixed and incorporated with white; and diffuſed, in its due proportions, though each part of the body. Such are the deſcriptions of a moſt beautiful ſkin, in ſeveral of the Roman poets; and ſuch often is the colouring of Titian, and particularly in his ſleeping Venus, or whatever other beauty that charming piece was meant to repreſent.

The reaſon why theſe colours pleaſe ſo much, is not only their natural livelineſs, nor the much greater charms they obtain from their being properly blended together, but is alſo owing in ſome degree to the idea they carry with them of good health; without which all beauty grows languid and leſs engaging; and with which it always recovers an additional life and luſtre.

As to the colour of the face in particular, a great deal of beauty is owing (beſide the cauſes already mentioned) to variety; that being deſigned by nature for the greateſt concourſe of different colours, of any part in the human body. Colours pleaſe by oppoſition; and it is in the face that they are the moſt diverſified, and the moſt oppoſed. Beauty.

It is an obſervation apparently whimſical, but perhaps not unjuſt, that the ſame thing which makes a fine evening, makes a fine face; that is, as to the particular part of beauty now under conſideration.

The beauty of an evening ſky, about the ſetting of the ſun, is owing to the variety of colours that are ſcattered along the face of the heavens. It is the fine red clouds, intermixed with white, and ſometimes darker ones, with the azure bottom appearing here and there between them, which makes all that beautiful compoſition that delights the eye ſo much, and gives ſuch a ſerene pleaſure to the heart. In the ſame manner, if you conſider ſome beautiful faces, you may obſerve, that it is much the ſame variety of colours which gives them that pleaſing look; which is ſo apt to attract the eye, and but too often to engage the heart. For all this ſort of beauty is reſolvable into a proper variation of fleſh colour and red, with the clear blueneſs of the veins pleaſingly intermixed about the temples and the going off of the cheeks, and ſet off by the ſhades of full eye-brows; and of the hair, when it falls in a proper manner round the face.

It is for much the ſame reaſon that the beſt landſcape-painters have been generally obſerved to chooſe the autumnal part of the year for their pieces, rather than the ſpring. They prefer the variety of ſhades and colours, though in their decline, to all their freſhneſs and verdure in their infancy; and think all the charms and livelineſs even of the ſpring, more than compenſated by the choice, oppoſition, and richneſs of colours, that appear almoſt on every tree in the autumn.

Though one's judgment is apt to be guided by particular attachments (and that more perhaps in this part of beauty than any other), yet the general perſuaſion ſeems well founded, that a complete brown beauty is really preferable to a perfect fair one; the bright brown giving a luſtre to all the other colours, a vivacity to the eyes, and a richneſs to the whole look, which one ſeeks in vain in the whiteſt and moſt tranſparent ſkins. Raphael's moſt charming Madonna is a brunette beauty; and his earlier Madonnas (or thoſe of his middle ſtyle) are generally of a lighter and leſs pleaſing complexion. All the beſt artiſts in the nobleſt age of painting, about Leo the tenth's time, uſed this deeper and richer kind of colouring; and perhaps one might add, that the glaring lights introduced by Guido, went a great way towards the declenſion of that art; as the enfeebling of the colours by Carlo Marat (or his followers) hath ſince alſo completed the fall of it in Italy.

Under this article *colour*, it ſeems doubtful whether ſome things ought not to be comprehended which are not perhaps commonly meant by that name: As that appearing ſoftneſs or ſilkineſs of ſome ſkins; that (A) Magdalen-

(A) The look here meant is moſt frequently expreſſed by the beſt painters in their Magdalens; in which, if there were no tears on the face, you would ſee, by the humid redneſs of the ſkin, that ſhe had been weeping extremely.

Beauty. Magdalen-look in ſome fine faces, after weeping; that brightneſs, as well as tint, of the hair; that luſtre of health that ſhines forth upon the features; that luminouſneſs that appears in ſome eyes, and that fluid fire, or gliſtening, in others: Some of which are of a nature ſo much ſuperior to the common beauties of colour, that they make it doubtful whether they ſhould not have been ranked under a higher claſs, and reſerved for the expreſſions of the paſſions. They are, however, mentioned here; becauſe even the moſt doubtful of them appear to belong partly to this head, as well as partly to the other.

2. *Form.* This takes in the turn of each part, as well as the ſymmetry, of the whole body, even to the turn of an eye-brow, or the falling of the hair. Perhaps, too, the attitude, while fixed, ought to be reckoned under this article: By which is not only meant the poſture of the perſon, but the poſition of each part; as the turning of the neck, the extending of the hand, the placing of a foot; and ſo on to the moſt minute particulars.

The general cauſe of beauty in the form or ſhape in both ſexes is a proportion, or a union and harmony, in all parts of the body.

The diſtinguiſhing character of beauty in the female form, is delicacy and ſoftneſs; and in the male, either apparent ſtrength or agility. The fineſt exemplars that can be ſeen for the former, is the Venus of Medici; and for the two latter, the Hercules Farneſe and the Apollo Belvedere.

There is one thing indeed in the laſt of theſe figures which exceeds the bounds of our preſent inquiry; what an Italian artiſt called *Il ſovra umano;* and what we may call the tranſcendent, or celeſtial. It is ſomething diſtinct from all human beauty, and of a nature greatly ſuperior to it; ſomething that ſeems like an air of divinity: Which is expreſſed, or at leaſt is to be traced out, in but very few works of the artiſts; and of which ſcarce any of the poets have caught any ray in their deſcriptions (or perhaps even in their imagination), except Homer and Virgil, among the ancients; and our Shakeſpeare and Milton among the moderns. Beauty.

The beauty of the mere human form is much ſuperior to that of colour; and it may be partly for this reaſon, that when one is obſerving the fineſt works of the artiſts at Rome (where there is ſtill the nobleſt collection of any in the world), one feels the mind more ſtruck and more charmed with the capital ſtatues, than with the pictures of the greateſt maſters.

One of the old Roman poets, in ſpeaking of a very handſome man, who was candidate for the prize in ſome of the public games, ſays, that he was much expected and much admired by all the ſpectators at his firſt appearance; but that, when he flung off his robes, and diſcovered the whole beauty of his ſhape altogether, it was ſo ſuperior, that it quite extinguiſhed the beauties they had before ſo much admired in his face. Much the ſame effect may be felt in viewing the Venus of Medici: If you obſerve the face only, it appears extremely beautiful; but if you conſider all the other elegancies of her make, the beauty of her face becomes leſs ſtriking, and is almoſt loſt in ſuch a multiplicity of charms.

Whoever would learn what makes the beauty of each part of the human body, may find it laid down pretty much at large, by (B) *Felibiens;* or may ſtudy it with more pleaſure to himſelf, in the fineſt pictures and ſtatues;

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extremely. There is a very ſtrong inſtance of this in a Magdalen by Le Brun, in one of the churches at Paris; and ſeveral by Titian, in Italy; the very beſt of which is at the Barberino palace at Venice. In ſpeaking of which, Roſalba hardly went too far, when ſhe ſaid, "It wept all over;" or (in the very words ſhe uſed) "Elle pleure juſqu' aux bouts de doigts."

(B) In his *Entretiens*, vol. ii. p. 14—45. The chief of what he ſays there, on the beauty of the different parts of the female form, is as follows: That the head ſhould be well rounded; and look rather inclining to ſmall than large. The forehead, white, ſmooth, and open (not with the hair growing down too deep upon it); neither flat nor prominent, but like the head, well rounded; and rather ſmall in proportion than large. The hair, either bright black or brown; not thin, but full and waving; and if it falls in moderate curls the better. The black is particularly uſeful for ſetting off the whiteneſs of the neck and ſkin. The eyes black, cheſnut, or blue; clear, bright, and lively; and rather large in proportion than ſmall. The eye brows, well divided, rather full than thin; ſemicircular, and broader in the middle than at the ends; of a neat turn, but not formal. The cheeks ſhould not be wide; ſhould have a degree of plumpneſs, with the red and white finely blended together; and ſhould look firm and ſoft. The ear ſhould be rather ſmall than large; well folded, and with an agreeable tinge of red. The noſe ſhould be placed ſo as to divide the face into two equal parts; ſhould be of a moderate ſize, ſtraight, and well-ſquared; though ſometimes a little riſing in the noſe, which is but juſt perceivable, may give a very graceful look to it. The mouth ſhould be ſmall; and the lips not of equal thickneſs: They ſhould be well turned, ſmall rather than groſs; ſoft, even to the eye; and with a living red in them. A truly pretty mouth is like a roſe-bud that is beginning to blow. The teeth ſhould be middle-ſized, white, well-ranged, and even. The chin of a moderate ſize; white, ſoft, and agreeably rounded. The neck ſhould be white, ſtraight, and of a ſoft, eaſy, and flexible make, rather long than ſhort; leſs above, and increaſing gently toward the ſhoulders: The whiteneſs and delicacy of its ſkin ſhould be continued, or rather go on improving to the boſom. The ſkin in general ſhould be white, properly tinged with red; with an apparent ſoftneſs, and a look of thriving health in it. The ſhoulders ſhould be white, gently ſpread, and with a much ſofter appearance of ſtrength than in thoſe of men. The arm ſhould be white, round, firm, and ſoft; and more particularly ſo from the elbow to the hands. The hand ſhould unite inſenſibly with the arm; juſt as it does in the ſtatue of the Venus of Medici. They ſhould be long and delicate, and even the joints and nervous parts of them ſhould be without either any hardneſs or dryneſs. The fingers ſhould be fine, long, round, and ſoft; ſmall, and leſſening towards the tips of them;

Beauty. ſtatues; for in life we commonly ſee but a ſmall part of the human body, moſt of it being either diſguiſed or altered by what we call dreſs.

In fact we do not only thus, in a great meaſure, hide beauty; but even injure, and kill it, by ſome parts of dreſs. A child is no ſooner born into the world, than it is bound up, almoſt as firmly as an old Egyptian mummy, in ſeveral folds of linen. It is in vain for him to give all the ſigns of diſtreſs that nature has put in his power, to ſhow how much he ſuffers whilſt they are thus impriſoning his limbs; or all the ſigns of joy, every time they are ſet at liberty. In a few minutes, the old witch who preſides over his infirmeſt days falls to tormenting him afreſh, and winds him up again in his deſtined confinement. When he comes to be dreſt like a man, he has ligatures applied to his arms, legs, and middle, in ſhort all over him, to prevent the natural circulation of his blood, and make him leſs active and healthy: and if it be a child of the tenderer ſex, ſhe muſt be bound yet more ſtraitly about the waiſt and ſtomach, to acquire a diſproportion that nature never meant in her ſhape.

The two other conſtituent parts of beauty, are expreſſion and grace; the former of which is common to all perſons and faces; and the latter is to be met with in very few.

3. *Expreſſion.* By this is meant the expreſſion of the paſſions; the turns and changes of the mind, ſo far as they are made viſible to the eye by our looks or geſtures.

Though the mind appears principally in the face and attitudes of the head; yet every part almoſt of the human body, on ſome occaſion or other, may become expreſſive. Thus the languiſhing hanging of the arm, or the vehement exertion of it; the pain expreſſed by the fingers of one of the ſons in the famous group of Laocoon, and in the toes of the dying gladiator. But this again is often loſt among us by our dreſs; and indeed is of the leſs concern, becauſe the expreſſion of the paſſions paſſes chiefly in the face, which we (by good luck) have not as yet concealed.

The parts of the face in which the paſſions moſt frequently make their appearance, are the eyes and mouth; but from the eyes they diffuſe themſelves very ſtrongly about the eye-brows; as, in the other caſe, they appear often in the parts all round the mouth. Beauty.

Philoſophers may diſpute as much as they pleaſe about the ſeat of the ſoul; but where-ever it reſides, we are ſure that it ſpeaks in the eyes. Perhaps it is injuring the eye-brows, to make them only dependents on the eye; for they, eſpecially in lively faces, have, as it were, a language of their own; and are extremely varied, according to the different ſentiments and paſſions of the mind.

Degree of pleaſure may be often diſcerned in a lady's eye-brow, though ſhe have addreſs enough not to let it appear in her eyes; and at other times may be diſcovered ſo much of her thoughts, in the line juſt above her eye-brows, that ſhe would probably be amazed how any body could tell what paſſed in her mind, and (as ſhe thought) undiſcovered by her face, ſo particularly and diſtinctly.

Homer makes the eye-brows the ſeat of (c) majeſty, Virgil of (d) dejection, Horace of (e) modeſty, and Juvenal of (f) pride; and it is not certain whether every one of the paſſions be not aſſigned, by one or other of the poets, to the ſame part.

Having hitherto ſpoken only of the paſſions in general, we will now conſider a little which of them add to beauty, and which of them take from it.

We may ſay, in general, that all the tender and kind paſſions add to beauty; and all the cruel and unkind ones add to deformity: And it is on this account that good nature may very juſtly be ſaid to be "the beſt feature even in the fineſt face."

Mr Pope has included the principal paſſion of each ſort in two very pretty lines:

Love, hope, and joy, fair pleaſure's ſmiling train;
Hate, fear, and grief, the family of pain.

The former of which naturally give an additional luſtre and

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them: And the nails long, rounded at the ends, and pellucid. The boſom ſhould be white and charming; and the breaſts equal in roundneſs, whiteneſs, and firmneſs; neither too much elevated nor too much depreſſed; riſing gently, and very diſtinctly ſeparated; in one word, juſt like thoſe of the Venus of Medici. The ſides ſhould be long, and the hips wider than the ſhoulders; and turn off as they do in the ſame Venus; and go down rounding and leſſening gradually to the knee. The knee ſhould be even, and well rounded; the legs ſtraight, but varied by a proper rounding of the more fleſhy part of them, and the feet finely turned, white, and little.

(c) Η, και κυανεηϲιν επ' οφρυϲιν ευϲε Κρονιων·
Αμβροϲιαι δ' αρα χαιται επερρωϲαντο ανακτος
Κρατος απ' αθανατοιο· μεγαν δ' ελελιξεν Ολυμπον. *Iliad.* i. 528.

It was from this paſſage that Phidias borrowed all the ideas of that majeſty which he had expreſſed ſo ſtrongly in his famous ſtatues of the Jupiter Olympius; and Horace, probably, his——Cuncta ſupercilio moventis. *Lib.* iii. *Od.* 1. 8.

(d) Frons læta parum, et dejecto lumina vultu. *Virgil Æn.* vi. 863.

(e) Deme ſupercilio nubem; plerumque modeſtus
Occupat obſcuri ſpeciem. *Horat.* lib. i. Epiſt. 18. 95.

(f) Malo Venuſinam, quam te, Cornelia, mater
Gracchorum; ſi cum magnus virtutibus affers
Grande ſupercilium, et numeras in dote triumphos. *Juvenal, Sat.* vi. 168.

It is here that the Romans uſed the word *ſupercilioſus* (as we do from it the word *ſupercilious*) for proud and arrogant perſons.

Beauty. and enlivening to beauty; as the latter are too apt to fling a gloom and cloud over it.

Yet in theſe, and all the other paſſions, moderation ought perhaps to be conſidered in a great meaſure the rule of their beauty, almoſt as far as moderation in actions is the rule of virtue. Thus an exceſſive joy may be too boiſterous in the face to be pleaſing; and a degree of grief in ſome faces, and on ſome occaſions, may be extremely beautiful. Some degrees of anger, ſhame, ſurpriſe, fear, and concern, are beautiful; but all exceſs is hurtful, and all exceſs ugly. Dulneſs, auſterity, impudence, pride, affectation, malice, and envy, are always ugly.

The fineſt union of paſſions that can perhaps be obſerved in any face, conſiſts of a juſt mixture of modeſty, ſenſibility, and ſweetneſs; each of which when taken ſingly is very pleaſing: but when they are all blended together, in ſuch a manner as either to enliven or correct each other, they give almoſt as much attraction as the paſſions are capable of adding to a very pretty face.

The prevailing paſſion in the Venus of Medici is modeſty: It is expreſt by each of her hands, in her looks, and in the turn of her head. And by the way, it may be queſtioned, whether one of the chief reaſons why ſide-faces pleaſe one more than full ones, be not from the former having more of the air of modeſty than the latter. This at leaſt is certain, that the beſt artiſts uſually chooſe to give a ſide-face rather than a full one; in which attitude, the turn of the neck too has more beauty, and the paſſions more activity and force. Thus, as to hatred and affection in particular, the look that was formerly ſuppoſed to carry an infection with it from malignant eyes, was a ſlanting regard; like that which Milton gives to Satan, when he is viewing the happineſs of our firſt parents in paradiſe; and the faſcination, or ſtroke of love, is moſt uſually conveyed, at firſt, in a ſide-glance.

It is owing to the great force of pleaſingneſs which attends all the kinder paſſions, "that lovers do not only ſeem, but are really, more beautiful to each other than they are to the reſt of the world;" becauſe when they are together, the moſt pleaſing paſſions are more frequently exerted in each of their faces than they are in either before the reſt of the world. There is then (as a certain French writer very well expreſſes it) "A ſoul upon their countenances," which does not appear when they are abſent from each other; or even when they are together converſing with other perſons, that are indifferent to them, or rather lay a reſtraint upon their features.

The ſuperiority which the beauty of the paſſions has over the two parts of beauty firſt mentioned, will probably be now pretty evident: or if this ſhould appear ſtill problematical to any one, let him conſider a little the following particulars, of which every body muſt have met with ſeveral inſtances in their lifetime: That there is a great deal of difference in the ſame face, according as a perſon is in a better or worſe humour, or in a greater or leſs degree of livelineſs: That the beſt complexion, the fineſt features, and the exacteſt ſhape, without any thing of the mind expreſſed on the face, are as inſipid and unmoving as the waxen figure of the fine ducheſs of Richmond in Weſtminſter-Abbey: That the fineſt eyes in the world, with an exceſs of malice or rage in them, will grow as ſhocking as they are in that fine face of Meduſa on the famous ſeal in the Strozzi family at Rome: That a face without any good features in it, and with a very indifferent complexion, ſhall have a very taking air; from the ſenſibility of the eyes, the general good-humoured turn of the look, and perhaps a little agreeable ſmile about the mouth. And theſe three things perhaps would go a great way toward accounting for the *Je ne ſçai quoi*, or that inexplicable pleaſingneſs of the face (as they chooſe to call it), which is ſo often talked of and ſo little underſtood; as the greater part, and perhaps all the reſt of it, would fall under the laſt article, that of grace. Beauty.

Thus it appears that the paſſions can give beauty without the aſſiſtance of colour or form; and take it away where they have united the moſt ſtrongly to give it. And hence the ſuperiority of this part of beauty to the other two.

This, by the way, may help us to account for the juſtneſs of what Pliny aſſerts in ſpeaking of the famous ſtatue of Laocoon and his two ſons: He ſays, it was the fineſt piece of art in Rome; and to be preferred to all the other ſtatues and pictures, of which they had ſo noble a collection in his time. It had no beauties of colour to vie with the paintings and other ſtatues there; and the Apollo Belvedere and the Venus of Medici, in particular, were as finely proportioned as the Laocoon: But this had much greater variety of expreſſion even than thoſe fine ones; and it muſt be on that account alone that it could have been preferable to them and all the reſt.

Before quitting this head, two things before mentioned deſerve to be repeated: That the chief rule of the beauty of the paſſions is moderation; and that the part in which they appear moſt ſtrongly is the eyes. It is there that love holds all his tendereſt language: It is there that virtue commands, modeſty charms, joy enlivens, ſorrow engages, and inclination fires the hearts of the beholders: It is there that even fear, and anger, and confuſion, can be charming. But all theſe, to be charming, muſt be kept within their due bounds and limits; for too ſullen an appearance of virtue, a violent and proſtitute ſwell of paſſion, a ruſtic and overwhelming modeſty, a deep ſadneſs, or too wild and impetuous a joy, become all either oppreſſive or diſagreeable.

4. The laſt finiſhing and nobleſt part of beauty is *Grace;* which every body is accuſtomed to ſpeak of as a thing inexplicable; and in a great meaſure perhaps it is ſo. We know that the ſoul is, but we ſcarce know what it is: every judge of beauty can point out grace; but no one ſeems even yet to have fixed upon a definition for it.

Grace often depends on ſome very little incidents in a fine face; and in actions it conſiſts more in the manner of doing things than in the things themſelves. It is perpetually varying its appearance, and is therefore much more difficult to be conſidered than in any thing fixed and ſteady. While you look upon one, it ſteals from under the eye of the obſerver; and is ſucceeded perhaps by another that flits away as ſoon and as imperceptibly. It is on this account that grace is better to be ſtudied in Corregio's, Guido's, and Raphael's pictures, than in real life.

Beauty. But though one cannot punctually ſay what grace is, we may point out the parts and things in which it is moſt apt to appear.

The chief dwelling-place of grace is about the mouth; though at times it may viſit every limb or part of the body. But the mouth is the chief ſeat of grace, as much as the chief ſeat for the beauty of the paſſions is in the eyes. Thus, when the French uſe the expreſſion of *une bouche fort gracieuſe*, they mean it properly of grace: but when they ſay, *des yeux tres gracieux*, it then falls to the ſhare of the paſſions; and it means kind or favourable.

In a very graceful face, by which we do not ſo much mean a majeſtic as a ſoft and pleaſing one, there is now and then (for no part of beauty is either ſo engaging or ſo uncommon) a certain delicioufneſs that almoſt always lives about the mouth, in ſomething not quite enough to be called a ſmile, but rather an approach toward one, which varies gently about the different lines there like a little fluttering Cupid, and perhaps ſometimes diſcovers a little dimple, that after juſt lightening upon you diſappears and appears again by fits.

The grace of attitudes may belong to the poſition of each part, as well as to the carriage or diſpoſition of the whole body: but how much more it belongs to the head than to any other part may be ſeen in the pieces of the moſt celebrated painters; and particularly in thoſe of Guido, who has been rather too laviſh in beſtowing this beauty on almoſt all his fine women; whereas nature has given it in ſo high a degree but to very few.

The turns of the neck are extremely capable of grace, and are very eaſy to be obſerved, though very difficult to be accounted for.

How much of this grace may belong to the arms and feet, as well as to the neck and head, may be ſeen in dancing. But it is not only in genteel motions that a very pretty woman will be graceful; and Ovid (who was ſo great a maſter in all the parts of beauty) had very good reaſon for ſaying, That when Venus, to pleaſe her gallant, imitated the hobbling gait of her huſband, her very lameneſs had a great deal of prettineſs and grace in it.

De arte Amandi, ii. 579.

Tibullus, lib. iv. el. 2. 8.

"Every motion of a graceful woman (ſays another writer of the ſame age) is full of grace." She deſigns nothing by it perhaps, and may even not be ſenſible of it herſelf: and indeed ſhe ſhould not be ſo too much; for the moment that any geſture or action appears to be affected, it ceaſes to be graceful.

Horace and Virgil ſeem to extend grace ſo far as to the flowing of the hair, and Tibullus even to the dreſs of his miſtreſs; but then he aſſigns it more to her manner of putting on and appearing in whatever ſhe wears than to the dreſs itſelf. It is true, there is another wicked poet (Ovid) who has ſaid (with much leſs decency) "that dreſs is the better half of the woman:"

——— *Pars minima eſt ipſa puella ſui.* Ovid.

There are two very diſtinct (and, as it were, oppoſite) ſorts of grace; the majeſtic and the familiar. The former belongs chiefly to the very *fine* women, and the latter to the very *pretty* ones: *That* is more commanding, and *this* the more delightful and engaging. The Grecian painters and ſculptors uſed to expreſs the former moſt ſtrongly in the looks and attitudes of their Minervas, and the latter in thoſe of Venus. Beauty.

Xenophon, in his Choice of Hercules (or at leaſt the excellent tranſlator of that piece), has made juſt the ſame diſtinction in the perſonages of Wiſdom and Pleaſure; the former of which he deſcribes as moving on to that young hero with the majeſtic ſort of grace; and the latter with the familiar:

Graceful, yet each with different grace they move;
This ſtriking ſacred awe, that ſofter winning love.

No poet ſeems to have underſtood this part of beauty ſo well as our own Milton. He ſpeaks of theſe two ſorts of grace very diſtinctly; and gives the majeſtic to his Adam, and both the familiar and majeſtic to Eve, but the latter in a leſs degree than the former:

Two of far nobler ſhape, erect and tall,
Godlike erect, with native honour clad,
In naked majeſty, ſeem'd lords of all;
And worthy ſeem'd. For in their looks divine
The image of their glorious Maker ſhone:
Truth, wiſdom, ſanctitude ſevere and pure;
Severe, but in true filial freedom plac'd;
Whence true authority in men: Though both
Not equal, as their ſex not equal, ſeem'd.
For contemplation he, and valour, form'd;
For ſoftneſs ſhe, and ſweet attractive grace.
Milton's *Par. Loſt*, book iv. 298.

———I eſpy'd thee, fair indeed and tall,
Under a plantain; yet methought leſs fair,
Leſs winning ſoft, leſs amiably mild,
Than that ſmooth wat'ry image——
(*Eve, of Adam and herſelf*) *Ib.* ver. 480.

——— Her heav'nly form
Angelic, but more ſoft and feminine;
Her graceful innocence; her ev'ry air
Of geſture, or leaſt action.—— B. ix. 461.

Grace was in all her ſteps: Heav'n in her eye;
In every geſture, dignity and love. B. viii. 489.

Speaking or mute, all comelineſs and grace
Attends thee; and each word, each motion, forms.
Ib. 223.

Though grace is ſo difficult to be accounted for in general, yet there are two particular things which ſeem to hold univerſally in relation to it.

The firſt is, "That there is no grace without motion;" that is, without ſome genteel or pleaſing motion, either of the whole body or of ſome limb, or at leaſt of ſome feature. And it may be hence that Lord Bacon calls grace by the name of decent motion; juſt as if they were equivalent terms: "In beauty, that of favour is more than that of colour; and that of gracious and decent motion, more than that of favour." *Works*, vol. iii. p. 362.

Virgil in one place points out the majeſty of Juno, and in another the graceful air of Apollo, by only ſaying that they move; and poſſibly he means no more when he makes the motion of Venus the principal thing by which Æneas diſcovers her under all her diſguiſe; *Æn.* i. 146. iv. 47. *Æn.* i. 406.

Beauty. diſguiſe; though the commentators, as uſual, would fain find out a more dark and myſterious meaning for it.

All the beſt ſtatues are repreſented as in ſome action or motion; and the moſt graceful ſtatue in the world (the Apollo Belvedere) is ſo much ſo, that when one faces it at a little diſtance, one is almoſt apt to imagine that he is actually going to move on toward you.

All graceful heads, even in the portraits of the beſt painters, are in motion; and very ſtrongly on thoſe of Guido in particular; which are all either caſting their looks up toward heaven, or down toward the ground, or ſide-way, as regarding ſome object. A head that is quite unactive, and flung flat upon the canvas (like the faces on medals after the fall of the Roman empire, or the Gothic heads before the revival of the arts), will be ſo far from having any grace, that it will not even have any life in it.

The ſecond obſervation is, "That there can be no grace with impropriety;" or, in other words, that nothing can be graceful that is not adapted to the characters of the perſon.

The graces of a little lively beauty would become ungraceful in a character of majeſty; as the majeſtic airs of an empreſs would quite deſtroy the prettineſs of the former. The vivacity that adds a grace to beauty in youth would give an additional deformity to old age; and the very ſame airs which would be charming on ſome occaſions may be quite ſhocking when extremely miſtimed or extremely miſplaced.

The inſeparable union of propriety and grace ſeems to have been the general ſenſe of mankind, as we may gueſs from the languages of ſeveral nations; in which ſome words that anſwer to our proper or becoming, are uſed indifferently for beautiful or graceful. Thus, among the Greeks the words Πρεπον and Καλον, and among the Romans *pulchrum* and *decens*, or *decoram*, are uſed indifferently for one another.

It appears wrong, however, to think (as ſome have done) that grace conſiſts entirely in propriety; becauſe propriety is a thing eaſy enough to be underſtood, and grace (after all we can ſay about it) very difficult. Propriety, therefore, and grace are no more one and the ſame thing than grace and motion are. It is true, it cannot ſubſiſt without either; but then there ſeems to be ſomething elſe, which cannot be explained, that goes to the compoſition, and which poſſibly may give it its greateſt force and pleaſingneſs.

Whatever are the cauſes of it, this is certain, that grace is the chief of all the conſtituent parts of beauty; and ſo much ſo, that it ſeems to be the only one which is abſolutely and univerſally admired: All the reſt are only relative. One likes a brunette beauty better than a fair one; I may love a little woman, and you a large one, beſt; a perſon of a mild temper will be fond of the gentler paſſions in the face, and one of a bolder caſt may chooſe to have more vivacity and more vigorous paſſions expreſſed there: But grace is found in few, and is pleaſing to all. Grace, like poetry, muſt be born with a perſon, and is never wholly to be acquired by art. The moſt celebrated of all the ancient painters was Apelles; and the moſt celebrated of all the modern Raphael: And it is remarkable, that the diſtinguiſhing character of each of them was grace. Indeed, that alone could have given them ſo high a pre-eminence over all their other competitors. Beauty.

Grace has nothing to do with the loweſt part of beauty or colour; very little with ſhape, and very much with the paſſions; for it is ſhe who gives their higheſt zeſt, and the moſt delicious part of their pleaſingneſs to the expreſſions of each of them.

All the other parts of beauty are pleaſing in ſome degree, but grace is pleaſingneſs itſelf. And the old Romans in general ſeem to have had this notion of it, as may be inferred from the original import of the names which they uſed for this part of beauty: *Gratia* from *gratus*, or "pleaſing;" and *decor* from *decens*, or "becoming."

The Greeks as well as the Romans muſt have been of this opinion; when in ſettling their mythology, they made the Graces the conſtant attendants of Venus or the cauſe of love. In fact, there is nothing cauſes love ſo generally and ſo irreſiſtibly as grace. It is like the ceſtus of the ſame goddeſs, which was ſuppoſed to comprehend every thing that was winning and engaging in it; and beſide all, to oblige the heart to love by a ſecret and inexplicable force like that of ſome magic charm.

She ſaid: with awe divine, the queen of love
Obey'd the ſiſter and the wife of Jove:
And from her fragrant breaſt the zone unbrac'd,
With various ſkill and high embroidery grac'd.
In this was every art, and every charm,
To win the wiſeſt, and the coldeſt warm:
Fond love, the gentle vow, the gay deſire,
The kind deceit, the ſtill reviving fire.
Perſuaſive ſpeech, and more perſuaſive ſighs,
Silence that ſpoke, and eloquence of eyes.
This on her hand the Cyprian goddeſs laid;
Take this, and with it all thy wiſh, ſhe ſaid:
With ſmiles ſhe took the charm; and ſmiling preſt
The powerful Ceſtus to her ſnowy breaſt.

Pope, Il. xiv. 256.

Although people in general are more capable of judging right of beauty, at leaſt in ſome parts of it, than they are of moſt other things; yet there are a great many cauſes apt to miſlead the generality in their judgments of beauty. Thus, if the affection is entirely engaged by any one object, a man is apt to allow all perfections to that perſon, and very little in compariſon to any body elſe; or if they ever commend others highly, it is for ſome circumſtance in which they bear ſome reſemblance to their favourite object.

Again, people are very often miſled in their judgements, by a ſimilitude either of their own temper or perſonage in others. It is hence that a perſon of a mild temper is more apt to be pleaſed with the gentler paſſions in the face of his miſtreſs; and one of a very lively turn would chooſe more of ſpirit and vivacity in his; that little people are inclined to prefer pretty women, and larger people majeſtic ones; and ſo on in a great variety of inſtances. This may be called falling in love with ourſelves at ſecond hand; and ſelf-love (whatever other love may be) is ſometimes ſo falſe-ſighted, that it may make the moſt plain, and even the moſt diſagreeable things, ſeem beautiful and pleaſing.

Sometimes an idea of uſefulneſs may give a turn to our ideas of beauty; as the very ſame things are reckoned

Beauty. koned beauties in a coach horſe which would be ſo many blemiſhes in a race-horſe.

But the greateſt and moſt general miſleader of our judgments, in relation to beauty, is cuſtom, or the different national taſtes for beauty, which turn chiefly on the two lower parts of it, colour and form.

It was from the moſt common ſhape of his country-women, that Rubens, in his pictures, delights ſo much in plumpneſs; not to give it a worſe name. Whenever he was to repreſent the moſt beautiful women, he is ſure to give them a good ſhare of corpulence. It ſeems as if nobody could be a beauty with him under two hundred weight. His very Graces are all fat.

But this may go much farther than mere bulk; it will reach even to very great deformities; which ſometimes grow into beauties, where they are habitual and general. One of our own countrymen (who was a particularly handſome man) in his travelling over the Alps, was detained by a fever in one of thoſe villages, where every grown perſon has that ſort of ſwellings in the neck which they call *goitres;* and of which ſome are very near as big as their heads. The firſt Sunday that he was able, he went to their church (for he was a Roman catholic) to return thanks to heaven for his recovery. A man of ſo good a figure, and ſo well dreſt, had probably never before been within the walls of that chapel. Every body's eyes were fixed upon him: and as they went out, they cried out loud enough for him to hear them, "O how completely handſome would that man be, if he had but a *goitre!*

In ſome of the moſt military nations of Africa, no man is reckoned handſome that has not five or ſix ſcars in his face. This cuſtom might poſſibly at firſt be introduced among them to make them leſs afraid of wounds in that part in battle: but however that was, it grew at laſt to have ſo great a ſhare in their idea of beauty, that they now cut and ſlaſh the faces of their poor little infants, in order to give them thoſe graces, when they are grown up, which are ſo neceſſary to win the hearts of their miſtreſſes; and which, with the aſſiſtance of ſome jewels or ingots of gold in their noſes, ears, and lips, muſt certainly be irreſiſtible to the ladies of that country.

The covering each cheek all over with a burning ſort of red colour, has long been looked upon in a neighbouring country to be as neceſſary to render a fine lady's face completely beautiful, as theſe ſcars are for the beaux in Africa.

The natural complexion of the Italian ladies is of a higher glow than ours uſually are; and yet Mr Addiſon is very juſt, in making a Numidian call the ladies of the ſame country *pale unripened beauties.*

> The glowing dames of Zama's royal court
> Have faces fluſht with more exalted charms:
> The ſun, that rolls his chariot o'er their heads,
> Works up more fire and colour in their cheeks:
> Were you with theſe, my prince, you'd ſoon forget
> The pale unripen'd beauties of the north!
>
> *Syphax* to *Juba;* in *Cato*, Act i. Scene 4.

The prince of Anamaboo, who had been ſo long and latterly ſo much uſed to the European complexion, yet ſaid of a certain lady a little before he left London, "That ſhe would be the moſt charming woman in the world if ſhe was but a negro."

In an account of ſome of the fartheſt travels that any of our people have made up the river Gambia, we are informed, that when they came to ſome villages where probably no Europeans had ever been before, the women ran frightened and ſcreaming from them, on taking them to be devils, merely on account of the whiteneſs of their complexion. Beauty, Beauvais.

We cannot avoid obſerving, however, that heaven is very good and merciful to mankind, even in making us capable of all this variety of miſtakes. If every perſon judged exactly right of beauty, every man that was in love in ſuch a diſtrict, would be in love with the ſame woman. The ſuperior beauty of each hamlet would be the object of the hate and malice of all the reſt of her own ſex in it, and the cauſe of diſſenſion and murders among all of the other. If this would hold in one town, it would hold for the ſame reaſons in every other town or diſtrict; and of courſe there would be nothing more wanting than this univerſal right judgment of beauty, to render the whole world one continued ſcene of blood and miſery.

But now that fancy has perhaps more to do with beauty than judgment, there is an infinity of taſtes, and conſequently an infinity of beauty; for to the mind of the lover, ſuppoſed beauty is full as good as real. Every body may now chooſe out what happens to hit his own turn and caſt. This increaſes the extent of beauty vaſtly, and makes it in a manner univerſal: for there are but few people in compariſon that are truly beautiful; but every body may be beautiful in the imagination of ſome one or other. Some may delight themſelves in a black ſkin, and others in a white; ſome in a gentle natural roſineſs of complexion, others in a high exalted artificial red; ſome nations in waiſts diſproportionably large, and another in waiſts as diſproportionably ſmall. In ſhort, the moſt oppoſite things imaginable may each be looked upon as beautiful in whole different countries, or by different people in the ſame country.

We ſhould perhaps make a diſtinction here again, as to the two former parts of beauty and the two latter. Fancy has much more to do in the articles of form and colour than in thoſe of the paſſions and grace. The good paſſions, as they are viſible on the face, are apparent goodneſs; and that muſt be generally amiable: and true grace, wherever it appears to any degree, one ſhould think muſt be pleaſing to every human creature; or perhaps this may never appear in the women of any nation, where the men are grown ſo ſavage and brutal as to have loſt all taſte for it.

Yet even as to grace itſelf, under the notion of pleaſingneſs, it may become almoſt univerſal, and be as ſubject to the dominion of fancy as any of the leſs ſignificant parts of beauty. A parent can ſee genteelneſs in the moſt awkward child perhaps that ever was born; and a perſon who is truly in love, will be pleaſed with every motion and air of the perſon beloved; which is the moſt diſtinguiſhing character that belongs to grace. It is true, this is all a miſtaken grace; but as to that particular perſon, it has all the effects of the true.

BEAUTY, in *Architecture*, *Painting*, and other arts, is the harmony and juſtneſs of the whole compoſition taken together.

BEAUVAIS, an epiſcopal city of France, in the department of Oiſe. The cathedral church which is

Beauvais || Becher.

is dedicated to St Peter, is much admired for its fine architecture. It contains a great number of relics, and a library of curious books. There are ſeveral other churches, among which is one dedicated to St Stephen, remarkable for its curious windows. The town was ineffectually beſieged by the Engliſh in 1443, and by the duke of Burgundy with an army of 80,000 men. In this laſt ſiege the women ſignalized themſelves under the conduct of Jean Hachette, who ſet up a ſtandard yet preſerved in the church of the Jacobins. The duke was obliged to raiſe the ſiege; and in memory of this exploit, the women walk firſt in a proceſſion on the 10th of July, the anniverſary of their deliverance. The inhabitants carry on a good trade in beautiful tapeſtry. Beauvais is ſituated on the river Therin, 42 miles north of Paris, in E. Long. 2. 15. N. Lat. 49. 26.

Beauvais, a town of France in Upper Languedoc, ſeated on the river Teſcou. E. Long. 1. 43. N. Lat. 44. 2.

BEAUVIN, a city of Burgundy in France, in E. Long. 4. 50. N. Lat. 47.

BEAUVOIR *ſur Mer*, a maritime town of France, in the department of Vendee, 25 miles ſouth-weſt of Nantes. W. Long. 1. 5. N. Lat. 46. 45.

BEAUVOISIS, a territory of France, formerly part of Picardy, now included under the department of Oiſe. Beauvais is the capital.

BEBELINGUEN, a town of Suabia, in the duchy of Wirtemberg in Germany, ſeated on a lake from which proceeds the river Worm. E. Long. 9. 8. N. Lat. 48. 45.

BEBRYCIA, in *Ancient Geography*, an ancient name of Bithynia, ſo called from the Bebryces its inhabitants. The Bebryces were afterwards driven out by the Thracians, viz. the Bithyni and Thyni: from whom, in proceſs of time, the country took the name of *Bithynia*. See Bithynia.

BEC, a town of France, in Normandy, now the department of Lower Seine, ſeated on a tongue of land, at the confluence of two rivers, in E. Long. 0. 52. N. Lat. 48. 45.

BECAH, or Bekah, a Jewiſh coin, being half a ſhekel. In Dr Arbuthnot's table of reductions, the bekah amounts to $13\frac{1}{16}$d. in Dr Prideaux's computation to 1s. 6d. Every Iſraelite paid an hundred bekahs a head annually for the ſupport of the temple.

BECALM, in a general ſenſe, ſignifies to appeaſe, to allay.

Becalm, in the ſea language. A ſhip is ſaid to be becalmed, when there is not a breath of wind to fill the ſails.

BECANOR, a town of India, in Aſia, ſeated on the river Ganges, in E. Long. 83. 5. N. Lat. 27. 40.

BECCABUNGA, brooklime; the trivial name of a ſpecies of veronica. See Veronica, Botany *Index*.

BECCLES, a large town of Suffolk in England, in E. Long. 1. 30. N. Lat. 52. 38.

BECHER, John Joachim, a celebrated chemiſt, was born at Spires, in 1645. He was connected with the moſt learned men in Europe; and the emperor, the electors of Mentz and Bavaria, and other perſons of high rank, furniſhed him with the means of making experiments in mathematics, natural philoſophy, medicine, and chemiſtry. As his thoughts were very judicious and uncommon with reſpect to economy and to increaſing the revenues of a ſtate, he was invited to Vienna, where he contributed greatly to the eſtabliſhment of ſeveral manufactures, a chamber of commerce, and an India company; but the jealouſy of ſome of the miniſters occaſioned his diſgrace and ruin. He was not leſs unhappy at Mentz, Munich, and Wurtzburg; which determined him to go to Haerlem, where he invented a machine for working a great quantity of ſilk in a little time, and with few hands: but new misfortunes made him come to England, and he died at London in 1685. He wrote many works; the principal of which are, 1. *Phyſica Subterranea*, which was reprinted at Leipſic in 1703, and in 1739, in octavo, with a ſmall treatiſe, by E. Stahl, entitled *Specimen Becherianum*. 2. *Experimentum chymicum novum*, 8vo. 3. *Character pro Notitia Linguarum univerſali*. 4. *Inſtitutiones Chymicæ, ſeu Manuductio ad Philoſophiam Hermeticam*, 4to. 5. *Inſtitutiones Chymicæ prodromæ*, 12mo. 6. *Experimentum novum ac curioſum de Minera arenaria perpetua*, &c.

Bechin, Beck.

BECHIN, a town of Bohemia, in a circle of the ſame name. It was taken and burnt by General Bequoi in 1619. It is ſeated on the river Lauſnics, in E. Long. 15. 12. N. Lat. 49. 14.

BECK, or Beke, a word which imports a ſmall ſtream of water iſſuing from ſome burn or ſpring. Hence *Hell-becks*, little brooks in the rough and wild mountains about Richmond near Lancaſhire, ſo called on account of their ghaſtlineſs and depth.

Beck is chiefly uſed among us in the compoſition of names of places originally ſituated on rivulets: hence Walbeck, Bournbeck, &c. The Germans uſe *bech* in the ſame manner.

Beck, *David*, an eminent portrait-painter, was born at Arnheim in Guelderland in 1621, and became a diſciple of Vandyck; from whom he acquired a fine manner of penciling, and that ſweet ſtyle of colouring which is peculiar to that great maſter and to all the diſciples trained up under his direction. He poſſeſſed beſides, that freedom of hand, and readineſs, or rather rapidity of execution, for which Vandyck was ſo remarkably famous; and King Charles I. when he obſerved the expeditious manner of Beck's painting, was ſo exceedingly ſurpriſed, that he told Beck, it was his opinion, he could paint if he was riding poſt. He was appointed portrait-painter and chamberlain to Queen Chriſtina of Sweden; and by her recommendation, moſt of the illuſtrious perſons in Europe ſat to him for their pictures. He was agreeable, handſome, and polite, and lived in the higheſt favour with his royal miſtreſs: but, having an earneſt deſire to viſit his friends in Holland, and leaving the court of Sweden much againſt the queen's inclination, ſhe apprehended that he intended never to return; and, as he died ſoon after at the Hague, it was ſuſpected that he was poiſoned. This happened in 1656, when he was aged only 35 years. A very ſingular adventure happened to this painter as he travelled through Germany, which ſeems not unworthy of being recited. He was ſuddenly and violently taken ill at the inn where he lodged, and was laid out as a corpſe, ſeeming to all appearance quite dead. His valets expreſſed the ſtrongeſt marks of grief for the loſs of their maſter, and while they ſat beſide his bed, they drank very freely, by way of conſolation.

At

Becket. At laſt one of them, who grew much intoxicated, ſaid to his companions, our maſter was fond of his glaſs while he was alive, and out of gratitude let us give him a glaſs now he is dead. As the reſt of the ſervants aſſented to the propoſal, he raiſed up the head of his maſter, and endeavoured to pour ſome of the liquor into his mouth. By the fragrance of the wine, or probably by a ſmall quantity that imperceptibly got down his throat, Beck opened his eyes; and the ſervant being exceſſively drunk, and forgetting that his maſter was conſidered as dead, compelled him to ſwallow what wine remained in the glaſs. The painter gradually revived, and by proper management and care recovered perfectly, and eſcaped a premature interment. How highly the works of this maſter were eſteemed, may appear from the many marks of diſtinction and honour which were ſhown him; for he received from different princes as an acknowledgment of his ſingular merit, nine gold chains, and ſeveral medals of gold, of a very large ſize.

BECKET, Thomas, lord chancellor of England, archbiſhop of Canterbury in the 12th century. The ſtory of his birth is as extraordinary as that of his life. It is related that his father Gilbert Becket, ſome time ſheriff of London, went on a pilgrimage to Jeruſalem, where being ſurpriſed and enſlaved by a party of Saracens, his maſter's daughter fell in love with him; and that when he made his eſcape ſhe followed him to London. So ſingular an inſtance of heroic affection ſtruck him; and after conſulting with ſome biſhops, he baptized her by the name of Matilda, and married her; from which marriage proceeded the haughty Thomas Becket. Being raiſed to the archbiſhopric, he began the great diſpute between the crown and the mitre, and ſided with the pope: at which King Henry II. was greatly offended; and calling an aſſembly of the biſhops at Weſtminſter, offered ſix articles againſt papal encroachments, which he urged Becket to aſſent to. Becket, at the importunities of ſeveral lords, ſigned them; but relapſing, he was ordered to be tried as a traitor: upon which he fled into Flanders. The king baniſhed all his relations, and Becket excommunicated all his oppoſers. At laſt, after ſeven years, by the interceſſion of the French king and the pope, he returned; but refuſed to abſolve theſe biſhops and others he had excommunicated: whereupon the king grew enraged, and is reported to have dropped theſe expreſſions: "That he was an unhappy prince, who maintained a great number of lazy inſignificant perſons about him, none of whom had gratitude or ſpirit enough to revenge him on a ſingle inſolent prelate who gave him ſo much diſturbance." Theſe words of the king put four gentlemen of his court on forming a deſign againſt the archbiſhop's life, which they executed in the cathedral church of Canterbury, on the 29th of December 1171. They endeavoured to drag him out of the church; but finding they could not do this without difficulty, killed him there. The aſſaſſins being afraid they had gone too far, durſt not return to the king's court at Normandy, but retired to Knareſborough in Yorkſhire; where everybody avoided their company, hardly any perſon even chooſing to eat or drink with them. They at length took a voyage to Rome, and being admitted to penance by Pope Alexander III. they went to Jeruſalem; where, according to the pope's order, they ſpent their lives in penitential auſterities, and died in the Black Mountain. They were buried at Jeruſalem, without the church door belonging to the Templars. King Henry was, or affected to be, much diſturbed at the news of Becket's death, and deſpatched an embaſſy to Rome to clear himſelf from the imputation of being the cauſe of it. Immediately all divine offices ceaſed in the church of Canterbury, and this for a year, excepting nine days; at the end of which, by order of the pope, it was reconſecrated. Two years after, Becket was canonized; and the following year, Henry returning to England, went to Canterbury, where he did penance as a teſtimony of his regret for the murder of Becket. When he came within ſight of the church where the archbiſhop was buried, he alighted off his horſe, and walked bareſoot, in the habit of a pilgrim, till he came to Becket's tomb; where, after he had proſtrated himſelf and prayed for a conſiderable time, he ſubmitted to be ſcourged by the monks, and paſſed all that day and night without any refreſhment, and kneeling upon the bare ſtone. In 1221 Becket's body was taken up, 50 years after his murder, in the preſence of King Henry III. and a great concourſe of the nobility and others, and depoſited in a rich ſhrine, erected at the expence of Stephen Langton archbiſhop of Canterbury, which was ſoon viſited from all parts, and enriched with the moſt coſtly gifts and offerings; and the miracles ſaid to be wrought at his tomb were ſo numerous, that Gervaſe of Canterbury tells us, there were two large volumes of them kept in that church. The monks uſed to raiſe his body every year; and the day on which this ceremony was performed, which was called the *day of his tranſlation*, was a general holiday: every 50th year there was celebrated a jubilee to his honour, which laſted 15 days: plenary indulgences were then granted to all that viſited his tomb; and 100,000 pilgrims have been regiſtered at a time in Canterbury. The devotion towards him had quite effaced in that town the adoration of the Deity; nay, even that of the virgin. At God's altar, for inſtance, there were offered in one year 3l. 2s. 6d. at the Virgin's, 63l. 5s. 6d. at St Thomas's, 832l. 12s. 3d. But next year the diſproportion was ſtill greater: there was not a penny offered at God's altar; the Virgin's gained only 4l. 1s. 8d. but St Thomas had got for his ſhare 954l. 6s. 3d. Louis VII. of France had made a pilgrimage to this miraculous tomb, and had beſtowed on the ſhrine a jewel which was eſteemed the richeſt in Chriſtendom. Henry VIII. to whom it may eaſily be imagined how obnoxious a ſaint of this character behoved to appear, and how much contrary to all his projects for degrading the authority of the court of Rome, not only pillaged the rich ſhrine dedicated to St Thomas, but made the ſaint himſelf be cited to appear in court, and be tried and condemned as a traitor: he ordered his name to be ſtruck out of the kalendar; the office for his feſtival to be expunged from all breviaries; and his bones to be burnt, and the aſhes thrown in the air. From Mr Thomas Warton we learn, that Becket was the ſubject of poetical legends. *The Lives of the Saints* in verſe, in Bennet's library (Number CLXV.), contain his martyrdom and tranſlation. This manuſcript is ſuppoſed to be of the 14th century. The ſame ingenious writer informs us, from Peter de Blois, that the Becket.

palace

Beckingham || Bed.

palace of Becket was perpetually filled with biſhops highly accompliſhed in literature, who paſſed their time there in reading, diſputing, and deciding important queſtions of the ſtate. "Theſe prelates, though men of the world, were a ſociety of ſcholars; yet very different from thoſe who frequented the univerſities, in which nothing was taught but words and ſyllables, unprofitable ſubtleties, elementary ſpeculations, and trifling diſtinctions. De Blois was himſelf eminently learned, and one of the moſt diſtinguiſhed ornaments of Becket's attendants. We know that John of Saliſbury, his intimate friend, the companion of his exile, and the writer of his life, was ſcarcely exceeded by any man of his time for his knowledge in philological and polite literature."

BECKINGHAM, Charles, an Engliſh dramatic writer, was the ſon of a linen-draper in London, and born in 1699. He was educated at that great nurſery of learning Merchant-Taylors ſchool, under the learned Dr Smith, where he made a very great proficiency in all his ſtudies, and gave the ſtrongeſt teſtimonials of very extraordinary abilities. In poetry more particularly he very early diſcovered an uncommon genius, two dramatic pieces of his writing being repreſented on the ſtage before he had completed his 20th year: and thoſe not ſuch as required the leaſt indulgence or allowance on account of his years; but ſuch as bore evidence to a boldneſs of ſentiment, an accuracy of diction, an ingenuity of conduct, and a maturity of judgement, which would have done honour to a much more ripened age. The titles of his plays, both of which are tragedies, are, 1. *Henry IV. of France.* 2. *Scipio Africanus.* At the repreſentation of the laſt mentioned piece, which indeed was the firſt he wrote, his ſchoolmaſter Dr Smith, as a peculiar mark of diſtinction and regard to the merit of his pupil, gave all his boys a holiday on the afternoon of the author's benefit, in order to afford an opportunity to ſuch of them as pleaſed to pay their compliments to their ſchool-fellow on that occaſion. Beſides theſe dramatic pieces, he wrote ſeveral other poems: but his genius was not permitted any very long period to expand itſelf in; for he died on the 18th of February 1730, in the 32d year of his age.

BECKUM, a town of the biſhopric of Munſter, in Germany, ſeated at the ſource of the river Verſe, in E. Long. 8. 18. N. Lat. 51. 46.

BECSANGIL, anciently Bithynia, a province of Natolia in Aſia; bounded on the north by the Black ſea; on the weſt, by the ſea of Marmora; on the ſouth, by Natolia Proper: and on the eaſt, by the province of Bolli. The principal town is Burſa.

BECTASSE, an order or ſect of religious among the Turks, denominated from their founder *Bectaſh*, preacher to Sultan Amurath. All the Janizaries belonging to the Porte are of the religion of Bectaſſe, being even ſaid to have derived their origin from the founder of this ſect. The habit of the Bectaſſe is white: on their heads they wear white caps of ſeveral pieces, with turbans of wool twiſted rope-faſhion. They obſerve conſtantly the hour of prayer, which they perform in their own aſſemblies, and make frequent declarations of the unity of God.

BED, a convenience for ſtretching and compoſing the body on, for eaſe, reſt, or ſleep, conſiſting generally of feathers encloſed in a ticken caſe. There are varieties of beds, as a ſtanding-bed, a ſettee-bed, a tent-bed, a truckle-bed, &c. Bed.

It was univerſally the practice, in the firſt ages, for mankind to ſleep upon ſkins of beaſts. It was originally the cuſtom of the Greeks and Romans. It was particularly the cuſtom of the ancient Britons before the Roman invaſion; and theſe ſkins were ſpread on the floor of their apartments. Afterwards they were changed for looſe ruſhes and heath, as the Welſh a few years ago lay on the former, and the Highlanders of Scotland ſleep on the latter to this preſent moment. In proceſs of time, the Romans ſuggeſted to the interior Britons the uſe, and the introduction of agriculture ſupplied them with the means, of the neater conveniency of ſtraw beds. The beds of the * Roman gentry at this period were generally filled with feathers, and thoſe of the inns with the ſoft down of reeds. But for many ages the beds of the Italians had been conſtantly compoſed of ſtraw; it ſtill formed thoſe of the ſoldiers and officers at the conqueſt of Lancaſhire; and from both, our countrymen learnt their uſe. But it appears to have been taken up only by the gentlemen, as the common Welſh had their beds thinly ſtuffed with ruſhes as late as the concluſion of the 12th century; and with the gentlemen it continued many ages afterwards. Straw was uſed even in the royal chambers of England as late as the cloſe of the 13th. Moſt of the peaſants about Mancheſter lie on chaff at preſent, as do likewiſe the common people all over Scotland: In the Highlands heath alſo is very generally uſed as bedding, even by the gentry; and the repoſe on a heath bed has been celebrated by travellers as a peculiar luxury, ſuperior to that yielded by down: In France and Italy, ſtraw beds remain general to this day. But after the above period, beds were no longer ſuffered to reſt upon the ground. The better mode, that had anciently prevailed in the eaſt, and long before been introduced into Italy, was adopted in Britain; and they were now mounted on pedeſtals †. This, however, was equally confined to the gentlemen. The bed ſtill continued on the floor among the common people. And the groſs cuſtom, that had prevailed from the beginning was retained by the lower Britons to the laſt; and theſe ground-beds were laid along the walls of their houſes, and formed one common dormitory for all the members of the family. The faſhion continued univerſally among the inferior ranks of the Welſh within theſe four or five ages, and with the more uncivilized part of the Highlanders down to our own times. And even at no great diſtance from Mancheſter, in the neighbouring Buxton, and within theſe 60 or 70 years, the perſons that repaired to the bath are all ſaid to have ſlept in one long chamber together; the upper part being allotted to the ladies, and the lower to the gentlemen, and only partitioned from each other by a curtain.

Whittaker's Hiſtory of Mancheſter.

* *Pliny*, lib. viii. c. 48. and xvi. c. 36.

† Gen. xlix.

Dining-Bed, *lectus tricliniaris*, or *diſcubitorius*, that whereon the ancients lay at meals. The dining or diſcubitory beds were four or five feet high. Three of theſe beds were ordinarily ranged by a ſquare table, (whence both the table and the room where they ate were called *triclinium*) in ſuch a manner that one of the ſides of the table remained open and acceſſible to the waiters. Each bed would hold three or four, rarely five perſons. Theſe beds were unknown before the ſecond

Bed || Beda.

cond Punic war: the Romans, till then, ſat down to eat on plain wooden benches, in imitation of the heroes of Homer, or, as Varro expreſſes it, after the manner of the Lacedemonians and Cretans. Scipio Africanus firſt made an innovation: he had brought from Carthage ſome of thoſe little beds called *punicani*, or *archaici*; being of a wood common enough, very low, ſtuffed only with ſtraw or hay, and covered with goats or ſheep's ſkins, *hædinis pellibus ſtrati*. In reality, there was no great difference, as to delicacy, between theſe new beds and the ancient benches; but the cuſtom of frequent bathing, which began then to obtain, by ſoftening and relaxing the body, put men on trying to reſt themſelves more commodiouſly by lying along than by ſitting down. For the ladies, it did not ſeem at firſt conſiſtent with their modeſty to adopt the mode of lying; accordingly they kept to the old cuſtom all the time of the commonwealth; but, from the firſt Cæſars, they ate on their beds. For the youth who had not yet put on the *toga virilis*, they were long kept to the ancient diſcipline. When they were admitted to table they only ſat on the edge of the beds of their neareſt relations. Never, ſays Suetonius, did the young Cæſars, Caius and Lucius, eat at the table of Auguſtus; but, they were ſet *in imo loco*, or, as Tacitus expreſſes it, *ad lecti fulcra*. From the greateſt ſimplicity, the Romans by degrees carried their dining-beds to the moſt ſurpriſing magnificence. Pliny aſſures us, it was no new thing to ſee them covered over with plates of ſilver, adorned with the ſofteſt mats, and the richeſt counterpanes. Lampridius, ſpeaking of Heliogabulus, ſays, he had beds of ſolid ſilver, *ſolido argento habuit lectos et tricliniares, et cubiculares*. We may add, that Pompey, in his third triumph, brought in beds of gold.—The Romans had alſo beds whereon they ſtudied, and beds whereon the dead were carried to the funeral pile.

Bed-Moulding, in *Architecture*, a term uſed for thoſe members of a corniche which are placed below the coronet; and now uſually conſiſt of an ogee, a liſt, a large boultine, and another liſt under the coronet.

Bed of Juſtice, in the old cuſtoms of France, a throne upon which the king ſat when he went to the parliament. The king never held a bed of juſtice unleſs for affairs that concerned the ſtate, and then all the officers of parliament were clothed in ſcarlet robes.

Bed of the Carriage of a Great Gun, a thick plank, that lies under the piece; being, as it were, the body of the carriage.

Bed, in maſonry, a courſe or range of ſtones; and the joint of the bed is the mortar between two ſtones, placed over each other.

Bed, in gardening, ſquare or oblong pieces of ground in a garden, raiſed a little above the level of the adjoining ground, and wherein they ſow ſeeds or plant roots.

Hot-Bed. See *Hot-bed*.

Lords of the Bed-Chamber, in the Britiſh court, are 12 noblemen who attend in their turns, each a month; during which time they lie in the king's bed chamber, and wait on him when he dines in private. Their ſalary is 1000l. per annum.

BEDA, commonly called *Venerable Bede*, one of our moſt ancient hiſtorians, was born in the year 672, in the neighbouthood of Weremouth, in the biſhopric of Durham. He was educated by the abbot Benedict in the monaſtery of St Peter, near the mouth of the river Wyre. At the age of 19 he was ordained deacon, and prieſt in the year 702. About this time he was invited to Rome by Pope Sergius; but there is no ſufficient reaſon to believe that he accepted the invitation. In the year 731 he publiſhed his Eccleſiaſtical Hiſtory; a work of ſo much merit, notwithſtanding the legendary tales it contains, that it were alone ſufficient to immortalize the author. He died in the year 735 of a lingering conſumption, probably occaſioned by a ſedentary life, and a long uninterrupted application to ſtudy and literary compoſitions, of which he left an incredible number. He was buried in the church of his convent at Jarrow: but his bones were afterwards removed to Durham, and there depoſited in the ſame coffin with thoſe of St Cuthbert. Bede was undoubtedly a ſingular phenomenon in an ignorant and illiterate age. His learning, for the times, was extenſive, his application incredible, his piety exemplary, and his modeſty exceſſive. He was univerſally admired, conſulted, and eſteemed, during his life: and his writings are deſervedly conſidered as the foundation of our eccleſiaſtical hiſtory. His language is neither elegant nor pure, but perſpicuous and eaſy.—All his works are in Latin. The firſt general collection of them appeared at Paris in 1544, in three volumes in folio. They were printed again at the ſame place in 1554, in eight volumes. They were alſo publiſhed in the ſame ſize and number of volumes at Baſil in 1563, reprinted at Cologne in 1612, and at the ſame place in 1688. Beſides this general collection, there are ſeveral of his compoſitions, which have been printed ſeparately, or amongſt the collections of the writings of ancient authors; and there are ſeveral manuſcripts aſcribed to him, which are preſerved in the different libraries in Oxford and Cambridge.

Beda || Bedell.

BEDALL, a town in the north riding of Yorkſhire. Through this town paſſes a Roman cauſeway to Richmond, Barnard-caſtle, &c. The parts adjacent are noted for hunting and road horſes. W. Long. 1. 40. N. Lat. 54. 30.

BEDARIEUX, or Bec d'Arieux, a town of Languedoc in France, now the department of Herault, ſeated on the river Obe, in E. Long. 3. 24. N. Lat. 43. 29.

BEDEL. See Beadle.

Bedel, a ſmall town in the north riding of Yorkſhire, ſeated on a little brook, in W. Long. 1. 30 N. Lat. 54. 30.

BEDELL, Dr William, a learned prelate, born in Eſſex in 1570. He went with Sir Henry Wotton the Engliſh ambaſſador to the republic of Venice, as his chaplain, in 1604; and continuing eight years in that city, contracted an intimate acquaintance with the famous Father Paul, of whom he learned Italian ſo well as to tranſlate the Engliſh Common Prayer Book into that language: in return he drew up an Engliſh grammar for Father Paul, who declared he had learned more from him in all parts of divinity than from any one beſide. He was accordingly much concerned when Bedell left Venice; and at his departure preſented him with his picture, the MSS. of his Hiſtory of the Council of Trent, his Hiſtory of the Interdict and Inquiſition,

Bedell || Bedford.

tion, with other literary donations. In 1629, he obtained the biſhopric of Kilmore and Adragh in Ireland; and finding theſe dioceſes in great diſorder, applied himſelf vigorouſly to reform the abuſes there. He was no perſecutor of Papiſts, but laboured with great ſucceſs to convert the better ſort of the Popiſh clergy: he procured an Iriſh tranſlation of the Common Prayer Book, which he cauſed to be read in his cathedral every Sunday; and the New Teſtament having been tranſlated by Archbiſhop Daniel, he procured one of the Old Teſtament; which he having been prevented from printing himſelf, was afterwards executed at the expence of the great Mr Robert Boyle. He publiſhed, in 1624, a controverſial book againſt the Roman catholics which he dedicated to Charles prince of Wales; and aſſiſted the archbiſhop of Spalatro in finiſhing his famous work *De Republica Eccleſiaſtica*.—When the bloody rebellion broke out in Ireland in Oct. 1641, the biſhop at firſt did not feel the violence of its effects; for the very rebels had conceived a great veneration for him, and they declared he ſhould be the laſt Engliſhman they would drive out of Ireland. His was the only houſe in the county of Cavan that was unviolated, and it was filled with the people who fled to him for ſhelter. About the middle of December, however, the rebels, purſuant to orders received from their council of ſtate at Kilkenny, required him to diſmiſs the people that were with him; which he refuſed to do, declaring he would ſhare the ſame fate with the reſt. Upon this they ſeized him, his two ſons, and Mr Clogy who had married his daughter-in-law, and carried them priſoners to the caſtle of Cloughboughter, ſurrounded by a deep water, where they put them all, except the biſhop, in irons; after ſome time, however, this part of their ſeverity was abated. After being confined for about three weeks, the biſhop and his two ſons, and Mr Clogy, were exchanged for ſome of the principal rebels: but the biſhop died ſoon after, on the 7th of February 1642, his death being chiefly occaſioned by his late impriſonment, and the weight of ſorrows which lay upon his mind. The Iriſh did him unuſual honours at his burial; for the chief of the rebels gathered their forces together, and with them accompanied his body to the church-yard.

BEDER, a ſtrong town of Aſia, in the dominions of the Great Mogul. E. Long. 81. 10. N. L. 16. 50.

BEDFORD, the county town of Bedfordſhire in England, ſeated on both ſides of the river Ouſe, over which there is a ſtone bridge; in W. Long. 0. 20. N. Lat. 52. 6. It is an ancient town, and pleaſantly ſituated, but not very large nor well built, though the buildings are much improved of late, and the river made navigable. It ſends two members to parliament, and gives title of *duke* to the noble family of Ruſſel. At this place the Britons were overthrown in a great battle in 572, by Cuthwulf the Saxon king; and here was a ſtrong caſtle, built in the time of the Normans by Pagan de Beauchamp, the third baron of Bedford. It was reduced by King Stephen after a long ſiege; and afterwards taken by King John, after a ſiege of 60 days, from Fulco de Brent, who rebelled againſt his ſovereign, notwithſtanding he had taken this caſtle before from the barons, and had it beſtowed upon him by the king. The town is a very ancient corporation, and has long ſent members to parliament. It is governed at preſent by a mayor, recorder, two bailiffs, twelve aldermen, two chamberlains, a town clerk, and three ſerjeants. The neighbouring country is very fruitful in wheat, great quantities of which are carried from hence to Hitchen and Hertford markets, ſold, ground, and conveyed to London. The town has five churches, a free ſchool, and ſeveral hoſpitals, and enjoys a good trade in corn by the way of Lynn. When the river is ſwelled by rains, eſpecially in winter, it is uſual in Cambridgeſhire to ſay, *the bailiff of Bedford is coming*; meaning, that it is going to lay their fens under water.

Bedford-ſhire.

BEDFORDSHIRE, an inland county of England. When the Romans landed in Britain, 55 years before Chriſt, it was included in the diſtrict inhabited by the Catieuchlani, whoſe chief or governor Caſſibelinus headed the forces of the whole iſland againſt Cæſar, and the year following was totally defeated. In 310 the emperor Conſtantine divided Britain into five Roman provinces, when this county was included in the third diviſion, called *Flavia Cæſarienſis*; in which ſtate it continued 426 years, when the Romans quitted Britain. At the eſtabliſhment of the kingdom of Mercia (one of the diviſions of the Saxon heptarchy) it was conſidered as part of that kingdom; and ſo continued from 582 to 827, when with the other petty kingdoms of the iſland it became ſubject to the Weſt Saxons under Egbert, and the whole was named *England*. In 889, Alfred held the ſovereignty; when England was divided into counties, hundreds, and tythings, and Bedfordſhire firſt received its preſent name. It is in the Norfolk circuit, the province of Canterbury, and biſhopric of Lincoln. Its form is oval, being about 33 miles long, 16 broad, and nearly 73 in circumference; containing an area of about 323 ſquare miles, or 260,000 ſquare acres. It ſupplies 400 men to the national militia. It contains 124 pariſhes, 58 vicarages, and 10 market-towns, viz. Bedford, Ampthill, Biggleſwade, Dunſtable, Leighton, Beaudeſart, Luton, Potton, Shefford, Tuddington, and Woburn, and 55 villages. The inhabitants, by computation, are 67,350, and it has 7,294 houſes that pay taxes. It is divided into nine hundreds, ſends two members to parliament, and pays ſeven parts of 513 of the land-tax. Its principal river, the Ouſe, is navigable to Bedford; and divides the county into two parts, of which that to the ſouth is the moſt conſiderable. In its courſe, which is very meandering, it receives ſeveral ſmall ſtreams; the principal one is the Ivel, which takes its riſe in the ſouthern part of the county. The air is healthy and the ſoil in general a deep clay. The north ſide of the Ouſe is fruitful and woody, but the ſouth ſide is leſs fertile: yet producing great quantities of wheat and barley, excellent in their kind, and woad for dyers. The ſoil yields plenty of fullers earth for our woollen manufactory. The chief manufactures of the county are thread, lace, and ſtraw ware. In this county there are many remains of Roman, Saxon, and Norman antiquities; and a few Roman ſtations, viz. Sandys near Potton, and the Magiovinum of Antoninus, by others ſuppoſed to be the ancient Salenæ, containing 30 acres, where many urns, coins, &c. have been dug up. Another at Madining-bowre, or Maiden-bower, one mile from Dunſtable, containing about nine acres, which Camden ſuppoſes to have been a Roman ſtation, from coins

Bedloe, Bedouins.

of the emperors having been frequently dug up there, and calls it *Magintum*. Leighton Beaudesart is supposed to have been a Roman camp. There is another at Arlesey near Shefford; and a Roman amphitheatre may be traced near Bradford Magna. The Roman road, Icknield-street, crosses this county, entering at Leighton Beaudesart, from whence it passes Dunstable, where it inclines northward, over Wardon-hills, to Baldock in Hertfordshire. The Watling-street enters this county near Laton from St Albans, passes a little north of Dunstable, where it crosses the Icknield-street, and from thence to Stoney Stratford in Buckinghamshire. A Roman road also enters near Potton, passes on to Sandy, and from thence to Bedford, where it crosses the Ouse, and proceeds to Newport Pagnell in Buckinghamshire. The following antiquities in this county are worthy of notice: Bedford Bridge and Priory; Chicksand Abbey near Shefford; Dunstable Priory near Luton; Eaton Park House or Eaton Bray; Five Knolls near Dunstable; Newnham Priory near Bedford; Northill Church, three miles from Biggleswade; Summeris Tower near Luton; Wardon Abbey near Shefford; Woburn Abbey; Woodhill Castle, or Oldhill Castle, near Harewood.

BEDLOE, William, who assumed the title of *Captain*, was an infamous adventurer of low birth, who had travelled over a great part of Europe under different names and disguises, and had passed among several ignorant persons for a man of rank and fortune. Encouraged by the success of Oates, he turned evidence, gave an account of Godfrey's murder, and added many circumstances to the narrative of the former. These villains had the boldness to accuse the queen of entering into a conspiracy against the king's life. A reward of 500l. was voted to Bedloe by the commons. He is said to have asserted the reality of the plot on his deathbed: but it abounds with absurdity, contradiction, and perjury; and still remains one of the greatest problems in the British annals. He died at Bristol 20th August 1680. Giles Jacob informs us, that he was author of a play called "The Excommunicated Prince, or the False Relict," 1679. The printer of it having, without the author's knowledge, added a second title, and called it "The Popish Plot in a Play," greatly excited the curiosity of the public, who were, however, much disappointed when they found the plan of the piece to be founded on a quite different story. Anthony Wood will not allow the captain the merit of this play; but asserts that it was written partly, if not entirely, by one Tho. Walter, M. A. of Jesus college, Oxford.

BEDOUINS, or Bedouis, a modern name of the wild Arabs, whether in Asia or Africa. When speaking of the Arabs, we should distinguish whether they are cultivators or pastors; for this difference in their mode of life occasions so great a one in their manners and genius, that they become almost foreign nations with respect to each other. In the former case, leading a sedentary life, attached to the same soil, and subject to regular governments, the social state in which they live, very nearly resembles our own. Such are the inhabitants of Yemen; and such also are the descendants of those ancient conquerors who have either entirely, or in part, given inhabitants to Syria, Egypt, and the Barbary states. In the second instance, having only a transient interest in the soil, perpetually removing their tents from one place to another, and under subjection to no laws, their mode of existence is neither that of polished nations nor of savages; and therefore more particularly merits our attention. Such are the Bedouins, or inhabitants of the vast deserts which extend from the confines of Persia to Morocco. Though divided into independent communities or tribes, not unfrequently hostile to each other, they may still be considered as forming one nation. The resemblance of their language is a manifest token of this relationship. The only difference that exists between them is, that the African tribes are of a less ancient origin, being posterior to the conquest of these countries by the caliphs or successors of Mahomet; while the tribes of the desert of Arabia, properly so called, have descended by an uninterrupted succession from the remotest ages. To these the orientals are accustomed to appropriate the name of *Arabs*, as being the most ancient and the purest race. The term *Bedaoui* is added as a synonimous expression, signifying, "inhabitants of the Desert."

Bedouins.

It is not without reason that the inhabitants of the desert boast of being the purest and the best preserved race of all the Arab tribes: for never have they been conquered, nor have they mixed with any other people by making conquests; for those by which the general name of Arabs has been rendered famous, really belong only to the tribes of Hedjaz and Yemen. Those who dwelt in the interior of the country never emigrated at the time of the revolution effected by Mahomet; or if they did take any part in it, it was confined to a few individuals, detached by motives of ambition. Thus we find the prophet in his Koran continually styling the Arabs of the desert *rebels* and *infidels*; nor has so great a length of time produced any very considerable change. We may assert they have in every respect retained their primitive independence and simplicity. See Arabia,

The wandering life of these people arises from the very nature of their deserts. To point to himself these deserts (says M. Volney), the reader must imagine a sky almost perpetually inflamed, and without clouds, immense and boundless plains, without houses, trees, rivulets, or hills, where the eye frequently meets nothing but an extensive and uniform horizon like the sea, though in some places the ground is uneven and stony. Almost invariably naked on every side, the earth presents nothing but a few wild plants thinly scattered, and thickets, whose solitude is rarely disturbed but by antelopes, hares, locusts, and rats. Such is the nature of nearly the whole country, which extends six hundred leagues in length and three hundred in breadth, and stretches from Aleppo to the Arabian sea, and from Egypt to the Persian gulf. It must not, however, be imagined that the soil in so great an extent is everywhere the same; it varies considerably in different places. On the frontiers of Syria, for example, the earth is in general fat and cultivable, nay even fruitful. It is the same also on the banks of the Euphrates: but in the internal parts of the country, and towards the south, it becomes white and chalky, as in the parallel of Damascus; rocky, as in the Tih and the Hedjaz; and a pure sand, as to the eastward of Yemen. This variety in the qualities of the soil is productive

Bedouins. ductive of ſome minute differences in the condition of the Bedouins. For inſtance, in the more ſterile countries, that is, thoſe which produce but few plants, the tribes are feeble and very diſtant; which is the caſe in the deſert of Suez, that of the Red ſea, and the interior of the great deſert called the *Najd*. When the ſoil is more fruitful, as between Damaſcus and the Euphrates, the tribes are more numerous and leſs remote from each other; and, laſtly, in the cultivable diſtricts, ſuch as the pachalics of Aleppo, the Hauran, and the neighbourhood of Gaza, the camps are frequent and contiguous. In the former inſtances, the Bedouins are purely paſtors, and ſubſiſt only on the produce of their herds, and on a few dates and fleſh meat, which they eat either freſh or dried in the ſun and reduced to a powder. In the latter, they ſow ſome land, and add cheeſe, barley, and even rice, to their fleſh and milk meats.

In thoſe diſtricts where the ſoil is ſtony and ſandy, as in the Tih, the Hedjaz, and the Najd, the rains make the ſeeds of the wild plants ſhoot, and revive the thickets, ranunculi, wormwood, and kali. They cauſe marſhes in the lower grounds, which produce reeds and graſs; and the plain aſſumes a tolerable degree of verdure. This is the ſeaſon of abundance both for the herds and their maſters; but on the return of the heats, every thing is parched up, and the earth, converted into a gray and fine duſt, preſents nothing but dry ſtems as hard as wood, on which neither horſes, oxen, nor even goats can feed. In this ſtate the deſert would become uninhabitable, and muſt be totally abandoned, had not nature formed an animal no leſs hardy and frugal than the ſoil is ſterile and ungrateful. No creature ſeems ſo peculiarly fitted to the climate in which it exiſts. Deſigning the camel to dwell in a country where he can find little nouriſhment, Nature (ſays M. Volney) has been ſparing of her materials in the whole of his formation. She has not beſtowed on him the plump fleſhineſs of the ox, horſe, or elephant; but limiting herſelf to what is ſtrictly neceſſary, ſhe has given him a ſmall head without ears at the end of a long neck without fleſh. She has taken from his legs and thighs every muſcle not immediately requiſite for motion; and in ſhort, has beſtowed on his withered body only the veſſels and tendons neceſſary to connect its frame together. She has furniſhed him with a ſtrong jaw, that he may grind the hardeſt aliments; but leſt he ſhould conſume too much, ſhe has ſtraitened his ſtomach, and obliged him to chew the cud. She has lined his foot with a lump of fleſh, which ſliding in the mud, and being no way adapted to climbing, fits him only for a dry, level, and ſandy ſoil like that of Arabia: ſhe has evidently deſtined him likewiſe to ſlavery, by refuſing him every ſort of defence againſt his enemies. Deſtitute of the horns of the bull, the hoof of the horſe, the tooth of the elephant, and the ſwiftneſs of the ſtag, how can the camel reſiſt or avoid the attacks of the lion, the tiger, or even the wolf? To preſerve the ſpecies, therefore, nature has concealed him in the depth of the vaſt deſerts, where the want of vegetables can attract no game, and whence the want of game repels every voracious animal. Tyranny muſt have expelled man from the habitable parts of the earth before the camel could have loſt his liberty. Become domeſtic, he has rendered habitable the moſt barren ſoil the world contains. He alone ſupplies all his maſter's wants. The milk of the camel nouriſhes the family of the Arab under the varied forms of curd, cheeſe, and butter; and they often feed upon his fleſh. Slippers and harneſs are made of his ſkin, tents and clothing of his hair. Heavy burdens are tranſported by his means: and when the earth denies forage to the horſe, ſo valuable to the Bedouin, the ſhe camel ſupplies that deficiency by her milk at no other coſt, for ſo many advantages, then a few ſtalks of brambles or wormwood and pounded date kernels. So great is the importance of the camel to the deſert, that were it deprived of that uſeful animal, it muſt infallibly loſe every inhabitant. Bedouins.

Such is the ſituation in which nature has placed the Bedouins, to make of them a race of men equally ſingular in their phyſical and moral character. This ſingularity is ſo ſtriking, that even their neighbours the Syrians regard them as extraordinary beings: eſpecially thoſe tribes which dwell in the depths of the deſerts, ſuch as the Anaza, Kaibar, Tai, and others, which never approach the towns. When in the time of Shaik Daher, ſome of their horſemen came as far as Acre, they excited the ſame curioſity there as a viſit from the ſavages of America would among us. Every body viewed with ſurpriſe theſe men, who were more diminutive, meagre, and ſwarthy, than any of the known Bedouins. Their withered legs were only compoſed of tendons, and had no calves. Their bellies ſeemed to cling to their backs, and their hair was frizzled almoſt as much as that of the negroes. They on the other hand were no leſs aſtoniſhed at every thing they ſaw; they could neither conceive how the houſes and minarets could ſtand erect, nor how men ventured to dwell beneath them, and always in the ſame ſpot; but above all, they were in an ecſtacy on beholding the ſea, nor could they comprehend what that deſert of water could be.

We may imagine that the Arabs of the frontiers are not ſuch novices; there are even ſeveral ſmall tribes of them, who living in the midſt of the country, as in the velley of Bekaa, that of the Jordan, and in Paleſtine, approach nearer to the condition of the peaſants; but theſe are deſpiſed by the others, who look upon them as baſtard Arabs and Rayas, or ſlaves of the Turks.

In general, the Bedouins are ſmall, meagre, and tawny; more ſo, however, in the heart of the deſert than on the frontiers of the cultivated country; but they are always of a darker hue than the neighbouring peaſants. They alſo differ among themſelves in the ſame camp; and M. Volney remarked, that the ſhaiks, that is the rich, and their attendants, were always taller and more corpulent than the common claſs. He has ſeen ſome of them above five feet five and ſix inches high; though in general they do not (he ſays) exceed five feet two inches. This difference can only be attributed to their food, with which the former are ſupplied more abundantly than the latter: And the effects of this are equally evident in the Arabian and Turcoman camels; for theſe latter, dwelling in countries rich in forage, are become a ſpecies more robuſt and fleſhy than the former. It may likewiſe be affirmed, that the lower claſs of Bedouins live in a ſtate of habitual wretchedneſs and famine. It will appear almoſt incredible to us, but it is an undoubted fact, that

Bedouins. the quantity of food uſually conſumed by the greateſt part of them does not exceed ſix ounces a day. This abſtinence is moſt remarkable among the tribes of the Najd and the Hedjaz. Six or ſeven dates ſoaked in melted butter, a little ſweet milk or curds, ſerve a man a whole day; and he eſteems himſelf happy when he can add a ſmall quantity of coarſe flour or a little ball of rice. Meat is reſerved for the greateſt feſtivals; and they never kill a kid but for a marriage or a funeral. A few wealthy and generous ſhaiks alone can kill young camels, and eat baked rice with their victuals. In times of dearth, the vulgar, always half famiſhed, do not diſdain the moſt wretched kinds of food; and eat locuſts, rats, lizards, and ſerpents broiled on briars. Hence are they ſuch plunderers of the cultivated lands and robbers on the high-roads: hence alſo their delicate conſtitution and their diminutive and meagre bodies, which are rather active than vigorous. It may be worth while to remark, that their evacuations of every kind, even perſpiration, are extremely ſmall; their blood is ſo deſtitute of ſeroſity, that nothing but the greateſt heat can preſerve its fluidity. This, however, does not prevent them from being tolerably healthy in other reſpects; for maladies are leſs frequent among them than among the inhabitants of the cultivated country.

From theſe facts we are by no means juſtified in concluding that the frugality of the Bedouins is a virtue purely of choice, or even of climate. The extreme heat in which they live unqueſtionably facilitates their abſtinence, by deſtroying that activity which cold gives to the ſtomach. Their being habituated alſo to ſo ſparing a diet, by hindering the dilatation of the ſtomach, becomes doubtleſs a means of their ſupporting ſuch abſtemiouſneſs; but the chief and primary motive of this habit is with them, as with the reſt of mankind, the neceſſity of the circumſtances in which they are placed, whether from the nature of the ſoil, as has been before explained, or that ſtate of ſociety in which they live, and which remains now to be examined.

It has been already remarked, that the Bedouin Arabs are divided into tribes, which conſtitute ſo many diſtinct nations. Each of theſe tribes appropriates to itſelf a tract of land forming its domain; in this they do not differ from cultivated nations, except that their territory requires a greater extent, in order to furniſh ſubſiſtence for their herds throughout the year. Each tribe is collected in one or more camps, which are diſperſed through the country, and which make a ſucceſſive progreſs over the whole, in proportion as it is exhauſted by the cattle; hence it is, that within a great extent a few ſpots only are inhabited, which vary from one day to another; but as the entire ſpace is neceſſary for the annual ſubſiſtence of the tribe, whoever encroaches on it is deemed a violator of property; this is with them the law of nations. If, therefore, a tribe, or any of its ſubjects, enter upon a foreign territory, they are treated as enemies and robbers, and a war breaks out. Now, as all the tribes have affinities with each other by alliances of blood or conventions, leagues are formed, which render theſe wars more or leſs general. The manner of proceeding on ſuch occaſions is very ſimple. The offence made known, they mount their horſes and ſeek the enemy; when they meet, they enter into a parley, Bedouins. and the matter is frequently made up; if not, they attack either in ſmall bodies, or man to man. They encounter each other at full ſpeed with fixed lances, which they ſometimes dart, notwithſtanding their length, at the flying enemy: the victory is rarely conteſted; it is decided by the firſt ſhock, and the vanquiſhed take to flight at full gallop over the naked plain of the deſert. Night generally favours their eſcape from the conqueror. The tribe which has loſt the battle ſtrikes its tents, removes to a diſtance by forced marches, and ſeeks an aſylum among its allies. The enemy, ſatisfied with their ſucceſs, drive their herds farther on, and the fugitives ſoon after return to their former ſituation. But the ſlaughter made in theſe engagements frequently ſows the ſeeds of hatreds which perpetuate theſe diſſenſions. The intereſt of the common ſafety has for ages eſtabliſhed a law among them, which decrees that the blood of every man who is ſlain muſt be avenged by that of his murderer. This vengeance is called *Tar*, or retaliation; and the right of exacting it devolves on the neareſt of kin to the deceaſed. So nice are the Arabs on this point of honour, that if any one neglects to ſeek his retaliation he is diſgraced for ever. He therefore watches every opportunity of revenge: if his enemy periſhes from any other cauſe, ſtill he is not ſatisfied, and his vengeance is directed againſt the neareſt relation. Theſe animoſities are tranſmitted as an inheritance from father to children, and never ceaſe but by the extinction of one of the families, unleſs they agree to ſacrifice the criminal, or *purchaſe the blood* for a ſtated price, in money or in flocks. Without this ſatisfaction, there is neither peace, nor truce, nor alliances, between them, nor ſometimes even between whole tribes: *There is blood between us*, ſay they on every occaſion; and this expreſſion is an inſurmountable barrier. Such accidents being neceſſarily numerous in a long courſe of time, the greater part of the tribes have ancient quarrels, and live in a habitual ſtate of war; which, added to their way of life, renders the Bedouins a military people, though they have made no great progreſs in war as an art.

Their camps are formed in a kind of irregular circle, compoſed of a ſingle row of tents, with greater or leſs intervals. Theſe tents, made of goat or camels hair, are black or brown, in which they differ from thoſe of the Turcomans, which are white. They are ſtretched on three or four pickets, only five or ſix feet high, which gives them a very flat appearance; at a diſtance, one of theſe camps ſeems only like a number of black ſpots; but the piercing eye of the Bedouin is not to be deceived. Each tent inhabited by a family is divided by a curtain into two apartments, one of which is appropriated to the women. The empty ſpace within the large circle ſerves to fold their cattle every evening. They never have any intrenchments; their only advanced guards and patroles are dogs; their horſes remain ſaddled and ready to mount on the firſt alarm; but as there is neither order nor regularity, theſe camps, always eaſy to ſurpriſe, afford no defence in caſe of an attack: accidents, therefore, very frequently happen, and cattle are carried off every day; a ſpecies of marauding war in which the Arabs are very experienced.

The tribes which live in the vicinity of the Turks

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Bedouins. are ſtill more accuſtomed to attacks and alarms; for theſe ſtrangers, arrogating to themſelves, in right of conqueſt, the property of the whole country, treat the Arabs as rebel vaſſals, or as turbulent and dangerous enemies. On this principle, they never ceaſe to wage ſecret or open war againſt them. The pachas ſtudy every occaſion to haraſs them. Sometimes they conteſt with them a territory which they had let them, and at others demand a tribute which they never agreed to pay. Should a family of ſhaiks be divided by intereſt or ambition, they alternately ſuccour each party, and conclude by the deſtruction of both. Frequently too they poiſon or aſſaſſinate thoſe chiefs whoſe courage or abilities they dread, though they ſhould even be their allies. The Arabs, on their ſide, regarding the Turks as uſurpers and treacherous enemies, watch every opportunity to do them injury. Unfortunately, their vengeance falls oftener on the innocent than the guilty. The harmleſs peaſant generally ſuffers for the offences of the ſoldier. On the ſlighteſt alarm, the Arabs cut their harveſts, carry off their flocks, and intercept their communication and commerce. The peaſant calls them thieves, and with reaſon; but the Bedouins claim the right of war, and perhaps they alſo are not in the wrong. However this may be, theſe depredations occaſion a miſunderſtanding between the Bedouins and the inhabitants of the cultivated country, which renders them mutual enemies.

Such is the external ſituation of the Arabs. It is ſubject to great viciſſitudes, according to the good or bad conduct of their chiefs. Sometimes a feeble tribe raiſes and aggrandizes itſelf, whilſt another, which was powerful, falls into decay, or perhaps is entirely annihilated; not that all its members periſh, but they incorporate themſelves with ſome other; and this is the conſequence of the internal conſtitution of the tribes. Each tribe is compoſed of one or more principal families, the members of which bear the title of ſhaiks, i. e. chiefs or lords. Theſe families have a great reſemblance to the patricians of Rome and the nobles of modern Europe. One of the ſhaiks has the ſupreme command over the others. He is the general of their little army; and ſometimes aſſumes the title of *emir*, which ſignifies commander and prince. The more relations, children, and allies, he has, the greater is his ſtrength and power. To theſe he adds particular adherents, whom he ſtudiouſly attaches to him, by ſupplying all their wants. But beſides this, a number of ſmall families, who, not being ſtrong enough to live independent, ſtand in need of protection and alliances, range themſelves under the banners of this chief. Such an union is called *kabila*, or tribe. Theſe tribes are diſtinguiſhed from each other by the name of their reſpective chiefs, or by that of the ruling family; and when they ſpeak of any of the individuals who compoſe them, they call them the *children* of ſuch a chief, though they may not be all really of his blood, and he himſelf may have been long ſince dead. Thus they ſay, *Beni Temin*, *Oulad Tai*, the children of Temin and of Tai. This mode of expreſſion is even applied, by metaphor, to the names of countries: the uſual phraſe for denoting its inhabitants being to call them *the children of ſuch a place*. Thus the Arabs ſay, *Oulad Maſr*, the Egyptians; *Oulad Sham*, the Syrians; they would alſo ſay, *Oulad Franſa*, the French; *Oulad Moſkou*, the Ruſſians; a remark which is not unimportant to ancient hiſtory. Bedouins.

The government of this ſociety is at once republican, ariſtocratical, and even deſpotic, without exactly correſponding with any of theſe forms. It is republican, inaſmuch as the people have a great influence in all affairs, and as nothing can be tranſacted without the conſent of a majority. It is ariſtocratical, becauſe the families of the ſhaiks poſſeſs ſome of the prerogatives which everywhere accompany power; and, laſtly, It is deſpotic, becauſe the principal ſhaik has an indefinite and almoſt abſolute authority, which, when he happens to be a man of credit and influence, he may even abuſe; but the ſtate of theſe tribes confines even this abuſe to very narrow limits: for if a chief ſhould commit an act of injuſtice; if, for example, he ſhould kill an Arab, it would be almoſt impoſſible for him to eſcape puniſhment; the reſentment of the offended party would pay no reſpect to his dignity; the law of retaliation would be put in force; and, ſhould he not pay the blood, he would be infallibly aſſaſſinated, which, from the ſimple and private life the ſhaiks lead in their camps, would be no difficult thing to effect. If he haraſſes his ſubjects by ſeverity, they abandon him and go over to another tribe. His own relations take advantage of his miſconduct to depoſe him and advance themſelves to his ſtation. He can have no reſource in foreign troops; his ſubjects communicate too eaſily with each other to render it poſſible for him to divide their intereſts and form a faction in his favour. Beſides, how is he to pay them, ſince he receives no kind of taxes from the tribe; the wealth of the greater part of his ſubjects being limited to abſolute neceſſaries, and his own confined to very moderate poſſeſſions, and thoſe too loaded with great expences?

The principal ſhaik in every tribe, in fact, defrays the charges of all who arrive at or leave the camp. He receives the viſits of the allies, and of every perſon who has buſineſs with them. Adjoining to his tent is a large pavilion for the reception of all ſtrangers and paſſengers. There are held frequent aſſemblies of the ſhaiks and principal men, to determine on encampments and removals; on peace and war; on the differences with the Turkiſh governors and the villages; and the litigations and quarrels of individuals. To this crowd, which enters ſucceſſively, he muſt give coffee, bread baked on the aſhes, rice, and ſometimes roaſted kid or camel; in a word, he muſt keep open table; and it is the more important to him to be generous, as this generoſity is cloſely connected with matters of the greateſt conſequence. On the exerciſe of this depend his credit and his power. The famiſhed Arab ranks the liberality which feeds him before every virtue: nor is this prejudice without foundation; for experience has proved that covetous chiefs never were men of enlarged views: hence the proverb, as juſt as it is brief, *A cloſe fiſt, a narrow heart.* To provide for theſe expences, the ſhaik has nothing but his herds, a few ſpots of cultivated ground, the profits of his plunder, and the tribute he levies on the high-roads; the total of which is very inconſiderable. The ſhaik with whom M. Volney reſided in the country of Gaza, about the end of 1784, paſſed for one of the moſt powerful of thoſe diſtricts; yet it did not appear to our author that his expenditure was greater than that of an opulent farmer.

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Bedouins. His perſonal effects, conſiſting of a few peliſſes, carpets, arms, horſes, and camels, could not be eſtimated at more than 50,000 livres (a little above 2000l.); and it muſt be obſerved, that in this calculation four mares of the breed of racers are valued at 6000 livres (250l.), and each camel at 10l. Sterling. We muſt not therefore, when we ſpeak of the Bedouins, affix to the words *Prince* and *Lord* the ideas they uſually convey; we ſhould come nearer to the truth by comparing them to ſubſtantial farmers in mountainous countries, whoſe ſimplicity they reſemble in their dreſs as well as in their domeſtic life and manners. A ſhaik who has the command of 500 horſe does not diſdain to ſaddle and bridle his own, nor to give him barley and chopped ſtraw. In his tent, his wife makes the coffee, kneads the dough, and ſuperintends the dreſſing of the victuals. His daughters and kinſwomen waſh the linen, and go with pitchers on their head and veils over their faces to draw water from the fountain. Theſe manners agree preciſely with the deſcriptions in Homer and the hiſtory of Abraham in Geneſis. But it muſt be owned that it is difficult to form a juſt idea of them without having ourſelves been eye-witneſſes.

The ſimplicity, or perhaps more properly the poverty, of the lower claſs of the Bedouins is proportionate to that of their chiefs. All the wealth of a family conſiſts of moveables; of which the following is a pretty exact inventory; a few male and female camels; ſome goats and poultry; a mare and her bridle and ſaddle; a tent; a lance 16 feet long; a crooked ſabre; a ruſty muſket, with a flint and matchlock; a pipe; a portable mill; a pot for cooking; a leathern bucket; a ſmall coffee roaſter; a mat; ſome clothes; a mantle of black wool: and a few glaſs or ſilver rings, which the women wear upon their legs and arms. If none of theſe are wanting their furniture is complete. But what the poor man ſtands moſt in need of, and what he takes moſt pleaſure in, is his mare; for this animal is his principal ſupport. With his mare the Bedouin makes his excurſions againſt hoſtile tribes, or ſeeks plunder in the country and on the high-ways. The mare is preferred to the horſe, becauſe ſhe is more docile, and yields milk, which on occaſion ſatisfies the thirſt and even the hunger of her maſter.

Thus confined to the moſt abſolute neceſſities of life, the Arabs have as little induſtry as their wants are few; all their arts conſiſt in weaving their clumſy tents and in making mats and butter. Their whole commerce only extends to the exchanging camels, kids, ſtallions, and milk; for arms, clothing, a little rice or corn, and money, which they bury. They are totally ignorant of all ſcience; and have not even any idea of aſtronomy, geometry, or medicine. They have not a ſingle book; and nothing is ſo uncommon among the ſhaiks as to know how to read. All their literature conſiſts in reciting tales and hiſtories in the manner of the Arabian Nights Entertainments. They have a peculiar paſſion for ſuch ſtories, and employ in them almoſt all their leiſure, of which they have a great deal. In the evening they ſeat themſelves on the ground, at the threſhold of their tents, or under cover, if it be cold; and there, ranged in a circle round a little fire of dung, their pipes in their mouths, and their legs croſſed, they ſit a while in ſilent meditation, till on a ſudden one of them breaks forth with *Once upon a time*.—and continues to recite the adventures of ſome young ſhaik and female Bedouin: he relates in what manner the youth firſt got a ſecret glimpſe of his miſtreſs; and how he became deſperately enamoured of her: he minutely deſcribes the lovely fair; boaſts her black eyes, as large and ſoft as thoſe of the gazelle; her languid and empaſſioned looks; her arched eye-brows, reſembling two bows of ebony; her waiſt ſtraight and ſupple as a lance: he forgets not her ſteps, light as thoſe of the *young filley*; nor her eye-laſhes, blackened with *kohl*; nor her lips painted blue; nor her nails, tinged with the golden-coloured *henna*; nor her breaſts reſembling two pomegranates; nor her words ſweet as honey. He recounts the ſufferings of the young lover, *ſo waſted with deſire and paſſion, that his body no longer yields any ſhadow*. At length, after detailing his various attempts to ſee his miſtreſs, the obſtacles of the parents, the invaſions of the enemy, the captivity of the two lovers, &c. he terminates, to the ſatisfaction of the audience, by reſtoring them, united and happy, to the paternal tent, and by receiving the tribute paid to his eloquence, in the *Ma cha allah* (an exclamation of praiſe, equivalent to *admirably well!*) he has merited. The Bedouins have likewiſe their love ſongs, which have more ſentiment and nature in them than thoſe of the Turks and inhabitants of the towns; doubtleſs, becauſe the former, whoſe manners are chaſte, know what love is: while the latter, abandoned to debauchery, are acquainted only with enjoyment. Bedouins.

When we conſider how much the condition of the Bedouins, eſpecially in the depths of the deſert, reſembles in many reſpects that of the ſavages of America, we ſhall be inclined to wonder why they have not the ſame ferocity; why, though they ſo often experience the extremity of hunger, the practice of devouring human fleſh was never heard of among them; and why, in ſhort, their manners are ſo much more ſociable and mild. The following reaſons are propoſed by M. Volney as the true ſolution of this difficulty.

It ſeems at firſt view (he obſerves), that America, being rich in paſturage, lakes, and foreſts, is more adapted to the paſtoral mode of life than to any other. But if we conſider that theſe foreſts, by affording an eaſy refuge to animals, protect them more ſurely from the power of man, we may conclude that the ſavage has been induced to become a hunter inſtead of a ſhepherd, by the nature of the country. In this ſtate, all his habits have concurred to give him a ferocity of character. The great fatigues of the chaſe have hardened his body; frequent and extreme hunger, followed by a ſudden abundance of game, has rendered him voracious. The habit of ſhedding blood, and tearing his prey, has familiarized him to the ſight of death and ſufferings. Tormented by hunger, he has deſired fleſh; and finding it eaſy to obtain that of his fellow-creature, he could not long heſitate to kill him to ſatisfy the cravings of his appetite. The firſt experiment made, this cruelty degenerates into a habit; he becomes a cannibal, ſanguinary and atrocious; and his mind acquires all the inſenſibility of his body.

The ſituation of the Arab is very different. Amid his vaſt naked plains, without water and without foreſts, he has not been able, for want of game or fiſh, to become either a hunter or a fiſherman. The camel has determined him to a paſtoral life, the manners of which have influenced his whole character. Finding

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Bedouins. at hand a light, but conſtant and ſufficient nouriſhment, he has acquired the habit of frugality. Content with his milk and his dates, he has not deſired fleſh; he has ſhed no blood: his hands are not accuſtomed to ſlaughter, nor his ears to the cries of ſuffering creatures; he has preſerved a humane and ſenſible heart.

No ſooner did the ſavage ſhepherd become acquainted with the uſe of the horſe, than his manner of life was conſiderably changed. The facility of paſſing rapidly over extenſive tracts of country, rendered him a wanderer. He was greedy from want, and became a robber from greedineſs; and ſuch is in fact his preſent character. A plunderer, rather than a warrior, the Arab poſſeſſes no ſanguinary courage; he attacks only to deſpoil; and if he meets with reſiſtance, never thinks a ſmall booty is to be put in competition with his life. To irritate him, you muſt ſhed his blood; in which caſe he is found to be as obſtinate in his vengeance as he was cautious in avoiding danger.

The Bedouins have often been reproached with this ſpirit of rapine; but without wiſhing to defend it, we may obſerve that one circumſtance has not been ſufficiently attended to, which is, that it only takes place towards reputed enemies, and is conſequently founded on the acknowledged laws of almoſt all nations. Among themſelves they are remarkable for a good faith, a diſintereſtedneſs, a generoſity, which would do honour to the moſt civilized people. What is there more noble than that right of aſylum ſo reſpected among all the tribes? A ſtranger, nay even an enemy, touches the tent of the Bedouin, and from that inſtant his perſon becomes inviolable. It would be reckoned a diſgraceful meanneſs, an indelible ſhame, to ſatisfy even a juſt vengeance at the expence of hoſpitality. Has the Bedouin conſented to eat bread and ſalt with his gueſt, nothing in the world can induce him to betray him. The power of the ſultan himſelf would not be able to force a refugee from the protection of a tribe, but by its total extermination. The Bedouin, ſo rapacious without his camp, has no ſooner ſet his foot within it, than he becomes liberal and generous. What little he poſſeſſes he is ever ready to divide. He has even the delicacy not to wait till it is aſked: when he takes his repaſt, he affects to ſeat himſelf at the door of his tent, in order to invite the paſſengers; his generoſity is ſo ſincere, that he does not look upon it as a merit, but merely as a duty; and he therefore readily takes the ſame liberty with others. To obſerve the manner in which the Arabs conduct themſelves towards each other, one would imagine that they poſſeſſed all their goods in common. Nevertheleſs they are no ſtrangers to property; but it has none of that ſelfiſhneſs which the increaſe of the imaginary wants of luxury has given it among poliſhed nations. Deprived of a multitude of enjoyments which nature has laviſhed upon other countries, they are leſs expoſed to temptations which might corrupt and debaſe them. It is more difficult for their ſhaiks to form a faction to enſlave and impoveriſh the body of the nation. Each individual, capable of ſupplying all his wants, is better able to preſerve his character and independence; and private poverty becomes at once the foundation and bulwark of public liberty.

This liberty extends even to matters of religion. We obſerve a remarkable difference between the Arabs of the towns and thoſe of the deſert; ſince, while the former crouch under the double yoke of political and religious deſpotiſm, the latter live in a ſtate of perfect freedom from both: it is true, that on the frontiers of the Turks, the Bedouins, from policy, preſerve the appearance of Mahometaniſm; but ſo relaxed is their obſervance of its ceremonies, and ſo little fervour has their devotion, that they are generally conſidered as infidels, who have neither law nor prophets. They even make no difficulty in ſaying that the religion of Mahomet was not made for them: "For (add they) how ſhall we make ablutions who have no water? How can we beſtow alms who are not rich? Why ſhould we faſt in the Ramadan, ſince the whole year with us is one continual faſt? and what neceſſity is there for us to make the pilgrimage to Mecca, if God be preſent everywhere?" In ſhort, every man acts and thinks as he pleaſes, and the moſt perfect toleration is eſtabliſhed among them.

Bedriacum || Bee.

BEDRIACUM, in *Ancient Geography* a village of Italy, ſituated, according to Tacitus, between Verona and Cremona, but nearer the latter than the former. From the account given by that hiſtorian, Cluverius conjectures that the ancient Bedriacum ſtood in the place where the city of Caneto now ſtands. This village was remarkable for the defeat of the emperor Galba by Otho, and afterwards of Otho by Vitellius.

BEDWIN MAGNA, a village five miles ſouth of Hungerford in Berkſhire in England. It has neither market nor fair; but is a borough by preſcription, and ſends two members to parliament. It is ſaid to have been a conſiderable place in the time of the Saxons, and that the traces of its fortifications are ſtill extant.

BEE, in *Natural Hiſtory*, a genus of inſects, for the characters and claſſification of which ſee APIS, ENTOMOLOGY *Index*. The mellifica, or domeſtic honey-bee, its hiſtory and economy, form the ſubject of this article.

I Deſcription of the honey-bee.

This ſpecies is furniſhed with downy hairs; has a duſky-coloured breaſt, and browniſh belly; the tibiæ of the hind-legs are ciliated, and tranſverſely ſtreaked on the inſide. Each foot terminates in two hooks, with their points oppoſite to each other; in the middle of theſe hooks there is a little thin appendix, which, when unfolded, enables the inſects to faſten themſelves to glaſs or the moſt poliſhed bodies. This part they likewiſe employ for tranſmitting the ſmall particles of crude wax, which they find upon flowers to the cavity in their thigh, hereafter deſcribed. The queen and drones, who never collect wax in this manner, have no ſuch cavity. This ſpecies is alſo furniſhed with a proboſcis or trunk, which ſerves to extract the honey from flowers; and has, beſides, a real mouth ſituated in the forepart of the head, with which it is able to feed on the farina of flowers, from which afterwards is made wax. The belly is divided into ſix rings or joints; which ſometimes ſhorten the body, by ſlipping the one over the other. In the inſide of the belly there is a ſmall bladder or reſervoir, in which the honey is collected, after having paſſed through the proboſcis and a narrow pipe which runs through the head and breaſt. This bladder, when full of honey, is about the ſize of a ſmall pea.

The

Bee.

The ſting, which is ſituated at the extremity of the belly, is a very curious weapon; and, when examined by the microſcope, appears of a ſurpriſing ſtructure. It has a horny ſheath or ſcabbard, which includes two bearded darts. This ſheath ends in a ſharp point near the extremity of which a ſlit opens, through which, at the time of ſtinging, the two bearded darts are protruded beyond the end of the ſheath: one of theſe is a little longer than the other, and fixes its beard firſt: and the other inſtantly following, they penetrate alternately deeper and deeper, taking hold of the fleſh with their beards or hooks, till the whole ſting is buried in the fleſh; and then a venomous juice is injected through the ſame ſheath, from a little bag at the root of the ſting. Hence the wound occaſions an acute pain and ſwelling of the part, which ſometimes continues ſeveral days. Theſe effects are beſt remedied by enlarging the wound directly to give it ſome diſcharge. This poiſon ſeems to owe its miſchievous efficacy to certain pungent ſalts. Let a bee be provoked to ſtrike its ſting againſt a plate of glaſs, and there will be a drop of the poiſon diſcharged and left upon the glaſs. This being placed under a double microſcope, as the liquor evaporates, the ſalts will be ſeen to concrete, forming oblong, pointed, clear cryſtals.—Mr Derham counted on the ſting of a waſp eight beards on the ſide of each dart, ſomewhat like the beards of fiſh-hooks; and the ſame number is to be counted on the darts of the bee's ſting. When theſe beards are ſtruck deep in the fleſh, if the wounded perſon ſtarts, or diſcompoſes the bee before it can diſengage them, the ſting is left behind ſticking in the wound: but if he have patience to ſtand quiet, the creature brings the hooks down cloſe to the ſides of the darts, and withdraws the weapon; in which caſe, the wound is always much leſs painful. The danger of being ſtung by bees may be in a great meaſure prevented by a quiet compoſed behaviour. A thouſand bees will fly and buzz about a perſon without hurting him, if he ſtand perfectly ſtill, and forbear diſturbing them even when near his face; in which caſe he may obſerve them for hours together without danger; but if he moleſts or beats them away, he uſually ſuffers for it. It has been lately affirmed *, that a perſon is in perfect ſafety in the midſt of myriads of bees, if he but carefully keep his mouth ſhut, and breathe gently through the noſtrils only; the human breath, it would ſeem, being peculiarly offenſive to their delicate organs: and merely with this precaution, it is ſaid, the very hives may be turned up, and even part of the comb cut out, while the bees are at work.

2 Its ſting.

* See *Edinburgh Medical Commentaries*, vol. iv. p. 352.

I. Economy, Inſtincts, &c. *of the* Honey-bee.

We may conſider a hive of bees as a well-peopled city, in which are commonly found from 15,000 to 18,000 inhabitants. This city is in itſelf a monarchy;—compoſed of a *queen;* of males which are the *drones;* and of *working bees*, which have been ſuppoſed and called neuters. The combs, which are of pure wax, ſerve as their magazine of ſtores, and for the nurſing places of their young offspring. There is between the combs a ſpace ſufficient for two bees to march abreaſt, without embarraſſing each other; and in ſome parts it is more ſpacious. There are alſo holes, or narrow paſſes, which croſs the combs tranſverſely, and are intended to ſhorten the way when the bees paſs from one comb to another.

Bee.

The Queen is eaſily diſtinguiſhed from the other bees by the form of her body: ſhe is longer and larger than they are, and her wings are much ſhorter than theirs in proportion to her body; for the wings of the other bees cover their whole body, whereas thoſe of the queen hardly reach beyond her middle, or end at about the third ring of her belly. Her hinder parts are more taper than thoſe of the other bees, terminating ſharper. Her belly and legs are of a deep yellow, much reſembling the pureſt gold. She is unwieldy in her flight, a reaſon for her ſeldom flying but when ſhe leaves the parent-hive to go and ſettle a colony. All the bees form her retinue, and like dutiful ſubjects repair to the place ſhe chooſes. She is armed with a vigorous ſting. Leſs paſſionate however than her ſubjects, ſhe only uſes her ſting when long provoked, or when in conteſt for imperial ſway. Never more than one remains in a hive, and that is the conqueror.

5 Queen bee.

A hive of bees cannot ſubſiſt without a queen, as ſhe alone produces their numerous poſterity; and on this account their fidelity and attachment to their ſovereign is admirable.

4 Attachment of her ſubjects.

Mr Wildman, by his dexterity in the management of bees, ſome years ago, ſurpriſed the whole kingdom. He can cauſe a ſwarm to light where he pleaſes, almoſt inſtantaneouſly; he can order them to ſettle on his head, then remove them to his hand; command them to depart and ſettle on a window, table, &c. at pleaſure. We ſhall ſubjoin his method of performing theſe feats in his own words:

5 Mr Wildman's feats by means of the queen.

"Long experience has taught me, that as ſoon as I turn up a hive, and give it ſome taps on the ſides and bottom, the queen immediately appears, to know the cauſe of this alarm; but ſoon retires again among her people. Being accuſtomed to ſee her ſo often, I readily perceive her at firſt glance; and long practice has enabled me to ſeize her inſtantly, with a tenderneſs that does not in the leaſt endanger her perſon. This is of the utmoſt importance; for the leaſt injury done to her brings immediate deſtruction to the hive, if you have not a ſpare queen to put in her place, as I have too often experienced in my firſt attempts. When poſſeſſed of her, I can without injury to her, or exciting that degree of reſentment that may tempt her to ſting me, ſlip her into my other hand, and, returning the hive to its place, hold her there, till the bees miſſing her, are all on wing, and in the utmoſt confuſion. When the bees are thus diſtreſſed, I place the queen wherever I would have the bees to ſettle. The moment a few of them diſcover her, they give notice to thoſe near them, and thoſe to the reſt; the knowledge of which ſoon becomes ſo general, that in a few minutes they all collect themſelves round her; and are ſo happy in having recovered this ſole ſupport of their ſtate, that they will long remain quiet in their ſituation. Nay, the ſcent of her body is ſo attractive of them, that the ſlighteſt touch of her, along any place or ſubſtance, will attach the bees to it, and induce them to purſue any path ſhe takes." This was the only witchcraft uſed by Mr Wildman, and is that alone which is practiſed by others who have ſince made ſimilar exhibitions. In ſhort, ſeize on the queen, and you

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Bee. are ſure of leading all the bees of a hive to any place you pleaſe.

6 Conſequences of her death, &c. When a queen dies by an accident, the bees of her hive immediately ceaſe working, conſume their own honey, fly about their own and other hives at unuſual hours when other bees are at reſt, and pine away if not ſoon ſupplied with another ſovereign. Her loſs is proclaimed by a clear and interrupted humming. This ſign ſhould be a warning to the owner of the bees, to take what honey remains in the hive, or to procure them another queen. In this laſt caſe, the flock inſtantly revives; pleaſure and activity are apparent through the whole hive; the preſence of the ſovereign reſtores vigour and exertion, and her voice commands univerſal reſpect and obedience: of ſuch importance is the queen to the exiſtence and proſperity of the other members of this community.

The diſſection of the queen-bee ſhows evidently that ſhe lays many thouſand eggs. It is computed that the ovaria of a queen-bee contain more than 5000 eggs at one time; and therefore it is not difficult to conceive that a queen-bee may produce 10,000 or 12,000 bees, or even more, in the ſpace of two months.

7 Of the drones. The common DRONES are ſmaller than the queen, and larger than the working bees; and in flying they make a greater noiſe. The diſſection of the drone gives as great proof of its being the male, as that of the queen does of her being female. In this creature there is no appearance of ovaries or eggs, nor any thing of the ſtructure of the common working bees, but the whole abdomen is filled with tranſparent veſſels, winding about in various ſinuoſities, and containing a white or milky fluid. This is plainly analogous to that fluid in the males of other animals, which is deſtined to render the eggs of the female prolific; and this whole apparatus of veſſels, which much reſembles the turnings and windings of the ſeminal veſſels in other animals, is plainly intended only for the preparation and retention of this matter, till the deſtined time of its being emitted. On ſqueezing the hinder parts alſo, may be forced out the penis, a ſmall and ſlender fleſhy body, contained between two horns of a ſomewhat harder ſubſtance, which join at their baſe, but gradually part aſunder as they are continued in length. Theſe parts, found in all the drones, and none of them in any other bees except theſe, ſeem to prove very evidently the difference of ſex. If a hive is opened in the beginning of ſpring, not a ſingle drone will be found in it; from the middle of May till the end of June, hundreds of them will be found, commonly from 200 or 300 to 1000; and from thence to the following ſpring it would be in vain to ſeek for them. They go not out till 11 in the morning, and return before ſix in the evening. But their expeditions are not thoſe of induſtry. They have no ſting, their roſtrum and feet are not adapted for collecting wax and honey, nor indeed are they obliged to labour. They only hover upon flowers to extract the ſweets, and all their thoughts are pleaſure. Their office is, to impregnate the eggs of the queen after they are depoſited in the cells. And while their preſence is thus neceſſary, they are ſuffered to enjoy the ſweets of love and life; but as ſoon as they become uſeleſs in the hive, the working bees declare the moſt cruel war againſt them, and make terrible ſlaughter of them. This war affects not only the bees already in life, but even the eggs and maggots; for the law which has pronounced the deſtruction of the males has no exception, it extends equally to thoſe which do not yet breathe and to thoſe which do; the hive is cleared of every egg, maggot, or nymph; the whole is torn away and carried off. After the ſeaſon proper for increaſing the number of bees is paſt, and when they ſhould attend only to the ſupplying of their magazines ſufficiently with winter ſtores, every veſtige of the drones is deſtroyed, to make room for honey. Whenever theſe drones are obſerved to remain in a hive late in the autumn, it is held to be a bad ſign of the ſtate of the hive. Bee.

But beſides theſe larger drones, Maraldi and Reaumur had long ago diſcovered that there were others of a leſſer ſize, not exceeding that of the common working bees. This fact, however, was not fully aſcertained before the late experiments of Mr Debraw, to be afterwards mentioned. It is well known, as has been already noticed, that the large drones never appear in the hive before the middle of April; that they are all dead before the end of Auguſt, when the principal breeding ſeaſon terminates; and that they are deſtroyed, together with all their worms or nymphs, by the working bees, probably by order of the queen, to ſave honey: yet it is equally certain, that the bees begin to breed early in the ſpring, ſometimes in February, if the weather is mild; and that many broods are completed before theſe drones appear. But if drones of a ſmaller ſize are ſuffered to remain, which in a time of ſcarcity conſume leſs honey than the others, theſe will anſwer the purpoſe of ſupplying the early broods, and the larger drones are produced againſt a time of greater plenty. Some obſervers affirm, that the ſmaller drones are all dead before the end of May, when the larger ſpecies appear and ſuperſede their uſe. Theſe circumſtances accord with the ſuggeſtion of Abbé le Pluche in his *Spectacle de la Nature*, That a ſmall number of drones are reſerved to ſupply the neceſſities of the enſuing year; and that theſe drones are very little, if at all, larger than the common bees.

8 The working bees. The WORKING BEES compoſe the greateſt body of the ſtate. Columella informs us, that the ancients diſtinguiſhed ſeveral kinds of them. He joins in opinion with Virgil, who approves of thoſe which are ſmall, oblong, ſmooth, bright, and ſhining, of a gentle and mild diſpoſition: "for," continues he, "by how much the larger and rounder the bee is, by ſo much the worſe it is; but if it be fierce and cruel, it is the worſt of all. The angry diſpoſition of bees of a better character is eaſily ſoftened by the frequent intercourſe of thoſe who take care of them, for they grow more tame when they are often handled." The experience of ages has now eſtabliſhed the ſort of bees which have been found to anſwer beſt the purpoſes of keeping them.

The working bees have the care of the hive, collect the wax and honey, fabricate and work up the wax, build the cells, feed the young, keep the hive clean, drive from thence ſtrangers, and employ themſelves in all other concerns relating to the hive.

The working bee has two ſtomachs; one which contains the honey, and a ſecond in which is contained the

Bee. crude wax. The working bees have no parts analogous to the ovaria of the queen, or that reſemble the male organs of the drones. Hence they have generally been ſuppoſed to be neutral or of neither ſex. But a different doctrine has lately been eſtabliſhed; which there will be occaſion to notice in the ſequel.

The ſting is very neceſſary for a working bee, both as an offenſive and as a defenſive weapon: for their honey and wax excite the envy of many greedy and lazy inſects; and they have alſo to defend themſelves againſt enemies who are fonder of eating them than their honey. There is likewiſe a time when the drones muſt be ſacrificed and exterminated for the good of the ſociety; and as they are larger and ſtronger than the working bees, theſe laſt would have a very unequal match, were it not for this poiſonous ſting.

9 Of their battles. There happen alſo among bees, either of the ſame or of different hives, moſt deadly feuds, in which their ſtings are their chief weapons. In theſe conteſts, great ſkill may be diſcerned in their manner of pointing the ſting between the ſcaly rings which cover their bodies, or to ſome other eaſily vulnerable part. The bee which firſt gains the advantage remains the conqueror; though the victory coſts the victor his life, if he has left his ſting in the body of the enemy; for, with the ſting, ſo much of his body is torn out, that death inevitably follows. Bees have very ſevere conflicts when whole hives engage in a pitched battle, and many are ſlain on both ſides. Their fighting and plundering one another ought chiefly to be imputed, as Mr Thorley obſerves, either to their perfect abhorrence of ſloth and idleneſs, or to their inſatiable thirſt for honey; for when, in ſpring or autumn, the weather is fair, but no honey can be collected from plants, and is to be found only in the hives of other bees, they will venture their lives to get it there.

Dr Warder aſſigns another cauſe of their fighting; which is, the neceſſity that the bees are reduced to when their own hive has been plundered, at a ſeaſon when it is too late for them to repair the loſs by any induſtry in the fields.

Sometimes one of the queens is killed in battle. In this caſe, the bees of both hives unite as ſoon as her death is generally known among them. All then become one people; the vanquiſhed go off with the robbers, richly laden with their own ſpoils, and return every day with their new aſſociates to pillage their old habitation. This cauſes a throng, unuſual for the ſeaſon, at the door of the hive they are plundering; and if the owner lifts it up at night, when all are gone home, he will find it empty of inhabitants; though there perhaps will remain in it ſome honey, which he takes as his property.

When two ſwarms take flight at the ſame time, they ſometimes quarrel, and great numbers are deſtroyed on both ſides, till one of the queens is ſlain. This ends the conteſt, and the bees of both ſides unite under the ſurviving ſovereign.

10 Their labours. When the bees begin to work in their hives, they divide themſelves into four companies: one of which roves in the fields in ſearch of materials; another employs itſelf in laying out the bottom and partitions of their cells; a third is employed in making the inſide ſmooth from the corners and angles; and the fourth company brings food for the reſt, or relieves thoſe who return with their reſpective burdens. But they are not kept conſtant to one employment; they often change the taſks aſſigned them: thoſe that have been at work being permitted to go abroad, and thoſe that have been in the fields already take their places. They ſeem even to have ſigns, by which they underſtand each other: for when any of them want food, it bends down its trunk to the bee from whom it is expected, which then opens its honey-bag, and lets ſome drops fall into the other's mouth, which is at that time opened to receive it. Their diligence and labour is ſo great, that, in a day's time, they are able to make cells which lie upon each other numerous enough to contain 3000 bees. Bee.

11 Of the combs. In the plan and formation of theſe cells they diſcover a moſt wonderful ſagacity. In conſtructing habitations within a limited compaſs, an architect would have three objects in view: firſt, to uſe the ſmalleſt quantity that can be of materials; next, to give to the edifice the greateſt capacity in a determined ſpace; and thirdly, to employ the ſpot in ſuch a manner that none of it may be loſt. On examination it would be found that the bees have obtained all theſe advantages in the hexagonal form of their cells: for, firſt, there is an economy of wax, as the circumference of one cell makes part of the circumferences of thoſe contiguous to it; ſecondly, the economy of the ſpot, as thoſe cells which join to one another leave no void between them; and thirdly, the greateſt capacity or ſpace; as, of all the figures which can be contiguous, that with ſix ſides gives the largeſt area. This thriftineſs prompts them to make the partitions of their cells thin; yet they are conſtructed ſo as that the ſolidity may compenſate for the ſcantineſs of materials. The parts moſt liable to injury are the entrance of the cells. Theſe the bees take care to ſtrengthen, by adding quite round the circumference of the apertures a fillet of wax, by which means this mouth is three or four times thicker than the ſides: and they are ſtrengthened at the bottom by the angle formed by the bottom of three cells falling in the middle of an oppoſite cell. The combs lie parallel to each other; and there is left between every one of them a ſpace which ſerves as a ſtreet, broad enough for two bees to paſs by each other. There are holes which go quite through the combs, and ſerve as lanes for the bees to paſs from one comb to another, without being obliged to go a great way about. When they begin their combs, they form at the top of the hive a root or ſtay to the whole edifice, which is to hang from it. Though they generally lay the foundations of the combs ſo that there ſhall be no more between them than what is ſufficient for two bees to paſs, yet they ſometimes place thoſe beginnings of two combs too far aſunder; and, in this caſe, in order to fill up part of the void ſpace ariſing from that bad diſpoſition, they carry their combs on obliquely, to make them gradually approach each other. This void ſpace is ſometimes ſo conſiderable, that the bees build in it an intermediate comb, which they terminate as ſoon as the original combs have only their due diſtances. As the combs would be apt, when full, to overcome by their weight all the ſecurity which the bees can give them againſt falling, they who prepare hives ſet in them, croſswiſe, ſticks, which ſerve as props to the combs, and ſaves the bees a great deal of labour. It is

not

Bee. not eaſy to diſcover the particular manner of their working; for, notwithſtanding the many contrivances uſed for this purpoſe, there are ſuch numbers in continual motion, and ſucceed one another with ſuch rapidity, that nothing but confuſion appears to the ſight. Some of them, however, have been obſerved carrying pieces of wax in their talons, and running to the places where they are at work upon the combs. Theſe they faſten to the work by means of the ſame talons. Each bee is employed but a very ſhort time in this way: but there is ſo great a number of them that go on in a conſtant ſucceſſion, that the comb increaſes very perceptibly. Beſides theſe, there are others that run about beating the work with their wings and the hinder part of their body, probably with a view to make it more firm and ſolid.

Whilſt part of the bees are occupied in forming the cells, others are employed in perfecting and poliſhing thoſe that are new modelled. This operation is performed by their talons, taking off every thing that is rough and uneven. Theſe poliſhers are not ſo deſultory in their operations as thoſe that make the cells; they work long and diligently, never intermitting their labour, excepting to carry out of the cell the particles of wax which they take off in poliſhing. Theſe particles are not allowed to be loſt; others are ready to receive them from the poliſhers, and to employ them in ſome other part of the work.

12 Of their building-materials, and proviſions. 1. *Wax.*

The balls which we ſee attached to the legs of bees returning to the hives are not wax, but a powder collected from the ſtamina of flowers, and yet brought to the ſtate of wax. The ſubſtance of theſe balls, heated in any veſſel, does not melt as wax would do, but becomes dry, and hardens: it may even be reduced to a coal. If thrown into water, it will ſink; whereas wax ſwims. To reduce this crude ſubſtance into wax, it muſt firſt be digeſted in the body of the bee.

Every bee, when it leaves the hive to collect this precious ſtore, enters into the cup of the flower, particularly ſuch as ſeem charged with the greateſt quantity of this yellow farina. As the animal's body is covered over with hair, it rolls itſelf within the flower, and quickly becomes quite covered with the duſt, which it ſoon after bruſhes off with its two hind legs, and kneads into two little balls. In the thighs of the hind-legs there are two cavities, edged with hair; and into theſe, as into a baſket, the animal ſticks its pellets. Thus employed, the bee flits from flower to flower, increaſing its ſtore, and adding to its ſtock of wax, until the ball upon each thigh becomes as big as a grain of pepper; by this time having got a ſufficient load, it returns, making the beſt of its way to the hive.

After the bees have brought home this crude ſubſtance, they eat it by degrees; or at other times, three or four bees come and eaſe the loaded bee, by eating each of them a ſhare, the loaded bee giving them a hint ſo to do. Hunger is not the motive of their thus eating the balls of waxy matter, eſpecially when a ſwarm is firſt hived; but it is their deſire to provide a ſpeedy ſupply of real wax for making the combs. At other times, when there is no immediate want of wax, the bees lay this matter up in repoſitories, to keep it in ſtore.

When this waxy matter is ſwallowed, it is, by the digeſtive powers of the bee, converted into real wax, which the bees again diſgorge as they work it up into combs; for it is only while thus ſoft and pliant from the ſtomach that they can fabricate it properly. That the wax thus employed is taken from their ſtomachs, appears from their making a conſiderable quantity of comb ſoon after they are hived, and even on any tree or ſhrub where they have reſted but a ſhort while before their being hived, though no balls were viſible on their legs, excepting thoſe of a few which may be juſt returned from the field. This is farther confirmed by what happened in a ſwarm newly hived: for two days together from the time of their quitting their former home it rained conſtantly, inſomuch that not one bee was able to ſtir out during that time; yet at the end of the two days they had made a comb 15 or 16 inches long, and thick in proportion. Bee.

The crude wax, when brought home by the bees, is often of as different colours as are the flowers from which it is collected: but the new combs are always of a white colour, which is afterwards changed only by the impurities ariſing from the ſteam, &c. of the bees.

Bees collect crude wax alſo for food; for if this was not the caſe, there would be no want of wax after the combs are made: but they are obſerved, even in old hives, to return in great numbers loaded with ſuch matter, which is depoſited in particular cells, and is known by the name of *bee-bread*. We may gueſs that they conſume a great deal of this ſubſtance in food by the quantity collected; which, by computation, may in ſome hives amount to an hundred weight in a ſeaſon, whilſt the real wax in ſuch an hive does not perhaps exceed two pounds.

13 2. The *propolis.*

It is well known that the habitation of bees ought to be very cloſe; and what their hives want from the negligence or unſkilfulneſs of man, theſe animals ſupply by their own induſtry: ſo that it is their principal care, when firſt hived, to ſtop up all the crannies. For this purpoſe they make uſe of a reſinous gum, which is more tenacious than wax, and differs greatly from it. This the ancients called *propolis*. It will grow conſiderably hard in the hive, though it will in ſome meaſure ſoften by heat; and is often found different in conſiſtence, colour, and ſmell. It has generally an agreeable aromatic odour when it is warmed; and by ſome it is conſidered as a moſt grateful perfume. When the bees begin to work with it, it is ſoft; but it acquires a firmer conſiſtence every day, till at length it aſſumes a brown colour, and becomes much harder than wax. The bees carry it on their hinder legs; and ſome think it is met with on the birch, the willow, and poplar. However it is procured, it is certain that they plaſter the inſide of their hives with this compoſition.

14 3. The *honey.*

Honey is originally a juice digeſted in plants, which ſweats through their pores, and chiefly in their flowers, or is contained in reſervoirs in which nature ſtores it. The bees ſometimes penetrate into theſe ſtores, and at other times find the liquor exuded. This they collect in their ſtomachs; ſo that, when loaded with it, they ſeem, to an inattentive eye, to come home without any booty at all.

Beſides the liquor already mentioned, which is obtained from the flowers of plants, another ſubſtance, called *honey-dew* *, has been diſcovered, of which the bees

* See the article *Honey-dew.*

Bee. bees are equally fond. Of this ſubſtance there are two kinds, both deriving their origin from vegetables, though in very different ways.

The firſt kind, the only one known to huſbandmen, and which paſſes for a dew that falls on trees, is no other than a mild ſweet juice, which, having circulated through the veſſels of vegetables, is ſeparated in proper reſervoirs in the flowers, or on the leaves, where it is properly called the *honey-dew:* ſometimes it is depoſited in the pith, as in the ſugar cane; and, at other times, in the juice of pulpy ſummer fruit when ripe. Such is the origin of the manna which is collected on the aſh and maple of Calabria and Briançon, where it flows in great plenty from the leaves and trunks of theſe trees, and thickens into the form in which it is uſually ſeen.

The ſecond kind of honey-dew, which is the chief reſource of bees after the ſpring-flowers and dew by tranſpiration on the leaves are paſt, owes its origin to a ſmall mean inſect†, the excrement thrown out by which makes a part of the moſt delicate honey we ever taſte.

† See the articles *Aphis* and *Honey-dew.*

From whatever ſource the bees have collected their honey, the inſtant they return home, they ſeek cells in which they may diſgorge and depoſite their loads. They have two ſort of ſtores: one which conſiſts of honey laid up for the winter; and the other of honey intended for accidental uſe in caſe of bad weather, and for ſuch bees as do not go abroad in ſearch of it. Their method of ſecuring each of theſe is different. They have in each cell a thicker ſubſtance, which is plaeed over the honey, to prevent its running out of the cell; and that ſubſtance is raiſed gradually as the cell is filled, till the bees, finding that the cell cannot contain any more, cloſe it with a covering of wax, not to be opened till times of want, or during the winter.

15 Of the manneriu which bees breed.

It has been already obſerved, that the cells are intended for other purpoſes beſides being places of ſtore for honey. One of the chief uſes is, their being nurſeries for the young. The cells for thoſe which are to be working bees are commonly half an inch deep; thoſe for drones, three quarters of an inch; and thoſe which are intended for keeping of honey only, ſtill deeper. This accounts for the inequalities obſerved in the ſurface of combs.

The queen-bee is generally concealed in the moſt ſecret part of the hive, and is never viſible but when ſhe lays her eggs in ſuch combs as are expoſed to ſight. When ſhe does appear, ſhe is always attended by ten or a dozen of the common ſort, who form a kind of retinue, and follow her wherever ſhe goes with a ſedate and grave tread. Before ſhe lays her eggs, ſhe examines the cells where ſhe deſigns to lay them; and if ſhe finds that they contain neither honey, wax, nor any embryo, ſhe introduces the poſterior part of her body into a cell, and fixes to the bottom of it a ſmall white egg, which is compoſed of a thin white membrane, full of a whitiſh liquor. In this manner ſhe goes on, till ſhe fills as many cells as ſhe has eggs to lay, which are generally many thouſands. Sometimes more than one egg has been depoſited in the ſame cell; when this is the caſe, the working bees remove the ſupernumerary eggs, and leave only one in each cell. On the firſt or ſecond day after the egg is lodged in the cell, the drone bee injects a ſmall quantity of whitiſh liquid, which, in about a day, is abſorbed by the egg. On the third or fourth day is produced a worm or maggot; which, when it is grown ſo as to touch the oppoſite angle, coils itſelf up in the ſhape of a ſemicircle, and floats in a proper liquid, whereby it is nouriſhed and enlarged in is dimenſions. This liquor is of a whitiſh colour, of the thickneſs of cream, and of an inſipid taſte like flour and water. Naturaliſts are not agreed as to the origin and qualities of this liquid. Some have ſuppoſed, that it conſiſts of ſome generative matter, injected by the working bees into each cell, in order to give fecundity to the eggs: but the moſt probable opinion is, that it is the ſame with what ſome writers have called the *bee-bread;* and that it is a mixture of water with the juices of plants and flowers collected merely for the nutrition of the young, whilſt they are in their weak and helpleſs ſtate. Whatever be the nature of this aliment, it is certain that the common working bees are very induſtrious in ſupplying the worms with a ſufficient quantity of it. The worm is fed by the working bees for about eight days, till one end touches the other in the form of a ring; and when it begins to feel itſelf uneaſy in its firſt poſture, it ceaſes to eat, and begins to unrol itſelf, thruſting that end forward towards the mouth of the cell which is to be the head. The attendant bees, obſerving theſe ſymptoms of approaching transformation, deſiſt from their labours in carrying proper food, and employ themſelves in faſtening up the top of the cell with a lid of wax, formed in concentric circles, and by their natural heat in cheriſhing the brood and haſtening the birth. In this concealed ſtate the worm extends itſelf at full length, and prepares a web of a ſort of ſilk in the manner of the ſilk-worm. This web forms a complete lining for the cell, and affords a convenient receptacle for the transformation of the worm into a nymph or chryſalis. Some naturaliſts ſuppoſe, that as each cell is deſtined to the ſucceſſive breeding of ſeveral worms, the whole web, which is compoſed of many cruſts or doubles, is in reality a collection of as many webs as there have been worms. M. Maraldi apprehends, that this lining is formed of the ſkin of the worms thrown off at its entrance into the nymph ſtate: but it is urged, that if the cells are opened when newly covered by the bees, the worm within will be found in its own form, and detected in the act of ſpinning its web; and by means of glaſſes it will be found compoſed of fine threads regularly woven together, like thoſe of other ſpinning animals. In the ſpace of 18 or 20 days the whole proceſs of transformation is finiſhed, and the bee endeavours to diſcharge itſelf from confinement by forcing an aperture with its teeth through the covering of the cell. The paſſage is gradually dilated; ſo that one horn firſt appears, then the head, and afterwards the whole body. This is uſually the work of three hours, and ſometimes of half a day. The bee, after it has diſengaged itſelf, ſtands on the ſurface of the comb, till it has acquired its natural complexion, and full maturity and ſtrength, ſo as to become fit for labour. The reſt of the bees gather round it in this ſtate, congratulate its birth, and offer it honey out of their own mouths. The exuviæ and ſcattered pieces of wax which are left in the cell are removed by the working bees; and the matrix is no ſooner cleanſed and fit for new fecundation, but the queen depoſites another egg in it; inſomuch that, M. Maraldi

Bee.

Bee. Maraldi ſays, he has ſeen five bees produced in the ſame cell in the ſpace of three months. The young bees are eaſily diſtinguiſhed from the others by their colour; they are gray, inſtead of the yellowiſh brown of the common bees. The reaſon of this is, that their body is black, and the hairs that grow upon it are white, from the mixture of which ſeen together reſults a gray; but this colour forms itſelf into a browniſh yellow by degrees, the rings of the body becoming more brown and the hairs more yellow.

The eggs from which drones are to proceed, are, as already obſerved, laid in larger cells than thoſe of the working bees. The coverings of theſe cells, when the drones are the nymph ſtate, are convex or ſwelling outward, whilſt the cells of the working bees are flat. This, with the privilege of leading idle effeminate lives, and not working for the public ſtock, is what diſtinguiſhes the drones.

The bees depart from their uſual ſtyle of building when they are to raiſe cells for bringing up ſuch maggots as are deſtined to become queens. Theſe are of a longiſh oblong form, having one end bigger than the other, with their exterior ſurface full of little cavities. Wax, which is employed with ſo geometrical a thriftineſs in the raiſing of hexagonal cells, is expended with profuſion in the cell which is to be the cradle of a royal maggot. They ſometimes fix it in the middle, and at other times on one ſide of a comb. Several common cells are ſacrificed to ſerve as a baſis and ſupport to it. It is placed almoſt perpendicular to the common cells, the largeſt end being uppermoſt. The lower end is open till the ſeaſon for cloſing it comes, or till the maggot is ready for transformation. It would be difficult to conceive how a tender maggot can remain in a cell turned bottom upmoſt, if we did not find it buried in a ſubſtance ſcarcely fluid, and if it was not in itſelf, at firſt, ſmall and light enough to be ſuſpended in this clammy paſte. As it grows it fills all the upper and larger part of the cell. As ſoon as the young queen comes out of her cell, that cell is deſtroyed, and its place is ſupplied by common cells; but as the foundation of the royal cell is left, this part of the comb is found thicker than any other. There are ſeveral ſuch cells prepared: for if there was only one reared in each hive, the ſwarms might often want a conductreſs. Many accidents may alſo deſtroy the little maggot before it becomes a bee. It is therefore neceſſary that a number of ſuch cells ſhould be provided; and accordingly there are obſerved ſeveral young queens in the beginning of the ſummer, more than one of which often takes flight when a ſwarm departs.

A young queen is in a condition to lead a ſwarm from a hive in which ſhe was born in four or five days after ſhe has appeared in it with wings. The bees of a ſwarm are in a great hurry when they know that their queen is ready to lay. In this caſe, they give to their new cells but part of the depth they are to have, and defer the finiſhing of them till they have traced the number of cells requiſite for the preſent time. The cells firſt made are intended only for working bees; theſe being the moſt neceſſary.

16 Of their ſwarming. When the hive is become too much crowded by the addition of the young brood, a part of the bees think of finding themſelves a more commodious habitation, and with that view ſingle out the moſt forward of the young queens. A new ſwarm is therefore conſtantly Bee. compoſed of one queen at leaſt, and of ſeveral thouſand working bees, as well as of ſome hundreds of drones. The working bees are ſome old, ſome young.

Scarce has the colony arrived at its new habitation, when the working bees labour with the utmoſt diligence to procure materials for food and building. Their principal aim is not only to have cells in which they may depoſite their honey: a ſtronger motive ſeems to animate them. They ſeem to know that their queen is in haſte to lay her eggs. Their induſtry is ſuch, that in 24 hours they will have made combs 20 inches long, and wide in proportion. They make more wax during the firſt fortnight, if the ſeaſon is favourable, than they do during all the reſt of the year. Other bees are at the ſame time buſy in ſtopping all the holes and crevices they find in their new hive, in order to guard againſt the entrance of inſects which covet their honey, their wax, or themſelves; and alſo to exclude the cold air, for it is indiſpenſably neceſſary that they be lodged warm.

When the bees firſt ſettle in ſwarming, indeed when they at any time reſt themſelves, there is ſomething very particular in their method of taking their repoſe. It is done by collecting themſelves in a heap, and hanging to each other by their feet. They ſometimes extend theſe heaps to a conſiderable length. It would ſeem probable to us, that the bees from which the others hang muſt have a conſiderable weight ſuſpended to them. All that can be ſaid is, that the bees muſt find this to be a ſituation agreeable to themſelves. They may perhaps have a method of diſtending themſelves with air, thereby to leſſen their ſpecific gravity; in the ſame manner as fiſhes do in order to alter their gravity compared with water.

When a ſwarm divides into two or more bands, which ſettle ſeparately, this diviſion is a ſure ſign that there are two or more queens among them. One of theſe cluſters is generally larger than the other. The bees of the ſmaller cluſter, or cluſters, detach themſelves by little and little, till at laſt the whole, together with the queen or queens, unite with the largeſt cluſter.

As ſoon as the bees are ſettled, the ſupernumerary queen or queens muſt be ſacrificed to the peace and tranquillity of the hive. This execution generally raiſes a conſiderable commotion in the hive; and ſeveral other bees, as well as the queen or queens, loſe their lives. Their bodies may be obſerved on the ground, near the hive. The queen that is choſen is of a more reddiſh colour than thoſe which are deſtroyed: ſo that fruitfulneſs ſeems to be a great motive of preference in bees; for the nearer they are to the time of laying their eggs, the bigger, larger, and more ſhining are their bodies. The method of hiving theſe ſwarms will be explained hereafter.

17 Other inſtincts. Beſides the capital inſtincts above-mentioned, bees are poſſeſſed of others, ſome of which are equally neceſſary for their preſervation and happineſs.—They anxiouſly provide againſt the entrance of inſects into the hive, by gluing up with wax the ſmalleſt holes in the ſkep. Some ſtand as centinels at the mouth of the hive, to prevent inſects of any kind from getting in. But if a ſnail, or other large inſect ſhould get in, notwithſtanding all reſiſtance, they ſting it to death; and then cover it over with a coat of propolis, to prevent

Bee. vent the bad ſmell or maggots which might proceed from the putrefaction of ſuch a large animal. Bees ſeem to be warned of the appearance of bad weather by ſome particular feeling. It ſometimes happens, even when they are very aſſiduous and buſy, that they on a ſudden ceaſe from their work; not a ſingle one ſtirs out; and thoſe that are abroad hurry home in ſuch prodigious crowds, that the doors of their habitations are too ſmall to admit them. On this occaſion, look up to the ſky, and you will ſoon diſcover ſome of thoſe black clouds which denote impending rain. Whether they ſee the clouds gathering for it, as ſome imagine, or whether (as is much more probable) they feel ſome other effects of it upon their bodies, is not yet determined; but it is alleged, that no bee is ever caught even in what we call a ſudden ſhower, unleſs it have been at a very great diſtance from the hive, or have been before injured by ſome accident, or be ſickly and unable to fly ſo faſt as the reſt. Cold is a great enemy to them. To defend themſelves againſt its effects during a hard winter, they crowd together in the middle of the hive, and buzz about, and thereby excite a warmth which is often perceptible by laying the hand upon the glaſs windows of the hive. They ſeem to underſtand one another by the motions of their wings: When the queen wants to quit the hive, ſhe gives a little buzz; and all the others immediately follow her example, and retire along with her.

18 Age of bees. As to the age of bees, the large drones live but a little while, being deſtroyed without mercy by the working bees, probably to ſave honey, as already noticed. But of the other ſort lately diſcovered, no larger than the working bees, and not eaſily to be diſtinguiſhed from them, the age has not yet been aſcertained. Writers are not agreed as to the age of the working bees. Some maintain that they are annual, and others ſuppoſe that they live many years. Many of them, it is well known, die annually of hard labour; and though they may be preſerved by ſucceſſion in hives or colonies for ſeveral years, the moſt accurate obſervers are of opinion that their age is but a year, or at the longeſt no more than two ſummers.

19 Opinions concerning the ſex and fecundation of bees. Concerning the ſex and fecundation of bees, various experiments have been made of late years, by which new light has been thrown upon the ſubject, and ſeveral difficulties which embarraſſed the proceſs of generation among theſe curious inſects ſeem to have been removed.

Swammerdam, and after him Maraldi, diſcovered in the ſtructure of the drones ſome reſemblance to the male organs of generation, as has already been deſcribed, and from thence concluded that they were the males: but neither of thoſe accurate and induſtrious obſervers could detect them in the act of copulation. Swammerdam, therefore, entertained a notion, that the female or queen-bee was fecundated without copulation; that it was ſufficient for her to be near the males; and that her eggs were impregnated by a kind of vivifying aura, exhaled from the body of the males, and abſorbed by the female. However, M. Reaumur thought that he had diſcovered the actual copulation of the drones with the female-bee, and he has very minutely deſcribed the proceſs of it. A very ingenious naturaliſt * of the preſent day, without taking any notice of recent diſcoveries, ſeems to have given into the ſame idea.

* *Barbut, Genera of Inſects*, p. 268.

"The office of the males or drones (ſays he) is to render the queen pregnant. One ſingle female ſhould in the midſt of ſeven or eight hundred males, one would think, be inceſſantly aſſailed. But nature has provided againſt that inconvenience, by making them of a conſtitution extremely frigid. The female chooſes out one that pleaſes her; ſhe is obliged to make the firſt advances, and excite him to love by her careſſes. But this favour proves fatal to him: ſcarce has he ceaſed from amorous dalliance, but he is ſeen to periſh. The pleaſure of theſe obſervations may be taken, by putting a female with ſeveral males into a bottle."

Others again, as M. Shirach and M. Hattorf, reject the drones as bearing no ſhare at all in the buſineſs of propagation, and aſſert the queen-bee to be ſelf-prolific. But for what purpoſe then ſhould wiſe nature have furniſhed the drones with that large quantity of ſeminal liquor? to what uſe ſo large an apparatus of fecundating organs ſo well deſcribed by Reaumur and Maraldi? The fact is, that the above gentlemen have founded their opinion upon obſervations that hives are peopled at a time of the year when (as they ſuppoſe) there are no drones in being. But we have already noticed, that nature has provided drones of different ſizes for the purpoſe of impregnation, adapted to different times, occaſions, and circumſtances: And the miſtake of Meſſrs Shirach and Hattorff ſeems to have proceeded from their miſſing the large-ſized drones, and not being acquainted with or not adverting to the other ſort, ſo hardly diſtinguiſhable from the working bees.

Laſtly, many of the ancients as well as moderns have ſuppoſed that the eggs of the female bee are not impregnated with the male ſperm, while in the body of the creature, but that they are depoſited unimpregnated in the cells; and that the male afterwards ejects the male ſperm on them as they lie in the cells, in the ſame manner as the generation of fiſhes is ſuppoſed to be performed by the males impregnating the ſpawn after it is caſt out by the females. M. Maraldi† long ſince conjectured that this might be the caſe; and he was confirmed in his opinion, by obſerving a liquid whitiſh ſubſtance ſurrounding each egg at the bottom of the cell a little while after it has been laid, and that a great number of eggs, which are not encompaſſed by this liquor, remained barren in the cell.

† *Hiſt. Acad. Sc.* 1712. p. 332.

This method of impregnation has been lately eſtabliſhed beyond all contradiction by the obſervations of Mr Debraw of Cambridge‡. Having put ſome bees into glaſs-hives with a large number of drones, he obſerved on the firſt or ſecond day (always before the third) from the time in which the eggs were placed in the cells, which the queen generally lays on the fourth or fifth day after they are put into the hive, that a great number of bees faſtened themſelves to one another, and formed a kind of curtain from the top to the bottom of the hive, probably in order to conceal the proceſs of generation. Mr Debraw, however, could ſoon perceive ſeveral bees, whoſe ſize he was not able to diſtinguiſh, inſerting the poſterior part of their bodies each into a cell, and ſinking into it; after a little while they retired, and he could ſee with the naked eye a ſmall quantity of whitiſh liquor left in the angle of the baſe of each cell containing an egg; this liquor

‡ *Phil. Tranſ.* vol. 67. part i. art. 3.

20 Mr Debraw's experiments and diſcoveries.

Bee. liquor was leſs liquid than honey, and had no ſweet taſte.

In order to prove further that the eggs are fecundated by the males, and that their preſence is neceſſary at the time of breeding, Mr Debraw made the following experiments. They conſiſt in leaving in a hive the queen, with only the common or working bees, without any drones, to ſee whether the eggs ſhe laid would be prolific. To this end, he took a ſwarm, and ſhook all the bees into a tube of water, leaving them there till they were quite ſenſeleſs; by which means he could diſtinguiſh the drones without any danger of being ſtung: Leaving theſe out, therefore, he reſtored the queen and working-bees to their former ſtate, by ſpreading them on a brown paper in the ſun; after this he replaced them in a glaſs-hive, where they ſoon began to work as uſual. The queen laid eggs, which, to his great ſurpriſe, were impregnated; for he imagined he had ſeparated all the drones or males, and therefore omitted watching them; at the end of twenty days he found ſeveral of his eggs had, in the uſual courſe of changes, produced bees, while ſome had withered away, and others were covered with honey. Hence he inferred, that ſome of the males had eſcaped his notice, and impregnated part of the eggs. To convince himſelf of this, he took away all the brood comb that was in the hive, in order to oblige the bees to provide a freſh quantity, being determined to watch narrowly their motions after new eggs ſhould be laid in the cells. On the ſecond day after the eggs were placed in the cells, he perceived the ſame operation that was mentioned before; namely, that of the bees hanging down in the form of a curtain, while others thruſt the poſterior part of their body into the cells. He then introduced his hand into the hive, and broke off a piece of the comb, in which there were two of theſe inſects: he found in neither of them any ſting a (circumſtance peculiar to the drones): upon diſſection, with the aſſiſtance of a microſcope, he diſcovered the four cylindrical bodies which contain the glutinous liquor, of a whitiſh colour, as obſerved by Maraldi in the large drones. He was therefore now under a neceſſity of repeating his experiments, in deſtroying the males, and even thoſe which might be ſuſpected to be ſuch.

He once more immerſed the ſame bees in water; and when they appeared in a ſenſeleſs ſtate, he gently preſsed every one, in order to diſtinguiſh thoſe armed with ſtings from thoſe which had none, and which of courſe he ſuppoſed to be males: of thoſe laſt he found fifty-ſeven, and replaced the ſwarm in a glaſs hive, where they immediately applied again to the work of making cells; and on the fourth or fifth day, very early in the morning, he had the pleaſure to ſee the queen-bee depoſite her eggs in thoſe cells: he continued watching moſt part of the enſuing days, but could diſcover nothing of what he had ſeen before.

The eggs after the fourth day, inſtead of changing in the manner of caterpillars, were found in the ſame ſtate they were the firſt day, except that ſome were covered with honey. A ſingular event happened the next day about noon: all the bees left their own hive, and attempted to get into a neighbouring hive, probably in ſearch of males; but the queen was found dead, having been killed in the engagement.

Bee. To be further ſatisfied, Mr Debraw took the brood-comb, which had not been impregnated, and divided it into two parts: one he placed under a glaſs bell, N° 1. with honey-comb for the bees food, taking care to leave a queen, but no drones, among the bees confined in it: the other piece of brood-comb he placed under another glaſs bell, N° 2. with a few drones, a queen, and a proportionable number of common bees. The reſult was, that in the glaſs N° 1. there was no impregnation, the eggs remained in the ſame ſtate they were in when put into the glaſs; and on giving the bees their liberty on the ſeventh day, they all flew away, as was found to be the caſe in the former experiment; whereas in the glaſs N° 2. the very day after the bees had been put into it, the eggs were impregnated by the drones, the bees did not leave their hives on receiving their liberty, the eggs at the uſual time underwent the neceſſary transformations, and a numerous young colony was produced.

Naturaliſts have obſerved, that the queen bees are produced in a manner peculiar to themſelves, and different from the drones and working bees. Some have ſuppoſed, that the eggs laid by the queen in a hive, and deſtined for the production of queen bees, are of a peculiar kind; but though this is not the caſe, as M. Shirach has lately diſcovered, yet there are particular cells appropriated for this purpoſe. Theſe cells are generally near the edges, and at the bottom of the combs, and ſometimes on the ſides of a honey-comb: they are of an oblong orbicular form, and very ſtrong; and are more or leſs numerous in different hives as occaſion ſeems to require. It has alſo been ſuppoſed, that the matter with which they are nouriſhed is of a different kind and quality from that employed for the nouriſhment of the other bees; that which has been collected out of the royal cells being of a gummy glutinous nature, of a deep tranſparent red, and diſſolving in the fire rather than crumbling to powder.

It has been generally ſuppoſed, that the queen-bee is the only female contained in the hive; and that the working bees are neutral, or of neither ſex. But M. Shirach * has lately eſtabliſhed a different doctrine, which has been alſo confirmed by the later obſervations of Mr Debraw †. According to M. Shirach, all the working or common bees are females in diſguiſe; and the queen-bee lays only two kinds of eggs, viz. thoſe which are to produce the drones, and thoſe from which the working bees are to proceed; and from any one or more of theſe, one or more queens may be produced; ſo that every worm of the latter or common kind, which has been hatched about three days, is capable, under certain circumſtances, of becoming the queen, or mother of a hive. In proof of this doctrine, new and ſingular as it may ſeem, he alleges a number of ſatisfactory and deciſive experiments, which have been ſince verified by thoſe of Mr Debraw. In the early months of the ſpring, and in any preceding month, even ſo late as November, he cut off from an old hive a piece of that part of the comb which contains the eggs of the working bees; taking care, however, that it contained likewiſe worms which had been hatched about three days. He fixed this in an empty hive, or box, together with a portion of honey-comb, &c. or, in other words, with a ſufficiency of food and building materials, or wax for the uſe of the intended colony.

* *Hiſt. Nat de la Reine des Abeilles, &c.*

† *Phil Tranſ.* vol. 67. part i. art. 21

M. Shirach's diſcoveries.

Bee. lony. He then put into, and confined within the ſame box, a ſufficient number of common working bees, taken from the ſame or any other hive. As ſoon as the members of this ſmall community found themſelves deprived of their liberty, and without a queen, a dreadful uproar enſued, which continued generally, with ſome ſhort intervals of ſilence, for the ſpace of about twenty-four hours; during which time it is to be ſuppoſed they were alternately meditating and holding council on the future ſupport of the new republic. On the final ceſſation of this tumult, the general and almoſt conſtant reſult was, that they betook themſelves to work; firſt proceeding to the conſtruction of a royal cell, and then taking the proper meaſures for hatching and feeding the brood encloſed within them. Sometimes even on the ſecond day the foundations of one or more royal cells were to be perceived; the view of which furniſhed certain indications that they had elected one of the encloſed worms to the ſovereignty.

The operation has been hitherto conducted in the houſe. This new colony may now be ſafely truſted in the garden, if the weather be warm, and have the liberty allowed them of paſſing out of the box; of which they inſtantly avail themſelves, and are ſeen in a ſhort time almoſt totally to deſert their new habitation. In about two hours, however, they begin to re-enter it. We ſhould not neglect to obſerve, that if they ſhould be placed near the old hive, from which they were taken, they will very often attempt to enter it, but are as conſtantly repulſed by their former companions and brethren. It is prudent, therefore, to place them at a diſtance from the mother ſtate, in order to avoid the inconveniences of a civil war. The final reſult of the experiment is, that the colony of working bees thus ſhut up, with a morſel of common brood, not only hatch it, but are found, at the end of eighteen or twenty days, to have produced from thence one or two queens; which have apparently proceeded from worms of the common ſort, pitched upon by them for that purpoſe; and which, under other circumſtances, that is, if they had remained in the old hive, there is reaſon to ſuppoſe would have been changed into common working bees. In the preſent inſtance, the common worm appears to be converted by them into a queen-bee, merely becauſe the hive was in want of one. Hence we may juſtly infer, that the kingdom of the bees is not, if the expreſſion may be uſed, a *jure divino* or hereditary monarchy, but an elective kingdom; in which the choice of their future ruler is made by the body of the people, while ſhe is yet in the cradle, or in embryo; and who are determined by motives of preference which will perhaps for ever elude the penetration of the moſt ſagacious naturaliſts.

The concluſions drawn by M. Shirach, from experiments of the preceding kind, often repeated by himſelf and others with the ſame ſucceſs, are, that all the common or working bees were originally of the female ſex; but that when they have undergone their laſt metamorphoſis, they are condemned to a ſtate of perpetual virginity, and the organs of generation are obliterated; merely becauſe they have not been lodged, fed, and brought up in a particular manner, while they were in the worm ſtate. He ſuppoſes that the worm, deſigned by the community to be a queen, or mother, owes its metamorphoſis into a queen, partly to the extraordinary ſize of its cell, and its peculiar poſition in it; but principally to a certain appropriate nouriſhment found there, and carefully adminiſtered to it by the working bees while it was in the worm ſtate; by which, and poſſibly other means unknown, the developement and extenſion of the germ of the female organs, previouſly exiſting in the embryo, is effected; and thoſe differences in its form and ſize are produced, which afterwards ſo remarkably diſtinguiſh it from the common working bees. Bee.

This diſcovery is capable of being applied towards forming artificial ſwarms, or new colonies of bees, by which means their number might be increaſed, and their produce in honey and wax proportionably augmented.

Explanation of Plate LXXXIX. Fig. 1. is the queen bee. 2. It the drone. 3. Is the working bee. 4. Repreſents the bees hanging to each other by the feet, which is the method of taking their repoſe. 5. The proboſcis or trunk, which is one of the principal organs of the bees, wherewith they gather the honey and take their nouriſhment. 6. One of the hind-legs of a working bee, loaded with wax. 7. A comb, in which the working bees are bred. The cells are the ſmalleſt of any. Two of them have the young bees encloſed. A royal cell is ſuſpended on one ſide. 8. A comb in which the drones are bred, being larger than the former; the young drones being included in ſeveral of them; with two royal cells ſuſpended on the ſide. 9. A ſimilar comb, in which the royal cell is fixed in the middle of the comb; and ſeveral common cells are ſacrificed to ſerve as a baſis and ſupport to it. In general, the royal cells are ſuſpended on the ſide of a comb, as in fig. 7, 8. To the ſide of fig. 9. two royal cells are begun, when they reſemble pretty much the cup in which an acorn lies. The other royal cells have the young queens included in them. Fig. 10. exhibits the ſting and all its parts. The ſting is compoſed of a ſheath or caſe, and two ſhanks, united to each other, and terminating in a ſharp point, ſo as to look like a ſingle part. *b*, The poiſonous bag, *c*, The tube that ſerves to convey the poiſon from its bag to the thickeſt part of the ſting's ſheath. *d d*, The two ſhanks of the ſting, mutually conveying to each other. *e e*, The ſheath of the ſting. *f f*, The thickeſt end of the ſheath, where the tube opens into it, by which it receives the inſect's poiſon. *g*, The extreme point of the ſting, formed by the two ſhanks of that organ, that are in this place cloſely united. *h h*, The beards with which the ſhanks of the ſting are armed at their extremities. *i*, The tube that ſerves to ſecrete the poiſon, which it diſcharges into the poiſon-bag. *k k*, The two blind extremities of the ſaid tube. *l l l l*, Two pair of cartilages, of different forms, which are for the moſt part of a deep black, and articulated among themſelves and with the ſhanks of the ſting. *m m*, Two other cartilages leſs conſpicuous than the former, with one pair of which they are articulated. Theſe two cartilages *m m*, are almoſt entirely of a membranaceous ſubſtance. *n n n n n n n n*, Eight places in which the foregoing cartilages are articulated among themſelves, and with the ſhanks of the ſting *d d*. *o o o o*, Four muſcles ſerving to move the ſting different ways, by the aſſiſtance of the ſame cartilages. *p p*, Two muſcles which draw the ſhanks of the ſting into its ſheath.

Bee. sheath. *q q*, Two appendages of the sting which are moved along with it, and seem to answer no other purpose but that of ornament.—Fig. 11. The ovary.—Fig. 12. Six eggs drawn after nature, and placed on their ends: These eggs are oblong, very slender, but somewhat thicker on their upper parts.—Fig. 13. An egg viewed with a microscope: it resembles the skin of a fish, divested of its scales, but still retaining the marks of their insertion.—Fig. 14. Worms of bees of different sizes, drawn after nature. *a*, A worm newly hatched. *b c d e*, Four worms that have received more nourishment, and are more grown. *f g*, Two worms still bigger than the former, having had more time to make use of the nourishment provided for them. They are here represented as they lie doubled in their cells. *b*, A worm placed on its belly, so as to show on its back a black line, inclining to a light blue or gray. This line denotes the stomach, which appears in this place through the transparent parts that lie over it. *i*, A worm lying on its back, and beginning to draw in the hinder part of its body, and move its head.—Fig. 15. A full-grown worm, viewed with a microscope. *a a*, Its 14 annular incisions or divisions. *b*, The head and eyes, &c. *c c c*, Ten breathing-holes.—Fig. 16. The worm forming its web. *a a*, The sides of the cell that contain it. *b*, The bottom of the cell. *c*, The entrance or door of the cell. The worm is here represented as making its web in the properest manner to shut up this entrance.—Fig. 17. Worm taken out of the web in which it had enclosed itself, and just ready to cast its skin.—Fig. 18. A cell containing the worm changed into a nymph, and perfectly lined with the said worm's web. Likewise the said web entire, with the nymph contained in it, as they appear on opening the cell. *a a*, The sides of the cell, lined with the worm's web. *b*, The mouth of the cell, perfectly closed by the web. *c*, The bottom of the cell. *d*, The web entire, as it appears on opening the cell, which it greatly resembles in form. *e*, The upper part of the web, of a convex form. This part shows its filaments pretty distinctly. *f*, The enclosed nymph appearing through the transparent sides of the web. *g*, The bottom of the web, answering to that of the wax-cell.—Fig. 19. Worm changed to a nymph, of its natural size and form, yet so as to exhibit its limbs, which are folded up in a most wonderful manner.—Fig. 20. The nymph of the bee viewed with the microscope, displaying in a distinct manner all the parts of the enclosed insect, and the beautiful manner in which they are laid up. *a*, The head, bloated with humours. *b b*, The eyes, projecting considerably. *c c*, The horns, or antennæ. *d*, The lip. *e e*, The teeth, or jaw-bones. *f f*, The first pair of joints belonging to the proboscis. *h*, The proboscis itself. *i i*, The first pair of legs. *k k*, Two transparent stiff little parts, lying against the lowest joints of the first pair of legs. These little parts are not to be found as they remain in the skin it sheds on quitting the nymph state. *l l*, The second pair of legs. *m m*, The wings. *n n*, The blade-bones. *o o*, The last pair of legs. *p p*, The abdominal rings. *q*, (*g*) The hinder part of the body. The sting projects a little in this place. *r*, Two little parts accompanying the sting. *s*, The anus.—Fig. 21. *a*, A cell full of bees bread, placed in layers. *b*, Little grains, of which the said substance, viewed with the microscope, appears to consist. Bee.

II. *Of the* Management *of* Bees, *and most approved Inventions for saving their Lives while we take their Honey and Wax.*

22 Of the apiary.

1. *Of the Apiary, and Hives.* Columella directs that the apiary face the south, and be situated in a place neither too hot nor too much exposed to the cold: that it be in a valley, in order that the loaded bees may with the greater ease descend to their homes: that it be near the mansion-house, on account of the conveniency of watching them; but so situated as not to be exposed to noisome smells, or to the din of men or cattle: that it be surrounded with a wall, which however should not rise above three feet high: that, if possible, a running stream be near them; or, if that cannot be, that water be brought near them in troughs, with pebbles or small stones in the water, for the bees to rest on while they drink; or that the water be confined within gently declining banks, in order that the bees may have safe access to it; they not being able to produce either combs, honey, or food for their maggots, without water: that the neighbourhood of rivers or basons of water with high banks be avoided, because winds may whirl the bees into them, and they cannot easily get on shore from thence to dry themselves; and that the garden in which the apiary stands be well furnished with such plants as afford the bees plenty of good pasture. The trees in this garden should be of the dwarf kind, and their heads bushy, in order that the swarms which settle on them may be the more easily hived.

The proprietor should be particularly attentive that the bees have also in their neighbourhood such plants as yield them plenty of food. Columella enumerates many of these fitted to a warm climate: among them he mentions thyme, the oak, the pine, the sweet-smelling cedar, and all fruit-trees. Experience has taught us, that furze, broom, mustard, clover, heath, &c. are excellent for this purpose. Pliny recommends broom, in particular, as a plant exceedingly grateful and very profitable to bees.

23 Of hives.

With regard to hives, those made of straw are generally preferred, on several accounts: they are not liable to be over-heated by the rays of the sun; they keep out cold better than wood or any other materials; and the cheapness renders the purchase of them easy. As the ingenious Mr Wildman's hives are reckoned to be of a preferable construction to any other, we shall give an account of them in his own words.

"My hives (says he) are seven inches in height and ten in width. The sides are upright, so that the top and bottom are of the same diameter. A hive holds nearly a peck. In the upper row of straw there is a hoop of about half an inch in breadth; to which are nailed five bars of deal, full a quarter of an inch in thickness, and an inch and quarter wide, and half an inch asunder from one another; a narrow short bar is nailed at each side, half an inch distant from the bars next them, in order to fill up the remaining parts of the circle; so that there are in all seven bars of deal, to which the bees fix their combs. The space of half an inch between the bars allows a sufficient and easy

Bee. passage for the bees from one comb to another. In order to give great ſteadineſs to the combs, ſo that, upon moving the hive, the combs may not fall off, or incline out of their direction, a ſtick ſhould be run through the middle of the hive, in a direction directly acroſs the bars, or at right angles with them. When the hives are made, a piece of wood ſhould be worked into the lower row of ſtraw, long enough to allow a door for the bees, of four inches in length, and half an inch in height.

"The proprietor of the bees ſhould provide himſelf with ſeveral flat covers of ſtraw, worked of the ſame thickneſs as the hives, and a foot in diameter, that ſo it may be of the ſame width as the outſide of the hives. Before the cover is applied to the hive, a piece of clean paper, of the ſize of the top of the hive, ſhould be laid over it; and a coat of cow-dung, which is the leaſt apt to crack of any cement eaſily to be obtained, ſhould be laid all round the circumference of the hive. Let the cover be laid upon this, and made faſt to the hive with a packing-needle and pack-thread, ſo that neither cold nor vermin may enter.

"Each hive ſhould ſtand ſingle on a piece of deal, or other wood, ſomewhat larger than the bottom of the hive: That part of the ſtand which is at the mouth of the hive ſhould project ſome inches, for the bees to reſt on when they return from the field. This ſtand ſhould be ſupported upon a ſingle poſt, two and a half feet high; to which it ſhould be ſcrewed very ſecurely, that high winds, or other accidents, may not blow down both ſtand and hive. A quantity of ſoot mixed with barley chaff ſhould be ſtrewed on the ground round the poſt; which will effectually prevent ants, ſlugs, and other vermin, from riſing up to the hive. The ſoot and chaff ſhould from time to time be renewed as it is blown or waſhed away; though, as it is ſheltered by the ſtand, it remains a conſiderable time, eſpecially if care be taken that no weeds riſe through it. Weeds, indeed, ſhould not be permitted to riſe near the hive; for they may give ſhelter to vermin which may be hurtful to the bees.

"The ſtands for bees ſhould be four yards aſunder; or if the apiary will not admit of ſo much, as far aſunder as may be, that the bees of one hive may not interfere with thoſe of another hive, as is ſometimes the caſe when the hives are near one another or on the ſame ſtand; for the bees, miſtaking their own hives, light ſometimes at the wrong door, and a fray enſues, in which one or more may loſe their lives.

24 Of the proper ſeaſon for purchaſing hives of bees. "The perſon who intends to erect an apiary ſhould purchaſe a proper number of hives at the latter part of the year, when they are cheapeſt. The hives ſhould be full of combs, and well ſtored with bees. The purchaſer ſhould examine the combs, in order to know the age of the hives. The combs of that ſeaſon are white, thoſe of the former year are of a darkiſh yellow; and where the combs are black, the hive ſhould be rejected, becauſe old hives are moſt liable to vermin and other accidents.

"If the number of hives wanted were not purchaſed in the autumn, it will be neceſſary to remedy this neglect after the ſeverity of the cold is paſt in the ſpring. At this ſeaſon, bees which are in good condition will get into the fields early in the morning, return loaded, enter boldly, and do not come out of the hive in bad weather; for when they do, this indicates they are in great want of proviſions. They are alert on the leaſt diſturbance, and by the loudneſs of their humming we judge of their ſtrength. They preſerve their hives free from all filth, and are ready to defend it againſt every enemy that approaches. Bee.

"The ſummer is an improper time for buying bees, becauſe the heat of the weather ſoftens the wax, and thereby renders the combs liable to break, if they are not very well ſecured. The honey, too, being then thinner than at other times, is more apt to run out of the cells; which is attended with a double diſadvantage, namely, the loſs of the honey, and the daubing of the bees, whereby many of them may be deſtroyed. A firſt and ſtrong ſwarm may indeed be purchaſed; and, if leave can be obtained, permitted to ſtand in the ſame garden till the autumn; but, if leave is not obtained, it may be carried away in the night after it has been hived.

"I ſuppoſe, that, in the ſtocks purchaſed, the bees are in hives of the old conſtruction. The only direction here neceſſary is, that the firſt ſwarm from theſe ſtocks ſhould be put into one of my hives; and that another of my hives ſhould in a few days be put under the old ſtock, in order to prevent its ſwarming again."

25 Of hiving the ſwarms. 2. *Of Hiving.* Bees, as has been already obſerved, never ſwarm till the hive be too much crowded by the young brood. They firſt begin to ſwarm in May, or in the end of April, but earlier or later according to the warmth of the ſeaſon. They ſeldom ſwarm before ten in the morning, and ſeldom later than three in the afternoon. We may know when they are about to ſwarm, by cluſters of them hanging on the outſide of the hive, and by the drones appearing abroad more than uſual: But the moſt certain ſign is, when the bees refrain from flying into the fields, though the ſeaſon be inviting. Juſt before they take flight, there is an uncommon ſilence in the hive; after this, as ſoon as one takes flight, they all follow. Before the ſubſequent ſwarmings, there is a great noiſe in the hive, which is ſuppoſed to be occaſioned by a conteſt whether the young or the old queen ſhould go out. When the bees of a ſwarm fly too high, they are made to deſcend lower, by throwing handfuls of ſand or duſt among them, which they probably miſtake for rain. For the ſame purpoſe, it is uſual to beat on a kettle or frying-pan: This practice may have taken its riſe from obſerving that thunder or any great noiſe prompts ſuch bees as are in the fields to return home.

As ſoon as the ſwarm is ſettled, the bees which compoſe it ſhould be got into a hive with all convenient ſpeed, to prevent their taking wing again. If they ſettle on a ſmall branch of a tree, eaſy to come at, it may be cut off and laid upon a cloth; the hive being ready immediately to put over them. If the branch cannot be conveniently cut, the bees may be ſwept from off it into a hive. Lodge but the queen into the hive, and the reſt will ſoon follow. If the bees muſt be conſiderably diſturbed in order to get them into a hive, the moſt adviſable way is to let them remain in the place where they have pitched till the evening, when there is leſs danger of their taking wing. If it be obſerved that they ſtill hover about the place they firſt alighted upon, the branches there may be rubbed with

rue,

Bee. rue, or alder-leaves, or any other thing diſtaſteful to them, to prevent their returning to it.

The hive employed on this occaſion ſhould be cleaned with the utmoſt care, and its inſide be rubbed very hard with a coarſe cloth, to get off the looſe ſtraws, or other impurities, which might coſt them a great deal of time and labour to gnaw away. It may then be rubbed with fragrant herbs or flowers, the ſmell of which is agreeable to the bees; or with honey.

The hive ſhould not be immediately ſet on the ſtool where it is to remain; but ſhould be kept near the place at which the bees ſettled, till the evening, leſt ſome ſtragglers ſhould be loſt. It ſhould be ſhaded either with boughs or with a cloth, that the too great heat of the ſun may not annoy the bees.

We ſometimes ſee a ſwarm of bees, after having left their hive, and even alighted upon a tree, return to their firſt abode. This never happens but when the young queen did not come forth with them, for want of ſtrength, or perhaps courage to truſt her wings for the firſt time; or poſſibly from a conſciouſneſs of her not being impregnated.

26 Of uniting ſwarms. When a ſwarm is too few in number for a hive, another may be added. The uſual method of thus uniting ſwarms is very eaſy. Spread a cloth at night upon the ground cloſe to the hive in which the two caſts or ſwarms are to be united; lay a ſtick acroſs this cloth; then fetch the hive with the new ſwarm, ſet it over the ſtick, give a ſmart ſtroke on the top of the hive, and all the bees will drop down upon the cloth in a cluſter. This done, throw aſide the empty hive, take the other from off the ſtool, and ſet this laſt over the bees, who will ſoon aſcend into it, mix with thoſe already there, and become one and the ſame family. Others, inſtead of ſtriking the bees down upon the cloth, place with its bottom upmoſt the hive in which the united ſwarms are to live, and ſtrike the bees of the other hive down into it. The former of theſe hives is then reſtored to its natural ſituation, and the bees of both hives ſoon unite. If ſome bees ſtill adhere to the other hive, they may be bruſhed off on the cloth, and they will ſoon join their brethren. Or one may take the following method, which gives leſs diſturbance to the bees. Set with its mouth upmoſt the hive into which the young ſwarm has been put, and ſet upon it the other hive. The bees in the lower hive, finding themſelves in an inverted ſituation, will ſoon aſcend into the upper.

Though all writers acknowledge, that one of the queens is conſtantly ſlain on theſe occaſions, and generally a conſiderable number of the working bees; yet none of them, Columella excepted, has propoſed the eaſy remedy of killing the queen of the latter caſt or ſwarm before the union is made; a means by which the lives of the working bees may be preſerved. This may be done either by intoxicating them and then picking her out, or by ſearching her out when the bees are beaten down upon the cloth; for this being done in the night, to prevent the battle which might otherwiſe enſue, there will be no great difficulty in finding her.

A large ſwarm may weigh eight pounds, and ſo gradually leſs, to one pound: conſequently a very good one may weigh five or ſix pounds. All ſuch as weigh leſs than four pounds ſhould be ſtrengthened by uniting to each of them a leſs numerous ſwarm. The ſize of the hive ſhould be proportioned to the number of the bees; and, as a general rule, it ſhould be rather under than over ſized, becauſe bees require to be kept warmer than a large hive will admit of. Bee.

27 Bee-hunting in America. In the *Letters from an American Farmer*, we have the following entertaining account of the ſwarming of bees, their flight into the woods, and the method of diſcovering them there. A little experience renders it eaſy to predict the time of their ſwarming: but the "difficult point is, when on the wing, to know whether they want to go to the woods or not. If they have previouſly pitched in ſome hollow trees, it is not the allurements of ſalt and water, of fennel, hickory leaves, &c. nor the fineſt box, that can induce them to ſtay. They will prefer thoſe rude, rough, habitations, to the beſt poliſhed mahogany hive. When that is the caſe with mine, I ſeldom thwart their inclinations. It is in freedom that they work. Were I to confine them, they would dwindle away and quit their labour. In ſuch excurſions we only part for a while. I am generally ſure to find them again the following fall. This elopement of theirs only adds to my recreations. I know how to deceive even their ſuperlative inſtinct. Nor do I fear loſing them, though 18 miles from my houſe, and lodged in the moſt lofty trees in the moſt impervious of our foreſts. After I have done ſowing, by way of recreation I prepare for a week's jaunt in the woods, not to hunt either the deer or the bears, as my neighbours do, but to catch the more harmleſs bees. I cannot boaſt that this chaſe is ſo noble or ſo famous among men: but I find it leſs fatiguing, and full as profitable; and the laſt conſideration is the only one that moves me. I take with me my dog, as a companion, for he is uſeleſs as to this game; my gun, for no one ought to enter the woods without one; my blanket, ſome proviſions, ſome wax, vermilion, honey, and a ſmall pocket-compaſs. With theſe implements I proceed to ſuch woods as are at a conſiderable diſtance from any ſettlements. I carefully examine whether they abound with large trees; if ſo, I make a ſmall fire, on ſome flat ſtones, in a convenient place. On the fire I put ſome wax: cloſe by this fire, on another ſtone, I drop honey in diſtinct drops, which I ſurround with ſmall quantities of vermilion, laid on the ſtone; and then I retire carefully to watch whether any bees appear. If there are any in that neighbourhood, I reſt aſſured that the ſmell of the burnt wax will unavoidably attract them. They will ſoon find out the honey, for they are fond of preying on that which is not their own; and in their approach, they will neceſſarily tinge themſelves with ſome particles of vermilion, which will adhere long to their bodies. I next fix my compaſs, to find out their courſe; which they keep invariably ſtraight, when they are returning home loaded. By the aſſiſtance of my watch, I obſerve how long thoſe are in returning which are marked with vermilion. Thus poſſeſſed of the courſe, and, in ſome meaſure, of the diſtance, which I can eaſily gueſs at, I follow the firſt, and ſeldom fail of coming to the tree where thoſe republicans are lodged. I then mark it; and thus, with patience, I have found out ſometimes 11 ſwarms in a ſeaſon; and it is inconceivable what a quantity of honey theſe trees will ſometimes afford. It entirely depends on the ſize of the

Bee. hollow, as the bees never reſt or ſwarm till it is repleniſhed; for, like men, it is only the want of room that induces them to quit the maternal hive. Next I proceed to ſome of the neareſt ſettlements, where I procure proper aſſiſtance to cut down the trees, get all my prey ſecured, and then return home with my prize. The firſt bees I ever procured were thus found in the woods by mere accident; for, at that time, I had no kind of ſkill in this method of tracing them. The body of the tree being perfectly ſound, they had lodged themſelves in the hollow of one of its principal limbs, which I carefully ſawed off, and, with a good deal of labour and induſtry, brought it home, where I fixed it up in the ſame poſition in which I found it growing. This was in April. I had five ſwarms that year, and they have been ever ſince very proſperous. This buſineſs generally takes up a week of my time every fall, and to me it is a week of ſolitary eaſe and relaxation."

28 Shifting the bees in ſearch of paſture.

3. *Of ſhifting the Abode of Bees.* Great improvements may certainly be made in the eſſential article of providing plenty of paſture for bees, whenever this ſubject ſhall be more carefully attended to than it has hitherto been. A rich corn country is well known to be a barren deſert to them during the moſt conſiderable part of the year; and therefore the practice of other nations, in ſhifting the places of abode of their bees, well deſerves our imitation.

Lib. ix. c. 14.

Columella informs us, that, as few places are ſo happily ſituated as to afford the bees proper paſture both in the beginning of the ſeaſon and alſo in the autumn, it was the advice of Celſus, that, after the vernal paſtures are conſumed, the bees ſhould be tranſported to places abounding with autumnal flowers; as was practiſed by conveying the bees from Achaia to Attica, from Eubœa and the Cyclad iſlands to Scyrus; and alſo in Sicily, where they were brought to Hybla from other parts of the iſland.

Lib. xxi. c. 12.

We find by Pliny, that this was likewiſe the practice of Italy in his time. "As ſoon," ſays he, "as the ſpring-food for bees has failed in the valleys near our towns, the hives of bees are put into boats, and carried up againſt the ſtream of the river, in the night, in ſearch of better paſture. The bees go out in the morning in queſt of proviſions, and return regularly to their hives in the boats, with the ſtores they have collected. This method is continued, till the ſinking of the boats to a certain depth in the water ſhows that the hives are ſufficiently full; and they are then carried back to their former homes, where their honey is taken out of them." And this is ſtill the practice of the Italians who live near the banks of the Po, (the river which Pliny inſtanced particularly in the above-quoted paſſage).

Vol. ii. p. 24.

M. Maillet relates, in his curious Deſcription of Egypt, that, "ſpite of the ignorance and ruſticity which have got poſſeſſion of that country, there yet remain in it ſeveral footſteps of the induſtry and ſkill of the ancient Egyptians. One of their moſt admirable contrivances is, their ſending their bees annually into diſtant countries, in order to procure them ſuſtenance there, at a time when they could not find any at home; and their afterwards bringing them back, like ſhepherds who ſhould travel with their flock, and make them feed as they go. It was obſerved by the ancient inhabitants of Lower Egypt, that all plants bloſſomed, and the fruits of the earth ripened, above ſix weeks earlier in Upper Egypt than with them. They applied this remark to their bees; and the means then made uſe of by them, to enable theſe uſefully induſtrious inſects to reap advantage from the more forward ſtate of nature there, were exactly the ſame as are now practiſed, for the like purpoſe, in that country. About the end of October, all ſuch inhabitants of Lower Egypt as have hives of bees, embark them on the Nile, and convey them up that river quite into Upper Egypt; obſerving to time it ſo that they arrive there juſt when the inundation is withdrawn, the lands have been ſown, and the flowers begin to bud. The hives thus ſent are marked and numbered by their reſpective owners, and placed pyramidically in boats prepared for the purpoſe. After they have remained ſome days at their fartheſt ſtation, and are ſuppoſed to have gathered all the wax and honey they could find in the fields within two or three leagues around; their conductors convey them in the ſame boats two or three leagues lower down, and there leave the laborious inſects ſo long time as is neceſſary for them to collect all the riches of this ſpot. Thus, the nearer they come to the place of their more permanent abode, they find the productions of the earth, and the plants which afford them food, forward in proportion. In fine, about the beginning of February, after having travelled through the whole length of Egypt, gathering all the rich produce of the delightful banks of the Nile, they arrive at the mouth of that river, towards the ocean; from whence they ſet out, and from whence they are now returned to their ſeveral homes: for care is taken to keep an exact regiſter of every diſtrict from whence the hives were ſent in the beginning of the ſeaſon, of their numbers, of the names of the perſons who ſent them, and likewiſe of the mark or number of the boat in which they were placed." Bee.

In many parts of France, floating bee-houſes are very common. They have on board one barge threeſcore or a hundred bee-hives, well defended from the inclemency of an accidental ſtorm. With theſe the owners ſuffer themſelves to float gently down the river, the bees continually chooſing their flowery paſture along the banks of the ſtream; and thus a ſingle-floating bee-houſe yields the proprietor a conſiderable income.

They have alſo a method of tranſporting their bees by land, well worth our imitation in many parts of this kingdom. Their firſt care is, to examine thoſe hives, ſome of whoſe honey-combs might be broken or ſeparated by the jolting of the vehicle; they are made faſt one to the other, and againſt the ſides of the hive, by means of ſmall ſticks, which may be diſpoſed differently as occaſion will point out. This being done, every hive is ſet upon a packing-cloth, or ſomething like it, the threads of which are very wide; the ſides of this cloth are then turned up and laid on the outſide of each hive, in which ſtate they are tied together with a piece of ſmall pack-thread wound ſeveral times round the hive. As many hives as a cart built for that purpoſe will hold, are afterwards placed in this vehicle. The hives are ſet two and two, the whole length of the cart. Over theſe are placed others; which make, as it were, a ſecond ſtory or bed of hives. Thoſe which

Bee. which are ſtored with combs ſhould always be turned topſy-turvy. It is for the ſake of their combs, and to fix them the better, that they are diſpoſed in this manner; for ſuch as have but a ſmall quantity of combs in them, are placed in their natural ſituation. Care is taken in this ſtowage not to let one hive ſtop up another, it being eſſentially neceſſary for the bees to have air; and it is for this reaſon they are wrapped up in a coarſe cloth, the threads of which were wove very wide, in order that the air may have a free paſſage, and leſſen the heat which theſe inſects raiſe in their hives, eſpecially when they move about very tumultuouſly, as often happens in theſe carts. Thoſe uſed for this purpoſe in Yevre, hold from 30 to 48 hives. As ſoon as all are thus ſtowed, the caravan ſets out. If the ſeaſon is ſultry, they travel only in the night; but a proper advantage is made of cool days. Theſe caravans do not go faſt. The horſes muſt not be permitted even to trot: they are led ſlowly, and through the ſmoothеſt roads. When there are not combs in the hives ſufficient to ſupport the bees during their journey, the owner takes the earlieſt opportunity of reſting them wherever they can collect wax. The hives are taken out of the cart, then ſet upon the ground, and after removing the cloth from over them, the bees go forth in ſearch of food. The firſt field they come to ſerves them as an inn. In the evening, as ſoon as they are all returned, the hives are ſhut up; and being placed again in the cart, they proceed on their journey. When the caravan is arrived at the journey's end, the hives are diſtributed in the gardens, or in the fields adjacent to the houſes of different peaſants, who, for a very ſmall reward, undertake to look after them. Thus it is that, in ſuch ſpots as do not abound in flowers at all ſeaſons, means are found to ſupply the bees with food during the whole year.

Theſe inſtances of the great advantages which attend ſhifting of bees in ſearch of paſture, afford an excellent leſſon to many places in this kingdom: they direct particularly the inhabitants of the rich vales, where the harveſt for bees ends early, to remove their ſtocks to places which abound in heath, this plant continuing in bloom during a conſiderable part of autumn, and yielding great plenty of food to bees. Thoſe in the neighbourhood of hills and mountains will ſave the bees a great deal of labour, by taking alſo the advantage of ſhifting their places of abode.

29 Management of bees in winter.

4. *Of feeding and defending Bees in Winter.* Providence has ordained, that inſects which feed on leaves, flowers, and green ſucculent plants, are in an inſenſible or torpid ſtate from the time that the winter's cold has deprived them of the means of ſubſiſtence. Thus the bees during the winter are in ſo lethargic a ſtate, that little food ſupports them: but as the weather is very changeable, and every warm or ſunny day revives them, and prompts them to return to exerciſe, food becomes neceſſary on theſe occaſions.

Many hives of bees, which are thought to die of cold in the winter, in truth die of famine; when a rainy ſummer has hindered the bees from laying in a ſufficient ſtore of proviſions. The hives ſhould therefore be carefully examined in the autumn, and ſhould then weigh at leaſt 18 pounds.

Columella deſcribes an annual diſtemper which ſeizes bees in the ſpring, when the ſpurge bloſſoms, and the elm diſcloſes its ſeeds; for that, being allured by the firſt flowers, they feed ſo greedily upon them, that they ſurfeit themſelves, and die of a looſeneſs, if they are not ſpeedily relieved. Bee.

The authors of the *Maiſon Ruſtique* impute this purging to the bees feeding on pure honey, which does not form a food ſufficiently ſubſtantial for them, unleſs they have bee-bread to eat at the ſame time; and adviſe giving them a honey-comb taken from another hive, the cells of which are filled with crude wax or bee-bread.

There is ſtill, however, a want of experiments to aſcertain both the time and the manner in which bees ſhould be fed. The common practice is to feed them in the autumn, giving them as much honey as will bring the whole weight of the hive to near 20 pounds. To this end, the honey is diluted with water, and then put into an empty comb, ſplit reeds, or, as Columella directs, upon clean wool, which the bees will ſuck perfectly dry. But the dilution with water makes the honey apt to be candied, and honey in that ſtate is prejudicial to bees.

The following directions given in the *Maiſon Ruſtique* ſeem to be very judicious. Repleniſh the weak hives in September with ſuch a portion of combs full of honey taken from other hives as ſhall be judged to be a ſufficient ſupply for them. In order to do this, turn up the weak hive, after taking the precaution of defending yourſelf with the ſmoke of rags, cut out the empty combs, and put the full ones in their place; where ſecure them with pieces of wood run acroſs, in ſuch manner that they may not fall down when the hive is returned to its place. The bees will ſoon fix them more effectually. If this method be thought too troubleſome, ſet under the hive a plate of liquid honey, unmixed with water, with ſtraws laid acroſs it, and over theſe a paper pierced full of holes, through which the bees will ſuck the honey without daubing themſelves. This ſhould be done in cloudy or rainy weather, when the bees ſtir leaſt abroad; and the hive ſhould be covered, to protect the bees from robbers, who might be allured to it by the ſmell of the honey. Tom. I. p. 435.

Another circumſtance which may render it very neceſſary to feed the bees is, when ſeveral days of bad weather enſue immediately after they have ſwarmed; for then, being deſtitute of every ſupply beyond what they carried with them, they may be in great danger of ſtarving. In this caſe, honey ſhould be given them in proportion to the duration of the bad weather.

The degree of cold which bees can endure has not been aſcertained. We find that they live in the cold parts of Ruſſia, and often in hollow trees, without any care being taken of them. Their hives are frequently made of the bark of trees, which does not afford them much protection from cold. Mr White, therefore, judiciouſly obſerves, that bees which ſtand on the north ſide of a building whoſe height intercepts the ſun's beams all the winter, will waſte leſs of their proviſions (almoſt by half) than others which ſtand in the ſun: for coming ſeldom forth, they eat little; and yet in the ſpring are as forward to work and ſwarm as thoſe which had twice as much honey in the autumn before. The owner ſhould, however, examine their ſtate in the winter; and if he finds, that, inſtead of being cluſtered

between

Bee.

between the combs, they fall down in numbers on the ſtool or bottom of the hive, the hive ſhould be carried to a warmer place, where they will ſoon recover. He muſt be cautious in returning them again to the cold, leſt the honey be candied.

Where the winters are extremely ſevere, the authors of the *Maiſon Ruſtique* adviſe to lay on the bottom of an old caſk the depth of half a foot of very dry earth, powdered, and preſſed down hard, and to ſet on this the ſtool with the hive; then, to preſerve a communication with the air, which is abſolutely neceſſary, to cut a hole in the caſk, oppoſite to the mouth of the hive, and place a piece of reed, or of alder made hollow, from the mouth of the hive to the hole in the caſk; and after this to cover the hive with more of the ſame dry earth. If there be any room to fear that the bees will not have a ſufficiency of food, a plate with honey, covered as before directed, may be put under the hive. If the number of hives be great, boxes may be made of deals nailed together, deep enough to contain the hives when covered with dry earth. The bees will thus remain all the winter free from any danger from cold, hunger, or enemies.

30 Methods of taking the honey and the wax. Common method in this country.

5. *Of taking the Honey and Wax.* In this country it is uſual, in ſeizing the ſtores of theſe little animals, to rob them alſo of their lives. The common method is, That when thoſe which are doomed for ſlaughter have been marked out (which is generally done in September), a hole is dug near the hive, and a ſtick, at the end of which is a rag that has been dipped in melted brimſtone, being ſtuck in that hole, the rag is ſet on fire, the hive is immediately ſet over it, and the earth is inſtantly thrown up all around, ſo that none of the ſmoke can eſcape. In a quarter of an hour, all the bees are ſeemingly dead; and they will ſoon after be irrecoverably ſo, by being buried in the earth that is returned back into the hole. By this laſt means it is that they are abſolutely killed; for it has been found by experiment, that all the bees which have been affected only by the fume of the brimſtone, recover again, excepting ſuch as have been ſinged or hurt by the flame. Hence it is evident, that fume of brimſtone might be uſed for intoxicating the bees, with ſome few precautions. The heavieſt and the lighteſt hives are alike treated in this manner: the former, becauſe they yield the moſt profit, with an immediate return; and the latter, becauſe they would not be able to ſurvive the winter. Thoſe hives which weigh from 15 to 20 pounds are thought to be the fitteſt for keeping.

More humane and judicious methods were practiſed by the ancients *; and the following ſimple method is at this day practiſed in Greece, degenerate as it is. "Mount Hymethus is celebrated for the beſt honey in all Greece. This mountain was not leſs famous in times paſt for bees and admirable honey; the ancients believing that bees were firſt bred here, and that all other bees were but colonies from this mountain; which if ſo, we aſſured ourſelves that it muſt be from this part of the mountain that the colonies were ſent; both becauſe the honey here made is the beſt, and that here they never deſtroy the bees. It is of a good conſiſtence, of a fair gold-colour, and the ſame quantity ſweetens more water than the like quantity of any other doth. I no ſooner knew that they never deſtroy or impair the ſtock of bees in taking away their honey, but I was inquiſitive to underſtand their method of ordering the bees; which being an art ſo worthy the knowledge of the curious, I ſhall not think it beſide the purpoſe, to relate what I ſaw, and was informed of to that effect by ſuch as had ſkill in that place.

Bee.

"The hives they keep their bees in are made of willows or oſiers, faſhioned like our common duſt-baſkets, wide at top and narrow at the bottom, and plaſtered with clay or loam within and without. They are ſet as in fig. 1. with the wide end uppermoſt. The tops are covered with broad flat ſticks, which are alſo plaſtered over with clay; and, to ſecure them from the weather, they cover them with a tuft of ſtraw, as we do. Along each of theſe ſticks, the bees faſten their combs; ſo that a comb may be taken out whole, without the leaſt bruiſing, and with the greateſt eaſe imaginable. To increaſe them in ſpring-time, that is in March or April, until the beginning of May, they divide them; firſt ſeparating the ſticks on which the combs and bees are faſtened, from one another, with a knife: ſo, taking out the firſt comb and bees together on each ſide, they put them into another baſket, in the ſame order as they were taken out, until they have equally divided them. After this, when they are both again accommodated with ſticks and plaſtered, they ſet the new baſket in the place of the old one, and the old one in ſome new place. And all this they do in the middle of the day, at ſuch time as the greateſt part of the bees are abroad; who at their coming home, without much difficulty, by this means divide themſelves equally. This device hinders them from ſwarming and flying away. In Auguſt, they take out their honey. This they do in the day-time alſo, while they are abroad; the bees being thereby, ſay they, diſturbed leaſt: at which time they take out the combs laden with honey, as before; that is, beginning at each outſide, and ſo taking away, until they have left only ſuch a quantity of combs, in the middle, as they judge will be ſufficient to maintain the bees in winter; ſweeping thoſe bees that are on the combs into the baſket again, and then covering it with new ſticks and plaſter."

Plate XC.

The Greek method above related was introduced into France in 1754, as we are informed by M. de Reaumur and Du Hamel, in the memoirs of the Royal Academy for that year, p. 331.

Attempts have been made in our own country to attain the deſirable end of getting the honey and wax without deſtroying the bees; the moſt approved of which we ſhall now relate as conciſely as poſſible.

32 Mr Thorley's obſervations, &c.

Mr Thorley, in his *Inquiry into the Nature, Order, and Government of Bees*, thinks colonies preferable to hives, for the following reaſons: *Firſt*, The more certain preſervation of very many thouſands of theſe uſeful creatures. *Secondly*, Their greater ſtrength (which conſiſts in numbers), and conſequently their greater ſafety from robbers. *Thirdly*, Their greater wealth, ariſing from the united labours of the greater number. He tells us, that he has in ſome ſummers taken two boxes filled with honey from one colony; and yet ſufficient ſtore has been left for their maintenance during the winter; each box weighing 40 pounds. Add to theſe advantages, the pleaſure of viewing them, with the greateſt ſafety, at all ſeaſons, even in their buſieſt time of gathering, and their requiring a much leſs attendance

*Vide *Columella*, lib. ix. c. 15. and *Varro de Re Ruſtica*, lib. iii. c. 16.

31 Greek method of ſharing the honey with the bees. See *Wheeler's Journey into Greece*, p. 411.

Bee. tendance in ſwarming time. The bees thus managed are alſo more effectually ſecured from wet and cold, from mice and other vermin.

His boxes are made of deal, which, being ſpongy, ſucks up the breath of the bees ſooner than a more ſolid wood would do. Yellow dram-deal thoroughly ſeaſoned is the beſt.

An octagon, being nearer to a ſphere, is better than a ſquare form; for as the bees, in winter, lie in a round body near the centre of the hive, a due heat is then conveyed to all the out-parts, and the honey is kept from candying.

The dimenſions which Mr Thorley, after many years experience, recommends for the boxes, are 10 inches depth, and 12 or 14 inches breadth in the inſide. He has tried boxes containing a buſhel or more, but found them not to anſwer the deſign like thoſe of a leſſer ſize. The larger are much longer in filling; ſo that it is later ere you come to reap the fruits of the labour of the bees: nor is the honey there ſo good and fine, the effluvia even of their own bodies tainting it.

The beſt and pureſt honey is that which is gathered in the firſt five or ſix weeks: and in boxes of leſs dimenſions you may take, in a month or little more, provided the ſeaſon be favourable, a box full of the fineſt honey.

The top of the box ſhould be made of an entire board a full inch thick after it has been planed; and it ſhould project on all ſides at leaſt an inch beyond the dimenſions of the box. In the middle of this top there muſt be a hole five inches ſquare, for a communication between the boxes; and this hole ſhould be covered with a ſliding ſhutter, of deal or elm, running eaſily in a groove over the back window. The eight pannels, nine inches deep, and three quarters of an inch thick when planed, are to be let into the top ſo far as to keep them in their proper places; to be ſecured at the corners with plates of braſs, and to be cramped with wires at the bottom to keep them firm; for the heat in ſummer will try their ſtrength. There ſhould be a glaſs-window behind, fixed in a frame, with a thin deal-cover, two ſmall braſs hinges, and a button to faſten it. This window will be ſufficient for inſpecting the progreſs of the bees. Two braſs handles, one on each ſide, are neceſſary to lift up the box: theſe ſhould be fixed in with two thin plates of iron, near three inches long, ſo as to turn up and down, and put three inches below the top-board, which is nailed cloſe down with ſprigs to the other parts of the box.

Thoſe who chooſe a frame within, to which the bees may faſten their combs, need only uſe a couple of deal ſticks of an inch ſquare, placed acroſs the box, and ſupported by two pins of braſs; one an inch and half below the top, and the other two inches below it; by which means the combs will quickly find a reſt. One thing more, which perfects the work, is, a paſſage, four or five inches long, and leſs than half an inch deep, for the bees to go in and out at the bottom of the box.

35 Management of bees in colonies, and method of taking their honey and wax.

1. In keeping bees in colonies, a houſe is neceſſary, or at leaſt a ſhed; without which the weather, eſpecially the heat of the ſun, would ſoon rend the boxes to pieces.

Your houſe may be made of any boards you pleaſe, but deal is the beſt. Of whatever ſort the materials are, the houſe muſt be painted, to ſecure it from the weather. Bee.

The length of this houſe, we will ſuppoſe for ſix colonies, ſhould be full 12 feet and a half, and each colony ſhould ſtand a foot diſtance from the other. It ſhould be three feet and a half high, to admit four boxes one upon another; but if only three boxes are employed, two feet eight inches will be ſufficient. Its breadth in the inſide ſhould be two feet. The four corner-poſts ſhould be made of oak, and well fixed in the ground, that no ſtormy winds may overturn it; and all the rails ſhould be of oak, ſupported by ſeveral uprights of the ſame, before and behind, that they may not yield or ſink under 6, 7, or 800 weight, or upwards. The floor of the houſe (about two feet from the ground) ſhould be ſtrong and ſmooth, that the loweſt box may ſtand cloſe to it.

This floor may be made with boards or planks of deal the full length of the bee-houſe; or, which is preferable, with a board or plank to each colony, of two feet four inches long, and fixed down to the rails; and that part which appears at the front of the houſe may be cut into a ſemicircle, as a proper alighting place for the bees. Plane it to a ſlope, that the wet may fall off. When this floor to a ſingle colony wants to be repaired, it may eaſily be removed, and another be placed in its room, without diſturbing the other colonies, or touching any other part of the floor.

Upon this floor, at equal diſtances, all your colonies muſt be placed, againſt a door or paſſage cut in the front of the houſe.

Only obſerve farther, to prevent any falſe ſtep, that as the top-board of the box (being a full inch broader than the other part) will not permit the two mouths to come together, you muſt cut a third in a piece of deal of a ſufficient breadth, and place it between the other two, ſo cloſe that not a bee may get that way into the houſe. And fixing the ſaid piece of deal down to the floor with two lath-nails, you will find afterwards to be of ſervice, when you have occaſion either to raiſe a colony, or take a box of honey, and may prove a means of preventing a great deal of trouble and miſchief.

The houſe being in this forwardneſs, you may cover it to your own mind, with boards, fine ſlates, or tiles. But contrive their poſition ſo as to carry off the wet, and keep out the cold, rain, ſnow, or whatever might any way hurt and prejudice them.

The back-doors may be made of half-inch deal, two of them to ſhut cloſe in a rabbit, cut in an upright pillar, which may be ſo contrived as to take in and out, by a mortoiſe in the bottom rail, and a notch in the inſide of the upper rail, and faſtened with a ſtrong haſp. Place theſe pillars in the ſpaces between the colonies.

Concluding your houſe made after this model, without front doors, a weather-board will be very neceſſary to carry the water off from the places where the bees ſettle and reſt.

Good painting will be a great preſervative. Forget not to paint the mouths of your colonies with different colours, as red, white, blue, yellow, &c. in form of a half-moon, or ſquare, that the bees may the better know their own home. Such diverſity will be a direction to them.

Thus your bees are kept warm in the coldeſt winter; and

Bee. and in the hotteſt ſummer greatly refreſhed by the cool air, the back-doors being ſet open without any air-holes made in the boxes.

Dr Warden obſerves, that in June, July, and Auguſt, when the colonies come to be very full, and the weather proves very hot, the appearance of a ſhower drives the bees home in ſuch crowds, that preſſing to get in, they ſtop the paſſage ſo cloſe, that thoſe within are almoſt ſuffocated for want of air; which makes theſe laſt ſo uneaſy, that they are like mad things. In this extremity, he has lifted the whole colony up a little on one ſide; and by thus giving them air, has ſoon quieted them. He has known them, he ſays, come pouring out, on ſuch an occaſion, in numbers ſufficient to have filled at once two or three quarts; as if they had been going to ſwarm. To prevent this inconvenience, he adviſes cutting a hole two inches ſquare in about the middle of one of the hinder pannels of each box. Over this hole, nail, in the inſide of the box, a piece of tin-plate punched full of holes ſo ſmall that a bee cannot creep through them; and have over it, on the outſide, a very thin ſlider, made to run in grooves; ſo that, when it is thruſt home, all may be cloſe and warm; and when it is opened, in very hot weather, the air may paſs through the hole, and prevent the ſuffocating heat. Or holes may be bored in the pannels themſelves, on ſuch an emergency, in a colony already ſettled.

Such a thorough paſſage for the air may be convenient in extreme heat, which is ſometimes ſo great as to make the honey run out of the combs. The Memoirs of the truly laudable Berne Society, for the year 1764, give us a particular inſtance of this, when they ſay, that, in 1761, many in Swiſſerland were obliged to ſmother their bees, when they ſaw the honey and wax trickling down; not knowing any other remedy for the loſſes they daily ſuſtained. Some ſhaded theſe hives from the ſun, or covered them with cloths wet ſeveral times a-day, and watered the ground all around.

The beſt time to plant the colonies is, either in ſpring with new ſtocks full of bees, or in ſummer with ſwarms. If ſwarms are uſed, procure, if poſſible, two of the ſame day: hive them either in two boxes or in a hive and a box: at night, place them in the bee-houſe, one over the other; and with a knife and a little lime and hair ſtop cloſe the mouth of the hive or upper box, ſo that not a bee may be able to go in or out but at the front door. This done, you will in a week or ten days with pleaſure ſee the combs appear in the boxes; but if it be a hive, nothing can be ſeen till the bees have wrought down into the box. Never plant a colony with a ſingle ſwarm, as Mr Thorley ſays he has ſometimes done, but with little ſucceſs.

When the ſecond box, or the box under the hive, appears full of bees and combs, it is time to raiſe your colony. This ſhould be done in the duſk of the evening, and in the following manner:

Place your empty box, with the ſliding ſhutter drawn back, behind the houſe, near the colony that is to be raiſed, and at nearly the height of the floor: then lifting up the colony with what expedition you can, let the empty box be put in the place where it is to ſtand, and the colony upon it; and ſhut up the mouth of the then upper box with lime and hair, as before directed. Bee

When, by the help of the windows in the back of the boxes, you find the middle box full of combs, and a quantity of honey ſealed up in it, the loweſt box half full of combs, and few bees in the uppermoſt box, proceed thus:

About five o'clock in the afternoon, drive cloſe with a mallet the ſliding ſhutter under the hive or box that is to be taken from the colony. If the combs are new, the ſhutter may be forced home without a mallet; but be ſure it be cloſe, that no bees may aſcend into the hive or box to be removed. After this ſhut cloſe the doors of your houſe, and leave the bees thus cut off from the reſt of their companions for the ſpace of half an hour or more. In this ſpace of time, having loſt their queen, they will fill themſelves with honey, and be impatient to be ſet at liberty.

If, in this interval, you examine the box or boxes beneath, and obſerve all to be quiet in them, you may be confident that the queen is there, and in ſafety. Hereupon raiſe the back part of the hive or box ſo far, by a piece of wood ſlipped under it, as to give the priſoners room to come out, and they will return to their fellows: then lifting the box from off the colony, and turning its bottom upmoſt, cover it with a cloth all night; and the next morning, when this cloth is removed, the bees that have remained in it will return to the colony. Thus you have a hive or box of honey, and all your bees ſafe.

If the bees do not all come out in this manner, Dr Warder's method may be followed, eſpecially if it be with a hive. It is to place the hive with the ſmall end downward in a pail, peck, or flower-pot, ſo as to make it ſtand firm; then to take an empty hive, and ſet it upon the former, and to draw a cloth tight round the joining of the two hives, ſo that none of the bees may be able to get out: after this, to ſtrike the full hive ſo ſmartly as to diſturb the bees that are in it, but with ſuch pauſes between the ſtrokes as to allow them time to aſcend into the empty hive, which muſt be held faſt while this is doing, leſt it fall off by the ſhaking of the other. When you perceive, by the noiſe of the bees in the upper hive, that they are got into this laſt, carry it to a cloth ſpread for this purpoſe before the colony, with one end faſtened to the landing-place, and knock them out upon it: they will ſoon crawl up the cloth, and join their fellows, who will gladly receive them.

Mr Thorley next gives an account of his narcotic, and of the manner of uſing it.

The method which he has purſued with great ſucceſs for many years, and which he recommends to the public as the moſt effectual for preſerving bees in common hives, is incorporation, or uniting two ſtocks into one, by the help of a peculiar fume or opiate, which will put them entirely in your power for a time to divide and diſpoſe of at pleaſure. But as that dominion over them will be of ſhort duration, you muſt be expeditious in this buſineſs.

The queen is immediately to be ſearched for, and killed. Hives which have ſwarmed twice, and are conſequently reduced in their numbers, are the fitteſt to be joined together, as this will greatly ſtrengthen and improve them. If a hive which you would take is

Bee. both rich in honey and full of bees, it is but dividing the bees into two parts, and putting them into two boxes inſtead of one. Examine whether the ſtock to which you intend to join the bees of another have honey enough in it to maintain the bees of both: it ſhould weigh full 20 pounds.

The narcotic, or ſtupifying fume, is made with the *fungus maximus* or *pulverulentus*, the large muſhroom, commonly known by the name of *bunt*, *puckfiſt*, or *frogcheeſe*. It is as big as a man's head, or bigger: when ripe, it is of a brown colour, turns to powder, and is exceeding light. Put one of theſe pucks into a large paper, preſs it therein to two-thirds or near half the bulk of its former ſize, and tie it up very cloſe: then put it into an oven ſome time after the houſehold bread has been drawn, and let it remain there all night; when it is dry enough to hold fire it is fit for uſe. The manner of uſing it is thus:

Cut off a piece of the puck, as large as a hen's egg, and fix it in the end of a ſmall ſtick ſlit for that purpoſe, and ſharpened at the other end; which place ſo that the puck may hang near the middle of an empty hive. This hive muſt be ſet with the mouth upward, in a pail or bucket which ſhould hold it ſteady, near the ſtock you intend to take. This done, ſet fire to the puck, and immediately place the ſtock of bees over it, tying a cloth round the hives, that no ſmoke may come forth. In a minute's time, or little more, you will hear the bees fall like drops of hail into the empty hive. You may then beat the top of the full hive gently with your hand, to get out as many of them as you can: after this, looſing the cloth, lift the hive off to a table, knock it ſeveral times againſt the table, ſeveral more bees will tumble out, and perhaps the queen among them. She often is one of the laſt that falls. If ſhe is not there, ſearch for her among the main body in the empty hive, ſpreading them for this purpoſe on a table.

You muſt proceed in the ſame manner with the other hive, with the bees of which theſe are to be united. One of the queens being ſecured, you muſt put the bees of both hives together, mingle them thoroughly, and drop them among the combs of the hive which they are intended to inhabit. When they are all in, cover it with a packing or other coarſe cloth which will admit air, and let them remain ſhut up all that night and the next day. You will ſoon be ſenſible that they are awaked from this ſleep.

The ſecond night after their union, in the duſk of the evening, gently remove the cloth from off the mouth of the hive (taking care of yourſelf), and the bees will immediately ſally forth with a great noiſe; but being too late, they will ſoon return: then inſerting two pieces of tobacco-pipes to let in air, keep them confined for three or four days, after which the door may be left open.

The beſt time for uniting bees is, after their young brood are all out, and before they begin to lodge in the empty cells. As to the hour of the day, he adviſes young practitioners to do it early in the afternoon, in order that having the longer light, they may the more eaſily find out the queen. He never knew ſuch combined ſtocks conquered by robbers. They will either ſwarm in the next ſummer, or yield a hive full of honey.

Mr N. Thornley ſon of the above-mentioned clergyman, has added to the edition which he has given of his father's book, a poſtſcript, purporting, that perſons who chooſe to keep bees in glaſs hives may, after uncovering the hole at the top of a flat-topped ſtraw-hive, or box, place the glaſs over it ſo cloſe that no bee can go in or out but at the bottom of the hive or box. The glaſs-hive muſt be covered with an empty hive or with a cloth, that too much light may not prevent the bees from working. As ſoon as they have filled the ſtraw-hive or box, they will begin to work up into the glaſs hive. He tells us, that he himſelf has had one of theſe glaſs-hives filled by the bees in 30 days in a fine ſeaſon; and that it contained 38 pounds of fine honey. When the glaſs is completely filled, ſlide a tin-plate between it and the hive or box, ſo as to cover the paſſage, and in half an hour the glaſs may be taken off with ſafety. What few bees remain in it, will readily go to their companions. He has added a glaſs window to his ſtraw-hives, in order to ſee what progreſs bees make; which is of ſome importance, eſpecially if one hive is to be taken away whilſt the ſeaſon ſtill continues favourable for their collecting honey; for when the combs are filled with honey, the cells are ſealed up, and the bees forſake them, and reſide moſtly in the hive in which their works are chiefly carried on. Obſerving alſo that the bees were apt to extend their combs through the paſſage of communication in the upper hive, whether glaſs or other, which rendered it neceſſary to divide the comb when the upper hive was taken away, he now puts in that paſſage a wire ſcreen or netting, the meſhes of which are large enough for a loaded bee to go eaſily through them. This prevents the joining of the combs from one box to the other, and conſequently obviates the neceſſity of cutting them, and of ſpilling ſome of the honey, which running down among a crowd of bees, uſed before to incommode them much, it being difficult for them to clear their wings of it. Plate XC. Fig. 2. is a drawing of one of his colonies.

Bee.

34 Glaſs-hives.

35 Of bees in boxes, and method of taking their honey and wax.

2. The reverend Mr White informs us, that his fondneſs for theſe little animals ſoon put him upon endeavouring if poſſible to ſave them from *fire* and *brimſtone*; that he thought he had reaſon to be content to ſhare their labours for the preſent, and great reaſon to rejoice if he could at any time preſerve their lives, to work for him another year; and that the main drift of his obſervations and experiments has therefore been, to diſcover an eaſy and cheap method, ſuited to the abilities of the common people, of taking away ſo much honey as can be ſpared, without deſtroying or ſtarving the bees; and by the ſame means to encourage ſeaſonable ſwarms.

In his directions how to make the bee-boxes of his inventing, he tells us, ſpeaking of the manner of conſtructing a ſingle one, that it may be made of deal or any other well ſeaſoned boards which are not apt to warp or ſplit. The boards ſhould be near an inch thick; the figure of the box ſquare, and its height and breadth nine inches and five eighths, every way meaſuring within. With theſe dimenſions it will contain near a peck and a half. The front part muſt have a door cut in the middle of the bottom edge, three inches wide, and near half an inch in height, which will give free liberty to the bees to paſs through, yet not be large enough for their enemy the mouſe to enter. In the

Bee. back part you muſt cut a hole with a rabbit in it, in which you are to fix a pane of the cleareſt and beſt crown-glaſs, about five inches in length and three in breadth, and faſten it with putty; let the top of the glaſs be placed as high as the roof, withinſide, that you may ſee the upper part of the combs, where the bees with their riches are moſtly placed. You will by this means be better able to judge of their ſtate and ſtrength, than if your glaſs was fixed in the middle. The glaſs muſt be covered with a thin piece of board, by way of ſhutter, which may be made to hang by a ſtring, or turn upon a nail, or ſlide ſidewiſe between two mouldings. Such as are deſirous of ſeeing more of the bees works, may make the glaſs as large as the box will admit without weakening it too much; or they may add a pane of glaſs on the top, which muſt likewiſe be covered with a ſhutter, faſtened down with pegs, to prevent accidents.

The ſide of the box which is to be joined to another box of the ſame form and dimenſions, as it will not be expoſed to the internal air, may be made of a piece of ſlit deal not half an inch thick. This he calls the *ſide of communication*, becauſe it is not to be wholly encloſed: a ſpace is to be left at the bottom the whole breadth of the box, and a little more than an inch in height; and a hole or paſſage is to be made at top, three inches long, and more than half an inch wide. Through theſe the bees are to have a communication from one box to the other. The lower communication being on the floor, our labourers, with their burdens, may readily and eaſily aſcend into either of the boxes. The upper communication is only intended as a paſſage between the boxes, reſembling the little holes or narrow paſſes which may be obſerved in the combs formed by our ſagacious architects, to ſave time and ſhorten the way when they have occaſion to paſs from one comb to another; juſt as in populous cities, there are narrow lanes and alleys paſſing tranſverſely from one large ſtreet to another.

In the next place you are to provide a looſe board, half an inch thick, and large enough to cover the ſide where you have made the communications. You are likewiſe to have in readineſs ſeveral little iron ſtaples, an inch and half long, with the two points or end bended down more than half an inch. The uſe of theſe will be ſeen preſently.

You have now only to fix two ſticks croſſing the box from ſide to ſide, and croſſing each other, to be a ſtay to the combs; one about three inches from the bottom, the other the ſame diſtance from the top; and when you have painted the whole, to make it more durable, your box is finiſhed.

The judicious bee-maſter will here obſerve, that the form of the box now deſcribed is as plain as poſſible for it to be. It is little more than five ſquare pieces of board nailed together; ſo that a poor cottager who has but ingenuity enough to ſaw a board into the given dimenſions, and to drive a nail, may make his own boxes well enough, without the help or expence of a carpenter.

No directions are neceſſary for making the other box, which muſt be of the ſame form and dimenſions. The two boxes differ from each other only in this, that the ſide of communication of the one muſt be on your right hand; of the other on your left. Fig. 3. repreſents two of theſe boxes, with their openings of communication, ready to join to each other. Bee.

Mr White's manner of hiving a ſwarm into one or both of theſe boxes is thus:

You are to take the looſe board, and faſten it to one of the boxes, ſo as to ſtop the communications. This may be done by three of the ſtaples before mentioned; one on the top of the box near the front; the two others on the back, near the top and near the bottom. Let one end of the ſtaple be thruſt into a gimlet-hole made in the box, ſo that the other end may go as tight as can be over the looſe board, to keep it from ſlipping when it is handled. The next morning after the bees have been hived in this box, the other box ſhould be added, and the looſe board ſhould be taken away. This will prevent a great deal of labour to the bees, and ſome to the proprietor.

Be careful to faſten the ſhutter ſo cloſe to the glaſs that no light may enter through it; for the bees ſeem to look upon ſuch light as a hole or breach in their houſe, and on that account may not ſo well like their new habitation. But the principal thing to be obſerved at this time is, to cover the box as ſoon as the bees are hived with a linen cloth thrown cloſely over it, or with green boughs to protect it from the piercing heat of the ſun. Boxes will admit the heat much ſooner than ſtraw-hives; and if the bees find their houſe too hot for them, they will be wiſe enough to leave it. If the ſwarm be larger than uſual, inſtead of faſtening the looſe board to one box, you may join two boxes together with three ſtaples, leaving the communication open from one to the other, and then hive your bees into both. In all other reſpects, they are to be hived in boxes after the ſame manner as in common hives.

The door of the ſecond box ſhould be carefully ſtopped up, and be kept conſtantly cloſed, in order that the bees may not have an entrance but through the firſt box.

When the boxes are ſet in the places where they are to remain, they muſt be ſcreened from the ſummer's ſun, becauſe the wood will otherwiſe be heated to a greater degree than either the bees or their works can bear; and they ſhould likewiſe be ſcreened from the winter's ſun, becauſe the warmth of this will draw the bees from that lethargic ſtate which is natural to them, as well as many other inſects, in the winter ſeaſon. For this purpoſe, and alſo to ſhelter the boxes from rain, our ingenious clergyman has contrived the following frame.

Fig. 4. repreſents the front of a frame for twelve colonies, *a*, *a*, are two cells of oak lying flat on the ground, more than four feet long. In theſe cells are fixed four oaken poſts, about the thickneſs of ſuch are as uſed for drying linen. The two poſts *b*, *b*, in the front, are about ſix feet two inches above the cells: the other two, ſtanding backward, five feet eight inches. You are next to nail ſome boards of ſlit deal horizontally from one of the fore-poſts to the other, to ſcreen the bees from the ſun. Let theſe boards be ſeven feet ſeven inches in length, and nailed to the inſide of the poſts; and be well ſeaſoned that they may not ſhrink or gape in the joints. *c*, *c*, Are two ſplints of deal, to keep the boards even, and ſtrengthen them.

Fig. 5. repreſents the back of the frame. *d*, *d*, *d*, *d*, are four ſtrong boards of the ſame length with the frame on which you are to place the boxes. Let the upper

Bee. upper ſide of them be very ſmooth and even, that the boxes may ſtand true upon them: or it may be ſtill more adviſable, to place under every pair of boxes a ſmooth thin board, as long as the boxes, and about a quarter of an inch wider. The bees will ſoon faſten the boxes to this board in ſuch a manner that you may move or weigh the boxes and board together, without breaking the wax or reſin, which for many reaſons ought to be avoided. Theſe floors muſt be ſupported by pieces of wood or bearers, which are nailed from poſt to poſt at each end. They are likewiſe to be well nailed to the frame, to keep them from ſinking with the weight of the boxes. *f* Repreſents the roof, which projects backward about ſeven or eight inches beyond the boxes, to ſhelter them from rain. You have now only to cut niches or holes in the frame, over againſt each mouth or entrance into the boxes, at *h*, *h*, *h*, in fig. 4. Let theſe niches be near four inches long; and under each you muſt nail a ſmall piece of wood for the bees to alight upon. The morning or evening ſun will ſhine upon one or both ends of the frame, let its aſpect be what it will: but you may prevent its over-heating the boxes, by a looſe board ſet up between the poſts, and kept in by two or three pegs.

The ſame gentleman, with great humanity, obſerves, that no true lover of bees ever lighted the fatal match without much concern: and that it is evidently more to our advantage, to ſpare the lives of our bees, and be content with part of their ſtores, than to kill and take poſſeſſion of the whole.

About the latter end of Auguſt, ſays he, by a little inſpection through your glaſſes, you may eaſily diſcover which of your colonies you may lay under contribution. Such as have filled a box and a half with their works, will pretty readily yield you the half box. But you are not to depend upon the quantity of combs without examining how they are ſtored with honey. The bees ſhould, according to him, have eight or nine pounds left them, by way of wages for their ſummer's works.

The moſt proper time for this buſineſs is the middle of the day; and as you ſtand behind the frame, you will need no armour, except a pair of gloves. The operation itſelf is very ſimple, and eaſily performed, thus: Open the mouth of the box you intend to take; then with a thin knife cut through the reſin with which the bees have joined the boxes to each other, till you find that you have ſeparated them; and after this, thruſt a ſheet of tin gently in between the boxes. The communication being hereby ſtopped, the bees in the fulleſt box, where it is moſt likely the queen is, will be a little diſturbed at the operation; but thoſe in the other box where we ſuppoſe the queen is not, will run to and fro in the utmoſt hurry and confuſion, and ſend forth a mournful cry, eaſily diſtinguiſhed from their other notes. They will iſſue out at the newly opened door; not in a body as when they ſwarm, nor with ſuch calm and cheerful activity as when they go forth to their labours; but by one or two at a time, with a wild flutter and viſible rage and diſorder. This, however, is ſoon over: for as ſoon as they get abroad and ſpy their fellows, they fly to them inſtantly and join them at the mouth of the other box. By this means, in an hour or two, for they go out ſlowly, you will have a box of pure honey, without leaving a bee in it to moleſt you; and likewiſe without dead bees, Bee. which, when you burn them, are often mixed with your honey, and both waſte and damage it.

Mr White acknowledges, that he has ſometimes found this method fail, when the mouth of the box to be taken away has not been conſtantly and carefully cloſed: the bees will in this caſe get acquainted with it as an entrance; and when you open the mouth in order to their leaving this box, many of them will be apt to return, and the communication being ſtopped, will in a ſhort time carry away all the honey from this to the other box; ſo much do they abhor a ſeparation. When this happens, he has recourſe to the following expedient, which he thinks infallible. He takes a piece of deal, a little larger than will cover the mouth of the box, and cuts in it a ſquare niche ſomewhat more than half an inch wide. In this niche he hangs a little trap-door, made of a thin piece of tin, turning upon a pin, with another pin croſſing the niche a little lower, ſo as to prevent the hanging door from opening both ways. This being placed cloſe to the mouth, the bees which want to get out will eaſily thruſt open the door outwards, but cannot open it the other way to get in again; ſo muſt, and will readily, make to the other box, leaving this in about the ſpace of two hours, with all its ſtore, juſtly due to the tender hearted bee-maſter as a ranſom for their lives.

What led Mr White to prefer collateral boxes to thoſe before in uſe, was, to uſe his own words, his "compaſſion for the poor bees, who, after traverſing the fields, return home weary and heavy laden, and muſt perhaps depoſite their burden up two pair of ſtairs, or in the garret. The lower room, it is likely, is not yet furniſhed with ſtairs: for, as is well known, our little architects lay the foundation of their ſtructures at the top, and build downward. In this caſe, the weary little labourer is to drag her load up the ſides of the walls: and when ſhe has done this, ſhe will travel many times backward and forward, as I have frequently ſeen, along the roof, before ſhe finds the door or paſſage into the ſecond ſtory; and here again ſhe is perplexed with a like puzzling labyrinth, before ſhe gets into the third. What a waſte is here of that precious time which our bees value ſo much, and which they employ ſo well! and what an expence of ſtrength and ſpirits, on which their ſupport and ſuſtenance depend! In the collateral boxes, the rooms are all on the ground floor; and becauſe I know my bees are wiſe enough to value convenience more than ſtate, I have made them of ſuch a moderate, though decent, height, that the bees have much leſs way to climb to the top of them than they have to the crown of a common hive."

36. Of the management of bees in Mr Wildman's hives.

Mr Wildman's hives have been already deſcribed (N° 23, 24). A good ſwarm will ſoon fill one of theſe hives, and therefore another hive may be put under it the next morning. The larger ſpace allowed the bees will excite their induſtry in filling them with combs. The queen will lay ſome eggs in the upper hive; but ſo ſoon as the lower hive is filled with combs, ſhe will lay moſt of them in it. In little more than three weeks, all the eggs laid in the upper hive will be turned into bees; and if the ſeaſon is favourable, their cells will be ſoon filled with honey.

As ſoon as they want room, a third hive ſhould be

Bee. placed under the two former; and in a few days after the end of three weeks from the time the ſwarm was put into the hive, the top hive may be taken away at noon of a fair day; and if any bees remain in it, carry it to a little diſtance from the ſtand, and turning its bottom up, and ſtriking it on the ſides, the bees will be alarmed, take wing, and join their companions in the ſecond and third hives. If it is found that the bees are very unwilling to quit it, it is probable that the queen remains among them. In this caſe, the bees muſt be treated in the manner that ſhall be directed when we deſcribe Mr Wildman's method of taking the honey and the wax. The upper hive now taken away ſhould be put in a cool place, in which no vermin, mice, &c. can come at the combs, or other damage can happen to them, and be thus preſerved in reſerve.

When the hives ſeem to be again crowded, and the upper hive is well ſtored or filled with honey, a fourth hive ſhould be placed under the third, and the upper hive be taken off the next fair day at noon, and treated as already directed. As the honey made during the ſummer is the beſt, and as it is needleſs to keep many full hives in ſtore, the honey may be taken out of the combs of this ſecond hive for uſe.

If the ſeaſon is very favourable, the bees may ſtill fill a third hive. In this caſe, a fifth hive muſt be put under the fourth, and the third taken away as before. The bees will then fill the fourth for their winter ſtore.

As the honey of the firſt hive is better than the honey collected ſo late as that in the third, the honey may be taken out of the combs of the firſt, and the third may be preſerved with the ſame care as directed for that.

In the month of September, the top hive ſhould be examined: if full, it will be a ſufficient proviſion for the winter; but if light, that is, not containing 20 pounds of honey, the more the better, then, in the month of October, the fifth hive ſhould be taken away, and the hive kept in reſerve ſhould be put upon the remaining one, to ſupply the bees with abundant proviſions for the winter. Nor need the owner grudge them this ample ſtore; for they are faithful ſtewards, and will be proportionally richer and more forward in the ſpring and ſummer, when he will reap an abundant profit. The fifth hive which was taken away ſhould be carefully preſerved during the winter, that it may be reſtored to the ſame ſtock of bees, when an additional hive is wanted next ſummer; or the firſt ſwarm that comes off may be put into it. The combs in it, if kept free from filth and vermin, will ſave much labour, and they will at once go to the collecting of honey.

It is almoſt needleſs to obſerve, that when the hives are changed, a cover, as already directed (ſee N° 23.) ſhould be put upon every upper hive; and that when a lower hive becomes an upper hive, the door of it ſhould be ſhut up, that ſo their only paſſage out ſhall be by the lower hive; for otherwiſe the queen would be apt to lay eggs in both indiſcriminately. The whole of the above detail of the management of one hive may be extended to any number; it may be proper to keep a regiſter to each ſet; becauſe, in reſtoring hives to the bees, they may be better pleaſed at receiving their own labours than that of other ſtocks.

If in the autumn the owner has ſome weak hives, which have neither proviſion nor number ſufficient for the winter, it is adviſable to join the bees to richer hives: for the greater number of bees will be a mutual advantage to one another during the winter, and accelerate their labours much in the ſpring. For this purpoſe, carry a poor and a richer hive into a room a little before night: then force the bees out of both hives into two ſeparate empty hives, in a manner that ſhall be hereafter directed: ſhake upon a cloth the bees out of the hive which contains the feweſt; ſearch for the queen; and as ſoon as you have ſecured her with a ſufficient retinue, bring the other hive which contains the greater number, and place it on the cloth on which the other bees are, with a ſupport under one ſide, and with a ſpoon ſhovel the bees under it. They will ſoon aſcend; and, while under this impreſſion of fear, will unite peaceably with the other bees; whereas, had they been added to the bees of the richer hive, while in poſſeſſion of their caſtle, many of the new-comers muſt have paid with their lives for their intruſion. Bee.

It appears from the account of the management of bees in Mr Wildman's hives, that there is very little art wanting to cauſe the bees to quit the hives which are taken away, unleſs a queen happens by chance to be among them. In that caſe, the ſame means may be uſed as are neceſſary when we would rob one of the common hives of part of their wealth. The method is as follows:

37 His method of taking the honey and wax.

Remove the hive from which you would take the wax and honey into a room, into which admit but little light, that it may at firſt appear to the bees as if it was late in the evening. Gently invert the hive, placing it between the frames of a chair or other ſteady ſupport, and cover it with an empty hive, keeping that ſide of the empty hive raiſed a little, which is next the window, to give the bees ſufficient light to get up into it. While you hold the empty hive, ſteadily ſupported on the edge of the full hive, between your ſide and your left arm, keep ſtriking with the other hand all round the full hive from top to bottom, in the manner of beating a drum, ſo that the bees may be frightened by the continued noiſe from all quarters; and they will in conſequence mount out of the full hive into the empty one. Repeat the ſtrokes rather quick than ſtrong round the hive, till all the bees are got out of it, which in general will be in about five minutes. It is to be obſerved, that the fuller the hive is of bees, the ſooner they will have left it. As ſoon as a number of them have got into the empty hive, it ſhould be raiſed a little from the full one, that the bees may not continue to run from the one to the other, but rather keep aſcending upon one another.

So ſoon as all the bees are out of the full hive, the hive in which the bees are muſt be placed on the ſtand from which the other hive was taken, in order to receive the abſent bees as they return from the fields.

If this is done early in the ſeaſon, the operator ſhould examine the royal cells, that any of them that have young in them may be ſaved, as well as the combs which have young bees in them, which ſhould on no account be touched, though by ſparing them a good deal of honey be left behind. Then take out the other combs with a long, broad, and pliable knife, ſuch as the apothecaries make uſe of. The combs ſhould be cut from the ſides and crown as clean as poſſible, to ſave the future labour of the bees, who muſt lick up the

BEE.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

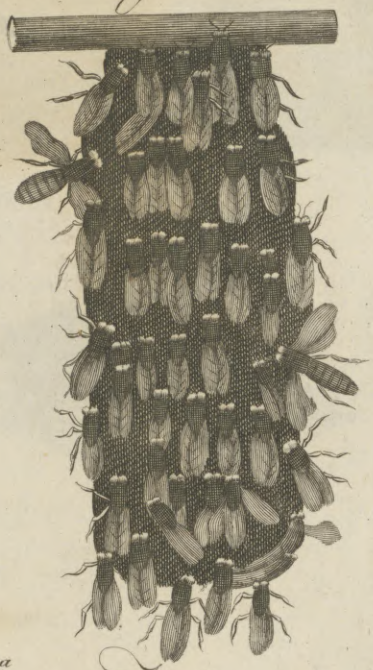


Fig. 10.

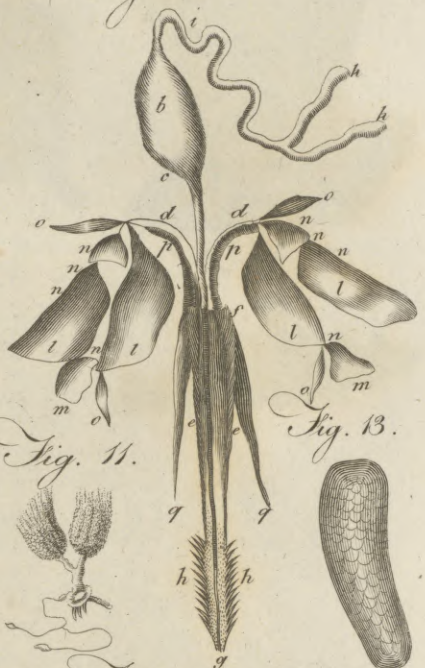


Fig. 5.

Fig. 12.

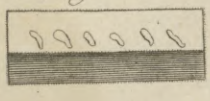


Fig. 16.

Fig. 17.

Fig. 11.

Fig. 13.

Fig. 6.

Fig. 14.

Fig. 9.

Fig. 8.

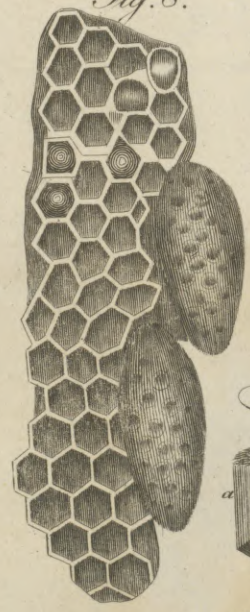
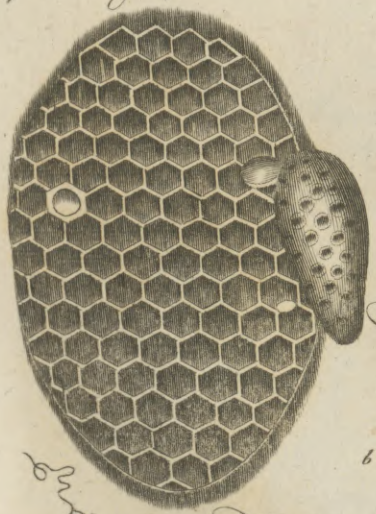


Fig. 7.



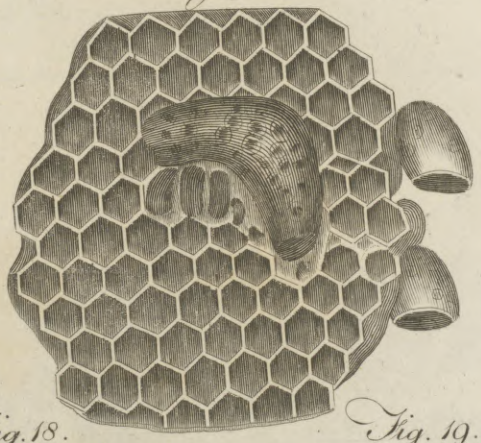


Fig. 18.

Fig. 19.

Fig. 21.

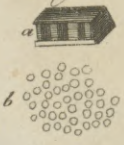


Fig. 20.

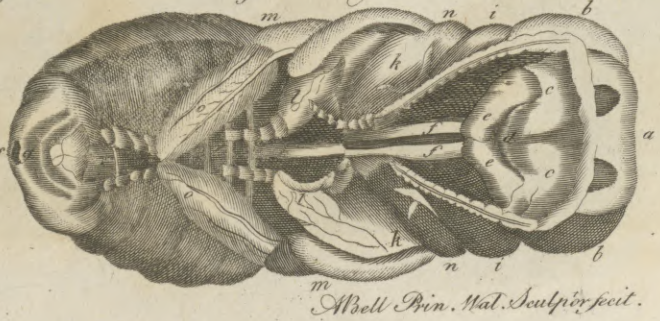


Fig. 15.

Abell Prin. Mal. Sculptor fecit.

Fig. 1.

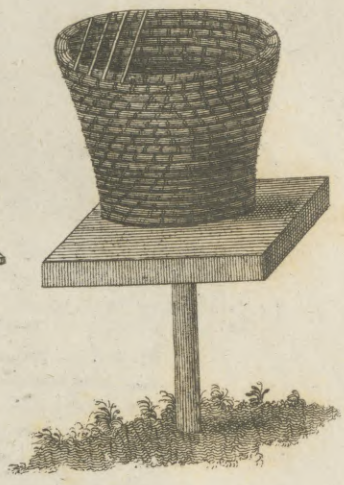


Fig. 2.

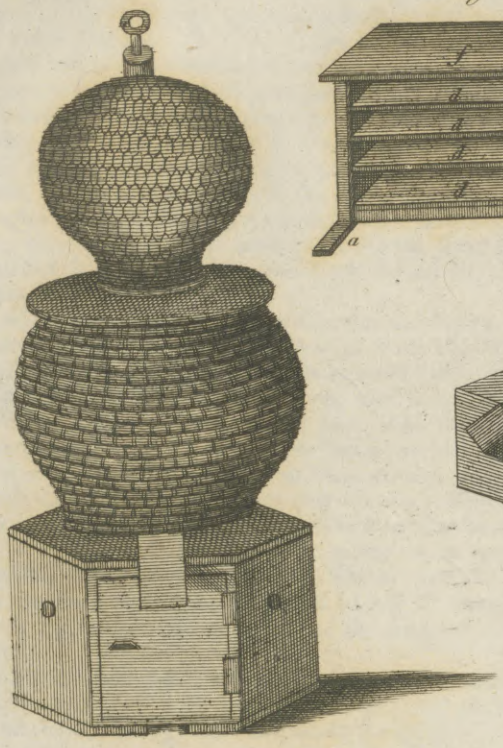


Fig. 3.

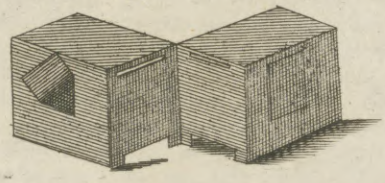


Fig. 4.

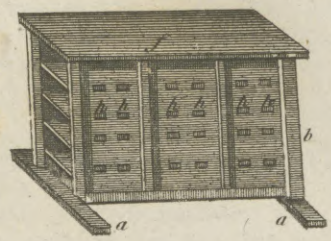


Fig. 5.

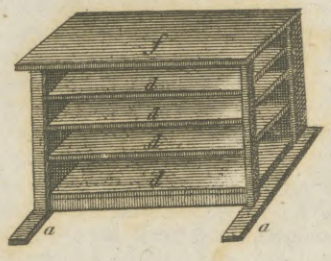


Fig. 6. Bird Catching. Fig. 7.

A. Bell Prin. Wal. Sculptor fecit.

Bee's-bread || Beech-oil.

the honey ſpilt, and remove every remain of wax; and then the ſides of the hive ſhould be ſcraped with a table ſpoon to clear away what was left by the knife. During the whole of this operation, the hive ſhould be placed inclined to the ſide from which the combs are taken, that the honey which is ſpilt may not daub the remaining combs. If ſome combs were unavoidably taken away, in which there are young bees, the parts of the combs in which they are ſhould be returned into the hive, and ſecured by ſticks in the beſt manner poſſible. Place the hive then for ſome time upright, that any remaining honey may drain out. If the combs are built in a direction oppoſite to the entrance, or at right angles with it, the combs which are the fartheſt from the entrance are to be preferred; becauſe there they are beſt ſtored with honey, and have the feweſt young bees in them.

Having thus finiſhed taking the wax and honey, the next buſineſs is to return the bees to their old hive; and for this purpoſe place a table covered with a clean cloth near the ſtand, and giving the hive in which the bees are a ſudden ſhake, at the ſame time ſtriking it pretty forcibly, the bees will be ſhaken on the cloth. Put their own hive over them immediately, raiſed a little on one ſide, that the bees may the more eaſily enter; and when all are entered, place it on the ſtand as before. If the hive in which the bees are be turned bottom uppermoſt, and their own hive be placed over it, the bees will immediately aſcend into it, eſpecially if the lower hive is ſtruck on the ſides to alarm them.

As the chief object of the bees during the ſpring and beginning of the ſummer is the propagation of their kind, honey during that time is not collected in ſuch quantity as it is afterwards: and on this account it is ſcarcely worth while to rob a hive before the latter end of June; nor is it ſafe to do it after the middle of July, leſt rainy weather may prevent their reſtoring the combs they have loſt, and laying in a ſtock of honey ſufficient for the winter, unleſs there is a chance of carrying them to a rich paſture.

Bee is alſo uſed figuratively to denote ſweetneſs, induſtry, &c. Thus Xenophon is called the *Attic bee*, on account of the great ſweetneſs of his ſtyle. Antonius got the denomination *Meliſſa* or *Bee*, on account of his collection of common places.—Leo Allatius gave the appellation *apes urbanæ* to the illuſtrious men at Rome from the year 1630 to the year 1632.

Bee's Bread. See Bee, N° 12. par. *ult.*

Bee-Eater. See Merops, Ornithology *Index.*

Bee-Flower. See Ophrys, Botany *Index.*

Bee-Glue, called by the ancients *propolis*, is a ſoft, unctuous, glutinous matter, employed by bees to cement the combs to the hives, and to cloſe up the cells. See Bee, N° 13.

Bee-Hives. See Bee, N° 19, 34, 36.

BEECH-tree. See Fagus, Botany *Index.*

Beech-Maſt, the fruit of the beech-tree, ſaid to be good for fattening hogs, deer, &c.—It has ſometimes, even to men, proved an uſeful ſubſtitute for bread. Chios is ſaid to have endured a memorable ſiege by means of it.

Beech-Oil, an oil drawn by expreſſion from the maſt of the beech-tree, after it has been ſhelled and pounded. This oil is very common in Picardy, and uſed there and in other parts of France inſtead of butter; but moſt of thoſe who take a great deal of it complain of pains and a heavineſs in the ſtomach.

Beef || Beer.

BEEF, the fleſh of black-cattle prepared for food. According to Dr Cullen *, beef, though of a more firm texture and leſs ſoluble than mutton, is equally alkaleſcent, perſpirable, and nutritious: and if in the ſouthern countries it is not eſteemed ſo, it is on account of its imperfection there.

* *Lect. on Mat. Med.*

BEELE, a kind of pick-axe, uſed by the miners for ſeparating the ores from the rocks in which they lie: this inſtrument is called a *tubber* by the miners of Cornwall.

BEER, is a ſpirituous liquor made from any farinaceous grain, but generally from barley. It is, properly ſpeaking, the wine of barley. The meals of any of theſe grains being extracted by a ſufficient quantity of water, and remaining at reſt in a degree of heat requiſite for the ſpirituous fermentation, naturally undergo this fermentation, and are changed into a vinous liquor. But as all theſe matters render the water mucilaginous, fermentation proceeds ſlowly and imperfectly in ſuch liquors. On the other ſide, if the quantity of farinaceous matter be ſo diminiſhed that its extract or decoction may have a convenient degree of fluidity, this liquor will be impregnated with ſo ſmall a quantity of fermentable matter, that the beer or wine of the grain will be too weak, and have too little taſte.

Theſe inconveniences are remedied by preliminary operations which the grain is made to undergo.—Theſe preparations conſiſt in ſteeping it in cold water, that it may ſoak and ſwell to a certain degree; and in laying it in a heap with a ſuitable degree of heat, by means of which, and of the imbibed moiſture, a germination begins, which is to be ſtopped by a quick drying, as ſoon as the bud ſhows itſelf. To accelerate this drying, and render it more complete, the grain is ſlightly roaſted, by making it paſs down an inclined canal ſufficiently heated. This germination, and this ſlight roaſting, changes conſiderably the nature of the mucilaginous fermentable matter of the grain. The germination attenuates much, and in ſome meaſure totally deſtroys, the viſcoſity of the mucilage; and it does this, when not carried too far, without depriving the grain of any of its diſpoſition to ferment. On the contrary, it changes the grain into a ſaccharine ſubſtance, as may be perceived by maſhing grains beginning to germinate. The ſlight roaſting contributes alſo to attenuate the mucilaginous fermentable matter of the grain. When the grain is thus prepared, it is fit to be ground, and to impregnate water with much of its ſubſtance without forming a glue or viſcous maſs. The grain thus prepared is called *malt*. This malt is then to be ground; and all its ſubſtance, which is fermentable and ſoluble in water, is to be extricated by means of hot water. This extract or infuſion is ſufficiently evaporated by boiling in caldrons; and ſome plant of an agreeable bitterneſs, ſuch as hops, is at that time added, to heighten the taſte of the beer, and to render it capable of being longer preſerved. Laſtly, this liquor is put into caſks, and allowed to ferment; nature performs the reſt of the work, and is only to be aſſiſted by the other moſt favourable circumſtances for the ſpirituous fermentation. See Fermentation.

Foreigners

Beeroth || Befort.

Foreigners have framed divers conjectures to account for the excellency of the Britiſh beer, and its ſuperiority to that of other countries, even of Bremen, Mons, and Roſtoch. It has been pretended our brewers throw dead dogs flayed into their wort, and boil them till the fleſh is all conſumed. Others, more equitable, attribute the excellency of our beer to the quality of our malt and water, and the ſkill of our brewers in preparing it.

Sour beer may be reſtored divers ways; as by ſalt made of the aſhes of barley-ſtraw, put into the veſſel and ſtirred; or by three or four handfuls of beech-aſhes thrown into the veſſel, and ſtirred; or, where the liquor is not very ſour, by a little put in a bag, without ſtirring: chalk calcined, oyſter-ſhells, egg-ſhells, burnt ſea-ſhells, crabs eyes, alkalized coral, &c. do the ſame, as they imbibe the acidity, and unite with it into a ſweetneſs.—Beer, it is ſaid, may be kept from turning ſour in ſummer, by hanging into the veſſel a bag containing a new laid egg, pricked full of little pin-holes, ſome laurel-berries, and a few barley-grains; or by a new-laid egg and walnut-tree leaves. Glauber commends his ſal mirabile and fixed nitre, put in a linen bag, and hung on the top of the caſk ſo as to reach the liquor, not only for recovering ſour beer, but preſerving and ſtrengthening it.

Laurel-berries, their ſkin being peeled off, will keep beer from *deadneſs*; and beer already dead may be reſtored by impregnating it with fixed air.

Beer *taſting of the caſk* may be freed from it by putting a handful of wheat in a bag, and hanging it in the veſſel.

BEEROTH, a village of Judea, ſituated at the foot of Mount Gabaon, ſeven miles from Ælia or Jeruſalem, on the road to Nicopolis (Jerome).

BEER-SHEBA (Moſes), a city to the ſouth of the tribe of Judah, adjoining to Idumea (Joſephus). See Bersabe.

BEESTINGS, or Breastings, a term uſed by country-people for the firſt milk taken from a cow after calving.—The beeſtings are of a thick conſiſtence, and yellow colour, ſeeming impregnated with ſulphur. Dr Morgan imagines them peculiarly fitted and intended by nature to cleanſe the young animal from the recrements gathered in its ſtomach and inteſtines during its long habitation *in utero*. The like quality and virtue he ſuppoſes in women's firſt milk after delivery; and hence infers the neceſſity of the mother's ſuckling her own child, rather than committing it to a nurſe whoſe firſt milk is gone.

BEET, in *Botany*. See Beta, Botany *Index*.

BEETLE. See Scarabæus, Entomology *Index*.

Beetle alſo denotes a wooden inſtrument for driving piles, &c. It is likewiſe called a *ſtamper*, and by paviors a *rammer*.

BEEVES, a general name for oxen. See Bos, Mammalia *Index*.

BEFORT, a ſmall town of France in the department of Upper Rhine. It was ceded to France by the treaty of Weſtphalia in 1648. There are not above 100 houſes in this town, but it is important on account of the great road by this place from Franche Compte. The fortifications were greatly augmented by Louis XIV. It is ſeated at the foot of a mountain. E. Long. 6. 2. N. Lat. 47. 38.

Beg || Beglerbeg

BEG, or Bey, in the Turkiſh affairs. See Bey.

Beg is more particularly applied to the lord of a banner, called alſo in the ſame language *ſangiak-beg*. A beg has the command of a certain number of the ſpahis, or horſe, maintained by the province under the denomination of *timariots*. All the begs of a province obey one governor-general called *begler-beg*, or *beyler-beg*, q. d. lord of lords or of the beys of the province.

Begs, or Beghs, of Egypt, denote twelve generals, who have the command of the militia or ſtanding forces of the kingdom; and are to ſecure the country from the inſults of Arabs, as well as to protect the pilgrims in their annual expeditions to Mecca. The begs, ſeveral of whom are deſcended from the ancient race of the Mamelukes, are very rich and powerful, maintaining each 500 fighting men for their own guard, and the ſervice of their court. On diſcontents, they have frequently riſen in rebellion. They are often at variance with the baſhaw, whom they have more than once plundered and impriſoned.

BEGA, Cornelius, painter of landſcape, cattle, and converſations, was born at Haerlem in 1620, and was the diſciple of Adrian Oſtade. Falling into a diſſipated way of life, he was diſinherited by his father: for which reaſon he caſt off his father's name, which was Begeyn, and aſſumed that of Bega: his early pictures being marked with the former, and his latter works with the other. He had a fine pencil, and a delicate manner of handling his colours, ſo as to give them a look of neatneſs and tranſparence; and his performances are ſo much eſteemed in the Low Countries, as to be placed among the works of the beſt artiſts. He caught the plague from a woman with whom he was deeply enamoured; and he ſhowed ſo much ſincerity of affection, that notwithſtanding the expoſtulations of all his friends and phyſicians, he would attend her to the laſt moments of her life, and died a few days after, aged 44.

BEGHARDS. See Beguards.

BEGLERBEG, a governor of one of the principal governments of the Turkiſh empire, and next in dignity to the grand vizier. To every beglerbeg the grand ſignior gives three enſigns or ſtaves, trimmed with a horſetail; to diſtinguiſh them from the baſhaws, who have but two; and from ſimple begs, or ſangiac begs, who have but one.

The province or government of beglerbeg is called *beglerbeglik*, or *beglierbeglik*. There are two ſorts; the firſt called *baſilo beglerbeglik*, which have a certain rent aſſigned out of the cities, countries, and ſignories allotted to the principality; the ſecond called *ſalianæ beglerbeglik*, for maintenance of which is annexed a ſalary or rent, collected by the grand ſignior's officers with the treaſure of the empire. The beglerbegs of the firſt ſort are in number 22, viz. thoſe of Anatolia, Caramania, Diarbekir, Damaſcus, Aleppo, Tripoli, Trebizond, Buda, Timiſwar, &c. The beglerbegs of the ſecond ſort are in number ſix, viz. thoſe of Cairo, Babylon, &c. Five of the beglerbegs have the title of *viziers*, viz. thoſe of Anatolia, Babylon, Cairo, Romania, and Buda.

The

Beguards || Beguines

The beglerbegs appear with great ſtate, and a large retinue, eſpecially in the camp, being obliged to bring a ſoldier for every 5000 aſpers of rent which they enjoy. Thoſe of Romania brought 10,000 effective men into the field.

The beglerbegs are become almoſt independent, and have under their juriſdiction ſeveral ſangiacs or particular governments, and begs, agas, and other officers who obey them.

BEGUARDS, or BEGHARDS, religious of the third order of St Francis in Flanders. They were eſtabliſhed at Antwerp in the year 1228, and took St Begghe for their patroneſs, whence they had their name. From their firſt inſtitution they employed themſelves in making linen cloth, each ſupporting himſelf by his own labour, and united only by the bonds of charity, without having any particular rule. But, when Pope Nicholas IV. had confirmed that of the third order of St Francis in 1289, they embraced it the year following. They were greatly favoured by the dukes of Brabant, particularly John II. and John III. who exempted them from all contributions and taxes. In the year 1425, they began to live in common, and made ſolemn vows in 1467, after having taken the habit of the Terciaries (or religious of the third order of St Francis) of Liege. At laſt, in 1472, they became ſubject to the general of the congregation of Zepperen in the dioceſe of Liege, to which they were united by Pope Sixtus IV. As the convent of Antwerp is ſince become very conſiderable, the name of *Beguards* has been given to all the other religious of the ſame congregation. But, in 1650, Pope Innocent X. having ſuppreſſed the general of the congregation of Zepperen, all the convents of the third order of St Francis, in the dioceſes of Liege, Malines, and Antwerp, were ſubmitted to the viſitation, juriſdiction, and correction, of the general of Italy, and erected into a province, under the title of *the province of Flanders*. This province has at preſent 10 or 12 convents, the principal of which are thoſe of Antwerp, Bruſſels, Maeſtricht, and Louvain.

BEGUINES, a congregation of religious or nuns founded either by St Begghe, founder likewiſe of the Beguards, or by Lambert le Begue; of whom the former died about the end of the ſeventh century, the latter about the end of the 12th. They were eſtabliſhed firſt at Liege, and afterwards at Neville, in 1207; and from this laſt ſettlement ſprang the great number of Beguinages, which are ſpread over all Flanders, and which have paſſed from Flanders into Germany. In the latter country, ſome of theſe religious fell into extravagant errors, perſuading themſelves that it was poſſible, in the preſent life, to arrive at the higheſt perfection, even to impeccability, and a clear view of God; in ſhort, to ſo eminent a degree of contemplation, that there was no neceſſity, after this, either to obſerve the faſts of the church, or ſubmit to the direction and laws of mortal men. The council of Vienna, in 1113, condemned theſe errors, and aboliſhed the order of Beguines; permitting, nevertheleſs, thoſe among them, who continued in the true faith, to live in chaſtity and penitence, either with or without vows. It is by favour of this latter clauſe, that there ſtill ſubſiſts ſo many communities of Beguines in Flanders; who, ſince the council of Vienna, have conducted themſelves with ſo much wiſdom and piety, that Pope John XXII. by his decretal, which explains that of his predeceſſor made in the council of Vienna, took them under his protection; and Boniface VIII. in another, exempted them from the ſecular tribunal, and put them under the juriſdiction of the biſhops. Beheading || Behn.

There is ſcarcely a town in the Low-Countries, in which there is not a ſociety of Beguines; and, notwithſtanding the change of religion at Amſterdam, there is a very flouriſhing one in that city. Theſe ſocieties conſiſt of ſeveral houſes placed together in one incloſure, with one or more churches, according to the number of Beguines. There is in every houſe a prioreſs, or miſtreſs, without whoſe leave they dare not ſtir out. They make a ſort of vow, which is conceived in the following terms: "I. N. promiſe to be obedient and chaſte as long as I continue in this Beguinage." They obſerve a three years noviciate before they take the habit. The rector of the pariſh is ſuperior of the Beguinage; and he does nothing without the advice of eight Beguines. They were formerly habited in different manners; ſome in grey, others in blue; but at preſent they all wear black. When they go abroad, in Amſterdam, they put on a black veil. Formerly they had as many different ſtatutes as there were ſocieties. In the viſitations of the year 1600 and 1601, by the archbiſhop Matthias Hovius, they were forbidden under the penalty of a fine, to have lapdogs. The fineſt Beguinage in Flanders is that of Malines. That of Antwerp likewiſe is very ſpacious, and has two ſeparate churches.

BEHEADING, a capital puniſhment, wherein the head is ſevered from the body by the ſtroke of an axe, ſword, or other cutting inſtrument.

Beheading was a military puniſhment among the Romans, known by the name of *decollatio*. Among them the head was laid on a *cippus* or block, placed in a pit dug for the purpoſe; in the army, without the *vallum*: in the city, without the walls, at a place near the *porta decumana*. Preparatory to the ſtroke, the criminal was tied to a ſtake, and whipped with rods. In the early ages the blow was given with an axe; but in after-times with a ſword, which was thought the more reputable manner of dying. The execution was but clumſily performed in the firſt times; but afterwards they grew more expert, and took the head off clean, with one circular ſtroke.

In England, beheading is the puniſhment of nobles as it was formerly in France; being reputed not to derogate from nobility, as hanging does.

In Scotland they do not behead with an axe, as in England; nor with a ſword, as in Holland; but with an edged inſtrument called the MAIDEN. With an inſtrument ſimilar to this, were the bloody executions perpetrated in France during the late revolution. It was called *guillotine*, from the name of the ſuppoſed inventor, who was a phyſician.

BEHEMOTH, the hippopotamus or river-horſe. See HIPPOPOTAMUS, MAMMALIA *Index*.

BEHEN, in *Botany*. See CUCUBALUS, BOTANY *Index*.

BEHMEN. See BOEHMEN.

BEHN, APHARA, a celebrated authoreſs, deſcended from a good family in the city of Canterbury, was born ſome time in Charles I.'s reign, but in what

year

Behn. year is uncertain. Her father's name was *Johnſon*, who through the intereſt of the Lord Willoughby, to whom he was related, being appointed lieutenant-general of Surinam and 36 iſlands, undertook a journey to the Weſt Indies, taking with him his whole family, among whom was our poeteſs, at that time very young. Mr Johnſon died in the voyage; but his family reaching Surinam, ſettled there for ſome years. Here it was that ſhe learned the hiſtory of, and acquired a perſonal intimacy with, the American prince Oroonoko and his beloved Imoinda, whoſe adventures ſhe hath ſo pathetically related in her celebrated novel of that name, and which Mr Southerne afterwards made ſuch an admirable uſe of it in adopting it as the groundwork of one of the beſt tragedies in the Engliſh language.

On her return to London, ſhe became the wife of one Mr Behn, a merchant, reſiding in that city, but of Dutch extraction. How long he lived after their marriage is not very apparent, probably not very long; for her wit and abilities having brought her into high eſtimation at court, King Charles II. fixed on her as a proper perſon to tranſact ſome affairs of importance abroad during the courſe of the Dutch war. To this purpoſe ſhe went over to Antwerp, where, by her intrigues and gallantries, ſhe ſo far crept into the ſecrets of ſtate, as to anſwer the ends propoſed by ſending her over. Nay, in the latter end of 1666, by means of the influence ſhe had over one Vander Albert, a Dutchman of eminence, whoſe heart was warmly attached to her, ſhe wormed out of him the deſign formed by De Ruyter, in conjunction with the family of the De Wits, of ſailing up the Thames and burning the Engliſh ſhips in their harbours, which they afterwards put in execution at Rocheſter. This ſhe immediately communicated to the Engliſh court: but though the event proved her intelligence to be well grounded, yet it was at that time only laughed at; which, together probably with no great inclination ſhown to reward her for the pains ſhe had been at, determined her to drop all further thoughts of political affairs, and during the remainder of her ſtay at Antwerp to give herſelf up entirely to the gaiety and gallantries of the place. Vander Albert continued his addreſſes, and after having made ſome unſucceſsful attempts to obtain the poſſeſſion of her perſon on eaſier terms than matrimony, at length conſented to make her his wife; but while he was preparing at Amſterdam for a journey to England with that intent, a fever carried him off, and left her free from any amorous engagements. In her voyage back to England, ſhe was very near being loſt, the veſſel ſhe was in being driven on the coaſt by a ſtorm; but happening to founder within ſight of land, the paſſengers were, by the timely aſſiſtance of boats from the ſhore, all fortunately preſerved.

From this period ſhe devoted her life entirely to pleaſure and the muſes. Her works are extremely numerous, and all of them have a lively and amorous turn. It is no wonder then that her wit ſhould have gained her the eſteem of Mr Dryden, Southerne, and other men of genius, as her beauty, of which in her younger part of life ſhe poſſeſſed a great ſhare, did the love of thoſe of gallantry. Nor does ſhe appear to have been any ſtranger to the delicate ſenſations of that paſſion, as appears from ſome of her letters to a gentleman, with whom ſhe correſponded under the name of Lycida, and who ſeems not to have returned her flame with equal ardour, or received it with that rapture her charms might well have been expected to command. Pejah || Beinaſchi

She publiſhed three volumes of Miſcellany Poems; two volumes of Hiſtories and Novels; tranſlated Fontenelle's Plurality of Worlds, and annexed a Criticiſm on it; and her plays make four volumes. In the dramatic line, the turn of her genius was chiefly to comedy. As to the character her plays ſhould maintain in the records of dramatic hiſtory, it will be difficult to determine, ſince their faults and perfections ſtand in ſtrong oppoſition to each other. In all, even the moſt indifferent of her pieces, there are ſtrong marks of genius and underſtanding. Her plots are full of buſineſs and ingenuity, and her dialogue ſparkles with the dazzling luſtre of genuine wit, which everywhere glitters among it. But then ſhe has been accuſed, and that not without great juſtice, of interlarding her comedies with the moſt indecent ſcenes, and giving an indulgence to her wit in the moſt indelicate expreſſions. To this accuſation ſhe has herſelf made ſome reply in the Preface to the Lucky Chance; but the retorting the charge of prudery and preciſeneſs on her accuſers, is far from being a ſufficient exculpation of herſelf. The beſt and perhaps the only true excuſe that can be made for it is, that, as ſhe wrote for a livelihood, ſhe was obliged to comply with the corrupt taſte of the times.

After a life intermingled with numerous diſappointments, ſhe departed from this world on the 16th of April 1689, and lies interred in the cloiſters of Weſtminſter-Abbey.

BEJA, an ancient town of Portugal, in the province of Alentejo. It is ſeated in a very agreeable and fruitful plain, remarkable for excellent wine. There are three gates remaining, which are of Roman architecture, and a great many Roman antiquities are dug out of the earth. The town has a ſtrong caſtle for its defence, and is ſituated in W. Long. 7. 20. N. Lat. 37. 58. It was taken from the Moors in 1162.

BEJAR, a town of Eſtremadura in Spain, famous for its baths. It is ſeated in a very agreeable valley ſurrounded with high mountains whoſe tops are always covered with ſnow. Here the dukes of Bejar have a handſome palace. In this neighbourhood are foreſts filled with game, and watered by fine ſprings; alſo a lake abounding with excellent fiſh, particularly trouts. They pretend that this lake makes ſuch a noiſe before a ſtorm, that it may be heard 15 miles off.

BEICHLINGEN, a town of Thuringia in Upper Saxony, in E. Long. 11. 50. N. Lat. 51. 20.

BEILA, a town of Italy, in Piedmont. E. Long. 7. 45. N. Lat. 45. 2.

BEILSTEIN, a town of the landgraviate of Heſſe in Germany, in E. Long. 8. 0. N. Lat. 50. 30.

BEINASCHI, Giovanni Battista, called *Cavalier Beinaſchi*, hiſtory painter, was a Piedmonteſe, and born in 1634. He ſtudied in Rome, under the direction of Pietro del Po; and ſome authors affirm, that he was afterwards the diſciple of Lanfranc. It was certain that he was peculiarly fond of the works of Lanfranc, and at laſt became ſo thoroughly acquainted with the ſtyle, manner, and touch, of that excellent

Beinheim || Bel.

excellent master, that many of the pictures of Beinaschi are at this day accounted the work of Lanfranc's own hand. He was an admirable designer; his lively invention furnished him with a surprising variety: his thought was noble; he was not only expeditious but correct; and as a public acknowledgment of his merit, the honour of knighthood was conferred upon him.

BEINHEIM, a fort of Alsace in France, seated on the river Sur, near its confluence with the Rhine, in E. Long. 8. 12. N. Lat. 45. 2.

BEIRA, a province of Portugal, bounded on the west by the ocean, on the south by the Portuguese Estremadura, on the south-east by the Spanish province of the same name, on the east by the province of Tralos Montos, and on the north by the river Douro. It extends in length about 34 leagues, and in breadth about 30 leagues, and is divided into six commarcas. Within this province lies Lamego, where the first assembly of the states was held; the chief episcopal city of Conimbra, or Coimbra, which is likewise an university; and Viseo, also a bishopric, and formerly the capital of a dukedom. The country is equally agreeable and fruitful, producing corn, wines, &c. in abundance, and the hills affording excellent pasture to cattle and sheep. The settled militia consists of about 10,000 men.

BEIRAM, or Bairam. See Bairam.

BEIRALSTON, a town in Devonshire, which sends two members to parliament.

BEIZA, or Beizath, in Hebrew antiquity, a word signifying an *egg*; as also a certain measure in use among the Jews. The beiza was likewise a gold coin, weighing 40 drachms, among the Persians, who gave out that Philip of Macedon owed their king Darius 1000 beizaths or golden eggs, for tribute-money; and that Alexander the Great refused to pay them, saying, that the bird which laid these eggs was flown into the other world.

BEKKER, Balthasar, one of the most famous Dutch divines, and author of the celebrated book, The World Betwitched, an ingenious piece against the vulgar notion of spirits. This raised a terrible clamour against him. He was deposed from the office of minister; but the magistrates of Amsterdam continued him his pension. He died in 1698.

BEL, Matthias, was born in Hungary, and became a Lutheran minister at Presburg, and historiographer to the emperor Charles VI. He wrote, among other works, a History of Hungary, which was so much admired, that the emperor sent him letters of nobility; and notwithstanding his being a Lutheran, the Pope, in 1736, sent him his picture, and many large gold medals. He was a member of the Royal Society of London, and of the academies of Berlin and Petersburg; and died in 1749, at 66 years of age.

Bel, or *Belus*, the supreme god of the ancient Chaldeans or Babylonians. He was the founder of the Babylonian empire; and is supposed to be the Nimrod of Scripture, and the same as the Phœnician Baal. This god had a temple erected to him in the city of Babylon, on the very uppermost range of the famous tower of Babel, or Babylon, wherein were many statues of this deity; and one, among the rest, of massy gold, 40 feet high. The whole furniture of this magnificent temple was of the same metal, and valued at 800 talents of gold.—This temple, with its riches, was in being till the time of Xerxes, who, returning from his unfortunate expedition into Greece, demolished it, and carried off the immense wealth which it contained. It was the statue of this god which Nebuchadnezzar, being returned to Babylon after the end of the Jewish war, set up and dedicated in the plain of Dura; the story of which is related at large in the third chapter of Daniel.

Bel || Belerium.

Bel and the Dragon, the history of; an apocryphal, and uncanonical book of Scripture. It was always rejected by the Jewish church, and is extant neither in the Hebrew nor the Chaldee language, nor is there any proof that it ever was so. St Jerome gives it no better title than the *Fable of Bel and the Dragon*. It is however permitted to be read, as well as the other apocryphal writings, for instruction and the improvement of manners.

BELAC, a small town of France, in the province of the Lyonnois, now the department of Upper Vienne, and district of La Marche. It contains about 3000 inhabitants. E. Long. 1. 15. N. Lat. 46. 15.

BELAY, on board a ship, signifies the same as fasten.—Thus they say, belay the sheet, or tack, that is, fasten it to the kevel, by winding it several times round a last, &c.

BELCASTRO, an episcopal city of Italy in the farther Calabria, and kingdom of Naples. It is seated on a mountain, in E. Long. 17. 15. N. Lat. 39. 6.

BELCHITE, a town of Spain, in the kingdom of Arragon, seated on the river Almonazir, in W. Long. 0. 30. N. Lat. 41. 19.

BELCHOE, a town of Ireland, in the province of Ulster, and county of Fermanagh, seated on Lough Nilly, in W. Long. 6. 6. N. Lat. 54. 2.

BELEM, a town of Estremadura in Portugal, about a mile from Lisbon. It is seated on the north side of the river Tajo, and is designed to defend the entrance to Lisbon; and here all the ships that sail up the river must bring to. In this place they inter the kings and queens of Portugal.

BELEMNITES, vulgarly called *thunder-bolts* or *thunder-stones*, are composed of several crusts of stone encircling each other, of a conical form, and various sizes; usually a little hollow, and somewhat transparent, formed of several striæ radiating from the axis to the surface of the stone; and when burnt or rubbed against one another, or scraped with a knife, yield an odour like rasped horn. Their size is various, from a quarter of an inch to eight inches; and their colour and shape differ. They are supposed to be originally either a part of some sea production; or a stone formed in the cavity of some worm-shell, which being of a tender and brittle nature, has perished, after giving its form to the stone. They are very frequently found in many parts of England; and the common people have a notion, that they are always to be met with after a storm. They are often enclosed in, or adhere to, other stones; and are most frequent amongst gravel, or in clay; they abound in Gloucestershire; and are found near Dedington in Oxfordshire, where they sometimes contain the silver marcasite.

BELERIUM, in *Ancient Geography*, a promontory

Beleſis. of the Dumnonii or Damnonii, the weſtmoſt Britons. Now called the *Land's End*, in Cornwall.

BELESIS, or NANYBRUS, is ſaid to have been the founder of the ancient Babyloniſh empire, and in conjunction with Arbaces the Mede to have put an end to the kingdom of the Aſſyrians by the defeat and death of Sardanapalus. This firſt prince is repreſented as a crafty and mean-ſpirited knave; and at the ſame time, as nothing leſs than a hero. It is ſaid, he was baſe enough to circumvent Arbaces his colleague and friend in the moſt ſhameful manner; by pretending a vow he had, in the midſt of the war, made to his god Belus, That if ſucceſs was the event of it, and the palace of Sardanapalus was conſumed, as it was, he would be at the charge and trouble of removing the aſhes that were left, to Babylon; where he would heap them up into a mount near the temple of his god; there to ſtand as a monument to all who ſhould navigate the Euphrates, of the ſubverſion of the Aſſyrian empire. He, it ſeems, had been privately informed, by an eunuch, of the immenſe treaſure which had been conſumed in the conflagration at Nineveh; and knowing it to be a ſecret to Arbaces, his avarice ſuggeſted to him this artifice. Arbaces not only granted him his requeſt; but appointed him king of Babylon, with an exemption from all tribute. Beleſis, by this artifice, carried a prodigious treaſure with him to Babylon; but when the ſecret was diſcovered, he was called to an account for it, and tried by the other chiefs who had been aſſiſtant in the war, and who, upon his confeſſion of the crime, condemned him to loſe his head. But Arbaces, a munificent and generous prince, freely forgave him, left him in poſſeſſion of the treaſure, and alſo in the independent government of Babylon, ſaying, The good he had done ought to ſerve as a veil to his crime; and thus he became at once a prince of great wealth and dominion.

In proceſs of time, and under the ſucceſſor of Arbaces, he became a man of dreſs, ſhew, and effeminacy, unworthy of the kingdom or province he held. Nanybrus, for ſo we muſt now call Beleſis, underſtanding a certain robuſt Mede, called *Parſondas*, held him in the utmoſt contempt, and had ſolicited the emperor of the Medes to diveſt him of his dominions, and to confer them upon himſelf, offered a very great reward to the man who ſhould take Parſondas, and bring him to him. Parſondas hunting ſomewhere near Babylon with the king of the Medes, and ſtraggling from the company, happened to fall in with ſome of the ſervants of the Babylonian Nanybrus, who had been tempted with the promiſed reward. They were purveyors to the king; and Parſondas being very thirſty, aſked them for a draught of wine; which they not only granted, but prevailed upon him to take a meal with them. As he drank freely, ſuſpecting no treachery, he was eaſily perſuaded to paſs that night in company with ſome beautiful women, brought on purpoſe to detain him. But, while he was in a profound ſleep, the ſervants of Nanybrus ruſhing upon him, bound him, and carried him to their prince; who bitterly reproached him for endeavouring to eſtrange his maſter the king of the Medes from him, and by that means place himſelf in his room on the throne of Babylon. Parſondas did not deny the charge; but with great intrepidity owned, that he thought himſelf more worthy of a crown than ſuch an indolent and effeminate prince as he was. Nanybrus, highly provoked at the liberty he took, ſwore by the gods Belus and Molis, or rather Mylitta, that Parſondas himſelf ſhould in a ſhort time become ſo effeminate as to reproach none with effeminacy. Accordingly, he ordered the eunuch who had the charge of his muſic-women, to ſhave, paint, and dreſs him after the manner of thoſe women, to teach him the art, and in ſhort to transform him by all poſſible means into a woman. His orders were obeyed; and the manly Parſondas ſoon excelled the faireſt female in ſinging, playing, and the other arts of allurement. Beleſis, Beleſme.

In the mean time the king of the Medes, having in vain ſought after his favourite ſervant, and in vain offered great rewards to ſuch as ſhould give him any information concerning him, concluded he had been deſtroyed by ſome wild beaſt in the chaſe. At length, after ſeven years, the Mede was informed of his ſtate and condition by an eunuch, who, being cruelly ſcourged by Nanybrus's order, fled, at the inſtigation of Parſondas, into Media; and there diſcloſed the whole to the king, who immediately deſpatched an officer to demand him. Nanybrus pretended to know nothing of any ſuch perſon; upon which another officer was ſent by the Mede, with a peremptory order to ſeize on Nanybrus if he perſiſted in the denial, to bind him with his girdle, and lead him to immediate execution. This order had the deſired effect: the Babylonian owned what he had before denied, promiſing to comply, without further delay, with the king's demand; and in the mean time invited the officer to a banquet, at which 150 women, among whom was Parſondas, made their appearance, ſinging and playing upon various inſtruments. But, of all, Parſondas appeared by far the moſt charming; inſomuch, that Nanybrus inquiring of the Mede which he liked beſt, he immediately pointed at him. At this the Babylonian clapt his hands; and, falling into an immoderate fit of laughter, told him who the perſon was whom he thus preferred to all the reſt; adding, that he could anſwer what he had done before the king of the Medes. The officer was no leſs ſurpriſed at ſuch an aſtoniſhing change than his maſter was afterwards, when Parſondas appeared before him. The only favour Parſondas begged of the king, for all his paſt ſervices, was, that he would avenge on the Babylonian the baſe and highly injurious treatment he had met with at his hands. The Mede marched accordingly at his inſtigation to Babylon; and, notwithſtanding the remonſtrances of Nanybrus, urging, that Parſondas had, without the leaſt provocation, endeavoured to deprive him of both his life and kingdom, declared that in ten days time he would paſs the ſentence on him which he deſerved, for preſuming to act as judge in his own cauſe, inſtead of appealing to him. But Nanybrus having in the mean time gained with a large bribe Mitraphernes the Mede's favourite eunuch, the king was by him prevailed upon to ſentence the Babylonian only to a fine; which made Parſondas curſe the man who firſt found out gold, for the ſake of which he was to live the ſport and deriſion of an effeminate Babylonian.

BELESME, a town of Perche in France, in the department of Orne, in W. Long. 0. 16. N. Lat. 48. 23.

BELEZERO,

Belezero || Belgium.

BELEZERO, a town of Ruſſia, and capital of a province of the ſame name. It is ſituated on the ſouth-eaſt ſhore of the White ſea, in E. Long. 36. 10. N. Lat. 61. 50.

BELFAST, a town of Ireland, in the county of Antrim. It is ſeated at the bottom of Carrickfergus bay, and is the chief town and port in this part of Ireland, as well for beauty and the number of its inhabitants, as for its wealth, trade, and ſhipping. It has a conſiderable trade with Glaſgow, and the inhabitants are moſtly Scots, and of the Preſbyterian religion. W. Long. 6. 15. N. Lat. 54. 38.

BELFRY, Belfredus, is uſed by military writers of the middle age for a ſort of tower erected by beſiegers to overlook and command the place beſieged. Belfry originally denoted a high tower, whereon ſentinels were placed to watch the avenues of a place, and prevent ſurpriſe from parties of the enemies, or to give notice of fires by ringing a bell. In the cities of Flanders, where there is no belfry on purpoſe, the tower of the chief church ſerves the ſame end. The word *belfry* is compounded of the Teutonic *bell*, and *freid* "peace," becauſe the bells were hung for preſerving the peace.

Belfry is alſo uſed for that part of a ſteeple wherein the bells are hung. This is ſometimes called by middle-age writers *campanile*, *clocaria*, and *triſtegum*.

Belfry is more particularly uſed for the timber-work which ſuſtains the bells in a ſteeple, or that wooden ſtructure to which the bells in church-ſteeples are faſtened.

BELGÆ, in *Ancient Geography*, a people of Britain, to the weſt: Now Hampſhire, Wiltſhire, and Somerſetſhire, (Camden).

BELGICA, a town of the Ubii in Gallia Belgica, midway between the rivers Rhine and Roer: Now called *Balchuſen* (Cluverius); a citadel of Juliers (Baudrand).

Belgica Gallia, one of Cæſar's three diviſions of Gaul, contained between the ocean to the north, the rivers Seine and Marne to the weſt, the Rhine to the eaſt, but on the ſouth at different times within different limits. Auguſtus, inſtituting everywhere a new partition of provinces, added the Sequani and Helvetii, who till then made a part of Celtic Gaul, to the Belgic (Pliny, Ptolemy). The gentilitious name is *Belgæ*, called by Cæſar the braveſt of the Gauls, becauſe untainted by the importation of luxuries. The epithet is *Belgicus* (Virgil).

BELGARDEN, a town of Germany, in Eaſt Pomerania, in the province of Caſſubia, and ſubject to Pruſſia. E. Long. 16. 5. N. Lat. 54. 10.

BELGINUM, a town of the Treviri, in Gallia Belgica: Now called *Baldenau*, in the electorate of Triers.

BELGIUM, manifeſtly diſtinguiſhed from Belgica, as a part from the whole (Cæſar); who makes Belgium the country of the Bellovaci; Hirtius adding the Atrebates. But as the Ambiani lay between the Bellovaci and Atrebates, we muſt alſo add theſe: and thus Belgium reached to the ſea, becauſe the Ambiani lay upon it: and theſe three people conſtituted the proper and genuine Belgæ (all the reſt being adventitious, or foreigners); and theſe were the people of Beauvais, Amiens, and Artois.

Belgorod || Belidor.

BELGOROD, a town of Ruſſia, and capital of a province of the ſame name. It is ſeated on the river Donnets, in E. Long. 18. 5. N. Lat. 51. 20.

Belgorod, a ſtrong town of Beſſarabia in European Turkey, ſeated at the mouth of the river Nieſter, on the Black ſea, 80 miles ſouth-eaſt of Bender. E. Long. 31. 0. N. Lat. 46. 30.

BELGRADE, a city of Turkey in Europe, and capital of Servia, ſeated at the confluence of the Save and the Danube, in E. Long. 21. 2. N. Lat. 45. 10. The Danube is very rapid near this city, and its waters look whitiſh. Belgrade is built on a hill, and was once large, ſtrong, and populous. It was ſurrounded with a double wall, flanked with a great number of towers, and had a caſtle ſituated on a riſing ground, and built with ſquare ſtones. The ſuburbs are very extenſive; and reſorted to by Turkiſh, Jewiſh, Greek, Hungarian, and Sclavonian merchants. The ſtreets where the greateſt trade is carried on are covered with wood, to ſhelter the dealers from the ſun and rain. The rivers render it very convenient for commerce; and as the Danube falls into the Black ſea, the trade is eaſily extended to diſtant countries, which renders it the ſtaple town in theſe parts; and as the Danube runs up to Vienna, they ſend goods from thence with a great deal of eaſe. The Armenians have a church here, and the Jews a ſynagogue, both theſe being employed as factors. The ſhops are but ſmall; and the ſellers ſit on tables, diſpoſing of their commodities out of a window, for the buyers never go on the inſide. The richeſt merchandiſe is expoſed to ſale in two bezeſteins or bazars, built croſswiſe. There are two exchanges, built with ſtone, and ſupported with pillars not unlike the Royal Exchange at London. There is likewiſe a caravanſera or public inn, and a college for young ſtudents. It has been taken by the Turks and Imperialiſts alternately ſeveral times; but was ceded to the Turks in 1739, and the fine fortifications demoliſhed.

BELGRADO, a town of Friuli, in the Venetian territories in Italy. It ſtands near the river Tejamento, in E. Long. 13. 5. N. Lat. 46. 0.

BELIA, in *Ancient Geography*, a town of hither Spain: Now *Belchite*, in the kingdom of Arragon. See Belchite.

BELIAL, בליעל, a Hebrew word which ſignifies a wicked worthleſs man, one who is reſolved to endure no ſubjection. Thus the inhabitants of Gibeah, who abuſed the Levite's wife (Judges xix. 22.), have the name of Belial given them. Hophni and Phineas, the high prieſt Eli's ſons, are likewiſe called ſons of Belial (1 Sam. ii. 12.), upon account of the ſeveral crimes they had committed, and the unbecoming manner in which they behaved themſelves in the temple of the Lord. Sometimes the name Belial is taken to denote the devil. Thus St Paul ſays (2 Cor. vi. 15.) "What concord hath Chriſt with Belial?" Whence it appears, that in his time the Jews, under the name of Belial, commonly underſtood the devil in the places where this term occurs in the Old Teſtament.

BELIDOR, Bernard Forest de, a Catalonian engineer in the ſervice of France, and member of the academies of ſciences at Paris and Berlin, and of the

Belief || Belisarius.

royal ſociety at London; a celebrated mathematician, and author of a number of military tracts in which the ſcience of mathematics is applied to military uſes. Died in 1765, aged 70.

BELIEF, in its general and natural ſenſe, denotes a perſuaſion, or a ſtrong aſſent of the mind to the truth of any propoſition. In which ſenſe, belief has no relation to any particular kind of means or arguments, but may be produced by any means whatever. Thus we are ſaid to believe our ſenſes, to believe our reaſon, to believe a witneſs, &c. And hence, in rhetoric, all ſorts of proofs, from whatever topics deduced, are called πιστις, becauſe apt to beget belief or perſuaſion touching the matter in hand.

Belief, in its more reſtrained and technical ſenſe, invented by the ſchoolmen, denotes that kind of aſſent which is grounded only on the authority or teſtimony of ſome perſon or perſons, aſſerting or atteſting the truth of any matter propoſed.

In this ſenſe, belief ſtands oppoſed to knowledge and ſcience. We do not ſay we believe that ſnow is white, or that the whole is equal to its parts; but we ſee and know them to be ſo. That the three angles of a triangle are equal to two right angles, or that all motion is naturally rectilinear, are not ſaid to be things credible, but ſcientifical; and the comprehenſion of ſuch truths is not belief but ſcience.

But when a thing propounded to us is neither apparent to our ſenſe, nor evident to our underſtanding; neither certainly to be collected from any clear and neceſſary connection with the cauſe from which it proceeds, nor with the effects which it naturally produces; nor is taken up upon any real arguments, or relation thereof to other acknowledged truths; and yet, notwithſtanding, appears as true, not by manifeſtation, but by an atteſtation of the truth, and moves us to aſſent, not of itſelf, but in virtue of a teſtimony given to it—this is ſaid to be properly credible; and an aſſent to this is the proper notion of belief or faith.

BELIEVERS, an appellation given toward the cloſe of the firſt century to thoſe Chriſtians who had been admitted into the church by baptiſm, and inſtructed in all the myſteries of religion. They had alſo acceſs to all the parts of divine worſhip, and were authorized to vote in the eccleſiaſtical aſſemblies. They were thus called in contradiſtinction to the catechumens, who had not been baptized, and were debarred from theſe privileges.

BELIO, in *Ancient Geography*, a river of Luſitania, called otherwiſe *Limæas*, *Limeas*, *Limias*, and *Lethe*, or the *river of oblivion:* the boundary of the expedition of Decimus Brutus. The ſoldiers out of ſuperſtition refuſing to croſs, he ſnatched an enſign out of the hands of the bearer, and paſſed over, by which his army was encouraged to follow (Livy.) He was the firſt Roman who ever proceeded ſo far, and ventured to croſs. The reaſon of the appellation according to Strabo is, that in a military expedition a ſedition ariſing between the Celtici and Turduli, after croſſing that river, in which the general was ſlain, they remained diſperſed there; and from this circumſtance it came to be called the *river of Lethe* or *oblivion*. Now called *El Lima*, in Portugal, running weſtward into the Atlantic, to the ſouth of the Minho.

BELISARIUS, general of the emperor Juſtinian's army, who overthrew the Perſians in the eaſt, the Vandals in Africa, and the Goths in Italy. See Rome. But after all his great exploits, he was falſely accuſed of a conſpiracy againſt the emperor. The real conſpirators had been detected and ſeized, with daggers hidden under their garments. One of them died by his own hand, and the other was dragged from the ſanctuary. Preſſed by remorſe, or tempted by the hopes of ſafety, he accuſed two officers of the houſehold of Beliſarius; and torture forced them to declare that they had acted according to the ſecret inſtructions of their patron. Poſterity will not haſtily believe, that a hero who in the vigour of life had diſdained the faireſt offers of ambition and revenge, ſhould ſtoop to the murder of his prince, whom he could not long expect to ſurvive. His followers were impatient to fly; but flight muſt have been ſupported by rebellion, and he had lived enough for nature and for glory. Beliſarius appeared before the council with leſs fear than indignation: after 40 years ſervice, the emperor had prejudged his guilt; and injuſtice was ſanctified by the preſence and authority of the patriarch. The life of Beliſarius was graciouſly ſpared: but his fortunes were ſequeſtered; and, from December to July, he was guarded as a priſoner in his own palace. At length his innocence was acknowledged; his freedom and honours were reſtored; and death, which might be haſtened by reſentment and grief, removed him from the world about eight months after his deliverance. That he was deprived of his eyes, and reduced by envy to beg his bread, "Give a penny to Beliſarius the general!" is a fiction of later times; which has obtained credit, or rather favour, as a ſtrange example of the viciſſitudes of fortune.—The ſource of this idle fable may be derived from a miſcellaneous work of the 12th century, the Chiliads of John Tzetzes, a monk. He relates the blindneſs and beggary of Beliſarius in ten vulgar or political verſes (Chiliad iii. N° 88. 339—348. in Corp. Poet. Græc. tom. ii. p. 311.

Εκπωμα ξυλινον κρατων εβοα τω μιλιω
Βελισαριω οβολον δοτε τω στρατηλατη
Ον τυχη μεν εδοξασει, αποτυφλοι δ' ὁ φθονος.

This moral or romantic tale was imported into Italy with the language and manuſcripts of Greece; repeated before the end of the 15th century by Crinitus, Pontanus, and Volaterranus; attacked by Alciat for the honour of the law, and defended by Baronius (A. D. 561, N° 2, &c.) for the honour of the church, Yet Tzetzes himſelf had read in other chronicles, that Beliſarius did not loſe his ſight, and that he recovered his fame and fortunes.—The ſtatue in the Villa Borgheſe at Rome, in a ſitting poſture, with an open hand, which is vulgarly given to Beliſarius, may be aſcribed with more propriety to Auguſtus in the act of propitiating Nemeſis (*Winckleman, Hiſt. de l'Art.* tom. iii. p. 266). "Ex nocturno vifu etiam ſtipem, quotannis, die certo, emendicabat a populo, cavam manum aſſes porrigentibus prebens." (*Sueton. in Aug.* c. 91.)

Beliſarius, Bell.

BELL, a well known machine ranked by muſicians among the muſical inſtruments of percuſſion.

The conſtituent parts of a bell are the body or *barrel*, the *clapper* on the inſide, and the ear or *cannon* by which it hangs to a large beam of wood. The matter of which it is uſually made is a compoſition called *bell-metal*,

Bell. *metal.* The thickneſs of a bell's edges is uſually $\frac{1}{15}$ of the diameter, and its height 12 times its thickneſs. The bell-founders have a diapaſon, or bell-ſcale, wherewith they meaſure the ſize, thickneſs, weight, and tone, of their bells. For the method of caſting bells, ſee FOUNDERY.

The ſound of a bell is conjectured to conſiſt in a vibratory motion of its parts, much like that of a muſical chord. The ſtroke of the clapper muſt neceſſarily change the figure of the bell, and of a round make it oval: but the metal having a great degree of elaſticity, that part will return back again which the ſtroke drove fartheſt off from the centre, and that even ſome ſmall matter nearer the centre than before; ſo that the two parts which before were extremes of the longeſt diameter, do then become thoſe of the ſhorteſt; and thus the external ſurface of the bell undergoes alternate changes of figure, and by that means gives that tremulous motion to the air in which the ſound conſiſts. M. Perrault maintains, that the ſound of the ſame bell or chord is a compound of the ſounds of the ſeveral parts thereof; ſo that where the parts are homogeneous, and the dimenſions of the figure uniform, there is ſuch a perfect mixture of all theſe ſounds as conſtitutes one uniform, ſmooth, even ſound; and the contrary circumſtances produce harſhneſs. This he proves from the bells differing in tone according to the part you ſtrike; and yet ſtrike it anywhere, there is a motion of all the parts. He therefore conſiders bells as a compound of an infinite number of rings, which according to their different dimenſions have different tones, as chords of different lengths have; and when ſtruck, the vibrations of the parts immediately ſtruck determine the tone, being ſupported by a ſufficient number of conſonant tones in the other parts.

Bells are obſerved to be heard farther placed on plains than on hills; and ſtill farther in valleys than on plains: the reaſon of which will not be difficult to aſſign, if it be conſidered that the higher the ſonorous body is, the rarer is its medium: conſequently, the leſs impulſe it receives, and the leſs proper vehicle it is to convey it to a diſtance.

M. Reaumur, in the Memoirs of the Paris Academy, has the following obſervations relating to the ſhape moſt proper for bells, to give them the loudeſt and cleareſt ſound. He obſerves, "that as pots and other veſſels more immediately neceſſary to the ſervice of life were doubtleſs made before bells, it probably happened that the obſerving theſe veſſels to have a ſound when ſtruck, gave occaſion to making bells, intended only for ſound, in that form; but that it does not appear that this is the moſt eligible figure; for lead, a metal which is in its common ſtate not at all ſonorous, yet becomes greatly ſo on its being caſt into a particular form, and that very different from the common ſhape of bells. In melting lead for the common occaſions of caſting in ſmall quantities, it is uſually done in an iron ladle: and as the whole is ſeldom poured out, the remainder, which falls to the bottom of the ladle, cools into a maſs of the ſhape of that bottom. This is conſequently a ſegment of a ſphere, thickeſt in the middle, and thinner towards the edges; nor is the ladle any neceſſary part of the operation, ſince if a maſs of lead be caſt in that form in a mould of earth or ſand, in any of theſe caſes it is found to be very ſonorous. Now if this ſhape alone can give ſound to a metal which in other forms is perfectly mute, how much more muſt it neceſſarily give it to other metals naturally ſonorous in whatever form? It ſhould ſeem, that bells would much better perform their office in this than in any other form: and that it muſt particularly be a thing of great advantage to the ſmall bells of common houſe-clocks, which are required to have a ſhrill note, and yet are not allowed any great ſize." He adds, "that had our forefathers had opportunities of being acquainted with the ſound of metals in this ſhape, we ſhould probably have had all our bells at preſent of this form." Bell.

The uſe of bells is very ancient, as well as extenſive. We find them among Jews, Greeks, Romans, Chriſtians, and Heathens, variouſly applied; as on the necks of men, beaſts, birds, horſes, ſheep: but chiefly hung in buildings, either religious, as in churches, temples, and monaſteries; or civil, as in houſes, markets, baths; or military, as in camps and frontier towns.

Among the Jews it was ordained, that the lower part of the blue tunic which the high prieſt wore when he performed religious ceremonies, ſhould be adorned with pomegranates and gold bells, intermixed equally and at equal diſtances. As to the number of the bells worn by the high prieſt, the Scriptures are ſilent; and authors are not very well agreed: but the ſacred hiſtorian has let us into the uſe and intent of them in theſe words (Exod. xxviii. 33—35.), "And it ſhall be upon Aaron to miniſter, and his ſound ſhall be heard when he goeth into the holy place before the Lord, and when he cometh out, that he die not." The kings of Perſia are ſaid to have the hem of their robes adorned like the Jewiſh high-prieſts with pomegranates and gold bells. It was in the opinion of Calmet, with a deſign of giving notice that the high-prieſt was paſſing by, that he wore little bells on the hem of his robe; or rather it was as it were a kind of public notice that he was going to the ſanctuary: for, as in the king of Perſia's court, no one was ſuffered to enter the apartments without giving notice thereof by the ſound of ſomething; ſo the high-prieſt, out of reſpect to the divine preſence reſiding in the holy of holies, did, by the ſound of little bells faſtened to the bottom of his robe, deſire, as it were, permiſſion to enter, that the ſound of the bells might be heard, and he not be puniſhed with death for an unmannerly intruſion. The figure of theſe bells is not known to us. The prophet Zachariah (xiv. 20.) ſpeaks of bells hung to war horſes. "In that day (ſays the prophet) there ſhall be upon the bells of horſes, Holineſs unto the Lord."

Among the Greeks, thoſe who went the nightly rounds in camps or garriſons, carried with them a little bell, which they rung at each centry box to ſee that the ſoldier on watch were awake. A codonophorous or bellman alſo walked in funeral proceſſions, at a diſtance before the corps, not only to keep off the crowd, but to advertiſe the *flamen dialis* to keep out of the way, for fear of being polluted by the ſight, or by the funerary muſic. The prieſt of Proſerpine at Athens, called *hierophantus*, rung a bell to call the people to ſacrifice.

There were alſo bells in the houſes of great men to call

Bell. call up the ſervants in a morning. Zonara aſſures us, that bells were hung with whips on the triumphal chariots of their victorious generals, to put them in mind that they were ſtill liable to public juſtice.

Bells were put on the necks of criminals going to execution, that perſons might be warned by the noiſe to get out of the way of ſo ill an omen as the ſight of the hangman or the condemned criminal, who was devoted and juſt going to be ſacrificed to the *dii manes*.

For bells on the necks of brutes, expreſs mention is made of them in Phædrus,—*Celſa cervice eminens, Clarumque collo jactans tintinnabulum.* Taking theſe bells away was conſtrued by the civil law, theft; and if the beaſt was loſt by this means, the perſon who took away the bells was to make ſatisfaction.

* *Hiſtory of Manchester.* As to the origin of *church-bells*, Mr Whittaker * obſerves, That bells being uſed, among other purpoſes, by the Romans to ſignify the times of bathing, were naturally applied by the Chriſtians of Italy to denote the hours of devotion, and ſummon the people to church. The firſt application of them to this purpoſe is, by Polydore Virgil and others, aſcribed to Paulinus biſhop of Nola, a city of Campania, about the year 400. Hence, it is ſaid, the names *nolæ* and *campanæ* were given them; the one referring to the city, the other to the country. Though others ſay they took the latter of theſe names, not from their being invented in Campania, but becauſe it was here the manner of hanging and balancing them, now in uſe, was firſt practiſed; at leaſt that they were hung on the model of a ſort of balance invented or uſed in Campania; for in Latin writers we find *campana ſtatera*, for a ſteel-yard; and in the Greek καμπανίζειν, and *ponderare*, "to weigh." In Britain, bells were applied to church-purpoſes, before the concluſion of the ſeventh century, in the monaſtic ſocieties of Northumbria, and as early as the ſixth even in thoſe of Caledonia. And they were therefore uſed from the firſt erection of pariſh-churches among us. Thoſe of France and England appear to have been furniſhed with ſeveral bells. In the time of Clothair II. king of France, and in the year 610, the army of that king was frighted from the ſiege of the city of Sens, by ringing the bells of St Stephen's church. The ſecond excerption of Egbert, about the year 750, which is adopted in a French capitulary of 801, commands every prieſt, at the proper hours, to ſound the bells of his church, and then to go through the ſacred offices to God. And the council of Enham, in 1011, requires all the mulcts for ſins to be expended in the reparation of the church, clothing and feeding the miniſter of God, and the purchaſe of church-veſtments, church-books, and church-bells. Theſe were ſometimes compoſed of iron in France; and in England, as formerly at Rome, were frequently made of braſs. And as early as the ninth century, there were many caſt of a large ſize and deep note.

Ingulphus mentions, that Turketulus abbot of Croyland, who died about the year 870, gave a great bell to the church of that abbey, which he named *Guthlac;* and afterwards ſix others, viz. two which he called *Bartholomew* and *Bettelin*, two called *Turketul* and *Tatwin*, and two named *Pega* and *Bega*, all which rang together; the ſame author ſays, *Non erat tunc tanta conſonantia campanarum in tota Anglia.* Not long after, Kinſeus archbiſhop of York gave two great bells to the church of St John at Beverly, and at the ſame time provided that other churches in his dioceſe ſhould be furniſhed with bells. Mention is made by St Aldhem, and William of Malmeſbury, of bells given by St Dunſtan to the churches in the weſt. The number of bells in every church gave occaſion to the curious and ſingular piece of architecture in the campanile or bell-tower; an addition, which is more ſuſceptible of the grander beauties of architecture than any other part of the edifice, and is generally therefore the principle or rudiments of it. It was the conſtant appendage to every pariſh-church of the Saxons, and is actually mentioned as ſuch in the laws of Athelſtan. Bell.

The Greek Chriſtians are uſually ſaid to have been unacquainted with bells till the ninth century, when their conſtruction was firſt taught them by a Venetian. Indeed, it is not true that the uſe of bells was entirely unknown in the ancient eaſtern churches, and that they called the people to church, as at preſent, with wooden mallets. Leo Allatius, in his diſſertations on the Greek temples, proves the contrary from ſeveral ancient writers. It is his opinion, that bells firſt began to be diſuſed among them after the taking of Conſtantinople by the Turks; who, it ſeems, prohibited them leſt their ſound ſhould diſturb the repoſe of ſouls, which, according to them, wander in the air. He adds that they ſtill retain the uſe of bells in places remote from the intercourſe of the Turks; particularly, very ancient ones in Mount Athos. F. Simon thinks the Turks prohibited the Chriſtians the uſe of bells, rather out of political than religious reaſons; inaſmuch as the ringing of bells might ſerve as a ſignal for the execution of revolts, &c.

In the ancient monaſteries we find ſix kinds of bells enumerated by Durandus, viz. *Squilla*, rung in the refectory; *cymbalum*, in the cloiſter; *nola*, in the choir; *nolula* or *dupla*, in the clock; *campana*, in the ſteeple; and *ſignum* in the tower. Belethus has much the ſame; only that for *ſquilla*, he puts *tintinnabulum*, and places the *campana* in the tower, and *campanella* in the cloiſter. Others place the *tintinnabulum* or *tiniolum*, in the refectory or dormitory; and add another bell called *corrigiuncula*, rung at the time of giving diſcipline, to call the monks to be flogged. The *cymbalum* is ſometimes alſo ſaid to have been rung in the cloiſter, to call the monks to meat.

In the funeral monuments of Weever, are the following particulars relating to bells: "Bells had frequently theſe inſcriptions on them:

"*Funera plango, Fulgura frango, Sabbata pango,*
"*Excito lentos, Diſſipo ventos, Paco cruentos.*

"In the little ſanctuary at Weſtminſter King Edward III. erected a clochier, and placed therein three bells for the uſe of St Stephen's chapel: about the biggeſt of them were caſt in the metal theſe words:

"King Edward made mee thirtie thouſand weight and three.
"Take me down and wey mee, and more you ſhall fynd mee.

"But theſe bells being to be taken down in the reign of King Henry VIII. one writes underneath with a coale:

"But

Bell.

" But Henry the eight
" Will bait me of my weight." *Ibid.* 492.

This laſt diſtich alludes to a fact mentioned by Stow in his ſurvey of London, ward of Farringdon Within; to wit, that near to St Paul's ſchool ſtood a clochier, in which were four bells called *Jeſus's bells*, the greateſt in all England, againſt which Sir Miles Partridge ſtaked an hundred pounds, and won them of King Henry VIII. at a caſt of dice. Nevertheleſs it appears that abroad there are bells of greater magnitude. In the ſteeple of the great church at Roan in Normandy is a bell with this inſcription:

Je ſuis George d'Ambois,
Qui trente cinque mille pois.
Mais lui qui me peſera,
Trente ſix mille me trouvera.

I am George of Ambois.
Thirty five thouſand in pois:
But he that ſhall weigh me,
Thirtie ſix thouſand ſhall find me. *Ibid.*

And it is a common tradition that the bells of King's college chapel, in the univerſity of Cambridge, were taken by Henry V. from ſome church in France, after the battle of Agincourt. They were taken down ſome years ago, and ſold to Phelps the bell-founder in Whitechapel, who melted them down.

The uſes of bells were ſummed up in the following diſtich, as well as that firſt above mentioned:

Laudo Deum verum, plebem voco, conjugo clerum,
Defunctos ploro, peſtem fugo, feſta decoro.

Matthew Paris obſerves, that anciently the uſe of bells was prohibited in time of mourning; though at preſent they make one of the principal ceremonies of mourning. Mabillon adds, that it was an ancient cuſtom to ring the bells for perſons about to expire, to advertiſe the people to pray for them; whence our paſſing bells. The paſſing-bell, indeed, was anciently rung for two purpoſes: one, to beſpeak the prayers of all good Chriſtians for a ſoul juſt departing; the other, to drive away the evil ſpirits who ſtood at the bed's foot, and about the houſe, ready to ſeize their prey, or at leaſt to moleſt and terrify the ſoul in its paſſage: but by the ringing of that bell (for Durandus informs us, evil ſpirits are much afraid of bells), they were kept aloof; and the ſoul, like a hunted hare, gained the ſtart, or had what is by ſportſmen called *law*. Hence, perhaps, excluſive of the additional labour, was occaſioned the high price demanded for tolling the greateſt bell of the church; for that being louder, the evil ſpirits muſt go farther off to be clear of its ſound, by which the poor ſoul got ſo much more the ſtart of them: beſides, being heard farther off, it would likewiſe procure the dying man a greater number of prayers. This diſlike of ſpirits to bells is mentioned in the Golden Legend, by W. de Worde. " It is ſaid, the evill ſpirytes that ben in the regyon of thayre, doubte moche when they here the belles rongen: and this is the cauſe why the belles ben rongen whan it thondreth, and whan grete tempeſte and outrages of wether happen, to the ende that the feinds and wycked ſpirytes ſhold be abaſhed and flee, and ceaſe of the movynge of tempeſte." Lobineau obſerves, that the cuſtom of ringing bells at the approach of thunder, is of ſome antiquity; but that the deſign was not ſo much to ſhake the air, and ſo diſſipate the thunder, as to call the people to church, to pray that the pariſh might be preſerved from that terrible meteor. Bell.

In the times of Popery, bells were baptized and anointed *oleo chriſmatis:* they were exorciſed, and bleſſed by the biſhop; from a belief, that, when theſe ceremonies were performed, they had power to drive the devil out of the air, to calm tempeſts, to extinguiſh fire, and to recreate even the dead. The ritual for theſe ceremonies is contained in the Roman pontifical; and it was uſual in their baptiſm to give to bells the name of ſome ſaint. In Chauncy's hiſtory of Hertfordſhire, page 383, is a relation of the baptiſm of a ſet of bells in Italy with great ceremony, a ſhort time before the writing that book. The bells of the pariſh-church of Winnington in Bedfordſhire had their names caſt about the verge of every one in particular, with theſe rhyming hexameters.

Nomina Campanis hæc indita ſunt quoque noſtris.
1. *Hoc ſignum Petri pulſatur nomine Chriſti.*
2. *Nomen Magdalene campana ſonat melode.*
3. *Sit nomen Domini benedictum ſemper in eum.*
4. *Muſa Raphaelis ſonat auribus Immanuelis.*
5. *Sum Roſa pulſata mundique Maria vocata.*

Weev. Fun. 122.

By an old chartulary, once in the poſſeſſion of Weever the antiquary, it appears that the bells of the priory of Little Dunmow in Eſſex were, anno 1501, new caſt, and baptized by the following names:

Prima in honore Sancti Michaelis Archangeli.
Secunda in honore S. Johannis Evangeliſti.
Tertia in honore S. Johannis Baptiſti.
Quarta in honore Aſſumptionis beatæ Mariæ.
Quinta in honore ſanctæ Trinitatis, et omnium ſanctorum.

Ib. 633.

The bells of Oſney abbey near Oxford were very famous; their ſeveral names were Douce, Clement, Auſtin, Hautecter [potius Hautcleri], Gabriel, and John.

Nankin in China was anciently famous for the largeneſs of its bells; but their enormous weight brought down the tower, the whole building fell to ruin, and the bells have ever ſince lain on the ground. One of theſe bells is near 12 Engliſh feet high, the diameter ſeven and a half, and its circumference 23; its figure almoſt cylindric, except for a ſwelling in the middle; and the thickneſs of the metal about the edges ſeven inches. From the dimenſions of this bell, its weight is computed at 50,000 pounds, which is more than double the weight of that of Erfort, ſaid by Father Kircher to be the greateſt bell in the world. Theſe bells were caſt by the firſt emperor of the preceding dynaſty, about 300 years ago. They have each their name; the hanger (*tchoui*), the eater (*che*), the ſleeper (*choui*), the will (*ſi*). Father le Compte adds, that there are ſeven other bells in Pekin caſt in the reign of Youlo, each of which weighs 120,000 pounds. But the ſounds even of their biggeſt bells are very

poor;

Bell.

poor; being ſtruck with a wooden in lieu of an iron clapper.

Hawkin's Hiſtory of Muſic, vol. iv. p. 152.

The practice of ringing bells in change, or regular peals, is ſaid to be peculiar to England; whence Britain has been termed the *ringing iſland*. The cuſtom ſeems to have commenced in the time of the Saxons, and was common before the Conqueſt. The ringing of bells, though a recreation chiefly of the lower ſort, is in itſelf not incurious. The tolling a bell is nothing more than the producing a ſound by a ſtroke of the clapper againſt the ſide of the bell, the bell itſelf being in a pendant poſition and at reſt. In ringing, the bell, by means of a wheel and a rope, is elevated to a perpendicular; in its motion to this ſituation the clapper ſtrikes forcibly on one ſide, and in its return downwards on the other ſide of the bell, producing at each ſtroke a ſound. There are in London ſeveral ſocieties of ringers, particularly one known by the name of the *College Youths*: of this it is ſaid Sir Matthew Hale, lord chief juſtice of the court of King's Bench, was, in his youthful days, a member; and in the life of this learned and upright judge, written by Biſhop Burnet, ſome facts are mentioned which favour this relation. In England the practice of ringing is reduced to a ſcience, and peals have been compoſed which bear the name of the inventors. Some of the moſt celebrated peals now known were compoſed about 50 years ago by one Patrick. This man was a maker of barometers: in his advertiſements he ſtyled himſelf *Torricellian Operator*, from Torricelli, who invented inſtruments of this kind. In the year 1684, one Abraham Rudhall, of the city of Glouceſter, brought the art of bell-founding to great perfection. His deſcendants in ſucceſſion have continued the buſineſs of caſting bells; and by a liſt publiſhed by them it appears, that at Lady-day 1774 the family, in peals and odd bells, had caſt to the amount of 3594. The peals of St Dunſtan's in the Eaſt, and St Bride's, London, and St Martin's in the Fields Weſtminſter, are in the number.

The muſic of bells is altogether melody; but the pleaſure ariſing from it conſiſts in the variety of interchange, and the various ſucceſſion and general predominance of the conſonances in the ſounds produced. Muſical authors ſeem to have written but little upon this ſubject.

Electrical Bells are uſed in a variety of entertaining experiments by electricians. The apparatus, which is originally of German invention, conſiſts of three ſmall bells ſuſpended from a narrow plate of metal; the two outermoſt by chains, and that in the middle, from which a chain paſſes to the floor, by a ſilken ſtring. Two ſmall knobs of braſs are alſo hung by ſilken ſtrings, one on each ſide of the bell in the middle, which ſerve for clappers. When this apparatus is connected with an electrified conductor, the outermoſt bells ſuſpended by the chains will be charged, attract the clappers, and be ſtruck by them. The clappers becoming electrified likewiſe will be repelled by theſe bells, and attracted by the middle bell, and diſcharge themſelves upon it by means of the chain extending to the floor. After this, they will be again attracted by the outermoſt bells; and thus, by ſtriking the bells alternately, occaſion a ringing, which may be continued at pleaſure. Flaſhes of light will be ſeen in the dark between the bells and clappers; and if the electrification be ſtrong, the diſcharge will be made without actual contact, and the ringing will ceaſe. An apparatus of this kind, connected with one of thoſe conductors that are erected for ſecuring buildings from lightning, will ſerve to give notice of the approach and paſſage of an electrical cloud.

Bell-Animal || Bellai.

Bell-Animal. See Animalcule, N° 24—28.

Bell-Metal. See Chemistry *Index*.

Bell, in *Chemiſtry*, denotes a glaſs veſſel placed over ſome matter in a ſtate of exhalation, either to collect the vapour or gather the flowers. Chemical bells are a ſort of receptacles chiefly uſed in preparing the oil or ſpirit of ſulphur, for gathering and condenſing fumes into a liquor.

Diving-Bell. See Diving.

Bell-Foundery. See Foundery.

Bell-Flower. See Campanula, Botany *Index*.

Bell-Weed. See Jacea, Botany *Index*.

BELLA, Stefana de la, a moſt eminent engraver, was born at Florence A. D. 1610. His father was a goldſmith; and he himſelf began to work at his father's buſineſs. But whilſt he was learning to draw, in order to perfect himſelf in that profeſſion, ſome of the prints of Callot fell by accident into his hands; with which he was ſo delighted, that he prevailed upon his father to permit him to apply himſelf to engraving; and he became the diſciple of Canta Gallina, who was alſo the inſtructor of Callot. De la Bella at firſt imitated the manner of Callot. His abilities ſoon began to manifeſt themſelves; and as by degrees he acquired a facility in the handling of the point, he quitted the ſtyle in which he only ſhone as an imitator, and adopted one entirely his own, which in freedom and ſpirit is ſaid even to have ſurpaſſed that of his fellow diſciple. He went to Paris A. D. 1642, where he formed an acquaintance with Iſrael Silveſtre, then newly returned from Rome; and he was much employed by Henriette the uncle of Silveſtre. Some time after, Cardinal Richelieu engaged him to go to Arras and make drawings of the ſiege and taking of that town by the royal army; which drawings he engraved at his return. He alſo went to Holland, where, it is reported, he ſaw ſome of the prints of Rembrandt Gerretſz, and attempted to imitate them; but finding he did not ſucceed to his expectations, he dropped that deſign, and continued to purſue his own manner, as moſt ſuitable to his genius. After abiding ſome conſiderable time at Paris, his family affairs obliged him to return to Florence; where he obtained a penſion from the Great Duke, and was appointed to inſtruct the prince Coſmo his ſon in the art of deſign. Being ſubject to violent pains in the head, his life was rendered very uncomfortable by this cruel diſorder, which at laſt put an end to it A. D. 1664, when he was only 54 years of age. De la Bella drew very correctly, and with great taſte. His works manifeſt much genius and vaſt fertility of invention. The fire and animation which appears in them compenſates for their ſlightneſs; and we may reaſonably expect to find them ſlight when we are told that he engraved 1400 plates.

BELLAC. See Belac.

BELLADONA, in *Botany*, the trivial name of a ſpecies of Atropa. See Atropa, Botany *Index*.

BELLAI, William du, lord of Langey, a French general,

Bellai. Bellarmin.

general, who ſignalized himſelf in the ſervice of Francis I. He was alſo an able negociator, ſo that the emperor Charles V. uſed to ſay, "that Langey's pen had fought more againſt him than all the lances in France." He was ſent to Piedmont in quality of viceroy, where he took ſeveral towns from the Imperialiſts. His addreſs in penetrating into the enemy's deſigns was ſurpriſing. In this he ſpared no expence, and thereby had intelligence of the moſt ſecret councils of the emperor and his generals. He was extremely active in influencing ſome of the univerſities of France to give their judgment agreeable to the deſires of Henry VIII. king of England, when this prince wanted to divorce his queen, in order to marry Anne Bullen. It was then the intereſt of France to favour the king of England in this particular, it being an affront to the emperor, and a gratification to Henry, which might ſerve to form a ſtrict alliance between him and Francis I. He was ſent ſeveral times into Germany to the princes of the Proteſtant league, and was made a knight of the order of St Michael. He was alſo a man of learning, having given proofs of his abilities and genius as a writer. He compoſed ſeveral works; the moſt remarkable of which was, the Hiſtory of his Own Times, in Latin; divided into ogdoades, that is, ſeveral parts, each conſiſting of eight books; moſt of which, however, have been loſt. When Langey was in Piedmont in 1542 he had ſome remarkable intelligence which he was deſirous himſelf to communicate to the king, and being very infirm, he ordered a litter for his conveyance; but after having paſſed the mountain of Tarara, betwixt Lyons and Roan, he found himſelf ſo extremely bad at St Saphorin that he was obliged to ſtop there, where he died the 9th of January, in the year 1543. He was buried in the church of Mans, and a noble monument was erected to his memory.

BELLARMIN, Robert, an Italian Jeſuit, one of the beſt controverſial writers of his time. In 1576 he read lectures at Rome on controverſies; which he did with ſuch applauſe, that Sixtus V. ſending a legate into France in 1590, appointed him as a divine, in caſe any diſpute in religion ſhould happen to be diſcuſſed. He returned to Rome, and was raiſed ſucceſſively to different offices, till at laſt, in 1599, he was honoured with a cardinal's hat; to accept of which dignity, it is ſaid, they were obliged to force him by the threats of an anathema. It is certain, that no Jeſuit ever did greater honour to his order than he; and that no author ever defended the cauſe of the Romiſh church in general, and that of the pope in particular, to more advantage. The Proteſtants have owned this ſufficiently: for, during the ſpace of 50 years, there was ſcarcely any conſiderable divine among them who did not fix upon this author for the ſubject of his books of controverſy. Notwithſtanding the zeal with which this Jeſuit maintained the power of the pope over the temporality of kings, he diſpleaſed Sixtus V. in his work *De Romano Pontifice*, by not inſiſting that the power which Jeſus Chriſt gave to his vicegerent was direct, but only indirect; and had the mortification to ſee it put into the index of the inquiſition, though it was afterwards removed. He left, at his death, to the Virgin Mary one half of his ſoul, and to Jeſus Chriſt the other.—Bellarmin is ſaid to have been a man of great chaſtity and temperance, and remarkable for his patience. His ſtature was low, and his mien very indifferent; but the excellence of his genius might be diſcovered from the traces of his countenance. He expreſſed himſelf with great perſpicuity; and the words which he firſt made uſe of to explain his thoughts were generally ſo proper, that there appeared no raſure in his writings.

Bellatrix || Belleforeſt.

BELLATRIX, in *Aſtronomy*, a ruddy glittering ſtar of the ſecond magnitude, in the left ſhoulder of Orion. It takes its name from *bellum*, as being anciently ſuppoſed to have a great influence in kindling wars, and forming warriors. Its longitude, according to Hevelius, for the year 1700, was 16° 47′ 20″; and its latitude ſouthward 16° 52′ 11″.

BELLCLARE, a town of Ireland, in the province of Connaught, and county of Sligo. W. Long. 9. 5. N. Lat. 53. 56.

BELLE, a town of the French Netherlands, ſeated in E. Long. 2. 40. N. Lat. 50. 45.

BELLEAU, Remi, a French poet, born at Nogent le Rotrou, in the territory of Perche, and province of Orleanois. He lived in the family of Renatus of Lorrain, marquis of Elbeuf, general of the French galleys; and attended him in his expedition into Italy, in 1557. This prince highly eſteemed Belleau for his courage; and having alſo a high opinion of his genius and abilities, entruſted him with the education of his ſon Charles of Lorrain. Belleau was one of the ſeven poets of his time who were denominated the *French Pleiades*. He wrote ſeveral pieces; and tranſlated the odes of Anacreon into the French language, but in this he is thought not to have preſerved all the natural beauties of the original. His paſtoral pieces are in greateſt eſteem. His verſes in that way (according to his eulogiſts) are expreſſed with ſuch beauty and ſimplicity, that they ſeem to be a living picture of what they deſcribe. He alſo wrote an excellent poem on the nature and difference of precious ſtones, which by ſome has been reputed his beſt performance. Belleau died at Paris, in the family of the duke d'Elbeuf, on the 6th of March, 1577. He was interred in the church De Peres Auguſtines, near the Pont-neuf: ſeveral eulogiums were made to his memory.

BELLEFOREST, Francis de, a French author, born in the province of Guienne, in 1530. He was but ſeven years of age when he loſt his father; and his mother was left in poor circumſtances, but ſhe contributed all in her power to his education. He was ſupported ſome years by the queen of Navarre, ſiſter to Francis I. Some time after he went to ſtudy at Bourdeaux; thence he removed to Toulouſe; and at laſt to Paris, where he got acquainted with ſeveral men of learning, and was honoured with the friendſhip of many perſons of quality. He wrote, 1. A Hiſtory of the Nine Charles's of France; 2. Annotations on the books of St Auguſtin; 3. An univerſal Hiſtory of the World; 4. The Chronicles of Nicholas Gillet, augmented; 5. An univerſal Coſmography; 6. Annals, or a general Hiſtory of France: and many other works. In ſhort, he ſupported his family by writing books on whatever ſubject was propoſed to him by the bookſellers, according to the taſte of the public. He died in 1583.

Bellegarde, Belleiſle.

BELLEGARDE, a town of France, in the department of the Eaſtern Pyrenees, on the frontiers of Catalonia. It is an important place on account of its being a paſſage to the Pyrenean mountains. E. Long. 3. 0. N. Lat. 42. 20.

BELLEGARDE, a town of France, in the department of Saone and Loire, ſeated on the river Saone, 15 miles ſouth-eaſt of Chalons, in E. Long. 4. 0. N. Lat. 46. 57.

BELLEISLE, an iſland of France, on the coaſt of Brittany, 15 miles diſtant from it. This iſland is between 12 and 13 leagues in circumference. It is a mixture of craggy rocks and fertile ſoil; but the inhabitants are very poor, and the only trade carried on in it is the curing of pilchards. There are three harbours in the iſland, viz. Palais, Sauzon, and Goulford; every one of which labours under ſome capital defect, either in being expoſed, ſhallow or dangerous in the entrance. It contains only one little city called *Le Palais*, three country towns, 103 villages, and about 5000 inhabitants. The iſland originally belonged to the earl of Cornouaille; but was afterwards yielded to the king, who in 1742 erected it into a duchy, in favour of Marſhal Belleiſle. The town of Palais takes its name from a caſtle which belonged to the duke de Belleiſle, which ſtood in its neighbourhood; but was afterwards converted into a citadel fronting the ſea, ſtrongly fortified. Its fortifications are compoſed principally of hornworks; and it is provided with two dry ditches, the one next the counterſcarp, and the other ſo contrived as to ſecure the interior fortifications. This citadel is divided from the largeſt part of the town by an inlet of the ſea, over which there is a bridge of communication. From the other part of the town, and which is moſt inhabited, it is only divided by its own fortifications and a glacis. In this ſtate was the iſland in 1761, when an expedition was undertaken againſt it by a Britiſh fleet under the command of Commodore Keppel, having on board a conſiderable land force commanded by General Hodgſon. The fleet ſailed from Spithead on the 29th of March, and arrived before Belleiſle on the 7th of April. The next day it was agreed to attempt a landing on the ſouth-eaſt part of the iſland, in a ſandy bay, near Lochmana point. Here the enemy were in poſſeſſion of a little fort; they had moreover intrenched themſelves on a hill exceſſively ſteep, the foot of which was ſcarped away. The attempt was made in three places with great reſolution; but the Britiſh were at laſt repulſed with the loſs of 500 men. It was not before the 25th of April that the weather allowed a ſecond attempt. This was made on a very ſtrong place, where the enemy were rather leſs attentive, on account of the exceſſive ſteepneſs and difficulty of climbing up the rocks. Beſides the principal attack, two feints were made at the ſame time to diſtract the enemy, whilſt the men of war directed their fire with great ſucceſs on the hills. Theſe manœuvres gave Brigadier-general Lambert, with a handful of men, an opportunity of climbing up a very ſteep rock without moleſtation. This little body formed themſelves in good order without delay, and were immediately attacked by 300 French. The Britiſh, however, ſuſtained this attack until the whole corps of Brigadier Lambert, which had now likewiſe aſcended, came to their aſſiſtance, with whoſe help they repulſed the enemy. The landing of all the forces being ſoon after made good, the French were driven into the town of Palais. Here the chevalier de St Croix who commanded them, a brave and experienced officer, reſolved to hold out to the laſt extremity; and it was not till the 7th of June that he capitulated, and the garriſon marched out with the honours of war. The iſland, however, was reſtored to the French by the treaty concluded in 1763.

Belleiſle, Bellenden.

BELLEISLE, an iſland of North America, lying at the mouth of the ſtrait between the country of the Eſquimaux, or New Britain, and the north end of Newfoundland; whence the ſtraits take alſo the name of *Belleiſle*. W. Long. 58. 5. N. Lat. 51. 50.

BELLENDEN, or BALLANTINE, WILLIAM, a Scotch writer who flouriſhed in the beginning of the 17th century, was profeſſor of humanity or belles lettres at Edinburgh, and maſter of the requeſts to James I. of England. But the former is ſuppoſed to have been only nominal, or early given up, and the latter alſo to have conſiſted in the name only, ſince he appears to have reſided almoſt conſtantly at Paris, where by the favour of his ſovereign he was enabled to live in eaſy circumſtances. There he publiſhed, in 1608, his *Cicero princeps*, a ſingular work; in which he extracted, from Cicero's writings detached paſſages, and compriſed them into one regular body, containing the rules of monarchical government, with the line of conduct to be purſued, and the virtues proper to be encouraged, by the prince himſelf: And the treatiſe, when finiſhed, he dedicated from a principle of patriotiſm and gratitude, to the ſon of his maſter, Henry, then prince of Wales. Four years afterwards, namely, in 1612, he proceeded to publiſh another work of a ſimilar nature, which he called *Cicero Conſul, Senator Senatuſque Romanus*, in which he treated, with much perſpicuity, and a fund of ſolid information, on the nature of the conſular office, and the conſtitution of the Roman ſenate. Finding theſe works received, as they deſerved, with the unanimous approbation of the learned, he conceived the plan of a third work, *De Statu priſci Orbis*, which was to contain a hiſtory of the progreſs of government and philoſophy, from the times before the flood to their various degrees of improvement under the Hebrews, Greeks, and Romans. He proceeded ſo far as to print a few copies of this work, in the year 1615, when it ſeems to have been ſuggeſted that his treatiſes, *De Statu Principis*, *De Statu Reipublicæ*, and *De Statu Orbis*, being on ſubjects ſo nearly reſembling each other, there might be a propriety in uniting them into one work, by republiſhing the two former, and entitling the whole *Bellendenus de Statu*. With this view, he recalled the few copies of his laſt work that were abroad, and after a delay of ſome months, publiſhed the three treatiſes together, under their new title, in 1616. Theſe pieces have been lately reprinted by an ingenious political editor, who has thought proper to inſcribe them to Mr Burke, Lord North, and Mr Fox, whoſe reſpective portraits are prefixed to each dedication, and whoſe talents and virtues he celebrates and defends in a preface of 76 pages, containing a very free and bold diſcuſſion of our public men and meaſures in very claſſical language, and a ſtrong and ſatirical repreſentation, under borrowed names of antiquity, of the chiefs of the other party, or the preſent miniſtry. Bellenden wrote another work, publiſhed after his death,

Bellerophon, Belles Lettres.

death, *De tribus Luminibus Romanorum*, whom he conceives to be Cicero, Seneca, and the elder Pliny. The editor gives an account of this work, from whence he took his idea of drawing his characters of the three luminaries of Great Britain. He marks the proficiency in Greek and Roman literature which once diſtinguiſhed the Scotch, before the civil diſſenſions drove their brighteſt geniuſes abroad, and celebrates the ardour for philoſophy and literature ſo prevalent in North Britain at preſent. Dr Middleton has been charged with borrowing not only the matter, but the arrangement, of his "Life of Cicero," from Bellenden, without the leaſt acknowledgment, and the editor confeſſes himſelf of this opinion. It is ſurpriſing how little is known of Bellenden or his writings: concerning his lineage, birth, private life, and death, no notices have been tranſmitted even by tradition.

BELLEROPHON, in fabulous hiſtory, the ſon of Glaucus king of Epirus, happening accidentally to kill his brother, fled to Prœtus king of Argos, who gave him a hoſpitable reception: but Sthenobea, his queen, falling in love with the beautiful ſtranger, and finding that nothing could induce him to injure his benefactor, ſhe accuſed him to her huſband of an attempt to violate her honour. Prœtus, however, not being willing to act contrary to the laws of hoſpitality, ſent him to Iobates king of Lyſia, and the father of Sthenobea, with letters deſiring him to put him to death: whence the proverb *Bellerophontis literas afferet*, equivalent to *Literæ Uriæ*. That prince, at the receipt of theſe letters, was celebrating a feſtival of nine days, which prevented Bellerophon's deſtruction. Iobates, however, ſent him in the mean time to ſubdue the Solymi, the Amazons, and Lyſians, and thought to get rid of him by expoſing him to the greateſt dangers; but by his prudence and courage he came off victorious. Iobates next employed him to deſtroy the Chimæra; when Minerva, or according to others, Neptune, in conſideration of his innocence, furniſhed him with the horſe Pegaſus, by whoſe aſſiſtance he killed the Chimæra. Iobates, on his return, being convinced of his truth and integrity, and charmed with his heroic virtues, gave him his daughter Philonoë in marriage, and declared him his ſucceſſor; which when Sthenobea heard, ſhe killed herſelf. Bellerophon at length growing vain with his proſperity, reſolved, by the aſſiſtance of Pegaſus, to aſcend the ſkies; when Jupiter checked his preſumption, by ſtriking him blind in his flight; on which he fell down to the earth, and wandered till his death in contempt and miſery: but Pegaſus mounting into heaven, Jupiter placed him among the conſtellations.

BELLES LETTRES. Whether we conſult the voluminous dictionaries of the French language, or thoſe treatiſes that profeſs to point out the method of ſtudying and teaching the belles lettres, we find not, in the one or the other, either a clear definition, or a ſuccinct explication of the words *belles lettres*, nor any ſummary of thoſe ſciences which are comprehended under that general and collective denomination. It appears to be a vague term, under which every one may include whatever he thinks proper. Sometimes we are told that by the belles lettres is meant, the knowledge of the arts of poetry and oratory; ſometimes that the true belles lettres are natural philoſophy, geometry, and other eſſential parts of learning; and ſometimes, that they comprehend the art of war, by land and ſea: in ſhort, they are made to include all that we know, and whatever we pleaſe; ſo that, in treating on the belles lettres, they talk of the uſe of the ſacraments, &c. * Some comprehend under the term, all thoſe inſtructive and pleaſing ſciences which occupy the memory and the judgment, and do not make part either of the ſuperior ſciences, of the *polite arts* †, or of mechanic, profeſſions: hence they make hiſtory, chronology, geography, genealogy, blazonry, philology, &c. the belles lettres. In a word, it were an endleſs taſk to attempt to enumerate all the parts of literature which different learned men have comprehended under this title. Nor would it be of any uſe to the reader for us to pretend to fix the true import of the term. Whatever arts or ſciences it may be ſuppoſed to include, they are ſeverally explained in the courſe of this work.

Belle-ville ‖ Bellini.

* *Rollin on the Belles Lettres.*

† See ARTS, *Polite.*

BELLE-VILLE, a town of the Beaujolois in France, ſeated near the river Saone. E. Long. 4. 46. N. Lat. 45. 5.

BELLEVOIS, painter of ſea-pieces, is known through all parts of Europe as a good painter, though no particulars have been handed down concerning his life. He died in 1684. His ſubjects are views of havens, ſea-ports, ſhores, calms, and ſtorms at ſea; but in his calms he ſhows his peculiar excellence. Pictures of this maſter are often in public ſales; and ſome of them, which ſeem of his beſt ſtyle, are ſold for a tolerable price.

BELLEY, or BELLAY, a town of France, and capital of Bujey, in the department of Ain. It is ſeated near the river Rhone. E. Long. 5. 50. N. Lat. 45. 43.

BELLINGHAM, a town of Northumberland in England. W. Long. 2. 10. N. Lat. 55. 10.

BELLINI, GENTIL, a Venetian painter, born in the year 1421. He was employed by the republic of Venice; and to him and his brother the Venetians are indebted for the noble works which are to be ſeen in the council-hall. We are told that Mahomet II. emperor of the Turks, having ſeen ſome of his performances, was ſo ſtruck with them, that he wrote to the republic, entreating them to ſend him. The painter accordingly went to Conſtantinople, where he did many excellent pieces. Amongſt the reſt, he painted the decollation of St John the Baptiſt, whom the Turks revere as a great prophet. Mahomet admired the proportion and ſhadowing of the work; but he remarked one defect in regard to the ſkin of the neck, from which the head was ſeparated; and in order to prove the truth of his obſervation, he ſent for a ſlave and ordered his head to be ſtruck off. The ſight ſo ſhocked the painter, that he could not be eaſy till he had obtained his diſmiſſion; which the grand ſignior granted, and made him a preſent of a gold chain. The republic ſettled a penſion upon him at his return, and made him a knight of St Mark. He died in 1501, in the 80th year of his age.

John Bellini, his brother, painted with more art and ſweetneſs. He died in 1512, aged 90.

BELLINI, *Laurence*, an eminent phyſician, born at Florence in the year 1643. After having finiſhed his ſtudies in polite literature, he went to Piſa, where he was aſſiſted by the generoſity of the grand duke Ferdinand

Bellinzona || Bellona.

dinand II. and ſtudied under two of the moſt learned men of that age, Oliva and Borelli. Oliva inſtructed him in natural philoſophy, and Borelli taught him mathematics. At 20 years of age, he was choſen profeſſor of philoſophy at Piſa, but did not continue long in this office; for he had acquired ſuch a reputation for his ſkill in anatomy, that the grand duke procured him a profeſſorſhip in that ſcience. This prince was often preſent at his lectures, and was highly ſatisfied with his abilities and performances. Bellini, after having held his profeſſorſhip almoſt 30 years, accepted of an invitation to Florence, when he was about 50 years of age. Here he practiſed phyſic with great ſucceſs, and was advanced to be firſt phyſician to the grand duke Coſmus III. He wrote the following books in Latin: 1. An Anatomical diſcourſe on the Structure and uſe of the Kidneys. 2. A Speech by way of thanks to the ſerene duke of Tuſcany. 3. Some Anatomical Obſervations, and a propoſition in Mechanics. 4. Of the Urine and Pulſe, of Blood-letting, Fevers, and diſeaſes of the Head and Breaſts. 5. Several Tracts concerning Urine, the motion of the Heart, and Bile, &c. He died January 8. 1703, being 60 years of age. His works were read and explained publicly during his life, by the famous Scotch phyſician Dr Pitcairn, profeſſor of phyſic in Leyden.

BELLINZONA, a town of Italy, in the Milaneſe, and one of the bailiwicks which the Swiſs poſſeſs in that country. It is ſeated on the river Teſino, five miles above the place where it falls into the Lago Maggiore, and is fortified with two ſtrong caſtles formerly joined together by a wall flanked with towers; but the Swiſs have demoliſhed a part of the fortifications. E. Long. 9. 0. N. Lat. 46. 8.

BELLIS, the DAISY. See BOTANY *Index*.

Bellis Major. See CHRYSANTHEMUM, BOTANY *Index*.

BELLON, a diſtemper common in countries where they ſmelt lead-ore. It is attended with languor, intolerable pains and ſenſations of grippings in the belly, and generally coſtiveneſs.—Beaſts, poultry, &c. as well as men, are ſubject to this diſorder: hence a certain ſpace round the ſmelting-houſes is called *bellon-ground*, becauſe it is dangerous for an animal to feed upon it.

BELLONA, in *Pagan Mythology*, the goddeſs of war, is generally reckoned the ſiſter of Mars, and ſome repreſent her as both his ſiſter and wife. She is ſaid to have been the inventreſs of the needle; and from that inſtrument is ſuppoſed to have taken her name Βελονη, ſignifying a *needle*. This goddeſs was of a cruel and ſavage diſpoſition, delighting in bloodſhed and ſlaughter; and was not only the attendant of Mars, but took a pleaſure in ſharing his dangers. She is commonly repreſented in an attitude expreſſive of fury and diſtraction, her hair compoſed of ſnakes clotted with gore, and her garments ſtained with blood: ſhe is generally depictured driving the chariot of Mars, with a bloody whip in her hand; but ſometimes ſhe is drawn holding a lighted torch or brand, and at others a trumpet. Bellona had a temple at Rome, near the Circus Flaminius, before which ſtood the column of war, from whence the conſul threw his lance when he declared war. She was alſo worſhipped at Comana, in Cappadocia; and Camden obſerves, that in the time of the emperor Severus, there was a temple of Bellona in the city of York.

Bellonarii || Bellows.

BELLONARII, in *Antiquity*, prieſts of Bellona, the goddeſs of wars and battles. The bellonarii cut and mangled their bodies with knives and daggers in a cruel manner, to pacify the deity. In this they are ſingular, that they offered their own blood, not that of other creatures, in ſacrifice. In the fury and enthuſiaſm wherewith they were ſeized on theſe occaſions, they ran about raging, uttering prophecies, and foretelling blood and ſlaughter, devaſtations of cities, revolutions of ſtates, and the like: whence Martial calls them *turba entheata Bellonæ*. In after-times, they ſeem to have abated much of their zeal and tranſport, and to have turned the whole into a kind of farce, contenting themſelves with making ſigns and appearances of cutting and wounds. Lampridius tells us, the emperor Commodus, out of a ſpirit of cruelty, turned the farce again into a tragedy, obliging them to cut and mangle their bodies really.

BELLONIA (ſo named from the famous Petrus Bellonius, who left many valuable tracts on natural hiſtory, &c.) a genus of the monogynia order, belonging to the pentandria claſs of plants. Of this genus there is only one ſpecies known, viz. the aſpera, with a rough balm leaf. This is very common in the warm iſlands of America.

BELLORI, JOHN PETER, of Rome; a celebrated antiquary and connoiſſeur in the polite arts; author of the lives of the modern painters, architects, and ſculptors, and of other works on antiquities and medals. He died in 1696.

BELLOVACI, in *Ancient Geography*, a people of Gallia Belgica, reckoned the braveſt of the Belgæ: now *Beauvaſis*, in the Iſle of France.

BELLOWS, a machine ſo contrived as to exſpire and inſpire the air by turns, by enlarging and contracting its capacity. This machine is uſed in chambers and kitchens, in forges, furnaces, and founderies, to blow up the fire: it ſerves alſo for organs and other pneumatic inſtruments, to give them a proper degree of air. All theſe are of various conſtructions, according to their different purpoſes; but in general they are compoſed of two flat boards, ſometimes of an oval, ſometimes of a triangular figure: Two or more hoops, bent according to the figure of the boards, are placed between them; a piece of leather, broad in the middle, and narrow at both ends, is nailed on the edges of the the boards, which it thus unites together; as alſo on the hoops which ſeparate the boards, that the leather may the eaſier open and fold again: a tube of iron, braſs, or copper, is faſtened to the undermoſt board, and there is a valve within, that covers the holes in the under board to keep in the air.

Anacharſis the Scythian is recorded as the inventor of bellows. The action of bellows bears a near affinity to that of the lungs; and what we call blowing in the latter, affords a good illuſtration of what is called *reſpiring* in the former. Animal life itſelf may on ſome occaſions be ſubſiſted by blowing into the lungs with a pair of bellows. Dr Hooke's experiment to this effect is famous: having laid the thorax of a dog bare, by cutting away the ribs and diaphragm, pericardium, &c. and having cut off the aſpera arteria below the epiglottis, and bound it on the noſe of a bellows,

he

Bone-Bellows || Belomancy.

he found, that as he blowed, the dog recovered, and as he ceaſed, fell convulſive; and thus was the animal kept alternately alive and dead above the ſpace of an hour. There are bellows made wholly of wood, without any leather about them; one of which is preſerved in the repoſitory of the Royal Society; and Dr Plot deſcribes another in the copper-works at Ellaſton in Staffordſhire. Ant. della Fruta contrived a ſubſtitute for bellows, to ſpare the expence thereof in the fuſion of metals. This is called by Kircher *camera æolia*, and in England commonly the *water-bellows*; where water falling through a funnel into a cloſe veſſel, ſends from it ſo much air continually as blows the fire. See the article FURNACE, where different blowing machines of this kind are deſcribed.

Smiths and founders bellows, whether ſingle or double, are wrought by means of a rocker, with a ſtring or chain faſtened thereto, which the workman pulls. The bellows pipe is fitted into that of the tewel. One of the boards is fixed, ſo as not to play at all. By drawing down the handle of the rocker, the moveable board riſes, and by means of a weight on the top of the upper board, ſinks again. The bellows of forges and furnaces of mines uſually receive their motion from the wheels of a water-mill. Others, as the bellows of enamellers, are wrought by means of one or more ſteps or treddles under the workman's feet. Laſtly, the bellows of organs are wrought by a man called the *blower*; and in ſmall organs by the foot of the player. Butchers have alſo a kind of blaſt or bellows of a peculiar make, by which they bloat or blow up their meat when killed, in order to piecing or parting it the better.

*Bone-*BELLOWS, φυσηλαις οστεινοις, occur in Herodotus for thoſe applied by the Scythians to the genitals of mares, in order to diſtend the uterus, and by this compreſſion make them yield a greater quantity of milk.

Heſſian BELLOWS are a contrivance for driving air into a mine for the reſpiration of the miners. This M. Papin improved, changing its cylindrical form into a ſpiral one; and with this, working it only with his foot, he could make a wind to raiſe two pound weight.

Hydroſtatic BELLOWS. See HYDROSTATICS.

BELLUNESE, a territory of Italy, belonging to the Venetians. It lies between Friuli, Codorino, Feltrino, the biſhopric of Trent and Tirol. It has good iron mines, but the only conſiderable place is Belluno.

BELLUNO, a town of Italy, in the Venetian territories, and capital of the Belluneſe. It is a biſhop's ſee; and is ſituated among the Alps, on the river Piave, between the towns Cadora and Trevigni, in E. Long. 12. 15. N. Lat. 46. 9.

BELLY, in *Anatomy*, the ſame with what is more uſually called *abdomen*. See ANATOMY.

BELMONTE, a town of Italy, in the hither Calabria, and kingdom of Naples. It is ſituated on the coaſt of the Tuſcan ſea. E. Long. 16. 50. N. Lat. 39. 20.

BELOMANCY; BELOMANTIA, a kind of divination by means of arrows, practiſed in the eaſt, but chiefly among the Arabians. The word is of Greek origin; compounded of βελος *arrow*, and μαντεια *divination*. Belon, Belone.

Belomancy has been performed in different manners. One was to mark a parcel of arrows, and put 11 or more of them into a bag: theſe were afterwards drawn out; and according as they were marked or not, they judged of future events.

Another way was to have three arrows, upon one of which was wrote, "God orders it me;" upon another, "God forbids it me;" and upon the third nothing at all. Theſe were put into a quiver, out of which they drew one of the three at random; if it happened to be that with the firſt inſcription, the thing they conſulted about was to be done: if it chanced to be that with the ſecond inſcription, it was let alone; but if it proved that without inſcription, they drew over again.

Belomancy is an ancient practice, and probably that which Ezekiel mentions, chap. xxi. 21. At leaſt St Jerome underſtands it ſo, and obſerves that the practice was frequent among the Aſſyrians and Babylonians. Something like it is alſo mentioned in Hoſea, chap. iv. only that ſtaves are there mentioned inſtead of arrows, which is rather rhabdomancy than belomancy. Grotius, as well as Jerome, confounds the two together, and ſhows that it prevailed much among the Magi, Chaldeans, and Scythians; whence it paſſed to the Sclavonians, and thence to the Germans, whom Tacitus obſerves to make uſe of it.

BELON, PETER, of Le Mans, the capital of Le Maine a province of France, flouriſhed about the middle of the 16th century. He publiſhed ſeveral books in Latin. He wrote, in French, of birds, beaſts, fiſhes, ſerpents, and the neglected culture of plants; and a book of travels, or obſervations of many ſingularities and memorable things found in Greece, Aſia, Judæa, Egypt, Arabia, and other foreign countries. He was murdered near Paris by one of his enemies, in 1564.

BELONE, in *Ichthyology*, the trivial name of a ſpecies of eſox. See ESOX, ICHTHYOLOGY *Index*.

BELSHAZZAR, the laſt king of Babylon, generally ſuppoſed to be the ſon of Evil-merodach, and grandſon to the great Nebuchadnezzar.—During the time that Babylon was beſieged by Cyrus, Belſhazzar made an entertainment for a thouſand of his moſt eminent courtiers (Dan. v. 1. &c.); and being heated with wine, ordered that the veſſels of gold and ſilver which his grandfather Nebuchadnezzar had taken out of the temple at Jeruſalem might be brought to the banqueting-houſe, that he and his princes, together with his wives and concubines, might drink out of them, which accordingly was done; and to add to their profaneneſs, in the midſt of their cups, they ſang ſongs in praiſe of their ſeveral idols. But it was not long before a damp was put to the king's mirth, by a hand appearing upon the wall, which in three words wrote the ſentence of his condemnation. The king ſaw the hand that wrote; and, being exceedingly affrighted, commanded all his wiſe men, magicians, and aſtrologers, to be immediately called, that they might read the writing, and explain its meaning. When they came, the king promiſed, that whoever ſhould expound this writing ſhould be made the third perſon of his kingdom in place

and

Belt || Belts.

and power. But the Magi could comprehend nothing of this writing; which increaſed the diſorder and uneaſineſs that the king was in, together with his whole court: whereupon, at the inſtance of the queen-mother, Daniel was ſent for. The king made him the ſame offer of honours and preſents that he had done to his own magicians if he would explain the writing. Daniel modeſtly refuſed thoſe offers: but having undertaken to perform what he required of him, he firſt reproved the king with great freedom for his ingratitude to God, who had advanced him to the rank of a ſovereign, and for the profanation of the veſſels which were conſecrated to his ſervice; and then proceeded to the interpretation of the words, which were theſe, *Mene, Tekel, Upharſin*. *Mene*, ſays he, which ſignifies *number*, intimates, that the days both of your life and reign are numbered, or that you have but a ſhort time to live; *Tekel*, which ſignifies *weight*, intimates, that you have been weighed in the balance of God's juſtice, and found too light; and *Upharſin*, (or *Peres*, as Daniel has it, and means the ſame thing), which ſignifies a *fragment*, intimates, that your kingdom ſhall be divided and given to the Medes and Perſians. Which accordingly came to paſs: for that very night, in the midſt of their feaſting and revelling, the city was taken by ſurpriſe, Belſhazzar ſlain, and the kingdom tranſlated to Cyaxares, whom the Scripture calls *Darius the Mede*. See BABYLON.

BELT, the *Great*, a famous ſtrait of Denmark between the iſland of Zeeland and that of Funen, at the entrance of the Baltic ſea. It is not however ſo commodious, nor ſo much frequented, as the Sound. In 1658 the whole ſtrait was frozen ſo hard, that Charles Guſtavus king of Sweden marched over it with a deſign to take Copenhagen.

BELT, the *Leſſer*, lies to the weſt of the Great Belt, between the iſland of Funen and the coaſt of Jutland. It is one of the paſſages from the German ocean to the Baltic, though not three miles in breadth, and very crooked.

BELT, *Baltheus*, properly denotes a kind of military girdle, uſually of leather, wherewith the ſword or other weapons are ſuſtained.—Belts are known among the ancient and middle-age writers by divers names, as ζωνη, ζωμα, *zona*, *cingulum*, *reminiculum*, *rinca* or *ringa*, and *baldrellus*. The belt was an eſſential piece of the ancient armour; inſomuch that we ſometimes find it uſed to denote the whole armour. In later ages, the belt was given to a perſon when he was raiſed to knighthood; whence it has alſo been uſed as a badge or mark of the knightly order.

The denomination *belt* is alſo applied to a ſort of bandages in uſe among ſurgeons, &c. Thus we meet with quickſilver belts, uſed for the itch; belts for keeping the belly tight, and diſcharging the water in the operation of tapping, &c.

BELT, is alſo a frequent diſeaſe in ſheep, cured by cutting their tails off, and laying the ſore bare; then caſting mould on it, and applying tar and gooſe greaſe.

BELTS, in *Aſtronomy*, two zones or girdles ſurrounding the body of the planet Jupiter. See ASTRONOMY.

BELTS, in *Geography*, certain ſtraits between the German ocean and the Baltic. The Belts belong to the king of Denmark, who exacts a toll from all ſhips which paſs through them, excepting thoſe of Sweden, which are exempted.

Bel-tein || Belus.

BEL-TEIN, a ſuperſtitious cuſtom obſerved in the Highlands of Scotland. It is a kind of rural ſacrifice, performed by the herdſmen of every village on the firſt of May. They cut a ſquare trench in the ground, leaving a turf in the middle: on that they make a fire of wood, on which they dreſs a large caudle of eggs, butter, oatmeal, and milk; and bring, beſides the ingredients of the caudle, plenty of beer and whiſky; for each of the company muſt contribute ſomething. The rites begin with ſpilling ſome of the caudle on the ground, by way of libation: on that, every one takes a cake of oatmeal, upon which are raiſed nine ſquare knobs, each dedicated to ſome particular being, the ſuppoſed preſerver of their flocks and herds, or to ſome particular animal, the real deſtroyer of them: each perſon then turns his face to the fire, breaks off a knob, and flinging it over his ſhoulder, ſays, *This I give to thee, preſerve thou my horſes; this to thee, preſerve thou my ſheep;* and ſo on. After that, they uſe the ſame ceremony to the noxious animal: *This I give to thee, O fox! ſpare thou my lambs; this to thee, O hooded crow! this to thee, O eagle!* When the ceremony is over, they dine on the caudle; and after the feaſt is finiſhed, what is left is hid by two perſons deputed for that purpoſe; but on the next Sunday they re-aſſemble and finiſh the reliques of the firſt entertainment. *Pennant's Tour.*

BELTURBET, a town of Ireland in the county of Cavan, and province of Ulſter, ſituated on the river Earn, in W. Long. 7. 35. N. Lat. 54. 7.

BELTZ, or BELZO, a province of Red Ruſſia in Poland, bounded by Leopold on the ſouth, by Chelm on the north, Little Poland on the eaſt, and Volhynia on the weſt. Its capital town is Beltz.

BELTZ, or *Belzo*, a town of Poland, and capital of the province of the ſame name, ſeated on the confines of Upper Volhynia, among marſhes, in E. Long. 25. 15. N. Lat. 50 5.

BELVEDERE, in the *Italian Achitecture*, &c. denotes either a pavilion on the top of a building, or an artificial eminence in a garden; the word literally ſignifying a *fine proſpect*.

BELVEDERE, a conſiderable town of Greece, and capital of a province of the ſame name in the Morea. The province lies on the weſtern coaſt: it is the moſt fertile and rich in all the Morea; and from it the raiſins called *Belvederes* take their name. The town is ſituated in E. Long. 22. 0. N. Lat. 38. 5.

BELVIDERE. See CHENOPODIUM, BOTANY *Index*.

BELUNUM, in *Ancient Geography*, a town of Rhætia, above Feltria, in the territory of the Veneti; now *Belluno*, capital of the Belluneſe in the territory of Venice. See BELLUNO.

BELUS, in *Ancient Geography*, a ſmall river of Galilee, at the diſtance of two ſtadia from Ptolemais, running from the foot of Mount Carmel out of the lake Cendevia. Near this place, according to Joſephus, was a round hollow or valley, where was a kind of ſand fit for making glaſs; which, though exported in great quantities, was found to be inexhauſtible. Strabo ſays, the whole of the coaſt from Tyre to Ptolemais has a ſand fit for making glaſs; but that the ſand of

the

Benares || Bench.

the rivulet Belus and its neighbourhood is a better sort; and here, according to Pliny, the making of glass was first discovered.

BEMA, in *Antiquity*, denotes a step or pace. The bema made a kind of itinerary measure among the Greeks, the length of which was equivalent to one cubit and two thirds, or to ten palms. Whence also the term *bematizein*, βηματιζειν, to *measure* a road.

Bema, in ecclesiastical writers, denotes the altar or sanctuary in the ancient churches. In which sense *bema* made the third or innermost part of the church, answering to the chancel among us.

Bema was also used for the bishop's chair, seat, or throne, placed in the sanctuary. It was called *bema* from the steps by which it was to be ascended.

Bema was also used for the reader's desk. This in the Greek church was denominated βημα γνοσων, in the Latin church *ambo*.

Bema is more peculiarly used for the Manichees altar, which was in a different place from that of the Catholics.

Bema was also a denomination given by this sect to the anniversary of the day when Manes was killed, which with them was a solemn feast and day of rejoicing. One of the chief ceremonies of the feast consisted in setting out and adorning their bema or altar with great magnificence.

BEMBEA, a province of the kingdom of Angola in Africa. It is divided into Higher and Lower; and extends on one side along the sea, and on the other divides Angola from the foreign states on the south. The country is large, populous, and abounding with cattle; with the fat of which the inhabitants anoint their heads and bodies, and clothe themselves with their hides coarsely dressed. They are addicted to the same idolatrous superstitions with the rest of the natives, but speak a quite different language. The province is watered by a river called *Lutano* or *San Francisco*, which abounds with crocodiles, sea horses, and monstrous serpents, that do a great deal of mischief.

BEMBO, Peter, a noble Venetian, secretary to Leo X. and afterwards cardinal, was one of the best writers of the 16th century. He was a good poet both in Italian and Latin; but he is justly censured for the looseness and immodesty of some of his poems. He published, besides these, A History of Venice; Letters; and a book in praise of the Duke and Duchess of Urbino. He died in 1547, in the 72d year of his age.

BEMSTER, or Bemister, a town of Dorsetshire in England, seated on the river Bert, in W. Long. 3. 15. N. Lat. 50. 45.

BEN. See Behn.

Ben, in *Pharmacy*, the name of an exotic purgative fruit, of the size and figure of a nut; whence it is also called the *ben-nut*, sometimes *balanus myrepsica*, or *glans unguentaria*.

Naturalists distinguish two kinds of bens; viz. the great, *ben magnum*, which resembles the filbert, and is by some called *avellana purgatrix*, brought from America; and the small, *ben parvum*, brought from Ethiopia.

Ben-nuts yield, by expression, much oil, which from its property of not becoming rancid, at least for years, is used as a menstruum for the extraction of the odoriferous parts of flowers of jessamin, violets, roses, hyacinths, lilies of the valley, tuberoses, jonquils, clove julyflowers, and others, which like these yield little or no essential oil by distillation, but impart their fragrance to expressed oils. The method of impregnating oil of ben with the odour of flowers is this: Some fine carded cotton is dipped in the oil, and put in the bottom of a proper vessel. On this is spread a thick layer of fresh flowers, above which more cotton dipt in oil is placed; and thus alternately flowers and cotton are disposed, till the vessel (which may be made of tin, with a cover to be screwed on to it, or of porcelain) is full. By digestion during 24 hours in a water-bath, the oil will receive the odour of the flowers.

Bema || Ben.

BENARES, a district of Hindostan Proper in the East Indies, which lies between Bahar and Oude; and comprehends the circars of Benares, Jionpour, Chunar, and Gazypour. This district was ceded to the English in 1775; and yields, it is said, a clear revenue of 380,000l. annually.

Benares, a populous city in the East Indies, and capital of the district of the same name. It is situated on the north side of the Ganges which is here very broad and the banks are very high. Benares has been much celebrated as the ancient seat of Braminical learning. Several Hindoo temples embellish the banks of the river; and many other of the public and private buildings are extremely magnificent. The streets however are narrow, and the houses high, some of them even five stories, which are inhabited by different families. The more opulent inhabitants live in detached houses which have an open court, and are surrounded by a wall. In the centre of the city there is a large Mahometan mosque which was built by the emperor Aurengzebe, who destroyed a magnificent Hindoo temple which had been erected on the same spot. Many of the Hindoo temples were demolished by the Mahometans, the ruins of which are still visible in different places round the city. The same manners and customs still prevail among these people, as at the remotest period which history has traced. No innovations either in civil or religious matters have been admitted. An insurrection was excited here in 1781, and by the formidable appearance which it assumed, threatened to prove fatal to the English interest in Hindostan. It was at length suppressed, and the Rajah Cheyt Sing was deposed in 1783. Benares has been also long celebrated for its observatory. See Observatory. It is 425 miles south-east of Delhi, and 400 miles north-west of Calcutta, in 83. 10. E Long. and 25. 20. N. Lat.

BENAVARRI, a town of the kingdom of Arragon in Spain, seated on the frontiers of Catalonia.—E. Long. 0. 40. N. Lat. 41. 55.

BENAVENTO, a town of Spain, in the kingdom of Leon, and Terra di Campos, with the title of a duchy. It is seated on the river Ela, in W. Long. 5. 0. N. Lat. 42. 4.

BENAVIDUS, or Bonavitus (Marcus Mantua), a celebrated civilian, taught civil law with reputation, during 60 years, at Padua the place of his birth; and died in 1582, aged 93. His principal works are, 1. *Collectanea super Jus Cæsareum*. 2. *Consiliorum*, tom. ii. *Problematum legalium*. 4. *De illustribus Jurisconsultis*, &c.

BENCH, or Banc, in *Law*. See Banc.

Free

King's Bench.

Free-Bench ſignifies that eſtate in copyhold-lands which the wife being eſpouſed a virgin, has, after the deceaſe of her huſband, for her dower, according to the cuſtom of the manor. As to this free-bench, ſeveral manors have ſeveral cuſtoms; and in the manors of Eaſt and Weſt Enbourne, in the county of Berks, and other parts of England, there is a cuſtom, that when a copyhold tenant dies, the widow ſhall have her free bench in all the deceaſed huſband's lands, whilſt ſhe lives ſingle and chaſte; but if ſhe commits incontinency, ſhe ſhall forfeit her eſtate: nevertheleſs, upon her coming into the court of the manor, riding on a black ram, and having his tail in her hand, and at the ſame time repeating a form of words preſcribed, the ſteward is obliged, by the cuſtom of the manor, to re-admit her to her free-bench.

King's Bench, a court in which the king was formerly accuſtomed to ſit in perſon, and on that account was moved with the king's houſehold. This was originally the only court in Weſtminſter-hall, and from this it is thought that the courts of common pleas and exchequer were derived. As the king in perſon is ſtill preſumed in law to ſit in this court, though only repreſented by his judges, it is ſaid to have ſupreme authority: and the proceedings in it are ſuppoſed to be *coram nobis*, that is, before the king. This court conſiſts of a lord chief juſtice and three other juſtices or judges, who are inveſted with a ſovereign juriſdiction over all matters whether of a criminal or public nature. The chief juſtice has a ſalary of 5500l. and the other judges 2400l. each.

All crimes againſt the public good, though they do not injure any particular perſon, are under the cognizance of this court; and no private ſubject can ſuffer any unlawful violence or injury againſt his perſon, liberty, or poſſeſſions, but a proper remedy is afforded him here; not only for ſatisfaction of damages ſuſtained, but for the puniſhment of the offender; and wherever this court meets with an offence contrary to the firſt principles of juſtice, it may puniſh it. It frequently proceeds on indictments found before other courts, and removed by *certiorari* into this. Perſons illegally committed to priſon, though by the king and council, or either of the houſes of parliament, may be bailed in it; and in ſome caſes even upon legal commitments.—Writs of mandamus are iſſued by this court, for the reſtoring of officers in corporations, &c. unjuſtly turned out, and freemen wrongfully diſfranchiſed.

The court of King's Bench is now divided into a crown ſide and plea ſide; the one determining criminal, and the other, civil cauſes.

On the crown ſide, or crown office, it takes cognizance of all criminal cauſes, from high treaſon down to the moſt trivial miſdemeanour or breach of the peace. Into this court alſo indictments from all inferior courts may be removed by writ of *certiorari*; and tried either at bar, or at *niſi prius*, by a jury of the county out of which the indictment is brought. The judges of this court are the ſupreme coroners of the kingdom. And the court itſelf is the principal court of criminal juriſdiction known to the laws of England. For which reaſon, by the coming of the court of King's Bench into any county (as it was removed to Oxford on account of the ſickneſs in 1665), all former commiſſions of *oyer* and *terminer*, and general gaol-delivery, are at once abſorbed and determined *ipſo facto*: in the ſame manner as, by the old Gothic and Saxon conſtitutions, *Jure vetuſto obtinuit, quieviſſe omnia inferiora judicia dicente jus rege*. Into this court of King's Bench hath reverted all that was good and ſalutary of the *ſtar-chamber*.

Amicable Bench || Bendida.

On the plea ſide, this court determines all perſonal actions commenced by bill or writ; as actions of debt, upon the caſe, detinue, trover, ejectment, treſpaſs, waſte, &c. againſt any perſon in the cuſtody of the marſhal of the court, as every perſon ſued here is ſuppoſed to be by law.

The officers on the crown ſide are the clerk and ſecondary of the crown; and on the ſide of the pleas there are two chief clerks or prothonotaries, and their ſecondary and deputy, the cuſtos brevium, two clerks of the papers, the clerk of the declarations, the ſigner and ſealer of bills, the clerk of the rules, clerk of the errors, and clerk of the bails; to which may be added the filazers, the marſhal of the court, and the crier.

Amicable Bench. See AMICABLE.

BENCHERS, in the inns of court, the ſenior members of the ſociety, who are inveſted with the government thereof.

BENCOOLEN, a fort and town of Aſia, on the ſouth-weſt coaſt of the iſland of Sumatra, belonging to the Britiſh. The place is known at ſea by a ſlender mountain called the *Sugar Loaf*, which riſes about 20 miles inland. About a quarter of a mile from the ſea ſtands an Indian village, whoſe houſes are ſmall and low, and built on poſts. The country about Bencoolen is mountainous and woody, and the air unwholeſome, the mountains being continually covered with thick heavy clouds that produce lightning, thunder, and rain. There is no beef to be had, except that of buffaloes, which is not very palatable; and indeed proviſions of all kinds, except fruit, are pretty ſcarce. The chief trade is in pepper, of which great quantities grow on the iſland. There are frequent bickerings betwixt the natives and the factory, to the no ſmall injury of the Eaſt India Company. The factory was once entirely deſerted; and had not the natives found that trade decreaſed by reaſon of their abſence, it is ſcarcely probable that ever the Engliſh would have been invited there again. E. Long. 101. 5. S. Lat. 4. 5.

BEND, in *Heraldry*, one of the nine honourable ordinaries, containing a third part of the field when charged, and a fifth when plain. It is ſometimes, like other ordinaries, indented, ingrailed, &c. and is either dexter or ſiniſter. See HERALDRY.

In Bend, is when any things, borne in arms, are placed obliquely from the upper corner to the oppoſite lower, as the bend lies.

BENDER, a town of Beſſarabia in European Turkey, ſeated on the river Nieſter, in E. Long. 29. 5. N. Lat. 46. 40. It is remarkable for being the place of retreat of Charles XII. after he was defeated by the Ruſſians at the battle of Pultowa in 1709.

BENDERMASSEN, a town of the iſland of Borneo in Aſia, and capital of a kingdom of the ſame name. It has a good harbour; and ſtands in E. Long. 113. 50. S. Lat. 2. 40.

BENDIDA, in *Antiquity*, a feſtival, not unlike the Bacchanalia, celebrated by the Athenians in honour of Diana.

BENDING,

Bending || Benedict.

BENDING, in a general ſenſe, the reducing a ſtraight body into a curve, or giving it a crooked form.

The bending of timber-boards, &c. is effected by means of heat, whereby their fibres are ſo relaxed that you may bend them into any figure.

BENDING, in the ſea language, the tying two ropes or cables together: thus they ſay, *bend the cable*, that is, make it faſt to the ring of the anchor; *bend the ſail*, make it faſt to the yard.

BENDS, in a ſhip, the ſame with what is called *wails*, or *wales*: the utmoſt timbers of a ſhip's ſide, on which men ſet their feet in climbing up. They are reckoned from the water, and are called the *firſt*, *ſecond*, or *third bend*. They are the chief ſtrength of a ſhip's ſides; and have the beams, knees, and foot-hooks, bolted to them.

BENDY, in *Heraldry*, is the field divided into four, ſix, or more parts, diagonally, and varying in metal and colour.—The general cuſtom of England is to make an even number; but in other countries they regard it not, whether even or odd.

BENCAPED, among ſailors. A ſhip is ſaid to be *bencaped* when the water does not flow high enough to bring her off the ground, out of the dock or over the bar.

BENEDETTO, St, a conſiderable town of the Mantuan, in Italy, in E. Long. 11. 25. N. Lat. 45. 0.

BENEDICITE, among eccleſiaſtical writers, an appellation given to the ſong of the three children in the fiery furnace, on account of its beginning with the word *benedicite*. The uſe of this ſong in Chriſtian worſhip is very ancient, it appearing to have been ſung in all the churches as early as St Chryſoſtom's time.

BENEDICT XIV. Pope, (Proſper Lambertini of Bologna), celebrated for his learning and moderation, which gained him the eſteem of all ſenſible Proteſtants. He was the patron of learned men and celebrated artiſts; and an elaborate writer on theological ſubjects. His works made 12 vols in folio. He died in 1758.

Benedict, St, the founder of the order of the Benedictin monks, was born in Italy about the year 480. He was ſent to Rome when he was very young, and there received the firſt part of his education. At 14 years of age he was removed from thence to Sublaco, about 40 miles diſtant. Here he lived a moſt aſcetic life, and ſhut himſelf up in a cavern, where nobody knew any thing of him except St Romanus, who, we are told, uſed to deſcend to him by a rope, and to ſupply him with proviſions. But being afterwards diſcovered by the monks of a neighbouring monaſtery, they choſe him for their abbot. Their manners, however, not agreeing with thoſe of Benedict, he returned to his ſolitude; whither many perſons followed him, and put themſelves under his direction, ſo that in a ſhort time he built 12 monaſteries. In the year 528, or the following, he retired to Mount Caſſino, where idolatry was ſtill prevalent, there being a temple of Apollo erected here. He inſtructed the people in the adjacent country, and having converted them, he broke the image of Apollo, and built two chapels on the mountain. Here he founded alſo a monaſtery, and inſtituted the order of his name, which in time became ſo famous and extended all over Europe. It was here too that he compoſed his *Regula Monachorum*, which Gregory the Great ſpeaks of as the moſt ſenſible and beſt written piece of that kind ever publiſhed. The time of his death is uncertain, but is placed between 540 and 550. He was looked upon as the Eliſha of his time; and is reported to have wrought a great number of miracles, which are recorded in the ſecond book of the Dialogues of St Gregory the Great. Benedict, Benedictins.

Benedict, abbot of Peterborough, was educated at Oxford, became a monk in the monaſtery of Chriſt's church in Canterbury, and ſome time after was choſen prior by the members of that ſociety. Though he had been a great admirer of Archbiſhop Becket, and wrote a life of that prelate, he was ſo much eſteemed by Henry II. that by the influence of that prince he was elected abbot of Peterborough, A. D. 1177. He aſſiſted at the coronation of Richard I. A. D. 1189; and was advanced to be keeper of the great ſeal, A. D. 1191. But he did not long enjoy this high dignity, as he died on Michaelmas-day, A. D. 1193. Beſides his Life of Archbiſhop Becket, he compoſed a Hiſtory of Henry II. and Richard I. from A. D. 1170 to A. D. 1192; which hath been much and juſtly eſteemed by many of our greateſt antiquaries, as containing one of the beſt accounts of the tranſactions of thoſe times. A beautiful edition of this work was publiſhed at Oxford, in two volumes, by Mr Hearne, A. D. 1735.

BENEDICTINS, in *Church Hiſtory*, an order of monks, who profeſs to follow the rules of St Benedict.

The Benedictins, being thoſe only that are properly called *monks*, wear a looſe black gown, with large wide ſleeves, and a capuche, or cowl, on their heads, ending in a point behind. In the canon law, they are ſtyled *black friars*, from the colour of their habit.

The rules of St Benedict, as obſerved by the Engliſh monks before the diſſolution of the monaſteries, were as follows: They were obliged to perform their devotions ſeven times in 24 hours, the whole circle of which devotions had a reſpect to the paſſion and death of Chriſt: they were obliged always to go two and two together: every day in lent they were obliged to faſt till ſix in the evening, and abated of their uſual time of ſleeping and eating; but they were not allowed to practiſe any voluntary auſterity without leave of their ſuperior: they never converſed in their refectory at meals, but were obliged to attend to the reading of the Scriptures: they all ſlept in the ſame dormitory, but not two in a bed; they lay in their clothes: for ſmall faults they were ſhut out from meals; for greater they were debarred religious commerce, and excluded from the chapel; and as to incorrigible offenders, they were excluded from the monaſteries. Every monk had two coats, two cowls, a table-book, a knife, a needle, and a handkerchief; and the furniture of their bed was a mat, a blanket, a rug, and a pillow.

The time when this order came into England is well known; for to it the Engliſh owe their converſion from idolatry. In the year 596, Pope Gregory ſent hither Auguſtine, prior of the monaſtery of St Andrew at Rome, with ſeveral other Benedictin monks. St Auguſtine became archbiſhop of Canterbury, and the Benedictins founded ſeveral monaſteries in England, as alſo the metropolitan church of Canterbury, and all the cathedrals that were afterwards erected.

Benedic-tion.

Pope John XXII. who died in 1334, after an exact inquiry, found, that, ſince the firſt riſe of the order, there had been of it 24 popes, near 200 cardinals, 7000 archbiſhops, 15,000 biſhops, 15,000 abbots of renown, above 4000 ſaints, and upwards of 37,000 monaſteries. There have been likewiſe of this order 20 emperors and 10 empreſſes, 47 kings and above 50 queens, 20 ſons of emperors, and 48 ſons of kings; about 100 princeſſes, daughters of kings and emperors; beſides dukes, marquiſes, earls, counteſſes, &c. innumerable. The order has produced a vaſt number of eminent writers and other learned men. Their Rabanus ſet up the ſchool of Germany. Their Alcuinus founded the univerſity of Paris. Their Dionyſius Exiguus perfected the eccleſiaſtical computation. Their Guido invented the ſcale of muſic; and their Sylveſter, the organ. They boaſt to have produced Anſelmus, Ildephonſus, Venerable Bede, &c.

There are nuns likewiſe who follow the rule of St Benedict; among whom thoſe who call themſelves *mitigated*, eat fleſh three times a-week, on Sundays, Tueſdays, and Thurſdays; the others obſerve the rule of St Benedict in its rigour, and eat no fleſh, unleſs they are ſick.

BENEDICTION, in a general ſenſe, the act of bleſſing, or giving praiſe to God, or returning thanks for his favours. Hence alſo benediction is ſtill applied to the act of ſaying grace before or after meals. Neither the ancient Jews nor Chriſtians ever ate without a ſhort prayer. The Jews are obliged to rehearſe 100 benedictions per day; of which 80 are to be ſpoken in the morning. The firſt treatiſe of the firſt order in the Talmud, entitled *Seraim*, contains the form and order of the daily benedictions. It was uſual to give benediction to travellers on their taking leave; a practice which is ſtill preſerved among the monks. Benedictions were likewiſe given among the ancient Jews, as well as Chriſtians, by impoſition of hands. And when at length the primitive ſimplicity of the Chriſtian worſhip began to give way to ceremony, they added the ſign of the croſs, which was made with the ſame hand, as before, only elevated, or extended. Hence benediction, in the modern Romiſh church, is uſed, in a more particular manner, to denote the ſign of the croſs made by a biſhop, or prelate, as conferring ſome grace on the people. The cuſtom of receiving benediction, by bowing the head before the biſhops, is very ancient; and was ſo univerſal, that emperors themſelves did not decline this mark of ſubmiſſion. Under the name *benediction*, the Hebrews alſo frequently underſtand the preſents which friends make to one another, in all probability becauſe they are generally attended with bleſſings and compliments, both from thoſe who give and thoſe who receive them.

Nuptial BENEDICTION, the external ceremony performed by the prieſt in the office of matrimony. This is alſo called *ſacerdotal* and *matrimonial benediction*, by the Greeks ἱερολογια and ἱερότελεστα. The nuptial benediction is not eſſential to, but the confirmation of, a marriage in the civil law.

Beatic BENEDICTION, (*benedictiob eatica*), is the viaticum given to dying perſons. The pope begins all his bulls with this form: *Salutem et apoſtolicam benedictionem.*

BENEDICTION is alſo uſed for an eccleſiaſtical ceremony, whereby a thing is rendered ſacred or venerable. In this ſenſe benediction differs from conſecration, as in the latter unction is applied, which is not in the former: Thus the chalice is conſecrated, and the pix bleſſed; as the former, not the latter, is anointed: though, in the common uſage, theſe two words are applied promiſcuouſly.—The ſpirit of piety, or rather of ſuperſtition, has introduced into the Romiſh church benedictions for almoſt every thing. We read of forms of benedictions for wax-candles, for boughs, for aſhes, for church-veſſels, and ornaments; for flags or enſigns, arms, firſt fruits, houſes, ſhips, paſcal eggs, cilicium or the hair-cloth of penitents, church-yards, &c. In general, theſe benedictions are performed by aſperſions of holy water, ſigns of the croſs, and prayers ſuitable to the nature of the ceremony. The forms of theſe benedictions are found in the Roman pontifical, in the Roman miſſal, in the book of eccleſiaſtical ceremonies printed in Pope Leo X.'s time, and in the rituals and ceremonies of the different churches which are found collected in Father Martene's work on the rites and diſcipline of the church.

Benefice.

BENEFICE (*beneficium*), in middle-age writers, is uſed for a fee, ſometimes denominated more peculiarly *beneficium militare*. In this ſenſe, benefice was an eſtate in land, at firſt granted for life only; ſo called, becauſe it was held *ex mero beneficio* of the donor: and the tenants were bound to ſwear fealty to the lord, and to ſerve him in the wars. In after-times, as theſe tenures became perpetual and hereditary, they left their name of *beneficia* to the livings of the clergy; and retained to themſelves the name of *feuds*.

BENEFICE, in an eccleſiaſtical ſenſe, a church endowed with a revenue for the performance of divine ſervice; or the revenue itſelf aſſigned to an eccleſiaſtical perſon, by way of ſtipend, for the ſervice he is to do that church.

All church-preferments, except biſhoprics, are called *benefices;* and all benefices are, by the canoniſts, ſometimes ſtyled *dignities:* but we now ordinarily diſtinguiſh between benefice and dignity; applying dignity to biſhoprics, deaneries, archdeaconries, and prebendaries; and benefice to parſonages, vicarages, and donatives.

Benefices are divided by the canoniſts into ſimple and ſacerdotal. In the firſt there is no obligation but to read prayers, ſing, &c. ſuch as canonries, chaplainſhips, chantries, &c.: the ſecond are charged with the cure of ſouls, or the direction and guidance of conſciences; ſuch as vicarages, rectories, &c.

The Romaniſts again diſtinguiſh benefices into regular and ſecular. *Regular* or titular benefices are thoſe held by a religious, or a regular, who has made profeſſion of ſome religious order; ſuch are abbeys, priories, conventuals, &c.; or rather, a regular benefice is that which cannot be conferred on any but a religious, either by its foundation, by the inſtitution of ſome ſuperior, or by preſcription: for preſcription, forty years poſſeſſion by a religious makes the benefice regular. *Secular* benefices are only ſuch as are to be given to ſecular prieſts, i. e. to ſuch as live in the world, and are not engaged in any monaſtic order. All benefices are reputed ſecular, till the contrary is made to appear. They are called *ſecular benefices*, becauſe held by ſeculars; of which kind are almoſt all cures.

The canoniſts diſtinguiſh three manners of vacating

Benefice || Beneficiary.

a benefice, viz. 1. *De jure*, when the perſon enjoying it is guilty of certain crimes expreſſed in thoſe laws, as hereſy, ſimony, &c. 2. *De facto*, as well as *de jure*, by the natural death or the reſignation of the incumbent; which reſignation may be either expreſs or tacit, as when he engages in a ſtate, &c. inconſiſtent with it, as, among the Romaniſts, by marrying, entering into a religious order, or the like. 3. By the *ſentence of a judge*, by way of puniſhment for certain crimes, as concubinage, perjury, &c.

Benefices began about 500. The following account of thoſe in England is given as the fact by Dr Burn, viz. that there are 1071 livings not exceeding 10l. per annum; 1467 livings above 10l. and not exceeding 20l. per annum; 1126 livings above 20l. and not exceeding 30l. per annum; 1049 livings above 30l. and not exceeding 40l. per annum; 884 livings above 40l. and not exceeding 50l. per annum; 5597 livings under 50l. per annum. It muſt be 500 years before every living can be raiſed to 60l. a-year by Queen Anne's bounty, and 339 years before any of them can exceed 50l. a-year. On the whole, there are above 11,000 church-preferments in England, excluſive of biſhoprics, deaneries, canonries, prebendaries, prieſt-vicars, lay-vicars, ſecondaries, &c. belonging to cathedrals, or choriſters, or even curates to well beneficed clergymen.

Benefice in commendam is that, the direction and management of which, upon a vacancy, is given or recommended to an eccleſiaſtic, for a certain time, till he may be conveniently provided for.

BENEFICIARII, in *Roman Antiquity*, denote ſoldiers who attended the chief officers of the army, being exempted from other duty. Beneficiarii were alſo ſoldiers diſcharged from the military ſervice or duty, and provided with *beneficia* to ſubſiſt on. Theſe were probably the ſame with the former, and both might be compriſed in the ſame definition. They were old experienced ſoldiers, who, having ſerved out their legal time, or received a diſcharge as a particular mark of honour, were invited again to the ſervice, where they were held in great eſteem, exempted from all military drudgery, and appointed to guard the ſtandard, &c. Theſe, when thus recalled to ſervice, were alſo denominated *evocati;* before their recal, *emeriti.*

Beneficiarii was alſo uſed for thoſe raiſed to a higher rank by the favour of the tribunes or other magiſtrates. The word *beneficiarius* frequently occurs in the Roman inſcriptions found in Britain, where *conſulis* is always joined with it; but beſides *beneficiarius conſulis*, we find in Grutar *beneficiarius tribuni, prætorii, legati, præfecti, proconſulis*, &c.

BENEFICIARY, in general, ſomething that relates to benefices.

Beneficiary, *Beneficiarius*, is more particularly uſed for a beneficed perſon, or him who receives and enjoys one or more benefices. A beneficiary is not the proprietor of the revenues of his church; he has only the adminiſtration of them, though unaccountable for the ſame to any but God.

Beneficiary is alſo uſed, in middle-age writers, for a feudatory or vaſſal. The denomination was alſo given to the clerks or officers who kept the accounts of the *beneficia*, and made the writings neceſſary thereto.

BENEFICIUM, in military matters among the Romans, denoted a promotion to a higher rank by the favour of ſome perſon in authority.

Benefield || Benevento.

BENEFIELD, Sebastian, an eminent divine of the 17th century, was born in 1559, at Preſtonbury in Glouceſterſhire, and educated at Corpus Chriſti college in Oxford. In 1608 he took the degree of doctor in divinity, and five years after was choſen Margaret profeſſor in that univerſity. He had been preſented ſeveral years before to the rectory of Meyſcy-Hampton, in Glouceſterſhire. He publiſhed Commentaries upon the firſt, ſecond, and third chapters of Amos; a conſiderable number of ſermons; and ſome Latin treatiſes. He died in 1630.

BENEFIT of clergy. See Clergy.

BENESOEUF, a town of Egypt, ſeated on the weſtern ſhore of the Nile, and remarkable for its hemp and flax. E. Long. 31. 0. N. Lat. 29. 10.

BENEVENTE, a town of the province of Leon, in Spain, ſeated on the river Eſla, in W. Long. 5. 5. N. Lat. 42. 4.

BENEVENTO, a city of Italy, in the kingdom of Naples, with an archbiſhop's ſee. It is ſituated near the confluence of the rivers Sabato and Calore, in a fertile valley called the *Strait of Benevento*, full of gentlemen's ſeats and houſes of pleaſure. This town hath frequently ſuffered terribly by earthquakes; particularly in 1703, when a great part of it was overturned, and the reſt much damaged. E. Long. 14. 57. N. Lat. 41. 6.

The arch of Trajan, now called the *Porta Aurea*, forms one of the entrances to the city. This arch, though it appears to great diſadvantage from the walls and houſes that hem it in on both ſides, is in tolerable preſervation, and one of the moſt magnificent remains of Roman grandeur to be met with out of Rome. The architecture and ſculpture are both ſingularly beautiful. This elegant monument was erected in the year of Chriſt 114, about the commencement of the Parthian war, and after the ſubmiſſion of Decebalus had entitled Trajan to the ſurname of Dacicus. The order is Compoſite; the materials, white marble; the height, 60 palms; length, 37 and a half; and depth 24. It conſiſts of a ſingle arch, the ſpan of which is 20 palms, the height 35. On each ſide of it, two fluted columns, upon a joint pedeſtal, ſupport an entablement and an attic. The intercolumniations and frize are covered with baſſo-relievos, repreſenting the battles and triumphs of the Dacian war. In the attic is the inſcription. As the ſixth year of Trajan's conſulate, marked on this arch, is alſo to be ſeen on all the milliary columns he erected along his new road to Brunduſium, it is probable that the arch was built to commemorate ſo beneficial an undertaking. Except the old metropolis of the world, no city in Italy can boaſt of ſo many remains of ancient ſculpture as are to be found in Benevento. Scarce a wall is built of any thing but altars, tombs, columns, and remains of entablatures.

The cathedral is a clumſy edifice, in a ſtyle of Gothic, or rather Lombard, architecture. This church, dedicated to the Virgin Mary, was built in the ſixth century, enlarged in the 11th, and altered conſiderably in the 13th, when Archbiſhop Roger adorned it with a new front. To obtain a ſufficient quantity of marble for this purpoſe, he ſpared neither ſarcophagus,

Benevento. altar, nor inſcription; but fixed them promiſcuouſly and irregularly in the walls of his barbarous ſtructure. Three doors (a type of the Trinity, according to the rules eſtabliſhed by the myſtical Vitruvii of thoſe ages) opened into this facade. That in the centre is of bronze, emboſſed with the life of Chriſt, and the effigies of the Beneventine metropolitan, with all his ſuffragan biſhops. The inſide offers nothing to the curious obſerver but columns, altars, and other decorations, executed in the moſt inelegant ſtyle that any of the church-building barbarians ever adopted. In the court ſtands a ſmall Egyptian obeliſk, of red granite, crowded with hieroglyphics. In the adjoining ſquare are a fountain and a very indifferent ſtatue of Benedict XIII. long archbiſhop of Benevento.

Of the Beneventine hiſtory the following abſtract is given by Mr Swinburne, in his *Travels in Sicily*. According to ſome authors (he informs us), Diomed was the founder of Beneventum; whence its origin muſt be referred to the "years that immediately ſucceeded the Trojan war. Other writers aſſign it to the Samnites, who made it one of their principal towns, where they frequently took refuge when worſted by the Romans. In their time its name was *Maleventum*, a word of uncertain etymology; however, it ſounded ſo ill in the Latin tongue, that the ſuperſtitious Romans, after achieving the conqueſt of Samnium, changed it into Beneventum, in order to introduce their colony under fortunate auſpices. Near this place, in the 479th year of Rome, Pyrrhus was defeated by Curius Dentatus. In the war againſt Hannibal, Beneventum ſignalized its attachment to Rome, by liberal tenders of ſuccour and real ſervices. Its reception of Gracchus, after his defeat of Hanno, is extolled by Livy; and, from the gratitude of the ſenate, many ſolid advantages accrued to the Beneventines. As they long partook, in a diſtinguiſhed manner, of the glories and proſperity of the Roman empire, they alſo ſeverely felt the effects of its decline, and ſhared in a large proportion the horrors of devaſtation that attended the irruption of the northern nations.

"The modern hiſtory of this city will appear intereſting to thoſe readers who do not deſpiſe the events of ages which we uſually and juſtly call dark and barbarous. They certainly are of importance to all the preſent ſtates of Europe; for at that period originated the original exiſtence of moſt of them. Had no northern ſavages deſcended from their ſnowy mountains, to overturn the Roman coloſſus, and break aſunder the fetters of mankind, few of thoſe powers, which now make ſo formidable a figure, would ever have been ſo much as heard of. The avengers of the general wrongs were, no doubt, the deſtroyers of arts and literature, and brought on the thick clouds of ignorance, which for many centuries no gleam of light could penetrate; but it is to be remembered, alſo, that the Romans themſelves had already made great progreſs in baniſhing true taſte and knowledge, and would very ſoon have been a barbarous nation, though neither Goths nor Vandals had ever approached the frontier.

"The Lombards came the laſt of the Scythian or Scandinavian hordes to invade Italy. After fixing the ſeat of their empire at Pavia, they ſent a detachment to poſſeſs the ſouthern provinces. In 571, Zotto was appointed duke of Benevento, as a feudatory of the king of Lombardy; and ſeems to have confined his rule to the city alone, from which he ſallied forth to ſeek for booty. The ſecond duke, whoſe name was Arechis, conquered almoſt the whole country that now conſtitutes the kingdom of Naples. His ſucceſſors appear long to have remained ſatisfied with the extent of dominion he had tranſmitted to them. Grimwald, one of them, uſurped the crown of Lombardy; but his ſon Romwald, though a very ſucceſsful warrior, contented himſelf with the ducal title. The fall of Deſiderius, laſt king of the Lombards, did not affect the ſtate of Benevento. By an effort of policy or reſolution, Arechis the ſecond kept poſſeſſion; and availing himſelf of the favourable conjuncture, aſſerted his independence,—threw off all feudal ſubmiſſion,—aſſumed the ſtyle of prince,—and coined money with his own image upon it; a prerogative exerciſed by none of his predeceſſors as dukes of Benevento. During four reigns, this ſtate maintained itſelf on a reſpectable footing; and might long have continued ſo, had not civil war, added to very powerful aſſaults from abroad, haſtened its ruin. Radelchis and Siconulph aſpired to the principality; and each of them invited the Saracens to his aid. The deſolation cauſed by this conflict is ſcarcely to be deſcribed. No better method for terminating theſe fatal diſſenſions could be deviſed than dividing the dominions into two diſtinct ſovereignties. In 851, Radelchis reigned as prince at Benevento; and his adverſary fixed his court with the ſame title at Salerno. From this treaty of partition, the ruin of the Lombards became inevitable: a want of union undermined their ſtrength,—foreigners gained an aſcendant over them, irreſolution and weakneſs pervaded their whole ſyſtem of government. The erection of Capua into a third principality was another deſtructive operation: and now the inroads of the Saracens, the attacks of the eaſtern and weſtern emperors, anarchy and animoſity at home, reduced the Lombard ſtates to ſuch wretchedneſs, that they were able to make a very feeble reſiſtance to the Norman arms. The city of Benevento alone eſcaped their ſway, by a grant which the emperor Henry II. had made of it to the biſhop of Rome, in exchange for the territory of Bamberg in Germany, where the popes enjoyed a kind of ſovereignty. From the year 1054 to this day, the Roman ſee, with ſome ſhort interruptions of poſſeſſion, has exerciſed temporal dominion over this city. Benevento has given three popes to the chair of St Peter; viz. Felix III. Victor III. and Gregory VIII. and, what it is much prouder of, reckons St Januarius in the liſt of its biſhops."

Benevento || Fenfield.

BENEVENTUM, in *Ancient Geography*, a town of the Samnites, formerly called *Maleventum* from the unwholeſomeneſs of the wind, and under that appellation it is mentioned by Livy; but after a Roman colony was led thither in the 485th year of the city, it came to have the name of *Beneventum*, as a more auſpicious title. It is mentioned by Horace as an ancient city, ſaid to have been built by Diomedes before the Trojan war. Now Benevento.

BENEVOLENCE, in morals, ſignifies the love of mankind in general, accompanied with a deſire to promote their happineſs. See Morals.

BENFIELD, a town of France, in the department of the Lower Rhine, whoſe fortifications were demoliſhed

Bengal. liſhed in conſequence of the treaty of Weſtphalia. E. Long. 7. 45. N. Lat. 48. 14.

BENGAL, a county of Hindoſtan in Aſia, bounded on the eaſt by the kingdoms of Aſſem, Tipra, and Arracan; on the weſt by Malva and Berar; on the north by Gehud, Rotas, Benares, and Jeſuat; and on the ſouth by Orixa and the bay of Bengal. Its greateſt length from weſt to eaſt is about 720 miles, and its breadth from ſouth to north, where greateſt, is not leſs than 300; though in ſome places, not above 150; extending from 21 to 25 degrees of north latitude, and from 80 to 91 of eaſt longitude.

1 Climate extremely unhealthy. As this country lies almoſt entirely within the torrid zone, and in the middle of a very extenſive continent, it is ſometimes ſubject to ſuch extremes of heat as render it very fatal to European conſtitutions. Dr Lind is of opinion, that the climate of Bengal is the moſt dangerous in this reſpect of any of the Engliſh territories, excepting Bencoolen on the coaſt of Sumatra.

2 Extreme heat of the land wind, and its ſurpriſing effects. Part of this unhealthineſs ariſes from the mere circumſtance of heat; for in all the ſouthern parts of India, when the wind blows over land, it is ſo extremely hot and ſuffocating as ſcarcely to be borne. The reaſon of this is evident from the mere inſpection of a map of Aſia, where it is evident, that whatever wind blows over land, eſpecially in the ſouthern parts, muſt paſs over an immenſe tract of country ſtrongly heated by the ſun; and as in every part of this extenſive continent there are ſandy deſerts of very conſiderable magnitude, the heat is thus prodigiouſly increaſed. This becomes very evident on the falling of a ſhower of rain at the time the land-wind prevails; for if the wind in its way paſſes through the ſhower, the air is agreeably cooled though the ſky ſhould be ever ſo clear; while thoſe who reſide only at a few miles diſtance, but out of the direct line of the ſhower, will be fainting under the exceſſive heat. Here, indeed, when the air is clear, the ſun-beams are much more powerful than in our climate, inſomuch that the light at noon-day is too powerful for the eyes to bear; and the large ſtars, as Venus and Jupiter, ſhine with a ſurpriſing luſtre. Thus the reflection of the ſunbeams from the earth muſt neceſſarily occaſion an extraordinary degree of heat in the atmoſphere; ſo that from the winds above mentioned very great inconveniences ſometimes ariſe, ſimilar to thoſe which are occaſioned by the *Harmattan* in Africa. Mr Ives tells us, that it is affirmed they will ſnap glaſs if it be too much expoſed to them; he has ſeen the veneering ſtripped off from a cheſt of drawers by their means; and they will certainly crack and chap almoſt every piece of wood that is not well ſeaſoned. In certain places they are ſo loaded with ſand, that the horizon appears quite hazy where they blow, and it is almoſt impoſſible to prevent the eyes from being thus greatly injured. They have likewiſe a very pernicious effect on ſuch people as are expoſed to them while ſleeping. This ſeldom fails to bring on a fit of the *barbiers*, a kind of paralytic diſtemper attended with a total deprivation of the uſe of the limbs, and which the patient never gets the better of but by removing to ſome other climate. Theſe hot winds are made uſe of with great ſucceſs for cooling liquors, by wrapping a wet cloth round the bottles and expoſing it to the air. The reaſon of this is explained under the article EVAPORATION. Mr Ives remarks, that it will thus cool much ſooner than by being expoſed to the cool ſea-breeze. Bengal.

3 Inundations of the Ganges, &c. deſcribed. The great cauſe of the unhealthineſs of Bengal, however, is owing to the inundations of the Ganges and Burrampooter, by which ſuch quantities of putreſcible matters are brought down as infect the air with the moſt malignant vapours when the waters retire. Though the rainy ſeaſon begins in Bengal only in the month of June, the river begins to ſwell in the mountains of Thibet early in April, and by the latter end of that month in Bengal alſo. The reaſon of this is partly the melting of the ſnow on the mountains of Thibet, and partly the vaſt collection of vapours brought by the ſoutherly or ſouth-weſt monſoon, which are ſuddenly ſtopped by the high mountains of Thibet. Hence it is obvious, that the accumulation and condenſation of theſe vapours muſt firſt take place in the neighbourhood of the mountains which oppoſe them; and thus the rainy ſeaſon commences ſooneſt in thoſe places which lie neareſt the mountains.

The rivers in Bengal begin to riſe at firſt very ſlowly, the increaſe being only at the rate of one inch per day for the firſt fortnight. It then gradually augments to two and three inches before any quantity of rain falls in the low countries; and when the rain becomes general, the increaſe at a medium is five inches per day. By the latter end of July, all the lower parts of Bengal, contiguous to the Ganges and Burrampooter, are overflowed, and preſent a ſurface of water more than 100 miles wide. This vaſt collection of fluid, however, is owing in a great meaſure to the rains which fall on the low country itſelf; for the lands in the neighbourhood are overflowed ſome time before the bed of the river is filled. It muſt be obſerved, that the ground on the bank of the river, and even to ſome miles diſtance, is higher than that which is more remote; and thus a ſeparation is made for a conſiderable time betwixt the waters of the land-flood and thoſe of the river.

4 Some lands guarded from too copious an inundation. As ſome of the lands in Bengal would receive damage from ſuch a copious inundation, they muſt for this reaſon be guarded by ſtrong dykes to reſiſt the waters, and admit only a certain quantity. Theſe, collectively taken, are ſaid to be more than 1000 miles in length, and are kept up at an enormous expence: yet they do not always anſwer the purpoſe, on account of the looſeneſs of the earth of which they are compoſed, even though ſome are of the thickneſs of an ordinary rampart at the baſe. One particular branch of the Ganges (navigable only in the rainy ſeaſon, and then equal in ſize to the Thames at Chelſea) is conducted for 70 miles between dykes: and when full, the paſſengers look down upon the adjacent country as from an eminence.

As the tide loſes its power of counteracting ſuch an impetuous torrent of freſh water, the height of the inundation gradually diminiſhes as it approaches the ſea, and totally vaniſhes at the point of confluence; which is owing to the facility with which the waters of the inundation ſpread over the level of the ocean. But when the force of winds conſpires with that of the tide, the waters are retarded in ſuch a manner as ſometimes to raiſe the inundation two feet above the ordinary level; which has been known to occaſion the loſs of whole crops of rice. In the year 1763, a melan-

5 Diſaſters occaſioned by too great an inundation.

choly

Bengal. choly accident happened at Luckipour, when a ſtrong gale of wind, conſpiring with a high ſpring-tide, at a ſeaſon when the periodical flood was within a foot and an half of its higheſt pitch, the waters are ſaid to have riſen ſix feet above their ordinary level. Thus the inhabitants of a particular diſtrict were ſwept away with their houſes and cattle; and to aggravate the diſtreſs, it happened in a part of the country where it was ſcarce poſſible to find a tree for a drowning man to eſcape to.

For ſome days before the middle of Auguſt the inundation is at a ſtand, and then begins to abate by a ceſſation of rains in the mountains, though great quantities ſtill continue to fall on the low country. The inundation does not, however, in its decreaſe, always keep pace with that of the river, by reaſon of the height of the banks; but after the beginning of October, when the rain has nearly ceaſed, the remainder goes off quickly by evaporation, leaving the ground exceedingly fertilized.

6 Dangerous effects of the north-weſt winds.

From the time that the monſoon changes in October to the middle of March, the rivers are in a ſtate of tranquillity; when the north-weſt winds begin, and may be expected once in three or four days till the commencement of the rainy ſeaſon. Theſe are the moſt formidable enemies of the inland navigation carried on by the large rivers. They are ſudden and violent ſqualls, attended with rain; and though their duration is commonly but ſhort, ſometimes produce fatal effects, whole fleets of trading boats having been ſunk by them almoſt inſtantaneouſly. They are more frequent in the eaſtern than the weſtern part of Bengal, and happen oftener towards the cloſe of the day than at any other time; but as they are indicated ſome time before they approach by the riſing and ſingular appearance of the clouds, the traveller has commonly time enough to ſeek for a place of ſhelter. It is in the great rivers alone that they are ſo formidable, and that about the end of May or beginning of June, when the rivers are much increaſed in width. After the commencement of the rainy ſeaſon, which varies in different parts from the middle to the end of June, tempeſtuous weather occaſionally happens. At this ſeaſon places of ſhelter are more common than at any other time by the filling up of the creeks and inlets as the river increaſes: and on the other hand, the bad weather, when it happens, is of longer continuance than during the ſeaſon of the north-weſters. The rivers being now ſpread to the diſtance of ſeveral miles, large waves are raiſed on them, particularly when blowing in a direction contrary to the rapid parts of the ſtream, which for obvious reaſons ought to be avoided.

7 Of the inland navigation in Bengal.

This navigation is performed in ſafety during the interval between the end of the rainy ſeaſon and the beginning of the north-weſters; an ordinary degree of attention being then only requiſite to pilot the boat clear of ſhallows and ſtumps of trees. The ſeaſon of the north-weſters requires the greateſt care and attention. Should one of theſe ſqualls approach, and no creek or inlet offer for ſhelter, the ſteep bank of the rivers ſhould be always ſought as a place of ſhelter, if it is not in a crumbling ſtate †, whether it be to the windward or leeward, rather than the other. If this cannot be done, the flat ſide muſt be taken up with; and if it be a lee ſhore, the anchor ſhould be thrown out to prevent driving upon it. In theſe caſes the maſt is always ſuppoſed to be ſtruck; and, provided this be done, and the cargo judiciouſly diſpoſed of, there is little danger of any of the boats commonly made uſe of being overſet. Bengal.

† See *Ganges*.

8 *Budgeroes*, a kind of boats, deſcribed.

The boats uſed in the inland navigation of Bengal are called *budgeroes*, and are formed ſomewhat like a pleaſure-barge. Some have cabins 14 feet broad and proportionally long, drawing from four to five feet water. Their motion is very ſlow, not exceeding the rate of eight miles a-day when moved by their oars; ſo that their progreſs down the river muſt depend principally on the motion of the current. From the beginning of November to the middle or latter end of May, the uſual rate of going down the ſtream is about 40 miles in twelve hours, and during the reſt of the year from 50 to 70 miles. The current is ſtrongeſt while the waters of the inundation are draining off, which happens in part of Auguſt and September. In many of the ſhallow rivers, however, the current is exceedingly ſlow during the dry months; inſomuch that the track-rope is frequently uſed in going downwards. In towing againſt the ſtream, the ſteep ſide of the river is generally preferred on account of the depth of water, though the current runs much ſtronger there than on the oppoſite ſide. On theſe occaſions it is neceſſary to provide a very long track-rope, as well for avoiding the falling pieces of the ſteep bank on the one ſide, as the ſhallow water on the other, when it becomes neceſſary to change ſides through the badneſs of the tracking ground. The anchor ſhould always be kept ready for dropping in caſe the track-rope breaks. The uſual rate of towing againſt the ſtream is from 17 to 20 miles a-day; and to make even this progreſs, the windings of the river require the boats to be dragged againſt the current at the rate of four miles and a half per hour for 12 hours. When the waters are high, a greater progreſs will be made, notwithſtanding the ſuperior ſtrength of the current; becauſe the filling of the river-bed gives many opportunities of cutting off angles and turnings, and ſometimes even large windings, by going through creeks.

Bengal produces the vegetables and animals common to other countries in the torrid zone. Its great produce of grain is rice, which is commonly exported from thence into other countries. By various accidents, however, the crop of rice ſometimes fails, and a famine is produced; and of this there have been many inſtances in Bengal as well as in other parts of Hindoſtan. One of the moſt deplorable of this kind happened in the year 1770. The nabob and ſeveral other men of the country diſtributed rice *gratis* to the poor until their ſtocks began to fail, when thoſe donations were of conſequence withdrawn. Vaſt multitudes then came down to Calcutta, the capital Engliſh ſettlement in the province, in hopes of meeting with relief at the place. The granaries of the Company, however, being quite empty, none could be afforded; ſo that when the famine had prevailed a fortnight, many thouſands fell down in the ſtreets and fields; whoſe bodies, mangled by the dogs and vultures, corrupting in the air, ſeemed to threaten a plague as the conſequence of the famine. An hundred people were daily employed on the Company's account, with doolys, ſledges, and bearers,

9 Account of a dreadful famine in 1770.

Bengal. bearers, to throw them into the river. At this time the fiſh could not be eaten, the river being ſo full of carcaſes; and many of thoſe who ventured to feed upon them died ſuddenly. Hogs, ducks, and geeſe, alſo fed moſtly on carnage; ſo that the only meat that could be procured was mutton; and this, from the dryneſs of the ſeaſon, was ſo ſmall, that a quarter of it would ſcarcely weigh a pound and a half.

10 Surpriſing cloud of inſects. In the month of Auguſt a moſt alarming phenomenon appeared, of a large black cloud at a diſtance in the air, which ſometimes obſcured the ſun, and ſeemed to extend a great way over and above Calcutta. The hotter the day proved the lower this cloud ſeemed to deſcend, and for three days it occaſioned great ſpeculation. The bramins pretended, that this phenomenon, which was a cloud of inſects, ſhould make its appearance three times; and if ever they deſcended to the earth, the country would be deſtroyed by ſome untimely misfortune. They ſaid, that about 150 years before there had been ſuch another bad time, when the earth was parched for want of water; and this cloud of inſects made its appearance, though it came much lower the ſecond time than it had done before. On the third day, the weather being very hot and cloudy, they deſcended ſo low that they could be plainly ſeen. They ſeemed to be about the ſize of a horſe-ſtinger, with a long red body, large head and eyes, keeping cloſe together like a ſwarm of bees, and to appearance, flying quite on a line. None, however, were caught, as the people were ſo much frightened by the prognoſtications of the bramins. Whilſt it rained they continued in one poſition for near a quarter of an hour; then they roſe five or ſix feet at once, and in a little time deſcended as much, until a ſtrong north-weſt wind blew for two days ſucceſſively. During its continuance they aſcended and deſcended, but more precipitately than before; and next morning the air was quite clear. For ſome days before the cloud made its appearance, the toads, frogs, and inſects, which during the rains make a continual noiſe through the night, diſappeared, and were neither heard nor ſeen, except in the river.

11 Cauſe of the famine. This dreadful famine was occaſioned by a preternatural drought. In this country they have two harveſts, one in April, called the *little harveſt*, which conſiſts of the ſmaller grain; the ſecond, called the *grand harveſt*, is only of rice. But by a drought which happened in 1769 the great harveſt of that year failed, as did alſo the little one of 1770, which produced the dreadful conſequences already mentioned.

12 Vegetable productions. Among the vegetables produced in Bengal, Mr Ives mentions the areca-tree, the woody part of which is as tough as whalebone. Here is alſo a beautiful tree called *chulta*, the flower of which is at firſt a hard green ball on footſtalks about four inches in length. This opens, and the calyx is compoſed of five round thick and ſucculent leaves; the corolla conſiſts of the like number of fine beautiful white petals. After one day the corolla falls off and the ball cloſes again, and is ſold in the markets. There is a ſucceſſion of theſe for ſeveral months. The mango tree grows here alſo in plenty. Its fruit is preferred to all others in the country excepting very fine pine-apples; the gentlemen eat little elſe in the hot months when theſe fruits are in ſeaſon. If no wine is drunk with them they are apt to produce boils, which are troubleſome but healthful. In the walks of Bengal they have a tall tree called the *tatoon*, ſaid to have been firſt brought into England by Captain Birch. The leaves are of a deep ſhining green, the lower part rather paler where it is ribbed, and undulated round the edges. The fruit is of the ſize, ſhape, and colour of an olive, with a moderately thin huſk, and a kernel like that of the date; five or ſix grow on the ſame pedicle. Near Calcutta is a large ſpreading tree called the *ruſſa*, which makes a fine appearance when in full bloom. The natives ſay that this and another near the Dutch ſettlement are the only two in Bengal. They pretend likewiſe that they can never find the ſeed; but Mr Ives informs us that this is to be met with in plenty, though in a bad condition, the ants and other vermin being ſo fond of them, that not a ſingle pod is ever to be met with that is not touched by one or other of theſe ſpecies of inſects. This tree bears flowers of bright crimſon, and all the ſhades from thence down to a bright yellow. They are in ſuch plenty as almoſt to cover the tree, but have little or no ſmell. The fruit is a pod of the ſhape and ſize of a large garden-bean, containing four or five fleſhy ſeeds, which eaſily fall into two when dry. They are brown on the outſide, white within, and nearly ſquare, but convex on the ſides. Bengal.

13 Birds of an extraordinary ſize. Among the animals to be met with in Bengal Mr Ives makes mention of a kind of birds named *argill* or *burgill* (ſee ARDEA, ſp. 6.) They are very large, and in the evenings would majeſtically ſtalk along like as many naked Indians, for which our author at firſt miſtook them. On diſcovering that they were birds he reſolved to ſhoot one of them; which, however, was very difficult to be done. The Indians ſhowed evident marks of diſſatisfaction at the attempt; and informed him that it was impoſſible to ſucceed, becauſe theſe birds were poſſeſſed by the ſouls of bramins. At laſt, however, he ſucceeded; and informs that the bird he ſhot extended 14 feet 10 inches betwen the tips of the wings; from the tip of the bill to the extremity of the claw was ſeven feet and a half: the legs were naked, as was alſo one half of the thighs; the naked parts being three feet in length. The feathers of the wings and back were of an iron colour, and very ſtrong; thoſe of the belly were very long, and on the breaſt was a great deal of down all of a dirty white. The bill was 16 inches round at the baſe, nearly of a triangular ſhape, and of different colours. In the craw was a land tortoiſe 10 inches long; and a large black male cat was found entire in its ſtomach.

14 Commerce inland. Bengal is reckoned the richeſt and moſt populous province in the empire of Hindoſtan. Beſides its own conſumption, which is certainly very conſiderable, its exports are immenſe. One part of its merchandiſe is carried into the inland country. Thibet takes off a quantity of its cottons, beſides ſome iron and cloths of European manufacture. The inhabitants of thoſe mountains fetch them from Patan themſelves, and give muſk and rhubarb in exchange.

But the trade of Thibet is nothing in compariſon of that which Bengal carries on with Agra, Delhi, and the provinces adjacent to thoſe ſuperb capitals, in ſalt, ſugar, opium, ſilk, ſilk-ſtuffs, and an infinite quantity of cottons, and particularly muſlins. Theſe articles,

Bengal. articles, taken together, amounted formerly to more than 1,750,000l. a-year. So conſiderable a ſum was not conveyed to the banks of the Ganges; but it was the means of retaining one nearly equal, which muſt have iſſued from thence to pay the duties, or for other purpoſes. Since the viceroys of the Mogul have made themſelves nearly independent, and ſend him no revenues but ſuch as they chooſe to allow him, the luxury of the court is greatly abated, and the trade we have been ſpeaking of is no longer ſo conſiderable.

15 Maritime. The maritime trade of Bengal, managed by the natives of the country, has not ſuffered the ſame diminution, nor was it ever ſo extenſive, as the other. It may be divided into two branches, of which Catek is in poſſeſſion of the greater part.

Catek is a diſtrict of ſome extent, a little below the moſt weſtern mouth of the Ganges. Balaſore, ſituated upon a navigable river, ſerves it for a port. The navigation to the Maldives, which the Engliſh and French have been obliged to abandon on account of the climate, is carried on entirely from this road. Here they load their veſſels with rice, coarſe cottons, and ſome ſilk ſtuffs, for theſe iſlands; and receive cowries in exchange, which are uſed for money in Bengal, and ſold to the Europeans.

The inhabitants of Catek, and ſome other people of the Lower Ganges, maintain a conſiderable correſpondence with the country of Aſham. This kingdom, which is thought to have formerly made a part of Bengal, and is only divided from it by a river that falls into the Ganges, deſerves to be better known, if what is aſſerted here be true, that gunpowder has been diſcovered there, and that it was communicated from Aſham to Pegu, and from Pegu to China. Its gold, ſilver, iron, and lead mines, would have added to its fame, if they had been properly worked. In the midſt of theſe riches, which were of very little ſervice to this kingdom, ſalt was an article of which the inhabitants were ſo much in want, that they were reduced to the expedient of procuring it from a decoction of certain plants.

In the beginning of the preſent century, ſome Bramins of Bengal carried their ſuperſtitions to Aſham, where the people were guided ſolely by the dictates of natural religion. The prieſts perſuaded them, that it would be more agreeable to Brama if they ſubſtituted the pure and wholeſome ſalt of the ſea to that which they uſed. The ſovereign conſented to this on condition that the excluſive trade ſhould be in his hands; that it ſhould only be brought by the people of Bengal; and that the boats laden with it ſhould ſtop at the frontiers of his dominions. Thus have all theſe falſe religions been introduced by the influence and for the advantage of the prieſts who teach, and of the kings who admit them. Since this arrangement has taken place, 40 veſſels from 500 to 600 tons burden each are annually ſent from the Ganges to Aſham laden with ſalt, which yields 200 per cent. profit. They receive in payment a ſmall quantity of gold and ſilver, ivory, muſk, eagle-wood, gum-lac, and a large quantity of ſilk.

Excepting theſe two branches of maritime trade, which, for particular reaſons, have been confined to the natives of the country, all the reſt of the veſſels ſent from the Ganges to the different ſea-ports of India belong to the Europeans, and are built at Pegu. See Pegu. Bengal.

A ſtill more conſiderable branch of commerce, which the Europeans at Bengal carry on with the reſt of India, is that of opium. Patna, ſituated on the Upper Ganges, is the moſt celebrated place in the world for the cultivation of opium. The fields are covered with it. Beſides what is carried into the inland parts, there are annually 3000 or 4000 cheſts exported, each weighing 300 pounds. It ſells upon the ſpot at the rate of between 24l. and 25l. a cheſt on an average. This opium is not purified like that of Syria and Perſia, which we make uſe of in Europe; it is only a paſte that has undergone no preparation, and has not a tenth part of the virtue of purified opium.

The Dutch ſend rice and ſugar from their ſettlements to the coaſt of Coromandel, for which they are paid in ſpecie, unleſs they have the good fortune to meet with ſome foreign merchandiſe at a cheap rate. They ſend out one or two veſſels laden with rice, cottons, and ſilk: the rice is ſold in Ceylon, the cottons at Malabar, and the ſilk at Surat; from whence they bring back cotton, which is uſually employed in the coarſer manufactures of Bengal. Two or three ſhips laden with rice, gum-lac, and cotton ſtuffs, are ſent to Baſſora; and return with dried fruits, roſe-water, and a quantity of gold. The rich merchandiſe carried to Arabia is paid for entirely in gold and ſilver. The trade of the Ganges with the other ſea-ports of India brings 1,225,000l. annually into Bengal.

Though this trade paſſes through the hands of the Europeans, and is carried on under their protection, it is not entirely on their own account. The Moguls, indeed, who are uſually ſatisfied with the places they hold under the government, have ſeldom any concern in theſe expeditions; but the Armenians, who, ſince the revolutions in Perſia, are ſettled upon the banks of the Ganges, to which they formerly only made voyages, readily throw their capitals into this trade. The Indians employ ſtill larger ſums in it. The impoſſibility of enjoying their fortunes under an oppreſſive government does not deter the the natives of this country from labouring inceſſantly to increaſe them. As they would run too great a riſk by engaging openly in trade, they are obliged to have recourſe to clandeſtine methods. As ſoon as an European arrives, the Gentoos, who know mankind better than is commonly ſuppoſed, ſtudy his character; and, if they find him frugal, active, and well informed, offer to act as his brokers and caſhiers, and lend or procure him money upon bottomry, or at intereſt. This intereſt, which is uſually nine per cent. at leaſt, is higher when he is under a neceſſity of borrowing of the Cheyks. 16 Gentoo brokers.

Theſe Cheyks are a powerful family of Indians, who have, time immemorial, inhabited the banks of the Ganges. Their riches have long ago procured them the management of the bank belonging to the court, the farming of the public revenue, and the direction of the money, which they coin afreſh every year in order to receive annually the benefit ariſing from the mint. By uniting ſo many advantages, they are enabled to lend the government 1,750,000l. 2,625,000l. or even 4,375,000l. at a time. When the 17 Cheyks, a powerful Indian family.

Bengal. the government finds it impoſſible to refund the money, they are allowed to indemnify themſelves by oppreſſing the people.

The Europeans who frequent the Ganges have not been ſufficiently alarmed at this deſpotiſm, which ought to have prevented them from ſubmitting to a dependence upon the Cheyks. They have fallen into the ſnare, by borrowing conſiderable ſums of theſe avaricious financiers, apparently at nine, but in reality at thirteen, per cent. if we take into the account the difference between the money that is lent them and that in which they are obliged to make their payments. The engagements entered into by the French and Dutch companies have been kept within ſome bounds; but thoſe of the Engliſh company have been unlimited. In 1755, they were indebted to the Cheyks about 1,225,000l.

The Portugueſe, who firſt frequented this rich country, had the wiſdom to eſtabliſh themſelves at Chatigan, a port ſituated upon the frontier of Arracan, not far from the moſt eaſtern part of the Ganges. The Dutch, who, without incurring the reſentment of an enemy at that time ſo formidable, were deſirous of ſharing in their good fortune, were engaged in ſearching for a port which, without obſtructing their plan, would expoſe them the leaſt to hoſtilities. In 1603, their attention was directed to Balaſore; and all the companies, rather through imitation than in conſequence of any well-concerted ſchemes, followed their example. Experience taught them the propriety of fixing as near as poſſible to the markets from whence they had their merchandiſe; and they ſailed up that branch of the Ganges which, ſeparating itſelf from the main river at Mourcha above Coſſimbuzar, falls into the ſea near Balaſore under the name of the river *Hughly*. The government of the country permitted them to erect warehouſes wherever there was plenty of manufactures, and to fortify themſelves upon this river.

18 Principal towns.

The firſt town that is met with in paſſing up the river is Calcutta, the principal ſettlement of the Engliſh company. See CALCUTTA.

Six leagues higher is ſituated Frederic Nagore, founded by the Danes in 1756, in order to ſupply the place of an ancient ſettlement where they could not maintain their ground. This new eſtabliſhment has not yet acquired any importance, and there is all the reaſon imaginable to believe that it will never become conſiderable.

Two leagues and a half higher lies Chandernagore, a ſettlement belonging to the French. See CHANDERNAGORE.

At the diſtance of a mile from Chandernagore is Chinſura, better known by the name of *Dougli*, being ſituated near the ſuburbs of that anciently renowned city. The Dutch have no other poſſeſſions there, but merely their fort; the territory round it depending on the government of the country, which hath frequently made it feel its power by its extortions. Another inconvenience attending this ſettlement is a ſandbank that prevents ſhips from coming up to it: they proceed no farther than Tulta, which is 20 miles below Calcutta; and this of courſe occaſions an additional expence to the government.

The Portugueſe had formerly made Bandel, which is eighty leagues from the mouth of the Ganges, and a quarter of a league above the Hughly, the principal ſeat of their commerce. Their flag is ſtill diſplayed, and there are a few unhappy wretches remaining there, who have forgotten their country after having been forgotten by it. This factory has no other employment than that of ſupplying the Moors and the Dutch with miſtreſſes. Bengal || Benguela.

19 Exports.

The exports from Bengal to Europe conſiſt of muſk, gum-lac, nicaragua wood, pepper, cowries, and ſome other articles of leſs importance brought thither from other places. Thoſe that are the immediate produce of the country are borax, ſalt-petre, ſilk ſtuffs, muſlins, and ſeveral different ſorts of cottons.

It would be a tedious and uſeleſs taſk to enumerate all the places where ticken and cottons, fit for table-linen or intended to be worn plain, painted, or printed, are manufactured. It will be ſufficient to refer to DACCA, which may be looked upon as the general mart of Bengal, where the greateſt variety of fineſt cottons are to be met with, and in the greateſt abundance. See DACCA.

The ſum total of the purchaſes made in Bengal by the European nations, amounted a few years ago to no more than 870,000l. One third of this ſum was paid in iron, lead, copper, woollens, and Dutch ſpices: the remainder was diſcharged in money. Since the Engliſh have made themſelves maſters of this rich country, its exports have been increaſed, and its imports diminiſhed, becauſe the conquerors have carried away a greater quantity of merchandiſe, and pay for it out of the revenues they receive from the country. There is reaſon to believe, that this revolution in the trade of Bengal has not arrived at its criſis, and that ſooner or later it will be attended with more important conſequences and effects.

For the hiſtory of Bengal, and its conqueſts by the Britiſh, ſee the article INDOSTAN.

BENGO, a province of the kingdom of Angola in Africa, having the ſea on the weſt, and the province of Moſeche on the eaſt. It produces plenty of banana trees; but the Portugueſe have grubbed up vaſt quantities of theſe, and cultivated the land, which now abounds with maize, and the manioc root of which they make bread *. The province is divided into a great number of diſtricts, of which the chiefs are natives, but tributary to Portugal, and obliged to till the lands belonging to the Portugueſe. They are Chriſtians, and have eight churches. * See *Jatropha*.

BENGUELA, a province of the kingdom of Angola in Africa, bounded on the eaſt by the river Rimba, on the north by the Coanza, and it extends weſtward quite to Cape Negro. Benguela was formerly governed by its own kings; but was entirely ruined by the incurſions of the barbarous Giagas, ſo that its being conquered by the Portugueſe proved a great happineſs. It ſtill retains the title of *kingdom*, and is allowed to enjoy ſome ſmall privileges; but is far from being reſtored to the ſtate of plenty it enjoyed before its deſtruction by the Giagas already mentioned. It produces abundance of ſalt, but inferior in quality to that which is made in the province of Chiſſama. The zimbis alſo, whoſe ſhells are current as money through many countries of Africa, are caught upon the coaſt. The country, which is moſtly mountainous, abounds with

Benhinnom || Benin.

with elephants, rhinoceroſes, lions, tygers, crocodiles, &c. which are very dangerous, and deſtroy great numbers of cattle.

BENHINNOM, in *Ancient Geography*, a valley in the ſuburbs, and to the eaſt of Jeruſalem, either a part of or conjoined with the valley of Kidron, (Joſhua); infamous for ſacrificing children, or paſſing them through the fire. The place in the valley where the idol ſtood to which the ſacrifice was made, was called *Tophet*, (2 Kings xxiii. 10. Jer. vii. 31, 32, and xix. 2.), from beating drums or tabours to drown the cries or ſhrieks of the children: called alſo *Geenon* or the *Valley of Ennon*: whence ſome derive *Gehenna*, the place of future puniſhment.

BENJAMIN. See Benzoin and Styrax.

BENIARAX, an ancient and conſiderable town in the kingom of Algiers in Africa, ſeated in W. Long. 0. 30. N. Lat. 35. 0.

BENIN, a country of Guinea, in Africa, has part of the gulf called the *Bite of Benin*, and the Slave Coaſt, on the weſt; part of Gago and Biafara on the north; Myjac and Makoko on the eaſt; and Congo on the ſouth, where it extends about one degree beyond the equinoctial line; the length from eaſt to weſt is about 600 miles; but its north and ſouth bounds are not ſo well determined. The land in general is low and woody; in ſome parts it has rivers and lakes, but in others there is a ſcarcity of water. There is here a great number of wild beaſts, particularly elephants, lions, tygers, leopards, baboons, monkeys, wild boars, deer, &c. The birds are partridges, of which ſome are blue and ſome green, turtles, wild ducks, woodcocks, &c. Their grain is Indian corn: they have no potatoes; but plenty of yams, which are of the potato kind, but vaſtly larger and more coarſe: theſe are their ordinary food, and ſerve in the room of bread; they have two ſorts of beans, like horſe-beans, but not near ſo good. Their fruits are cocoa-nuts, cormantine apples, bananas, wild figs, &c.

The negroes have ſeveral colours which might ſerve for painting and a good ſort of ſoap made with palm-oil and wood-aſhes; they have a great deal of cotton, which not only ſerves for their own uſe, but is exported to diſtant places. The river Rio or Benin has a great many arms; ſome of which are ſo large, that they deſerve the name of rivers: it abounds with fiſh, which the inhabitants eat ſmoke-dried as well as freſh. The place of trade in this river is at Arebo, about 120 miles diſtant from its mouth; and to this place the ſhips may ſail up. Thoſe who take this voyage ſee the mouths of a great many rivers fall into the principal channel to the right and the left; but how far it aſcends into the country is not known. A little higher up, the country is very low and marſhy, and ſeems to be divided into iſlands; and yet there are trees of all ſizes growing on the banks; this renders the country very unhealthy, as many of our Britiſh ſailors have found to their coſt; it is alſo incommoded with vaſt numbers of flies, called *moſquitoes*, which ſting terribly, and render the ſkin full of puſtules. There are three principal villages to which the negroes come from the inland countries to traffic. One is called *Boodadou*, and conſiſts of about 50 houſes, or rather huts, for they are made with reeds and covered with leaves. The ſecond, called *Arebo*, was mentioned above; this is much larger than the former, and pretty well ſtocked with inhabitants; and the houſes have much more room, but they are built after the ſame manner. The third has the name of *Agaton*, and was built upon a hill. It was almoſt ruined by the wars; but the negroes lately rebuilt it, on account of its agreeable ſituation. Great Benin is the place of reſidence of the king. Benin.

The inhabitants of Benin are very exact in their trading, and will not recede from any of their old cuſtoms: this renders them very ſlow in their dealings, and backward to pay their debts, which ſometimes obliges the traders to ſail before they receive ſatisfaction; but then they are paid as ſoon as they return. Some of the merchants are appointed by the government, which demands a ſort of cuſtom; but it is very trifling. There are three ſorts of officers under the king; the firſt are always near him, and none can addreſs him but by their means: there are ſeveral of the ſecond ſort; one takes care of the ſlaves, another of the cattle, another of the ſtreets, another of war, and ſo on.

Children go almoſt naked till they are 14, and then they wrap a cotton cloth round their middles; the richer ſort put on a ſort of callico gowns when they go abroad, with a kind of drawers; but within they are contented with their uſual cloth: the better ſort of women wear their cotton cloths like petticoats, and have a covering round their ſhoulders, but take care it ſhall be open before.

The richer ſort of the inhabitants of Benin live upon beef, mutton, and poultry; their drink is water, and brandy when they can get it. The poorer ſort live upon dried fiſh, bananas, and beans; their drink is water and palm-wine. Their chief handicraft men are ſmiths, carpenters, and curriers; but they perform all their work in a very bungling manner. The men have as many wives as they can keep, which they take without any ceremony except treating their relations. The wives of the lower ſort may go wherever they have a mind; but thoſe of the rich are ſhut up: they allow their wives to be very familiar with the Europeans, and yet pretend to be very jealous of their own countrymen. When a woman is caught in adultery, ſhe is turned away, and the goods of the man are forfeited to the huſband; but if the relations of the woman are rich, they prevail with him to overlook the fault by dint of preſents.

They uſe circumciſion, which is performed ſeven days after the children are born, at which time the father makes a feaſt for the relations; they have alſo cuſtoms, relating to uncleanneſs, reſembling thoſe of the Jews. Thieves are puniſhed by making the party amends if they can, otherwiſe they are baſtinadoed; but murder is always puniſhed with death. When a perſon is only ſuſpected of a crime, they have ſeveral ways of putting him to a trial, like the fire ordeal, or the bitter water of the Jews; but they are of ſuch a nature, that the innocent may be as often condemned as the guilty.

With regard to their religion, they believe in an almighty and inviſible God; yet worſhip images in a human form, and in thoſe of all ſorts of animals, making them offerings, every one being his own prieſt; they look upon theſe leſſer deities as mediators between him and man; ſome of theſe idols are in the houſe and ſome

in

Benin || Bennaventa.

in cabins by themſelves. Every fifth day is holy; on which the rich kill cows, ſheep, and goats, and others dogs, cats, and fowls, which they diſtribute among their poor neighbours.

BENIN, the capital of a kingdom of the ſame name, is the reſidence of their kings, and is ſeated pretty far in the country: it ſtands in a plain, and is about four miles in compaſs. The ſtreets are long and broad: and there are markets twice a-day, where they ſell cows, cotton, elephants teeth, European merchandiſes, and whatever the country produces. The houſes are large with clay walls, and at a diſtance from each other; they are covered with reeds, ſtraw, and leaves. The women in this place are the greateſt ſlaves; for they go every day to market, manage the houſehold affairs, take care of the children, cook the victuals, and till the ground. The king's palace makes great part of the town; and its great extent excepted, there is nothing worth taking notice of, it being only a confuſed heap of buildings, made with boards and clay, without regularity or neatneſs. In the middle, there is a wooden tower, about 70 feet high, made like a chimney; and on the top is a brazen ſerpent, hanging with his head downwards; this is pretty well made, and is the moſt curious thing in the town: there is a gallery of ſtatues, but ſo wretchedly carved, that there is no knowing what they repreſent without being told: behind a curtain there are 11 brazen heads, with an elephant's tooth on each; theſe are the king's idols: his throne is made of ivory, on which he ſits in a pavilion of India ſtuff. The king ſhows himſelf but once a-year, on the day of a certain feſtival; and then he is ſurrounded with his wives and a great number of his officers, who walk out in proceſſion to begin the feaſt by ſacrificing to their gods; this done, he beſtows victuals and wine among the multitude, which is imitated by his officers. All the inhabitants of this town and country go under the denomination of the *king's ſlaves*, and ſome relations ſay, that none of them wear any habit till given them by the king: but this ſeems to be only a ſalvo to account for the great number of men and women that are daily ſeen naked in the ſtreets; for if it be true, that the king of Benin can bring 100,000 fighting men into the field, his ſubjects muſt be very numerous; and probably his majeſty is not rich enough to beſtow garments upon them all. The Europeans reſort hither to purchaſe ſlaves. E. Long. 5. 4. N. Lat. 7. 40.

BENISH-DAYS, among the Egyptians, a term for three days of the week, which are days of leſs ceremony in religion than the other four, and have their name from the *beniſh*, a garment of common uſe, not of ceremony. In Cairo, on Sundays, Tueſdays, and Thurſdays, they go to the baſhaw's divan; and theſe are the general days of buſineſs. Fridays they ſtay at home, and go to their moſques at noon; but though this is their day of devotion, they never abſtain from buſineſs. The three other days of the week are the beniſh-days, in which they throw off all buſineſs and ceremony, and go to their little ſummer-houſes in the country.

BENNAVENTA, or BENNAVENNA, (Antonine) a town of Britain, on the Auſona Major, or the Antona of Tacitus: ſuppoſed to be Northampton on the Nen; but Camden ſays it is Wedon, a village ſix miles to the weſt of Northampton.

Bennet.

BENNET, HENRY, earl of Arlington, was born of an ancient family in Middleſex. In the beginning of the civil war, he was appointed under-ſecretary to George Lord Digby, ſecretary of ſtate; afterward entered himſelf as a volunteer for the royal cauſe, and did his majeſty good ſervice, eſpecially at Andover in Hampſhire, where he received ſeveral wounds. When the wars were ended, he left not the king when ſucceſs did, but attended his intereſt in foreign parts. He was made ſecretary to the duke of York; received the honour of knighthood from Charles II. at Bruges, in 1658: and was ſent envoy to the court of Spain. His majeſty, upon his return to England, called him home, made him keeper of his privy purſe, and principal ſecretary of ſtate. He had always a peculiar hatred to the lord chancellor Hyde; who on the other hand conſidered him as a concealed Papiſt. In 1670 he was one of the council diſtinguiſhed by the title of the *Cabal*, and one of thoſe who adviſed ſhutting up the exchequer. In 1672 he was made Earl of Arlington and Viſcount Thetford, and ſoon after knight of the garter. In 1673, he was appointed one of the three plenipotentiaries from the court of Great Britain to Cologn, to mediate a peace between the emperor and the king of France. The houſe of commons, in 1673, drew up articles of impeachment againſt him. In 1674 he was made chamberlain of his majeſty's houſehold, with this public reaſon, that it was in recompenſe of his long and faithful ſervice, and particularly for his having performed the office of principal ſecretary of ſtate for the ſpace of 12 years, to his majeſty's great ſatisfaction. But afterward his intereſt began to decline, while that of the earl of Danby increaſed; for upon his return from his unſucceſsful journey to Holland in 1675, his credit was ſo much ſunk, that ſeveral perſons at court diverted the king with mimicking his perſon and behaviour; yet he held his lord chamberlain's place to the day of his death in 1685. His eſteemed letters to Sir William Temple were publiſhed after his death.

BENNET, *Chriſtopher*, an eminent phyſician in the 16th century, was the ſon of John Bennet, of Raynton, in Somerſetſhire. He was educated at Lincoln college, Oxford; and gave the public a treatiſe on conſumptions, entitled, *Theatri Tabidorum Veſtibulum*, &c. alſo *Exercitationes Diagnoſticæ, cum Hiſtoriis demonſtrativis, quibus Alimentorum et Sanguinis vitia deteguntur in pleriſque morbis*, &c.

BENNET, *Dr Thomas*, an eminent divine, born at Saliſbury on the 7th of May 1673, and educated at St John's college, Cambridge. In 1700, he was made rector of St James's, in Colcheſter; afterwards he was lecturer of St Olave's, Southwark, and morning-preacher at St Lawrence, Jewry; and at laſt was preſented to the vicarage of St Giles's, Cripplegate, worth 500l. a-year. While he was in this ſtation, he was engaged in ſeveral expenſive law-ſuits in defence of the rights of the church, to which he recovered 150l. a-year. He wrote, 1. An Anſwer to the Diſſenter's Plea for Separation. 2. A Confutation of Popery. 3. A Diſcourſe of Schiſm. 4. An Anſwer to a book entitled Thomas againſt Bennet. 5. A Confutation of

Benoit || Benſerade.

Quakeriſm. 6. A brief Hiſtory of the joint Uſe of pre-conceived Forms of Prayer. 7. An Anſwer to Dr Clarke's Scripture-doctrine of the Trinity. 8. A Paraphraſe, with Annotations on the Book of Common-prayer. 7. A Hebrew Grammar; and other pieces. He died October 9. 1728, in the 56th year of his age.

BENOIT, Renatus, a famous doctor of the Sorbonne, and curate of Euſtathius at Paris in the 16th century. He was a ſecret favourer of the Proteſtant religion; and that his countrymen might be able to read the bible in their own tongue, he publiſhed at Paris the French tranſlation, which had been made by the reformed miniſters at Geneva. This tranſlation was approved of by ſeveral doctors of the Sorbonne before it went to the preſs, and King Charles IX. had granted a privilege for the printing of it. Yet when it was publiſhed, it was immediately condemned. He had been before that time confeſſor to the unhappy Mary queen of Scotland, during her ſtay in France, and attended her when ſhe returned into Scotland. Some time before the death of Henry III. Dr Benoit, or ſome of his friends with his aſſiſtance, publiſhed a book, entitled, *Apologie Catholique*, i. e. The Catholic Apology; in which it was ſhown, that the Proteſtant religion, which Henry king of Navarre profeſſed, was not a ſufficient reaſon to deprive him of his right of ſucceeding to the crown of France. When Henry IV. was reſolved to embrace the Catholic religion, he aſſiſted at that aſſembly in which King Henry abjured the reformed religion. The king promoted him to the biſhoprick of Troyes in Champagne 1597, but he could never obtain the pope's bulls to be inſtalled. However, he enjoyed the temporalties of that biſhopric till he reſigned it. He died in 1608.

BENSERADE, Isaac de, an ingenious French poet of the 17th century, was born at Lyons. He made himſelf known at court by his verſes and his wit, and had the good fortune to pleaſe the cardinals de Richelieu and Mazarin. After the death of Richelieu, he got into favour with the duke de Breze, whom he accompanied in moſt of his expeditions; and when this nobleman died, he returned to court, where his poetry became highly eſteemed. He wrote, 1. A Paraphraſe upon Job. 2. Verſes for Interludes. 3. Rondeaux upon Ovid. 4. Several Tragedies. A ſonnet which he ſent to a young lady with his Paraphraſe on Job being put in competition with the Urania of Voiture, cauſed him to be much ſpoken of; for what an honour was it to be head of a party againſt this celebrated author? Thoſe who gave the preference to Benſerade's performance were ſtyled the *Jobiſts*, and their antagoniſts the *Uraniſts*; and the diſpute long divided the whole court and the wits. Some years before his death, he applied himſelf to works of piety, and tranſlated almoſt all the Pſalms.

M. l'Abbé Olivet ſays, that Benſerade towards the latter end of his life, withdrew from court, and made Gentilly the place of his retirement. When he was a youth, he ſays it was the cuſtom to viſit the remains of the ornaments with which Benſerade had embelliſhed his houſe and gardens, where every thing favoured of his poetical genius. The bark of the trees were full of inſcriptions: and, amongſt others, he remembers the firſt which preſented itſelf was as follows:

Adieu fortune, honneurs adieu, vous et les votres,
Je viens ici vous oublier;
Adieu toi meme amour, bien plus que les autres
Difficile a congedier.

Benſon.

Fortune and honours, all adieu,
And whatſoe'er belongs to you.
I to this retirement run,
All your vanities to ſhun.
Thou too adieu, O powerful love;
From thee 'tis hardeſt to remove.

M. Voltaire is of opinion that theſe inſcriptions were the beſt of his productions, and he regrets that they have not been collected.

Benſerade ſuffered at laſt ſo much from the ſtone, that, notwithſtanding his great age, he reſolved to ſubmit to the operation of cutting. But his conſtancy was not put to this laſt proof; for a ſurgeon letting him blood, by way of precaution, pricked an artery, and, inſtead of endeavouring to ſtop the effuſion of blood, ran away. There was but juſt time to call F. Commire, his friend and confeſſor, who came ſoon enough to ſee him die. This happened the 19th of October 1691, in the 82d year of his age.

BENSHEIM, a town of Germany in the Palatinate of the Rhine, ſeated in E. Long. 8. 45. N. Lat. 52. 23.

BENSON, Dr George, a learned diſſenting miniſter, born at Great Salkeld, in Cumberland, in 1699. His love of learning was ſo ſucceſsful, that, at 11 years of age, he was able to read the Greek Teſtament. He afterwards ſtudied at Dr Dixon's academy at Whitehaven, from whence he removed to the univerſity of Glaſgow. In 1721, he was choſen paſtor of a congregation of Diſſenters at Abingdon in Berkſhire; in 1729, he received a call from a ſociety of diſſenters in Southwark, with whom he continued 11 years; and in 1740, was choſen by the congregation of Crutched Friars, colleague to the learned and judicious Dr Lardner. From the time of his engaging in the miniſtry he propoſed to himſelf the critical ſtudy of the Scriptures, particularly of the New Teſtament, as a principal part of his buſineſs. The firſt fruits of theſe ſtudies which he preſented to the public was, A Defence of the reaſonableneſs of Prayer, with a Tranſlation of a Diſcourſe of Maximus Tyrius containing ſome popular Objections againſt Prayer, and an Anſwer to theſe. The light which Mr Locke had thrown on the obſcureſt parts of St Paul's epiſtles, by making him his own expoſitor, encouraged and determined Mr Benſon to attempt to illuſtrate the remaining epiſtles in the ſame manner. In 1731, he publiſhed A Paraphraſe and Notes on the Epiſtle to Philemon, as a ſpecimen. This was well received, and the author encouraged to proceed in his deſign. With the epiſtle to Philemon was publiſhed "A ſhort diſſertation, to prove from the ſpirit and ſentiments the apoſtle diſcovered in his epiſtles, that he was neither an enthuſiaſt nor impoſtor; and conſequently that the religion which he aſſerted he received immediately from heaven, and confirmed by a variety of miracles, is indeed divine." This argument hath ſince been improved and illuſtrated, with great delicacy and ſtrength, in a review of the apoſtle's entire conduct and character by Lord Littleton. Mr Benſon proceeded with great diligence and reputation to publiſh Paraphraſes

Bentham || Bentivoglio.

phraſes and Notes on the two Epiſtles to the Theſſalonians, the firſt and ſecond to Timothy, and the Epiſtle to Titus; adding, Diſſertations on ſeveral important Subjects, particularly on Inſpiration. In the year 1735, our author publiſhed his Hiſtory of the firſt Planting of Chriſtianity, taken from the Acts of the Apoſtles, and their Epiſtles, in 2 vols 4to. In this work, beſides illuſtrating throughout the hiſtory of the Acts and moſt of the epiſtles, by a view of the hiſtory of the times, the occaſion of the ſeveral epiſtles, and the ſtate of the churches to whom they were addreſſed, he eſtabliſhed the truth of the Chriſtian religion on a number of facts, the moſt public, important, and inconteſtable. He alſo wrote, The reaſonableneſs of the Chriſtian Religion; The Hiſtory of the Life of Jeſus Chriſt; A Paraphraſe and Notes on the ſeven Catholic Epiſtles; and ſeveral other works which procured him great reputation. One of the univerſities in Scotland ſent him a diploma, with a doctor's degree; and many of high rank in the church of England, as Herring, Hoadley, Butler, Benſon, Coneybeare, &c. ſhowed him great marks of favour and regard. He purſued the ſame ſtudies with great application and ſucceſs till the time of his death, which happened in the year 1763, in the 64th year of his age.

BENTHAM, Thomas, biſhop of Litchfield and Coventry, was born at Shirburn in Yorkſhire in the year 1513, and educated in Magdalene college, Oxford. He took the degree of batchelor of arts in 1543, and in 1546 was admitted perpetual fellow, and proceeded maſter of arts the year following, which was that of Edward's VI.'s acceſſion to the crown. He now threw off the maſk of Popery, which during the equivocal reign of Henry VIII. he had worn with reluctance. When Mary came to the crown, being deprived of his fellowſhip by her viſitors, he prudently retired to Baſil in Switzerland, where for ſome time he expounded the Scriptures to the Engliſh exiles in that city; but, being ſolicited by ſome Proteſtants in London, he returned to London before the death of the queen, and was appointed ſuperintendant of a private congregation in the city. Immediately on the acceſſion of Elizabeth, Bentham was preferred in the church, and in the ſecond year of her reign was conſecrated biſhop of Litchfield and Coventry. He died at Eccleſhal in Staffordſhire in 1570, aged 65. He was buried in the chancel of the church there; and a monument was erected, with the effigy of himſelf, his wife, and four children, with the following inſcription:

Hac jacet in tumba Benthamus, epiſcopus ille
Doctus, divinus, largus, paſcens, pius, almus.
Ob. 19. *Feb.* 1578.

Biſhop Bentham had the character of a pious and zealous reformer, and was particularly celebrated for his knowledge of the Hebrew language. His works are, 1. Expoſition of the Acts of the Apoſtles; manuſcript. 2. A Sermon on Chriſt's Temptation; Lond. 8vo. 3. Epiſtle to M. Parker; manuſcript. 4. The Pſalms, Ezekiel, and Daniel, tranſlated into Engliſh in Queen Elizabeth's Bible.

BENTIVOGLIO, Guy, cardinal, born at Ferrara, in the year 1579. He went to ſtudy at Padua, where he made a conſiderable proficiency in polite literature. Upon his leaving the univerſity, he went to reſide at Rome, where he became univerſally eſteemed. He was ſent nuncio to Flanders, and then to France; in both which employments his behaviour was ſuch as gave great ſatisfaction to Paul V. who made him a cardinal, which was the laſt promotion he made, a little before his death, which happened on the 28th of January 1621. Bentivoglio was at this time in France, where Louis XIII. and all the French court congratulated him on his new dignity; and when he returned to Rome, his Chriſtian majeſty entruſted him with the management of the French affairs at that court. Pope Urban VII. had a high regard for him on account of his fidelity, diſintereſtedneſs, and conſummate knowledge in buſineſs. He was beloved by the people, and eſteemed by the cardinals; and his qualities were ſuch, that in all probability he would have been raiſed to the pontificate on the death of Urban, which happened on the 29th of July 1644; but having gone to the conclave during the time of the moſt intolerable heats at Rome, it affected his body to ſuch a degree, that he could not ſleep for 11 nights afterwards; and this want of reſt threw him into a fever, of which he died the 7th of September 1644, aged 65. He has left ſeveral works; the moſt remarkable of which are, A Hiſtory of the Civil Wars of Flanders, An Account of Flanders, with Letters and Memoirs.

Bentivoglio || Bentley.

Bentivoglio, a ſmall town of Italy in the territory of Bologna, with a caſtle, ſituated in E. Long. 11. 34. N. Lat. 44. 47.

BENTLEY, Richard, an eminent critic and divine, was born at Oulton, in the pariſh of Rothwell, near Wakefield. His anceſtors, who were of ſome conſideration, poſſeſſed an eſtate, and had a ſeat at Hepenſtall, in the pariſh of Hallifax. His grandfather James Bentley was a captain in King Charles I.'s army at the time of the civil wars; and being involved in the fate of his party, had his houſe plundered, his eſtate confiſcated, and was himſelf carried priſoner to Pomfret Caſtle, where he died. Thomas Bentley, the ſon of James, and father of Dr Bentley, married the daughter of Richard Willis of Oulton, who had been a major in the royal army. This lady, who was a woman of exceeding good underſtanding, taught her ſon Richard his accidence. To his grandfather Willis, who was left his guardian, he was in part indebted for his education; and having gone through the grammar ſchool at Wakefield with ſingular reputation, both for his proficiency and his exact and regular behaviour, he was admitted of St John's college, Cambridge, under the tuition of Mr Johnſon, on the 24th of May 1676; being then only four months above 14 years of age. On the 22d of March 1681-2, he ſtood candidate for a fellowſhip, and would have been unanimouſly elected, had he not been excluded by the ſtatutes on account of his being too young for prieſt's orders. He was then a junior bachelor, and but little more than 19 years old. It was ſoon after this that he became a ſchool-maſter at Spalding. But that he did not continue long in this ſituation is certain from a letter of his grandfather Willis's, ſtill preſerved in the family, from which it appears, that he was with Dr Stillingfleet at the Deanery of St Paul's on the 25th of April 1683. He had been recommended by his college to the dean as preceptor to his ſon; and Dr Stillingfleet gave Mr Bentley his choice whether he would carry his pupil to Cambridge

Bentley. Cambridge or Oxford. He fixed upon the latter univerſity on account of the Bodleian library, to the conſulting of the manuſcripts of which he applied with the cloſeſt attention. Being now of age, he made over a ſmall eſtate which he derived from his family to his elder brother, and immediately laid out the money he obtained for it in the purchaſe of books. In July 1683, he took the degree of maſter of arts at St John's college, Cambridge. In 1692, his patron being advanced to the ſee of Worceſter, collated him to a prebend in that church, and alſo made him his domeſtic chaplain. That learned prelate, as well as Dr Will. Lloyd, then biſhop of Litchfield, had ſeen many proofs of our author's extraordinary merit, when they concurred in recommending him as a fit perſon to open the lectures upon Mr Boyle's foundation, in defence of natural and revealed religion. This gave him a fine opportunity of eſtabliſhing his fame. He ſaw it well; and reſolved to puſh it to the utmoſt. Sir Iſaac Newton's *Principia* had been publiſhed but a few years, and the book was little known and leſs underſtood. Mr Bentley therefore determined to ſpare no pains in diſplaying to the beſt advantage the profound demonſtrations which that excellent work furniſhed in proof of a Deity; and that nothing might be wanting to complete the deſign, he applied to the author, and received from him the ſolution of ſome difficulties which had not fallen within the plan of his treatiſe*. In ſhort, our author's ſermons at Boyle's lectures were univerſally admired, and highly raiſed his reputation as a preacher; notwithſtanding that eſcape which laid him open to the raillery of Dr Keil, viz. of proving the moon not to turn round her axis becauſe ſhe always ſhows the ſame face to the earth. In 1693, he was made keeper of the royal library at St James's.

* Vid. *Four Letters from Sir Iſaac Newton to Dr Bentley*, Lond. 1756.

In the following year aroſe the famous diſpute between him and the honourable Mr Boyle, in relation to the epiſtles of Phalaris; of which Mr Boyle had publiſhed a very fine edition, with a Latin verſion of the text. Theſe epiſtles the Doctor aſſerted to be ſpurious, the production of ſome ſophiſt, and altogether contemptible as a literary performance. The principal pieces which appeared in this noted controverſy were, 1. Dr Bentley's diſſertation upon the epiſtles of Themiſtocles, Socrates, Euripides, Phalaris, and the Fables of Æſop, at the end of the ſecond edition of Mr Wotton's Reflections on Ancient and Modern Learning: but afterwards printed by Dr Bentley entire, and added with great additions to his farther defence of it, in anſwer to Mr Boyle. 2. "Dr Bentley's Diſſertation on the Epiſtles of Phalaris and the Fables of Æſop examined by the Honourable Charles Boyle, Eſq;" a book more commonly known by the title of *Boyle againſt Bentley*. 3. Dr Bentley's Anſwer to the above, commonly known by the name of *Bentley againſt Boyle*; a curious piece, interſperſed with a great deal of true wit and humour. From the caprice or partiality of the age the victory was adjudged to Mr Boyle, and the ridicule of the wits exerciſed upon Dr Bentley. Thus Dr Garth, in the Diſpenſary,

So Diamonds take a luſtre from their foil,
And to a BENTLEY *'tis we owe a* BOYLE.

Dr Bentley had alſo ſome wags who were his enemies *even* at Cambridge, who drew his picture in the hands of Phalaris's guards, who were putting him into their maſter's bull, and out of the Doctor's mouth came a label with theſe words, *I had rather be* ROASTED *than* BOYLED. And Dean Swift, in his Tale of a Tub, had ſome ſtrokes at Dr Bentley upon this occaſion, but more eſpecially in his Battle of the Books, where, on account of Dr Bentley's diſſertation of Phalaris, &c. being annexed to Mr Wotton's reflections on learning, and their being great friends, he makes Mr Wotton and Dr Bentley, ſtanding ſide by ſide, in each other's defence, to be both transfixed to the ground by one ſtroke of the javelin of Mr Boyle, and this he heightens by the ſimile of a cook's ſpitting a brace of woodcocks. Nay, ſo ſtrong is the influence of literary prejudice and faſhion, that many even of Dr Bentley's friends conſidered Boyle's Examination as unanſwerable. Nor could they be convinced of the contrary, till the Doctor, firſt aſking them where it was ſo impregnable, and confuting one article after another upon the ſpot, as faſt as they inſtanced, aſſured them it was all of the ſame kind. This he effectually ſhowed in his anſwer. It now, however, ſeems to be the ſettled opinion of the literary world, that the Doctor has not only the evident advantage in reſpect of learning and argument, but that he is little, if at all, inferior to his antagoniſt in point of wit and ſmartneſs. It may not, however, be amiſs to recite a few teſtimonies on the ſubject. Mr Walpole, ſpeaking of Mr Boyle's tranſlation of the Epiſtles of Phalaris, ſays, "This work occaſioned the famous controverſy with Dr Bentley;—who alone, and unworſted, ſuſtained the attacks of the brighteſt genius's in the learned world, and whoſe fame has not ſuffered by the wit to which it gave occaſion." Mr Towers, in his Britiſh Biography expreſſes himſelf in the following terms: "In the controverſy between him and Mr Boyle, the popular clamour, indeed, was in favour of the latter; but Bentley's is unqueſtionably a much more valuable performance than that of Boyle. The latter, conſidered as a mere Engliſh compoſition, has the advantage in point of ſtyle; and pleaſed the generality, by the perſonal ſatire which it contained againſt Dr Bentley, who had many enemies. But Bentley had greatly the ſuperiority with reſpect to juſt reaſoning, critical ſagacity, and extent of learning; and his vindication of himſelf alſo contained many ſhrewd and ſarcaſtical ſtrokes againſt Mr Boyle and his performance. Much has been ſaid in favour of Mr Boyle, as a genteel and polite writer; and it muſt be confeſſed, that Dr Bentley's manner was often too aſſuming, and that he was deficient in point of civility. But notwithſtanding this, there was, perhaps, a much greater want of real candour and politeneſs, whatever affectation of them there might be, in the very contemptuous and unfair manner in which Dr Bentley was treated throughout Mr Boyle's book, than in any thing which Bentley had ſaid againſt Boyle. Bentley, with all his foibles, was too reſpectable a character to be a proper ſubject of ſuch treatment; though Swift, Garth, and Pope, have joined in countenancing the popular prejudices againſt him." Mr Dodwell, who reſided at Oxford during the controverſy, who made himſelf in ſome ſort a party in it, and who had a very particular court paid to him by the Chriſt-Church men, declared to them that he never learned ſo much from any book of the ſize in his life,

Bentley. life, as he had done from Dr Bentley's Anſwer to Boyle.

In 1696, at the public commencement, Mr Bentley had been created doctor of divinity by the univerſity of Cambridge; and ſome time thereafter admitted, *ad eundem*, in the univerſity of Oxford.

In 1700 he was preſented to the maſterſhip of Trinity college, Cambridge, which is reckoned worth near 1000l. per annum. Upon this promotion he reſigned his prebend of Worceſter; and, in 1701, was collated to the archdeaconry of Ely. Being thus placed in a ſtate of eaſe and affluence, he entered into matrimony, and indulged his inclination in critical purſuits; and the fruits of his labours, which he occaſionally publiſhed, all diſplayed ſuch erudition and ſagacity, that, by degrees, he obtained the character of being the greateſt critic of the age. In the mean while, however, he carried matters with ſo high a hand in the government of his college, that, in 1709, a complaint was brought before the biſhop of Ely, as viſitor, againſt him, by ſeveral of the fellows, who charged him with embezzling the college money, and other miſdemeanors. In anſwer to this, he preſented his defence to the biſhop, which he publiſhed in 1710, under the title of *The preſent State of Trinity College*, 8vo; and thus began a quarrel, which was carried on with the moſt virulent animoſity on each ſide, for above 20 years, when it at laſt ended in the Doctor's favour. In 1716, upon the death of Dr James, he was appointed regius profeſſor of divinity in the former univerſity; annexed to which was a good benefice in the biſhopric of Ely. His Majeſty King George I. on a viſit to the univerſity in 1717, having, as uſual, nominated by mandate ſeveral perſons for a doctor's degree in divinity, our profeſſor, to whoſe office it belonged to perform the ceremony called *creation*, demanded four guineas from each perſon, beſides a broad piece of gold, and abſolutely refuſed to create any doctor without theſe fees: hence there aroſe a long and warm diſpute, during which, the doctor was firſt ſuſpended, and then degraded; but on a petition to his majeſty from relief from that ſentence, the affair was referred to the court of King's Bench, where the proceedings againſt him being reverſed, a mandamus was iſſued, charging the univerſity to reſtore him. With regard to Dr Bentley's long diſpute with his college, Mr Whiſton repreſents his having been induced in a ſingle inſtance, after four years of unexceptionable conduct, to recede from the excellent rule of *detur digniori*, in the election to a fellowſhip, as the firſt falſe ſtep which led to others, and was very prejudicial to his own happineſs. A conciſe and accurate account of his controverſies with his college and the univerſity, and of the publications which appeared on theſe occaſions, may be ſeen in Mr Gough's anecdotes of topography. There are likewiſe, in the Harleian collection of manuſcripts in the Britiſh Muſeum, N° 7523, ſome authentic papers, relative to the proceedings of the univerſity againſt Dr Bentley. Dr Bentley was endowed with a natural hardineſs of temper, which enabled him to ride out both theſe ſtorms without any extraordinary diſturbance, or interruption to his literary purſuits. In his private character, tho' he is generally allowed to have been too fond of money, he was hearty, ſincere, and warm in his friendſhip, an affectionate huſband, and a moſt indulgent father. He loved hoſpitality and reſpect; maintained the dignity and munificence of the ancient abbots in houſe-keeping at his lodge, which he beautified; and, in converſation, tempered the ſeverity of the critic with ſuch a peculiar ſtrain of vivacity and pleaſantry, as was very entertaining. He died at his lodge in Trinity college, on the 14th of July 1742, at 80 years of age. To his lateſt hour, he could read the ſmalleſt Greek Teſtament without ſpectacles; and he died of a young man's diſorder, a pleuritic fever. He was of a large and robuſt frame of body, and of ſtrong features. Theſe gave a dignity, perhaps a ſeverity, to his aſpect, which probably heightened the opinion many had conceived of the haughtineſs and roughneſs of his temper. But, in fact, he was of ſo tender a diſpoſition, that he never read a touching ſtory without tears. It was not, indeed, till after he had been afflicted with a ſlight paralytic ſtroke, that this particular effect of the ſoftneſs of his nature was in every caſe apparent: ſo that it may poſſibly be imputed, in ſome degree, to his diſorder. It is, however, certain that previous to that event he was endued with great tenderneſs and ſenſibility. In the conteſt about the viſitatorial power, when he met Biſhop Moore, he was ſo ſtruck with ſeeing his old friend appear in a hoſtile manner againſt him, that he fainted away in the court. Bentley.

When we conſider the great abilities and uncommon erudition of which Dr Bentley was poſſeſſed, it reflects ſome diſgrace on our country, ſays Dr Kippis, that even his literary reputation ſhould be ſo long treated with contempt; that he ſhould be repreſented as a mere verbal critic, and as a pedant without genius. The unjuſt light in which he was placed, was not entirely owing to the able men who oppoſed him in the Boylean controverſy: it aroſe perhaps principally from the poets engaging on the ſame ſide of the queſtion, and making him the object of their ſatire and ridicule. The "flaſhing Bentley" of Pope will be remembered and repeated by thouſands who know nothing of the Doctor's real merit. Having mentioned this epithet, we ſhall add the candid note of the poet's right reverend editor. "This great man, with all his faults, deſerved to be put into better company. The following words of Cicero deſcribe him not amiſs: "*Habuit a natura genus quoddam acuminis, quod etiam arte limaverat, quod erat in reprehendis verbis verſutum et ſolers; ſed ſæpe ſtomachoſum, nonnunquam frigidum, interdum etiam facetum.*" In the fourth book of the Dunciad, Mr Pope introduces our critic at greater length, and with ſtill greater ſeverity. Perhaps it may be found, that the aſperity of Mr Pope was not entirely owing to the combination of certain wits and poets againſt Dr Bentley, but to perſonal reſentment. We are told that Biſhop Atterbury, having Bentley and Pope both at dinner with him, inſiſted on knowing what opinion the Doctor entertained of the Engliſh Homer. He for ſome time eluded the queſtion: but at laſt, being urged to ſpeak out, he ſaid, "The verſes are good verſes; but the work is not Homer, it is Spondanus." It muſt indeed be acknowledged, that one cauſe of Dr Bentley's having enemies, was his not always bearing his faculties with ſufficient meekneſs. He appears to have had a conſiderable degree of literary pride, and to have ſpoken of himſelf and others with uncommon freedom. Mr Whiſton informs us of the Doctor's having

Bentley.

ving ſaid, "That when he himſelf ſhould be dead, Waſſe would be the moſt learned man in England." Dr Salter, who was extremely devoted to the memory of Dr Bentley, confeſſed that he was remarkable for his *faſtus*, eſpecially towards his equals, and for ſpeaking highly of himſelf. But at the ſame time, he is deſcribed by Dr Salter as having been a very amiable and pleaſant man in private life, and as poſſeſſing much good nature, though he had been otherwiſe repreſented. This account agrees with the moſt authentic information from different quarters. It is related of Dr Bentley, that he uſed to pull off his hat to the younger ſtudents, but would not do it to the fellows of his college. Being aſked the reaſon for making this difference, he anſwered, "That the young ones might come to ſomething; but for the others, they never could be good for any thing."

The Doctor's principal works, beſides thoſe already mentioned, were, 1. Animadverſions and remarks on the poet Callimachus. 2. Annotations on the two firſt Comedies of Ariſtophanes. 3. Emendations, &c. on the Fragment of Menander and Philemon. 4. Remarks upon Collins's diſcourſe of freethinking. 5. Beautiful and correct editions of Horace, Terence, Phædrus, and Milton, with notes.

In 1721 he publiſhed Propoſals for printing a new edition of the Greek Teſtament, and St Hierom's Latin verſion; in which edition he intended to make no uſe of any manuſcript that was not at leaſt 1000 years old. Upon theſe propoſals Dr Middleton publiſhed ſome remarks; and the work never made its appearance. "If Dr Middleton's attack contributed to this event (Dr Kippis obſerves), he certainly did no little diſſervice to the cauſe of ſacred literature. The completion of Dr Bentley's noble undertaking was the principal employment of the latter part of his life. He had collected and collated all the manuſcripts of Europe to which acceſs could be obtained. For this purpoſe, his nephew Thomas Bentley, LL. D. well known in the republic of letters, travelled through Europe at his uncle's expence. The work was of ſuch magnitude, that he found it neceſſary, for the firſt time, to publiſh propoſals for printing it by ſubſcription. The whole was completed for publication; and he had received 2000l. in part of the ſubſcription, all of which he returned to the ſubſcribers when he took the reſolution of not letting it appear in the world during his own life. The work is now in the poſſeſſion of his executor Dr Richard Bentley, one of the ſenior fellows of Trinity College, and rector of Nailſton near Aſhby in Leiceſterſhire; and it is hoped that at ſome future period it may yet ſee the light;—Other valuable remains of Dr Bentley are ſtill in exiſtence; ſome of which are in the hands of his executor, and ſome in thoſe of Mr Cumberland his grandſon. The latter gentleman is poſſeſſed of the Doctor's claſſic books, with his marginal notes. From theſe notes Mr Cumberland hath publiſhed an edition of Lucan; which though not perfect throughout, is full and complete with regard to the four firſt books. The ſame gentlemen has a Homer of our great critic's, with many marginal notes and corrections, preparatory to an edition of it which he intended to have given. Dr Bentley's critical correſpondence with his numerous literary acquaintance, which muſt be very inſtructive and entertaining, is not only preſerved, but deſigned to be laid before the public."

Benzoin || Berchem.

The Doctor's publication of Milton, it is ſaid, was owing to Queen Caroline. Her Majeſty repreſented to him, that he had printed no edition of an Engliſh claſſic, and urged him to undertake Milton. His notes upon this great poet have been the worſt received of any of his critical performances. The learned Biſhop Newton ſpeaks of them with conſiderable ſeverity, intermixed, however, with ſome applauſe.

BENZOIN, in *Materia Medica*, a concrete reſinous juice, obtained from a ſpecies of ſtyrax. See Styrax.

BERAMS, a coarſe cloth, all made with cotton-thread, which comes from the Eaſt Indies, and particularly from Surat.

BERAR, a province of Aſia, in the dominions of the Great Mogul, near the kingdom of Bengal. It abounds in corn, rice, pulſe, and poppies, from which laſt they extract opium; and ſugar-canes grow almoſt without cultivation. The capital town is called *Shopour*.

BERAUM, a royal city of Bohemia, and capital of a circle of the ſame name. E. Long. 14. 25. N. Lat. 50. 2.

BERAY, a town of Normandy in France, ſituated in W. Long. 1. 20. N. Lat. 49. 6.

BERBERIS, the barberry. See Botany *Index*.

BERBICE, a river of Terra Firma in America, which falls into the North ſea, in S. Lat. 6. 30. This is the only river in the country, and waters a great number of plantations of cotton, &c. belonging to the Dutch.

BERCARIA, Berqueria, or *Berkeria*, in middle-age writers, denotes a ſheep-fold, ſheep-cote, ſheep-pen, or other encloſure, for the ſafe keeping a flock of ſheep.—The word is abbreviated from *berbicaria*; of *berbex*, detorted from *vervex*. Hence alſo a ſhepherd was denominated *berbicarius* and *berquarius*.

BERCHEROIT, or Berkoits, a weight uſed at Archangel, and in all the Ruſſian dominions, to weigh ſuch merchandiſes as are heavy and bulky. It weighs about 364lb. Engliſh averdupois weight.

BERCHEM, or Berghem, Nicholas, an excellent painter, was a native of Haerlem, and born in 1624. He received inſtructions from ſeveral very eminent maſters; and it was no ſmall addition to their fame that Berchem was their ſcholar. The charming pictures of cattle and figures by this admirable maſter are juſtly held in the higheſt eſtimation. He has been ſingularly happy in having many of them finely engraved by John Viſſcher, an artiſt of the firſt rank. Berchem had an eaſy expeditious manner of painting, and an inexpreſſible variety and beauty in the choice of ſites for his landſcapes; executing them with a ſurpriſing degree of neatneſs and truth. He poſſeſſed a clearneſs and ſtrength of judgment, and a wonderful power and eaſe in expreſſing his ideas; and although his ſubjects were of the lower kind, yet his choice of nature was judicious, and he gave to every ſubject as much of beauty and elegance as it would admit. The leafing of his trees is exquiſitely and freely touched; his ſkies are clear; and his clouds float lightly, as if ſupported by air. The diſtinguiſhing characters of the pictures of Berchem are, the breadth and juſt diſtribution

Berdaſh || Berenice.

ſtribution of the lights; the grandeur of his maſſes of light and ſhadow; the natural eaſe and ſimplicity in the attitudes of his figures, expreſſing their ſeveral characters; the juſt degradation of his diſtances; the brilliancy and harmony, as well as the tranſparence, of his colouring; the correctneſs and true perſpective of his deſign; and the elegance of his compoſition; and where any of thoſe marks are wanting, no authority ought to be ſufficient to aſcribe any picture to him. He painted every part of his ſubjects ſo extremely well, as to render it difficult to determine in which he excelled moſt; his trees, buildings, waters, rocks, hills, cattle, and figures, being all equally admirable.

BERCHETT, Peter, an eminent hiſtory painter, was born in France in 1659, and at the age of 18 was employed in the royal palaces. He came to England in 1681, to work under Rambour, a French painter of architecture; but, after ſtaying a year, returned to Marli. He came again, and was ſent by King William to the palace he was building at Loo, where he was employed 15 months; and then came a third time to England, where he had ſufficient buſineſs. We are informed by Mr Walpole, that he then painted the ceiling of the chapel of Trinity college, Oxford, the ſtaircaſe at the duke of Schomberg's in Pall-mall, and the ſummer-houſe at Ranelagh. His drawings in the academy were much approved. Towards the cloſe of his life he retired to Marybone, where he painted only ſmall pieces of fabulous hiſtory, and died there in January 1720.

BERDASH, in *Antiquity*, was a name formerly uſed in England for a certain kind of neck-dreſs; and hence a perſon who made or ſold ſuch neckcloths was called a *berdaſher*, from which is derived our word *haberdaſher*.

BERECYNTHIA, the mother of the gods, in the Pagan theology.

BERENGARIANISM, a name given by eccleſiaſtical writers to the opinion of thoſe who deny the truth and reality of the body and blood of Chriſt in the euchariſt. The denomination took its riſe from Berengarius, archdeacon and ſcholiaſticus of the church of St Mary at Anjou about the year 1035, who maintained, that the bread and wine, even after conſecration, do not become the true body and blood of our Lord, but only a figure and ſign thereof.

Berengarianiſm was ſtrenuouſly oppoſed by Lanfranc, Guitmond, Adelmannus, Albericus, &c. Divers ſynods were held, wherein the author was condemned at Rome, Verſailles, Florence, Tours, &c. He retracted, and returned again more than once; ſigned three ſeveral Catholic confeſſions of faith; the firſt in the ſecond council of Rome, the ſecond in the third, and the third in the fourth council of the ſame city. But he ſtill relapſed to his former opinion when the ſtorm was over; though Mabillon maintains he ſoon recovered from his fourth fall, and died an orthodox Catholic in 1088.

BERENICE, daughter of Ptolemy Auletes king of Egypt, ſucceeded her father before his death. This baniſhed prince implored the aſſiſtance of the Romans. Pompey reſtored him. Berenice, to ſupport herſelf on the throne, allured a prince, whoſe name was Seleucus, deſcended from the kings of Syria, and admitted him to her nuptial bed, and to her ſceptre. She was ſoon weary of him, and put him to death. She next caſt her eye on Archelaus, who married her, and put himſelf at the head of her troops to repulſe the Romans. He was killed in a battle. Ptolemy returned to Alexandria and put his rebellious daughter to death.

Berenice || Bereſow.

Berenice, wife of Ptolemy Euergetes king of Egypt, cut off her hair in purſuance of a vow, and conſecrated it in the temple of Venus. This depoſit being afterwards loſt, Connon the mathematician, in compliment to her, declared that the queen's locks had been conveyed to heaven, and compoſed thoſe ſeven ſtars near the tail of the bull, called to this day *coma Berenices*.

Berenice, daughter of Coſtobarus and of Salome ſiſter to Herod the Great, was married firſt to Ariſtobulus, ſon of the ſame Herod and Mariamne. He having a brother who married the daughter of Archelaus king of Cappadocia, often upbraided Berenice that he was married below himſelf in wedding her. Berenice related all theſe diſcourſes to her mother, and exaſperated her ſo furiouſly, that Salome, who had much power over Herod's mind, made him ſuſpect Ariſtobulus, and was the principal cauſe that urged this cruel father to get rid of him. She married again; and having loſt her ſecond huſband, went to Rome, and got into the favour of Auguſtus. But, above all, ſhe inſinuated herſelf into the good graces of Antonia, the wife of Druſus, which in the end proved of great ſervice to Agrippa.

Berenice, grand-daughter of the preceding, and daughter of Agrippa I. king of Judea, has been much talked of on account of her amours. She was betrothed to one Marcus, but he died before the marriage. Soon after, ſhe married his uncle Herod, who at the deſire of Agrippa, both his brother and father-in-law, was created king of Chalcis by the emperor Claudius. She loſt her huſband in the eighth year of the emperor Claudius; and in her widowhood, it was rumoured ſhe committed inceſt with her brother Agrippa. To put a ſtop to this report, ſhe offered herſelf in marriage to Polemon king of Cilicia, provided he would change his religion. He accepted her offers, was circumciſed, and married her. Berenice ſoon left him to follow her own ways, and he abandoned Judaiſm to return to his former religion. She was always very well with her brother Agrippa, and ſeconded him in the deſign of preventing the deſolation of the Jews. She got Titus into her ſnares; but the murmurs of the Roman people hindering her from becoming his wife, there remained nothing for her but the title of miſtreſs or concubine of the emperor. The French ſtage, in the 17th century, reſounded with the amours of Titus and Berenice.

Berenice, in *Ancient Geography*, the name of ſeveral cities, particularly of a celebrated port-town on the Sinus Arabicus: Now *Suez*; which ſee.

Berenice's Hair, *Coma Berenices*. See Berenice.

BERE-regis, a town of Dorſetſhire in England, in W. Long. 2. 15. N. Lat. 50. 40.

BERESOW, a diviſion of the province of Tobolſk in Siberia. It is bounded on the north by the ſtraits of Waigatz, on the eaſt by a large bay of the Frozen ocean, which runs into the land towards the ſouth, and at the 65th degree of latitude ſeparates into two arms; one of which is called the *Obſkaia-Guba* or

Berewicha || Bergamaſco.

Oby-bay; and the other *Tazowſkaia-Guba*, or the bay of *Tazow*. The river Oby empties itſelf into the former, and the Taz into the latter. This diſtrict was under the Ruſſian dominion long before the other parts of Siberia were conquered, being reduced by the Czar Gabriel ſo early as the year 1530.

BEREWICHA, or BEREWICA, in our old writers, denotes a village or hamlet belonging to ſome town or manor, ſituated at ſome diſtance therefrom.—The word frequently occurs in Doomſday-book: *Iſtæ ſunt berewichæ ejuſdem manerii.*

BERG, a duchy of Germany, in the circle of Weſtphalia. It is bounded on the north by the duchy of Cleves, on the weſt by the county of Mark and the duchy of Weſtphalia, on the ſouth by Wetteravia, and on the eaſt by the dioceſe of Cologne, from which it is ſeparated by the Rhine. It is about 150 miles in length, and 24 in breadth. It is very fruitful along the Rhine, but mountainous and woody towards the county of Mark. It is ſubject to the elector Palatine, but his right is diſputed by Pruſſia and Saxony. The principal town is Duſſeldorp; and the principal rivers, beſides the Rhine, are the Wipper, Agger, and Sieg.

BERG, *St Winox*, a town of the Low Countries, in the country of Flanders, fortified by Vauban, and ſubject to France. It is ſeated on the river Colme, ſix miles from Dunkirk, and 21 from Ypres. The air is often very unwholeſome, eſpecially to ſtrangers. It has an hoſpital for ſoldiers, taken care of by friars called *Bons Fieux*, and two ſeminaries for young ſtudents. The river Colme ſerves inſtead of a canal to go to Hondſhot, St Omer's, and Gravelines. There is likewiſe another canal to go to Dunkirk. The villages in its territory are very famous for butter and cheeſe, of which they ſend a great quantity to Flanders. Fort Lapin and Fort Suiſſe are within a cannon's ſhot of this place, and Fort St Francis is ſeated on the canal, near three miles from the town. E. Long. 2. 35. N. Lat. 50. 7.

BERG-ZABERN, a town of France, in Alſace. E. Long. 7. 55. N. Lat. 49. 4.

BERG-Gruin, in *Natural Hiſtory*, the name of an earth uſed in painting, and properly called *green okre*, though not known among the colour-men under that name. It is found in many parts of Germany, Italy, and England, commonly in the neighbourhood of copper-mines, from particles of which metal it receives its colour. In many parts of Germany, they have a purer kind of this, diſtinguiſhed by no peculiar name, but ſeparated by art from the waters draining from the copper-mines, and differing no otherwiſe from this native ſubſtance, than as the waſhed okres of Oxfordſhire, &c. do from theſe ſent us in their natural condition. The characters by which the native kind is known from other green earths, are theſe: it is a denſe compact ſubſtance, conſiderably heavy, and of a pale but not diſagreeable green; of a rough and uneven, but not duſty ſurface, and ſomewhat unctuous to the touch. It adheres firmly to the tongue; does not break eaſily between the fingers; nor at all ſtains the hands. It is of a brackiſh diſagreeable taſte, and does not ferment with acids.

BERGAMASCO, a province of Italy, in the territory of Venice. It is bounded on the eaſt by the Breſſan, on the north by the Valteline, on the weſt and ſouth by the Milaneſe. It extends about 36 leagues from north to ſouth, and 30 from eaſt to weſt. It is watered by ſeveral rivers which render it very fertile, and particularly it produces a great number of cheſnuts. It has mines of iron, and quarries of marble, and other ſtones of which they make millſtones. There are a great number of villages, but no city except Bergamo the capital. The people are very induſtrious, and make the beſt of their natural productions. They are well ſtocked with cattle, and make fine tapeſtry. Their language is the moſt corrupt of any in Italy. Bergamo || Bergen.

BERGAMO, JAMES PHILIP DE, an Auguſtin monk, born at Bergamo in 1434, wrote in Latin a Chronicle from the creation of the world to the year 1503, and a Treatiſe of Illuſtrious Women. He died in 1518.

BERGAMO, anciently *Bergomum*, a large and ſtrong town of Italy, in the Venetian territory, and capital of the province of Bergamaſco. It has a ſtrong citadel, and is the ſee of a biſhop. Its ſituation near the Alps makes the inhabitants ſubject to ſwellings in their throats, owing to the badneſs of the Alpine waters. E. Long. 9. 38. N. Lat. 45. 42.

BERGAMOT, a ſpecies of citron, produced at firſt caſually by an Italian's grafting a citron on the ſtock of a bergamot pear-tree, whence the fruit produced by this union participated both of the citron tree and the pear-tree. The fruit hath a fine taſte and ſmell, and its eſſential oil is in high eſteem as a perfume. The eſſence of bergamot is alſo called *eſſentia de cedra*. It is extracted from the yellow rind of the fruit by firſt cutting it in ſmall pieces, then immediately ſqueezing the oil out of them into a glaſs veſſel. This liquor is an etherial oil. A water is diſtilled from the peel as follows: Take the outer rind of three bergamots, a gallon of pure proof-ſpirit, and four pints of pure water; draw off a gallon in a balneum mariæ, then add as much of the beſt white ſugar as will be agreeable. Or take of the eſſence of bergamot three drams and a half, of rectified ſpirit of wine three pints, of volatile ſal ammoniac a dram; diſtill off three pints in a balneum mariæ.

BERGAMOT is alſo the denomination of a coarſe tapeſtry, manufactured with flocks of ſilk, wool, cotton, hemp, ox, cow, or goat's hair, and ſuppoſed to be invented by the people of Bergamo in Italy.

BERGARAC, a very rich, populous, and trading town of France, ſeated on the river Dordogne, in E. Long. 0. 37. N. Lat. 50. 57.

BERGAS, a town of Romania in European Turkey, and the ſee of a Greek archbiſhop. It is ſeated on the river Lariſſa, in E. Long. 27. 30. N. Lat. 41. 17.

BERGEN, anciently *Bergi*, a city of Norway, and capital of the province of Bergenhus. It is the ſee of a biſhop, and has a ſtrong caſtle and a good port. It is a large place; but is ſubject to fires, as being all built of wood. It is ſurrounded with mountains almoſt inacceſſible; and little or no corn grows in all the country; that which they uſe is all imported, and diſtributed from thence throughout the kingdom. The principal trade is in ſtock-fiſh, firs, and deal-boards. E. Long. 5. 45. N. Lat. 60. 11.

BERGEN, a town of Pomerania in Germany, and capital

Berghem || Bergman.

pital of the Isle of Rugen, subject to the Swedes. E. Long. 13. 0. N. Lat. 54. 30.

BERGEN-OP-ZOOM, a town of the Low Countries, in Dutch Brabant, and in the marquisate of the same name. It is seated on an eminence, in the middle of a morass, about a mile and a half from the eastern branch of the Scheld, with which it has a communication by a navigable canal. The houses are well built, and the market-places and squares handsome and spacious. The church before the last siege was reckoned a good building, and so was the marquis's palace. It has a good tract of land under its jurisdiction, with several villages, and some islands in the Scheld. It has a very advantageous situation on the confines of Brabant, Holland, Zealand, and Flanders. It is strong by nature as well as by art, being so secured by the morasses about it, which are formed by the river Zoom, that it was reckoned impregnable. It was, however, taken in 1747 by the French, but it is thought not without the help of treachery. The fortifications are allowed to be the masterpiece of that great engineer Cohorn. It had been twice besieged before without success. The marquis of Spinola was the last but one who invested it, and he was forced to raise the siege with the loss of 10,000 men. E. Long. 4. 15. N. Lat. 51. 30.

BERGHEM. See BERCHEM.

BERGHMONT, an assembly or court held upon a hill in Derbyshire, for deciding controversies among the miners.

BERGMAN, SIR TORBERN, a celebrated chemist and natural philosopher, was born in the year 1735 at Catharineberg in Westgothland. His father was receiver-general of the finances, and had destined him to the same employment; but nature had designed him for the sciences. To them he perceived an irresistible inclination from his earliest years, and nature proved more powerful than the will of his friends. His first studies were confined to mathematics and physics: and the efforts that were made to divert him from science having proved ineffectual, he was sent to Upsal, with permission to follow the bent of his inclination. Linnæus at that time filled the whole kingdom with his fame. Instigated by his example, the Swedish youth flocked around him: and accomplished disciples leaving his school, carried the name and the system of their master to the most distant parts of the globe. Bergman was struck with the splendour of his renown; he attached himself to the man whose merit had procured it, and by whom he was very soon distinguished. He applied himself at first to the study of insects, and made several ingenious researches into their history; among others into that of the genus of *tenthredo*, so often and so cruelly preyed on by the larvæ of the ichneumons, that nestle in their bowels and devour them. He discovered that the leech was oviparous; and that the coccus aquaticus is the egg of this animal, from whence issue ten or twelve young. Linnæus, who had at first denied this fact, was struck with astonishment when he saw it proved. *Vidi et obstupui!* were the words he pronounced, and which he wrote at the foot of the memoir when he gave it his sanction. Mr Bergman soon distinguished himself as an astronomer, naturalist, and geometrician; but these are not the titles by which he acquired his fame. The chair of chemistry and mineralogy which had been filled by the celebrated Wallerius, becoming vacant by his resignation, Mr Bergman was among the number of the competitors: and without having before this period discovered any particular attention to chemistry, he published a memoir on the preparation of alum that astonished his friends as well as his adversaries. Nobody was able to conceive how in so short a time he could have made a course of experiments so complete, on a subject so new to him. His dissertation was warmly attacked in the periodical publications, and Wallerius himself criticised without reserve. But in the midst of so many enemies, he possessed a firm friend. The prince Gustavus, now king of Sweden, and then chancellor of the university, took cognizance of the affair. After having consulted two persons, the most able to give him advice, and whose testimony went in favour of Bergman, he addressed a memorial, written with his own hand, in answer to all the grievances alleged against the candidate, to the consistory of the university and to the senate, who confirmed the wishes of his Royal Highness.

Bergman.

Mr Bergman had now a hard duty to fulfil: he had to satisfy the hopes that were conceived of him; to fill the place of Wallerius; and to put envy to silence. He did not follow the common track in the study of chemistry. As he had received the lessons of no master, he was tainted with the prejudices of no school. Accustomed to precision, and having no time to lose, he applied himself to experiments without paying any attention to theories: he repeated those often which he considered as the most important and instructive, and reduced them to method; an improvement till then unknown. He first introduced into chemistry the process by analysis, which ought to be applied to every science; for there should be but one method of teaching and learning, as there is but one of judging well. These views have been laid down by Mr Bergman in an excellent discourse, which contains, if we may say so, his profession of faith in what relates to the sciences. It is here that he displays himself without disguise to his reader; and here it is of importance to study him with attention. The productions of volcanoes had never been analyzed when Messrs Ferber and Troil brought a rich collection of these into Sweden. At the sight of them Mr Bergman conceived the design of investigating their nature. He examined first of all the matters least altered by the fire, and the forms of which were still to be discerned: he followed them in their changes progressively; he determined, he imitated their more complicated appearances; he knew the effects which would result from the mixture and decomposition of the saline substances which are found abundantly in these productions. He discovered such as were formed in the humid way; and then in his laboratory he observed the process of nature; that combat of flames and explosions; that chaos in which the elements seem to clash and to confound one another, unveiled themselves to his eyes. He saw the fire of volcanoes kindled in the midst of pyritical combinations, and sea-salt decomposed by clays; he saw fixed air disengaged from calcined calcareous stones, spreading upon the surface of the earth, and filling caverns in which flame and animal life are equally extinguished; he saw the sulphureous acid

Bergomum || Bering's Straits.

thrown out in waves, convert itſelf into the vitriolic by mere contact with the air; and diſtilling through the rocks, form the alum veins of the ſolfatara. He ſaw the bitumens as they melted; the inflammable and ſulphureous airs exhaling; and the waters become mineral and impregnated with the fire and vapours of theſe ſtupendous furnaces, preparing for the beings that move and diſpute on the cruſt of the abyſs, a remedy for pain and a balſam for diſeaſe.

The continual application which Mr Bergman beſtowed on his ſtudies having affected his health, he was adviſed to interrupt them if he wiſhed to prolong his life: but he found happineſs only in ſtudy, and wiſhed not to forfeit his title to reputation by a few years more of inactivity and languor. He exhauſted his ſtrength, and died in the month of June in the year 1784. The univerſity of Upſal paid the moſt diſtinguiſhed honours to his memory; and the academy of Stockholm conſecrated to him a medal to perpetuate the regret of all the learned in Europe for his loſs. His Phyſical and Chemical Eſſays have been collected and tranſlated by Dr Edmund Cullen, and publiſhed in 2 vols 8vo.

BERGOMUM, in *Ancient Geography*, a town of the Tranſpadana, built by the Gauls on their incurſions into Italy. Now called *Bergamo*, in the territory of Venice. E. Long. 10. N. 45. 40.

BERIA, Berie, *Berry*, ſignifies a large open field; and thoſe cities and towns in England which end with that word are built on plain and open places, and do not derive their names from boroughs as Sir Henry Spelman imagines. Moſt of our gloſſographers in the names of places have confounded the word *berie* with that of *bury* and *borough*, as if the appellative of ancient towns: whereas the true ſenſe of the word *berie*, is a flat wide campaign, as is proved from ſufficient authorities by the learned Du Freſne, who obſerves that *Beria Sancti Edmundi*, mentioned by Mat. Pariſ. ſub. ann. 1174, is not to be taken for the town, but for the adjoining plain. To this may be added, that many flat and wide meads, and other open grounds, are called by the name of *beries* and *bery-fields*; the ſpacious meadow between Oxford and Iſlay was in the reign of King Athelſtan called *Bery*; as is now the largeſt paſture-ground in Quarendon in the county of Buckingham, known by the name of *Beryfield*. And though theſe meads have been interpreted demeſne or manor meadows, yet they were truly any flat or open meadows that lay adjoining to any villa or farm.

BERING, Sinus, of Copenhagen, a Latin lyric poet, flouriſhed about 1560.

BERING's Straits, the name of that narrow diviſion of the old and new world, where the diſtance between Aſia and America is only 13 leagues. They are ſo named from Captain Vitus Bering, a Dane by birth, and employed on the ſame plan of diſcovery in theſe parts as our great countryman Cook was in the late voyage. He was in the ſervice of Peter the Great: who, by the ſtrength of an extenſive genius, conceiving an opinion of the vicinity of America to his Aſiatic dominions, laid down a plan of diſcovery worthy of ſo extraordinary a monarch, but died before the attempt was begun; but his ſpirit ſurvived in his ſucceſſor. Bering, after a tedious and fatiguing journey through the wilds of Siberia, arrived in Kamtſchatka, attended with the ſcanty materials for his voyage, the greateſt part of which he was obliged to bring with him through a thouſand difficulties. He ſailed from the river of Kamtſchatka on July 15th 1728; and on the 15th of Auguſt ſaw Serdze Kamen, or the heart-ſhaped rock, a name beſtowed on it by the firſt diſcoverer.—From Serdze Kamen, to a promontory named by Captain Cook *Eaſt Cape*, the land trends ſouth-eaſt. The laſt is a circular peninſula of high cliffs, projecting far into the ſea due eaſt, and joined to the land by a long and very narrow iſthmus, in lat. 66. 6. This is the Tſchutſki Noſs of our navigators, and forms the beginning of the narrow ſtraits or diviſion of the old and new world. The diſtance between Aſia and America in this place, as already mentioned, is only 13 leagues. The country about the cape, and to the north-weſt of it, was inhabited. About mid-channel are two ſmall iſlands, named by the Ruſſians the *iſles of St Diomedes*; neither of them above three or four leagues in circuit. It is extremely extraordinary that Bering ſhould have ſailed through this confined paſſage, and yet that the object of his miſſion ſhould have eſcaped him. His misfortune could only be attributed to the foggy weather, which he muſt have met with in a region notorious for miſts; for he ſays that he ſaw land neither to the north nor to the eaſt. Our generous commander, determined to give him every honour his merit could claim, has dignified theſe with the name of *Bering's Straits*. The depth of theſe ſtraits is from 12 to 29 or 30 fathoms. The greateſt depth is in the middle, which has a ſlimy bottom; the ſhalloweſt parts are near each ſhore, which conſiſt of ſand mixed with bones and ſhells. The current or tide very inconſiderable, and what there was came from the weſt. From Eaſt Cape the land trends ſouth by weſt. In lat. 65. 36. is the bay in which Captain Cook had the interview with the Tſchutſki. Immediately beyond is the bay of St Laurence, about five leagues broad in the entrance and four deep, bounded at the bottom by high land. A little beyond is a large bay, either bounded by low land at the bottom, or ſo extenſive as to have the end inviſible. To the ſouth of this are two other bays; and in N. Lat. 64. 13. Long. 186. 36. is the extreme ſouthern point of the land of the Tſchutſki. This formerly was called the *Anadirſkoi Noſs*. Near it Bering had converſation with eight men, who came off to him in a *baidar* or boat covered with the ſkins of ſeals; from which Bering and others have named it the *Tſchutſki Noſs*.

Bering's Straits || Berkeley.

BERITH, a ſimple mentioned in Scripture, uſed for cleanſing or taking out ſpots (Jer. ii. 22.) Some will have it to be the *kali* or ſalt-wort, from the aſhes of which ſoap is made; and in our verſion it is rendered *ſoap*: others, after Rudbeck, made it to be the dye of the purple-fiſh.

BERKELEY, George, the celebrated biſhop of Cloyne, was the eldeſt ſon of William Berkeley, Eſq; of Thomaſtown in the county of Kilkenny; a cadet of the family of Earl Berkeley of Berkeley caſtle. At eight years of age he was ſent to the ſchool of the Ormond foundation at Kilkenny, from which Swift had a few years before been removed to the univerſity. Before Berkeley had attained his fourteenth year he was admitted a penſioner in Trinity college Dublin, in which whilſt B. A. he obtained a fellowſhip. Some

of

Berkeley. of his firſt eſſays as a writer were publiſhed in the Spectator and Guardian, which entertaining works he adorned with many pieces in favour of virtue and religion. His learning and his virtues, his wit and agreeable converſation, made his friendſhip ſought and his acquaintance cultivated by many great and learned men: and among others by the earl of Peterborough, Dr Swift, Dr Arbuthnot, Mr Pope, and Mr Addiſon. The earl took him as chaplain and ſecretary of embaſſy into Italy; and during his abſence on that occaſion he became ſenior fellow of his college, and was in 1717 created D. D. by *diploma*.

Upon his return, his acquaintance among the great was conſiderable extended; and Lord Burlington, who at Rome had conceived for him a high eſteem on account of his ſkill in architecture, obtained for him, through the duke of Grafton, then (1721) lord-lieutenant of Ireland, the king's grant of the deanery of Down, worth 2000l. per annum. Such however was the narrow ſyſtem of politics at that time prevalent in the Iriſh cabinet, that though his majeſty had actually ſigned the grant, the lords juſtices recommanded *back* for the deanery of Down Swift's Dean *Daniel*, celebrated for having in a ſtate ſermon ſtyled Pompey an *unfortunate gentleman;* and ſuch was Dr Berkeley's humility and mildneſs of temper, that he could not be prevailed upon to diſpute the matter, or even to expoſtulate on the ſubject. His patron Lord Burlington procured for him afterwards (1724) the deanery of Derry, the next beſt in Ireland to that of Down; and upon this preferment the Doctor reſigned his fellowſhip.

In the year 1722 his fortune received a conſiderable increaſe from an event by him very unexpected. Upon his firſt going to London (1717) he ſent one morning a note to Swift, deſiring that they might dine together that day at a tavern. The dean of St Patrick's returned for anſwer, that they might enjoy one another's company at their eaſe where he himſelf was engaged to dine, with the family of Mrs Eſther Vanhomrigh (the celebrated Vaneſſa); and thither he took Mr Berkeley. Some years before her death this lady removed to Ireland, and fixed her reſidence at Cell-bridge, a pleaſant village in the neighbourhood of Dublin, moſt probably with a view of frequently enjoying the company of a man for whom ſhe had conceived a very ſingular attachment. But finding herſelf totally diſappointed in that expectation, ſhe altered her intention of making the dean of St Patrick's her heir, and left the whole of her fortune (8000l.) to be divided equally between her near relation Judge Marſhal of the common pleas in Ireland, and Dr Berkeley whom ſhe had never ſeen but once in her life, and that at the diſtance of nine years.

In the interval between Dr Berkeley's return from abroad and his preferment to the deanery of Derry, his mind had been employed in conceiving a noble and benevolent plan for the better ſupplying of the churches in our foreign plantations, and for converting the ſavage Americans to Chriſtianity, by erecting a college in the Summer Iſlands. To this propoſal the addreſs and abilities of its author procured, after a tedious attendance on the great, an apparently ſucceſsful reception; for he obtained a charter for its foundation, together with a parliamentary grant of 20,000l. for carrying it into execution, to which were added ſeveral Berkeley. large ſubſcriptions from individuals, to be paid as ſoon as the public bounty ſhould be received. Upon the faith of this, our philoſopher embarked for America; where he became ſo generally and ſo juſtly venerated by all deſcriptions of men, that each vied with the other which ſhould moſt honour him. The queen, with whom he was a favourite, had endeavoured to diſſuade him from this enterpriſe, by offering him her intereſt for an Engliſh biſhopric; but he replied, that he ſhould prefer the headſhip of St Paul's college at Bermuda to the primacy of all England. From that headſhip he was to enjoy a revenue of 100l. per annum: and was bound by his charter to reſign his deanery, then worth 1100l. per annum, within a year and a half after the 20,000l. ſhould be paid by government. That ſum was never paid; and after two years reſidence on Rhode Iſland and its neighbouring continent, during which time every intereſt of piety and virtue was near to his heart and cultivated by his labours, the dean was obliged to return to Europe, and abandon one of the nobleſt deſigns that had ever entered into the human heart to form.

In Auguſt 1728, immediately before his departure for America, he entered into marriage with Anne, the eldeſt daughter of the right honourable John Forſter, Eſq; ſpeaker of the Iriſh houſe of commons; which lady died in 1785. In May 1734 he was conſecrated biſhop of Cloyne, and vacated his deanery. On that occaſion he ſaid to his few intimates, "I will never accept of a tranſlation." At Cloyne he diſtinguiſhed himſelf by paſtoral vigilance, prelatical hoſpitality, and conſtant reſidence. Through the whole of his clerical life, he was, while his health permitted, a conſtant and an extemporaneous preacher; nor is it known that he ever reduced a ſingle ſermon to writing, except one preached before the ſociety for propagating the goſpel in foreign parts, which at their requeſt was publiſhed. He endeared himſelf to the people of his dioceſe by promoting at once their temporal and their ſpiritual happineſs. He endeavoured by all means to raiſe a ſpirit of induſtry, and to propagate the arts of cultivation and agriculture in that neglected country; and it may be truly ſaid, that never man laboured more earneſtly to amaſs a fortune or to aggrandize a family, than he did to promote the beſt intereſts of mankind, conſidered either as citizens on earth or as candidates for heaven.

The earl of Cheſterfield, who had never ſeen him but once, and that when they were both young men, on being made lord lieutenant of Ireland ſent to him a moſt reſpectful offer of the then vacant ſee of Clogher, of more than double the value of Cloyne, promiſing at the ſame time his recommendation to any other richer ſee that might be vacated during his adminiſtration. But the good biſhop declined the generous offer, requeſting the lord lieutenant not to think of him on any other vacancy, as he was reſolved never to quit his firſt biſhopric for any other. In 1751, finding the infirmities of age come upon him, and wiſhing to retire from the care of his dioceſe to ſuperintend the education of his ſon (then nominated a ſtudent of Chriſt-church, and now prebendary of Canterbury), that the revenues of the church might not be miſapplied, nor the intereſts of religion ſuffer by the abſence of the paſtor from

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Berkeley. his flock, he made great intereſt for leave to reſign his biſhopric, of which the income was then not leſs than 1700l. per annum. Failing of ſucceſs in this application, he let the lands of his demeſne at Cloyne, on very eaſy terms, at the rent of 200l. which he directed to be diſtributed annually among the poor houſe keepers of Cloyne, Youghall, and Aghadda, until his return.

At Oxford he lived highly reſpected by the learned members of that great univerſity, till the hand of Providence unexpectedly deprived them of the pleaſure and advantage derived from his reſidence among them. On Sunday evening January 14th 1753, as he was ſitting in the midſt of his family, and juſt after he had concluded an extemporancous comment on the 15th chapter of 1 Cor. he was inſtantly tranſlated, without a groan, from earth to heaven. A polypus in the heart was the cauſe of his diſſolution. About a minute before his death he had ſeated himſelf on a couch and turned his face towards the wall; and had he not ceaſed ſpeaking *in the middle of a ſentence*, his lady and his ſon would not immediately have diſcovered their loſs. His remains were, with much funeral ſolemnity, interred at Chriſt-church, his friend Biſhop Conybeare, then dean of that cathedral, performing the laſt ſervice. An elegant marble monument, with a ſpirited inſcription by the preſent archbiſhop of York, mark the ſpot where his aſhes reſt. As to his perſon, he was of the tall middle ſize; has countenance was very handſome, and full of meaning and benignity; and his bodily ſtrength was uncommonly great even to the laſt year of his life: but he was ſubject to grievous nervous colics, in which he thought tar-water gave him more efficacious relief than any other medicine. Mr Pope ſums up his character in one line. After mentioning ſome particular virtues which characterized other prelates then living, he aſcribes

To Berkeley ev'ry virtue under heav'n.

An admirable deſcription is given of him in the following anecdote. Biſhop Atterbury, having heard much of Mr Berkeley, wiſhed to ſee him. Accordingly he was one day introduced to that prelate by the earl of Berkeley. After ſome time, Mr Berkeley quitted the room: on which Lord Berkeley ſaid to the biſhop, "Does my couſin anſwer your lordſhip's expectations?" The biſhop, lifting up his hands in aſtoniſhment, replied, "So much underſtanding, ſo much knowledge, ſo much innocence, and ſuch humility, I did not think had been the portion of any but angels, till I ſaw this gentleman." His knowledge is ſaid to have even extended to the minuteſt objects, and included the arts and buſineſs of common life. Thus Dr Blackwell, in his memoirs of the court of Auguſtus, having made an obſervation, "that the ingenious mechanic, the workers in ſtone and metal, and improvers in trade, agriculture, and navigation, ought to be ſearched out and converſed with no leſs than the profeſſors of ſpeculative ſcience," adds the following eulogium on our prelate: "In this reſpect I would with pleaſure do juſtice to the memory of a very great though ſingular ſort of a man, Dr. Berkeley, better known as a philoſopher and intended founder of an univerſity in the Bermudas or Summer Iſlands, than as biſhop of Cloyne in Ireland. An inclination to carry me out on that expedition, as one of the young profeſſors on his new foundation, having brought us often together, I ſcarce remember to have converſed with him on that art, liberal or mechanic, of which he knew not more than the ordinary practitioners. With the wideſt views, he deſcended into a minute detail, and grudged neither pains nor expence for the means of information. He travelled through a great part of Sicily on foot; clambered over the mountains and crept into the caverns to inveſtigate its natural hiſtory, and diſcover the cauſe of its volcanoes: and I have known him ſit for hours in forgeries and founderies to inſpect their ſucceſſive operations. I enter not into his peculiarities either religious or perſonal: but admire the extenſive genius of the man, and think it a loſs to the weſtern world that his noble and exalted plan of an American univerſity was not carried into execution. Many ſuch ſpirits in our country would quickly make learning wear another face." Berkeley, Berkſhire.

He publiſhed many ingenious works, particularly, "An eſſay towards a new theory of viſion:" "The principles of human knowledge;" the ſingular notions in which gave riſe to much controverſy: "Alciphron, or the minute philoſopher;" one of the moſt elegant and genteel defences of that religion which he was born to vindicate both by his virtues and his ingenuity: "The Analyſt;" in which he endeavours to ſhow that Sir Iſaac Newton's doctrine of fluxions is more incomprehenſible than any myſtery in the Chriſtian religion: "The Queriſt:" in which the true intereſts of Ireland are pointed out in a very ſtriking light: and "Siris, or a treatiſe on tar-water," which, under his ſanction, became for a while a very popular medicine. In the Gentleman's Magazine for January 1777, it is ſaid that the adventures of Signior Gaudentio di Lucca have been generally attributed to Biſhop Berkeley; but we have the beſt authority to ſay that they were not the offſpring of his pen. The biſhop never ſaw the work till it was put into his hands by his ſon; and when he read it, he expreſſed no ſmall contempt for the ſtyle of a writer who deſcribes his hero as a *tall clean made gentleman;* though he owned his fancy to be often brilliant. We believe the adventures of Gaudentio di Lucca were written by a Romiſh prieſt for his amuſement when a priſoner in the Tower of London.

BERKSHIRE, is an inland county of England, which contained the whole of that Britiſh principality inhabited by the Atrebatii, who are ſuppoſed to have been originally from Gaul. When Conſtantine divided the iſland into Roman provinces in 310, this principality was included in Britannia Prima, the firſt diviſion, whoſe boundaries were the Engliſh channel on the ſouth, and the Thames and Severn on the north. On the Romans quitting the iſland, and civil diſſenſions enabling the Saxons to eſtabliſh the Heptarchy, this part of the country was included in the kingdom of the Weſt Saxons, which commenced in 519, and continued till 828, when it became the only remaining ſovereignty, having conquered all the others, and they were incorporated by the name of England, under Egbert; whoſe grandſon, Alfred, a native of Wantage, in this county, in 889 divided his kingdom into counties, hundreds, and pariſhes, and at this time this diviſion firſt received its appellation of Berkſhire, or Berocſhire. At preſent it is in the Oxford circuit, the province

Berkſhire. province of Canterbury, and dioceſe of Saliſbury. The general ſhape of it ſomewhat reſembles the form of a ſlipper or ſandal. It contains an area of 654 ſquare miles, or 527,000 ſquare acres; is 39 miles long, 29 broad, and about 137 in circumference. It ſupplies 560 men to the national militia; is ſituated north-weſt of London; has 140 pariſhes, 62 vicarages, 12 market towns, but no city, 671 villages, 135,000 inhabitants, 11,560 houſes that pay the tax; is divided into 20 hundreds; ſends nine members to parliament, two for the county, two for Windſor, two for Reading, two for Wallingford, and one for Abingdon; and pays 10 parts of the proportion of the land-tax. Its principal river is the Thames. It alſo has the Kennet, great part of which is navigable; the Loddon, the Ocke, and the Lambourne, a ſmall ſtream, which, contrary to all other rivers, is always higheſt in ſummer, and ſhrinks gradually as winter approaches. The air of this county is healthy even in the vales; and though the ſoil is not the moſt fertile, yet it is remarkably pleaſant. It is well ſtored with timber, particularly oak and beech, and produces great plenty of wheat and barley. Its principal manufactures, are woollen cloth, ſail cloth, and malt.

Its market towns are Abingdon, Faringdon, Hungerford, Eaſt Ilſley, Lower-Lambourne, Maidenhead, Newbury, Ockingham, Reading, Wallingford, Wantage, and Windſor, remarkable for its royal caſtle, as the county is for White-horſe-hill, near Lambourne, where is the rude figure of a horſe, which takes up near an acre of ground on the ſide of a green hill, ſaid to have been made by Alfred in the reign of his brother Ethelred, as a monument to perpetuate a victory over the Danes in 872, at Aſhdown, now Aſhbury-Park.

The Roman Watling-ſtreet, from Dunſtable, enters Berkſhire at the village of Streatley, between Wallingford and Reading, and croſſing this county proceeds to Marlborough. Another Roman road from Hampſhire enters this county, leads to Reading and Newbury the Spinæ of Camden, where it divides: one branch extends to Marlborough in Wilts, and the other to Cirenceſter in Glouceſterſhire. A branch from the Icknield-ſtreet proceeds from Wallingford to Wantage.

There is a Roman camp near Wantage on the brow of a hill, of a quadrangular form; there are other remains of encampments at Eaſt-Hampſtead, near Ockingham, near White-horſe-hill, near Puſey, and upon Sinodun-hill, near Wallingford. At Lawrence Waltham is a Roman fort, and near Denchworth is Cherbury caſtle, a fortreſs of Canute. Uſſington caſtle, near White-horſe-hill, is ſuppoſed to be Daniſh; and near it is Dragon-hill, ſuppoſed to be the burying-place of Uter Pendragon, a Britiſh prince. Near White-horſe-hill are the remains of a funeral monument of a Daniſh chief ſlain at Aſhdown by Alfred. In this county the following antiquities are worthy the notice of travellers: Abingdon church and abbey; Aldworth caſtle, near Eaſt Ilſley; Byſham monaſtery; Dunnington caſtle; Lambourne church; Reading abbey; Sunning chapel; Wallingford church and caſtle. Windſor caſtle beggars all deſcription for ſituation, &c. Berkſhire is an earldom belonging to a branch of the Howard family, the repreſentative being earl of Suffolk and Berkſhire.

BERLIN, a city of Germany, capital of the elec- Berlin.
torate of Brandenburg, and of the whole Pruſſian dominions, ſeated in E. Long. 13. 37. N. Lat. 52. 53. This city is one of the largeſt, beſt built, and beſt governed, of any in Germany. The ſtreets are large, ſtraight, clean, and well paved, and ſome of them very long and elegant. There are alſo ſeveral large and beautiful ſquares, with pleaſant walks. It is ſurrounded with handſome gardens, which produce excellent fruit. The river Spree, that croſſes the city, has a communication with the Havel Oder, and Elbe, which greatly facilitate commerce. The French refugees have greatly contributed to the embelliſhment of the grandeur of Berlin; inaſmuch as they have introduced all kinds of manufactures, and various arts.

Berlin is divided into five parts, without reckoning the ſuburbs, which are very large. The houſes in theſe laſt are almoſt all of wood; but ſo well plaſtered, that they ſeem to be of ſtone. In the ſuburb called *Spandau* is a houſe belonging to the royal family, with well contrived apartments, and furniſhed in a very fine taſte. In the ſuburb of Stralau is a houſe and garden belonging to the king. The royal gate of the city is defended by a half moon, and two baſtions, covered with brick; it fronts the royal ſtreet, which is one of the longeſt and moſt frequented in the city. It contains very handſome houſes, particularly thoſe belonging to ſome of the miniſters of ſtate.

The royal ſtreet is croſſed by five others, which are large and fine. On the new bridge, which is of ſtone, over the Spree, is an equeſtrian ſtatue of William the Great, which is eſteemed an exquiſite piece of workmanſhip. The elector is repreſented in a Roman habit, and his horſe ſtands on a pedeſtal of white marble adorned with baſſo relievos, and four ſlaves bound to the baſe.

After this bridge is paſt, the king's palace appears, which is a grand and ſuperb edifice; it is four ſtories high, and the apartments are extremely magnificent. No place in Europe has ſuch a great quantity of ſilver tables, ſtands, luſtres, branched candleſticks, &c. In the knights hall there is a buffet, which takes up all one ſide, where there are baſons and ciſterns of gilt ſilver, of extraordinary magnitude. The furniture of the great apartment is extremely rich; and there is a very handſome gallery, adorned with paintings, repreſenting the principal actions of Frederick I. Formerly there were fine gardens to the palace, but they are now turned into a place of arms. The king's ſtables are large, ſtand near the palace, and front the great ſtreet. Externally they make a Gothic appearance, but within they are very magnificent. The mangers are of ſtone, and the pillars that divide the ſtalls are of iron, adorned with the king's cypher, gilt. Over the racks are pictures repreſenting the fineſt horſes which the king's ſtud has produced. Over the ſtables there are large rooms, containing all ſorts of horſe-furniture, particularly the horſe-equipage of Frederick I. all the metallic part of which is gold, ſet with diamonds. Beſides theſe, there are handſome lodgings for the officers of the ſtables. Over the riding-houſe is a theatre, where plays have been acted, and balls have been made for the entertainment of the court.

The arſenal conſiſts of four grand buildings, that form a court in the middle, like a college: each front has

Berkshire. has three large porticoes. On the principal gate is a medallion of Frederick II. in bronze; and the four cardinal virtues, of a coloſſal ſtature, placed on pedeſtals on each ſide of the portico, ſeem to look at the portrait of the king, which is ſupported by Fame and Victory. The Corinthian order is prevalent in the firſt ſtage, and is managed with a great deal of art. The whole edifice is ſurrounded in the upper part with a baluſtrade, adorned with trophies and ſtatues, among which is Mars ſeated on a heap of ſeveral ſorts of arms. This altogether forms a noble and majeſtic decoration. It is bounded with iron in the ſhape of cannon, which are placed at proper diſtances, and ſupport iron chains that hang like feſtoons, to prevent paſſengers from approaching the windows below. The lower rooms are filled with a great number of braſs cannon; the walls and pillars which ſuſtain the floor are ſet off with cuiraſſes and helmets. The upper ſtory contains ſeveral rooms filled with arms, which are diſpoſed in a curious order. Behind the arſenal is the houſe of the general of the artillery, which includes the foundery, where they are continually at work. Beſides this there are other places where they keep the train of artillery.

The opera-houſe is an elegant modern edifice. The front has a noble portico ſupported by Corinthian columns, and a pediment adorned with baſſo relievos and ſtatues. The columns that ſupport the roof throw the whole into a grand ſaloon. It has three galleries, and is ſaid to be capable of containing 2000 perſons.

A rampart and foſſe ſeparate Worder from Dorothea Stadt, or the New Town, inhabited chiefly by French. There are ſeven great alleys or walks, which divide this quarter into two parts. The middle walk is broader than the reſt, and is ſurrounded with baluſtrades, having a graſs-plot in the middle: this is for perſons that take the air on foot. The alleys on each ſide are paved, and ſerve for thoſe that come abroad in coaches. Theſe alleys, which are about three miles in length, are terminated with a bar, that leads towards the park. The alleys with trees are bounded by rows of houſes. In one of theſe is a building, formerly called the *leſſer ſtables*, and now made into lodgings for the guards. The apartments above theſe are occupied by the academy of painting and the academy of arts and ſciences. Behind theſe is the obſervatory, where there is a great number of aſtronomical and mathematical inſtruments.

There are other things worthy of obſervation, ſuch as the cabinet of medals, and of the antiquities belonging to the king; that of natural curioſities; the chemical laboratory, and its furnaces and medals, of a new invention: the theatre for anatomical demonſtrations; the royal library, which is one of the completeſt in Germany, and has many ſcarce books and manuſcripts.

The city was taken in 1760 by an army of Ruſſians, Auſtrians, Saxons, &c. who entered on the 9th of October. They totally deſtroyed the magazines, arſenals, and founderies, ſeized an immenſe quantity of military ſtores, and a number of cannon and arms; called firſt for the immediate payment of 800,000 guilders, and then laid on a contribution of 1,900,000 German crowns: not ſatisfied with this, many irregularities were committed by the ſoldiery; but on the whole, though ſome ſhocking actions were committed, a far more exact diſcipline was obſerved than from ſuch troops could have been expected upon ſuch an occaſion, where there was every incentive which could work upon the licenſe of a conquering army. Their officers no doubt with great difficulty preſerved even that degree of order. Berlin || Bermudas.

But though their behaviour was tolerable with regard to the private inhabitants, there was ſomething ſhocking and ungenerous in their treatment of the king's palaces. The apartments of the royal caſtle of Charlottenburgh were entirely plundered, the precious furniture ſpoiled, the pictures defaced, without even ſparing the antique ſtatues collected by Cardinal Polignac, which had been purchaſed by the houſe of Brandenburgh. The caſtle of Schonhauſen, belonging to the queen, and that of Fredericsfeld, belonging to the Margrave Charles, were alſo plundered.

The palace of Potſdam, the famous Sans-ſouci, had a better fate; Prince Eſterhaſi commanded there, and it was preſerved from the ſmalleſt violation. The prince, on viewing the palace, only aſked which picture of the king reſembled him moſt; and being informed, deſired that he might have leave to take it, together with two German flutes which the king uſed, to keep them, he ſaid, in memory of his majeſty. This was a ſort of taking very different from pillage.

They ſtaid in the city four days: but hearing that the king, apprehenſive of this ſtroke, was moving to the relief of his capital, they quitted it on the 13th of October; and having waſted the whole country round for a vaſt extent, and driven away all the cattle and horſes they could find, retreated by different routes out of Brandenburgh.

BERLIN, a ſort of vehicle, of the chariot kind; taking its name from the city of Berlin, in Germany: though ſome attribute the invention of it to the Italians, and derive the word from *berlina*, a name given by them to a ſort of ſtage, whereon perſons are expoſed to public ſhame. The berlin is a very convenient machine to travel in, being lighter, and leſs apt to be overturned, than a chariot. The body of it is hung high, on ſhafts, by leathern braces; there being a kind of ſtirrup, or footſtool, for the conveniency of getting into it: inſtead of ſide-windows, ſome have ſcreens to let down in bad, and draw up in good, weather.

BERME, in *Fortification*, a ſpace of ground left at the foot of the rampart, on the ſide next the country, deſigned to receive the ruins of the rampart, and prevent their filling up the foſſe. It is ſometimes paliſadoed, for the more ſecurity; and in Holland it is generally planted with a quickſet hedge. It is alſo called *lizière*, *relais*, *foreland*, *retrait*, *pais de ſouris*, &c.

BERMUDAS, or SUMMER-ISLANDS, a cluſter of ſmall iſlands in the Atlantic ocean, lying almoſt in the form of a ſhepherd's crook, in W. Long. 65. N. Lat. 32. 30. between 200 and 300 leagues diſtant from the neareſt place of the continent of America, or any of the other Weſt-India iſlands. The whole number of the Bermudas iſlands is ſaid to be about 400, but very few of them are habitable. The principal is St George's, which is not above 16 miles long, and three at moſt in breadth. It is univerſally agreed, that the nature of this and the other Bermudas iſlands has undergone a ſurpriſing alteration for the worſe ſince they were firſt diſcovered;

Bermudas. covered; the air being much more inclement, and the ſoil much more barren than formerly. This is aſcribed to the cutting down thoſe fine ſpreading cedar trees for which the iſlands were famous, and which ſheltered them from the blaſts of the north wind, at the ſame time that it protected the undergrowth of the delicate plants and herbs. In ſhort, the Summer iſlands are now far from being deſirable ſpots; and their natural productions are but juſt ſufficient for the ſupport of the inhabitants, who, chiefly for that reaſon, perhaps, are temperate and lively even to a proverb: at firſt tobacco was raiſed upon theſe iſlands; but being of worſe quality than that growing on the continent, the trade is now almoſt at an end. Large quantities of ambergris were alſo originally found upon the coaſts, and afforded a valuable commerce; but that trade is alſo reduced, as likewiſe their whale trade, though the perquiſites upon the latter form part of the governor's revenue, he having 10l. for every whale that is caught. The Bermudas iſlands, however, might ſtill produce ſome valuable commodities, were they properly cultivated. There is here found, about three or four feet below the ſurface, a white chalk ſtone which is eaſily chiſſeled, and is exported for building gentlemen's houſes in the Weſt-Indies. Their palmetto leaves, if properly manufactured, might turn to excellent account in making women's hats; and their oranges are ſtill valuable. Their ſoil is alſo ſaid to be excellent for the cultivation of vines, and it has been thought that ſilk and cochineal might be produced; but none of theſe things have yet been attempted. The chief reſource of the inhabitants for ſubſiſtence is in the remains of their cedar wood, of which they fabricate ſmall ſloops, with the aſſiſtance of the New England pine, and ſell many of them to the American colonies, where they are much admired. Their turtle-catching trade is alſo of ſervice; and they are ſtill able to rear great variety of tame-fowl, and have wild ones abounding in vaſt plenty. All the attempts to eſtabliſh a regular whale fiſhery on theſe iſlands have hitherto proved unſucceſsful; they have no cattle, and even the black hog breed, which was probably left by the Spaniards, is greatly decreaſed. The water on the iſlands, except that which falls from the clouds, is brackiſh; and at preſent the ſame diſeaſes reign there as in the Caribbee iſlands. They have ſeldom any ſnow, or even much rain; but when it does fall, it is generally with great violence, and the north or north-eaſt wind renders the air very cold. The ſtorms generally come with the new moon; and if there is a halo or circle about it, it is a ſure ſign of a tempeſt, which is generally attended with dreadful thunder and lightning. The inhabited parts of the Bermudas iſlands are divided into nine diſtricts called *tribes*. 1. St. George. 2. Hamilton. 3. Ireland. 4. Devonſhire. 5. Pembroke. 6. Pagets. 7. Warwick. 8. Southampton. 9. Sandys. There are but two places on the large iſland where a ſhip can ſafely come near the ſhore, and theſe are ſo well covered with high rocks that few will chooſe to enter in without a pilot; and they are ſo well defended by forts, that they have no occaſion to dread an enemy. St George's town is at the bottom of the principal haven; and is defended by nine forts, on which are mounted 70 pieces of cannon that command the entrance. The town has a handſome church, a fine library, and a noble town-houſe, where the governor, council, &c. aſſemble. Beſides theſe three are about 1000 houſes well built. The tribes of Southampton and Devonſhire have each a pariſh-church and library, and the formed has a harbour of the ſame name; there are alſo ſcattered houſes and hamlets over many of the iſlands, where particular plantations require them. The inhabitants are clothed chiefly with Britiſh manufactures, and all their implements for tilling the ground and building are made in Britain. Bermudas.

It is uncertain who were the firſt diſcoverers of the Bermudas iſlands. John Bermudas a Spaniard is commonly ſaid to have diſcovered them in 1527; but this is diſputed, and the diſcovery attributed to Henry May an Engliſhman. As the iſlands were without the reach of the Indian navigation, the Bermudas were abſolutely uninhabited when firſt diſcovered by the Europeans. May abovementioned was ſhipwrecked upon St George's; and with the cedar which they felled there, aſſiſted by the wreck of their own ſhip, he and his companions built another which carried them to Europe, where they publiſhed their accounts of the iſlands. When Lord Delawar was governor of Virginia, Sir Thomas Gates, Sir George Summers, and Captain Newport, were appointed to be his deputy-governors; but their ſhip being ſeparated by a ſtorm from the reſt of the ſquadron, was in the year 1609 wrecked on the Bermudas, and the governors diſagreeing among themſelves, built each of them a new ſhip of the cedar they found there, in which they ſeverally ſailed to Virginia. On their arrival there, the colony was in ſuch diſtreſs, that Lord Delaware, upon the report which his deputy-governors made him of the plenty they found at the Bermudas, deſpatched Sir George Summers to bring proviſions from thence to Virginia in the ſame ſhip which brought him from Bermudas, and which had not an ounce of iron about it, except one bolt in the keel. Sir George, after a tedious voyage, at laſt reached the place of his deſtination, where, ſoon after his arrival, he died, leaving his name to the iſlands, and his orders to the crew to return with black hogs to the colony of Virginia. This part of his will, however, the ſailors did not chooſe to execute; but ſetting ſail in their cedar ſhip for England, landed ſafely at Whitechurch in Dorſetſhire.

Notwithſtanding this dereliction of the iſland, however it was not without Engliſh inhabitants. Two ſailors, Carter and Waters, being apprehenſive of puniſhment for their crimes, had ſecreted themſelves from their fellows when Sir George was wrecked upon the iſland, and had ever ſince lived upon the natural productions of the ſoil. Upon the ſecond arrival of Sir George they enticed one Chard to remain with them; but differing about the ſovereignty of the iſland, Chard and Waters were on the point of cutting one anothers throats, when they were prevented by the prudence of Carter. Soon after, they had the good fortune to find a great piece of ambergris weighing about 80 pounds, beſides other pieces, which in thoſe days were ſufficient, if properly diſpoſed of, to have made each of them maſter of a large eſtate. Where they were, this ambergris was uſeleſs; and therefore they came to the deſperate reſolution of carrying themſelves and it in an open boat to Virginia or to Newfoundland, where they hoped to diſpoſe of their treaſure to advantage. In the mean time, however, the

Bermudas. Virginia Company claimed the property of the Bermudas iſlands; and accordingly ſold it to 120 perſons of their own ſociety, who obtained a charter from King James for their poſſeſſing it. This New Bermudas Company, as it was called, fitted out a ſhip with 60 planters on board to ſettle on the Bermudas, under the command of one Mr Richard Moor, by profeſſion a carpenter. The new colony arrived upon the iſland juſt at the time the three ſailors were about to depart with their ambergris; which Moor having diſcovered, he immediately ſeized and diſpoſed of it for the benefit of the company. So valuable a booty gave vaſt ſpirit to the new company; and the adventurers ſettled themſelves upon St George's iſland, where they raiſed cabins. As to Mr Moor, he was indefatigable in his duty, and carried on the fortifying and planting the iſland with incredible diligence; for we are told, that he not only built eight or nine forts or rather blockhouſes, but inured the ſettlers to martial diſcipline. Before the firſt year of his government was expired, Mr Moor received a ſupply of proviſions and planters from England; and he planned out the town of St George as it now ſtands. The fame of this ſettlement ſoon awakened the jealouſy of the Spaniards, who appeared off St George's with ſome veſſels; but being fired upon from the forts, they ſheered off, though the Engliſh at that time were ſo ill provided for a defence, that they had ſcarcely a ſingle barrel of gunpowder on the iſland. During Moor's government the Bermudas were plagued with rats which had been imported into them by the Engliſh ſhips. This vermin multiplied ſo faſt in St George's iſland, that they even covered the ground, and had neſts in the trees. They deſtroyed all the fruits and corn within doors; nay, they increaſed to ſuch a degree, that St George's iſland was at laſt unable to maintain them, and they ſwam over to the neighbouring iſlands, where they made as great havock. This calamity laſted five years, though probably not in the ſame degree, and at laſt it ceaſed all of a ſudden.

On the expiration of Moor's government, he was ſucceeded by Captain Daniel Tucker, who improved all his predeceſſor's ſchemes for the benefit of the iſland, and particularly encouraged the culture of tobacco. Being a ſevere diſciplinarian, he held all under him ſo rigidly to duty, that five of his ſubjects planned as bold an enterpriſe for liberty as was perhaps ever put in execution. Their names were Barker, who is ſaid to have been a gentleman; another Barker, a joiner; Goodwin, a ſhip-carpenter; Paet, a ſailor; and Saunders, who planned the enterpriſe. Their management was as artful as their deſign was bold. Underſtanding that the governor was deterred from taking the pleaſure of fiſhing in an open boat, on account of the dangers attending it, they propoſed to build him one of a particular conſtruction, which accordingly they did in a ſecret part of the iſland; but when the governor came to view his boat, he underſtood that the builders had put to ſea in it. The intelligence was true: for the adventurers, having provided themſelves with the few neceſſaries they wanted, ſailed for England; and notwithſtanding the ſtorms they encountered, their being plundered by a French privateer, and the incredible miſeries they underwent, they landed in 42 days time at Corke in Ireland, where they were generouſly relieved and entertained by the earl of Thomond. Bermudas, Bern.

In 1619 Captain Tucker reſigned his government to Captain Butler. By this time the high character which the Summer iſlands bore in England rendered it faſhionable for men of the higheſt rank to encourage their ſettlement; and ſeveral of the firſt nobility of England had purchaſed plantations among them. Captain Butler brought over with him 500 paſſengers, who became planters on the iſlands, and raiſed a monument to the memory of Sir George Summers. The iſland was now ſo populous (for it contained about a thouſand whites), that Captain Butler applied himſelf to give it a new conſtitution of government by introducing an aſſembly, the government till this time being adminiſtered only in the name of the governor and council. A body of laws was likewiſe drawn up, as agreeable to the laws of England as the ſituation of the iſland would admit of. One Mr Barnard ſucceeded Captain Butler as governor, but died ſix weeks after his arrival on the iſland; upon which the council made choice of Mr Harriſon to be governor till a new one ſhould be appointed. No fewer than 3000 Engliſh were now ſettled in the Bermudas, and ſeveral perſons of diſtinction had curioſity enough to viſit it from England. Among theſe was Mr Waller the poet, a man of fortune, who being embroiled with the parliament and commonwealth of England, ſpent ſome months in the Summer iſlands, which he has celebrated in one of his poems as the moſt delightful place in the world. The dangers attending the navigation, and the untowardly ſituation of theſe iſlands, through their diſtance from the American continent, ſeem to be the reaſons why the Bermudas did not now become the beſt peopled iſlands belonging to England; as we are told that ſome time ago they were inhabited by no fewer than 10,000 whites. The inhabitants, however, never ſhowed any great ſpirit for commerce, and thus they never could become rich. This, together with the gradual alteration of the ſoil and climate already taken notice of, ſoon cauſed them dwindle in their population; and it is computed that they do not now contain above half the number of inhabitants they once did, and even theſe ſeem much more inclined to remove to ſome other place than to ſtay where they are; ſo that unleſs ſome beneficial branch of commerce be found out, or ſome uſeful manufacture eſtabliſhed, the ſtate of the Bermudas muſt daily grow worſe and worſe.

BERN, one of the cantons of Switzerland, which holds the ſecond rank among the 13; but as it is by far the largeſt in extent, containing almoſt one-third of the whole country, it ſeems juſtly entitled to the firſt. It is bounded to the north by the cantons of Baſil and Solothurn, and the Auſtrian foreſt towns; to the ſouth by the lake of Geneva, the Valais, and duchy of Savoy; to the eaſt by Uri, Underwald, Lucern, and the county of Baden; and to the weſt by Solothurn, Neufchatel, Franche Compte, the diſtrict of Biel, and the land of Gex. It is the moſt fruitful, the richeſt, and by much the largeſt, of all the cantons, extending in length about ſixty leagues, and about thirty where broadeſt. It yields not only plenty of grain, fruit, and paſture; but alſo good wine, a variety of coloured earths and clays, ſand ſtone, mundick, gypſum, pit-

coal,

Bern. coal, ſulphur, and iron-ore. Here likewiſe are large herds of cattle, great and ſmall; and, in conſequence of that, great quantities of milk, butter, and cheeſe. The rivers that water this canton are the Aar, the Emmat, the Wigger, the Aaa, the Ruſz, the Limmat, the Sanen, the Senſen, and the Kandel. The principal lake is that of Geneva; the length of which is about 18 leagues, and the greateſt breadth between three and four. The depth in ſome places is near 400 fathom, in others not above 40. The Rhone enters it at the eaſt end, near Bouveret, and iſſues out again at the weſt cloſe by Geneva. In ſummer its waters are much ſwelled by the melting of the ſnow on the mountains. This lake, however, is not entirely ſurrounded by the territory of Bern, but partly by Savoy and the country of Gex; the former of which belongs to the king of Sardinia, and the latter to France, and the territory of Sion. Its borders are extremely fertile and beautiful, being much embelliſhed with vineyards, which yield excellent wine, and interſperſed with towns and villages, betwixt which a conſiderable commerce is carried on. The other great lakes, that are wholly or partly within this canton, are thoſe of Neufchatel, Biel, Murte, Thun, Brien, and Halwyl, which all abound in fiſh, particularly that of Geneva, where trouts are ſometimes caught weighing 40 or 50 pounds. In that of Biel, called alſo the *Nydau-lake*, are two ſmall iſlands, one of which is very beautiful. This lake is about three leagues in length and one in breadth. Along the whole weſt and north-weſt ſides of the canton runs that chain of mountains called by the general name of *Jura*; but the ſeveral mountains of which it is compoſed have all their particular names. This canton is well cultivated, and very populous, the number of its ſubjects being computed at 400,000. German is the prevailing language, but almoſt all the people of faſhion ſpeak either French or Italian; even the common people in the Pais de Vaud, and other places that lie towards France or Italy, ſpeak a corrupt French or Italian, or a jargon compoſed of both. The eſtabliſhed religion here and the other Proteſtant cantons is Calviniſm, the ſame both in doctrine and diſcipline as in Holland; nor is any other tolerated, except in the common bailiages, and the vale of Frick. The miniſters are divided into deaneries and claſſes, and hold yearly chapters or ſynods. They are kept in a greater dependence on the civil power here than in the other cantons, and not ſuffered to interfere with matters of ſtate. The city of Bern firſt joined the confederacy in the year 1353. Towards the defence thereof the canton now furniſhes 2000 men. Every male from 16 to 60 is enrolled in the militia, and about a third of them regimented. There are officers for every diſtrict, whoſe province it is to ſee that the men be regularly exerciſed; that their arms, ammunition, and clothing, be in good condition; and that they be kept in a conſtant readineſs to march. Once a-year they are drawn out to a general review. The ſame attention is paid to thoſe that belong to the train of artillery. Some regiments conſiſt of married, and ſome of unmarried men; ſome of foot, others of dragoons. There is alſo one regiment and a troop of cuiraſſiers. The latter conſiſts entirely of burghers of Bern. Both the horſemen and footmen find their horſes, arms, and accoutrements. Beſides the arms and artillery in the arſenal at Bern, all the caſtles, where the country governors or bailiffs reſide, are well furniſhed with them. At Bern is a conſtant guard or garriſon of 200 men, and a ſmall garriſon at Fort Arburg. In the ſame city is alſo an office, which grants licenſes for levies to foreign powers, and where the recruits make their appearance and are regiſtered. The bailiffs have the chief direction of affairs in their ſeveral diſtricts, being generals of the militia, and preſiding in the courts of juſtice; but, in civil cauſes above a certain value, an appeal lies from them to Bern; and, in capital caſes, their ſentence muſt be confirmed by the great council before it can be executed. When any bailiwic is to be diſpoſed of, as many balls as there are competitors are put into a bag, whereof one is gilt, and he that draws that has the bailiwic. Bern.

Mr Keyſler obſerves, that the wealthieſt peaſants in Switzerland are thoſe of Bern; it being difficult to find a village without one, at leaſt, who is worth between 20,000 or 30,000 guilders, and ſometimes even 60,000. He ſays, the common people of both ſexes wear ſtraw hats, and that the women's petticoats are tied up ſo near their arm-pits, that hardly an hand's-breadth is left for their ſhape: that the inns, not only in this canton but throughout Switzerland, are in general very good; that the manners of the people were in many reſpects, greatly changed within 50 years before he viſited them, which was about 50 years ago, and conſequently muſt be much more ſo now; that inſtead of the plainneſs and honeſt ſimplicity of their anceſtors, the love of ſuperfluities and high living greatly prevailed; that luxury, pomp, and that infatuation for foreign productions which had infected moſt parts of Europe, had alſo extended its contagious influence to Switzerland, though not to ſuch a degree as in many other countries. Dr Burnet ſays, that drinking is ſo common, and produces ſo many quarrels and diſorders, that the bailiffs not only ſubſiſt by the fines payable for them, but often get eſtates, carrying perhaps 20,000 crowns at the end of five years to Bern; that their law is ſhort and clear, inſomuch that the moſt intricate ſuit is ended after two or perhaps three hearings, either in the firſt inſtance before the bailiff, or in the ſecond at Bern; that the civility expreſſed in this country to women, at firſt meeting them, is not by ſaluting them, but by ſhaking them by the hand, and that none but ſtrangers take off their hats to them. Mr Addiſon ſays, that the peaſants are generally clothed in a coarſe kind of canvas, the manufacture of the country, and that their holiday-clothes go from father to ſon; ſo that it is not uncommon to ſee a countryman in his great-grandfather's doublet and breeches; that the belief of witchcraft prevailed among them ſo much, that there were ſome executions on that account while he was in the country; that the queſtion, or torture, is uſed not only in this canton but all over Switzerland; that though the ſubjects of the ſtate are rich, the public is poor; and though they could oppoſe a ſudden invaſion, yet that their unkindly ſoil requires ſuch a number of hands to cultivate it, that they could not ſpare the reinforcements and recruits that would be neceſſary in a long war. Upon extraordinary occaſions, however, they boaſt that they could raiſe 80,000 men in 24 hours. This canton is divided into the German country, that is, that part of the canton in which the German tongue is ſpoken, and which is alſo

Bern. called the *ancient canton*, extending from Morat to the county of Baden; and the Roman, called alſo the *Waal*, and *Pais de Vaud*. The former of theſe contains 35 bailiwicks and about 300 pariſhes.

BERN, a city of Switzerland, and capital of the canton of that name, is ſituated in E. Long. 7. 40. N. Lat. 40. 0. It is ſaid that the taking of a bear on the day on which the foundation of this city was laid, gave occaſion to its name; hence it is often in Latin called *Arctopolis*, i. e. the city of the bear, and has a bear for its coat of arms. It is almoſt ſurrounded by the river Aar. The houſes are moſtly built of white freeſtone, and, in the principal ſtreets, have piazzas or arches under them, for the conveniency of walking dry in wet weather. Moſt of the ſtreets are paved with flints, and traverſed by a canal lined with freeſtone, which is brought from a conſiderable diſtance, and is very uſeful in carrying off the filth of the city, extinguiſhing fires, and other purpoſes. The city is large, ſtanding almoſt in the middle of the canton, and containing ſeveral churches, of which one is called the *Great Church*, and the firſt miniſter thereof *the dean*, who is the head of the city-clergy. From an inſcription near the great door of this church, it appears, that the firſt ſtone of it was laid in 1421. Over the ſame door is a repreſentation of the laſt judgment, in which the ſculptor hath placed the pope among the damned. In this city is alſo a college with eight profeſſors, a large public library, and a muſeum; a ſtately granary, in which a great quantity of corn is always kept; a guildhall; a well ſtored arſenal; and ſeveral hoſpitals. In the arſenal is a wooden ſtatue of the famous Tell, which repreſents him as taking aim at the apple placed on the head of his ſon. There is alſo the ſtatue of Berchtold von Zahringen, the founder of the city; and two large horns of buffaloes or wild bulls, called in Latin *Uri*, ſuch as are uſed in war by the canton of Uri, inſtead of trumpets, and taken from it in the year 1712. Hard by alſo hang the groteſque dreſſes of thoſe who blew them. The inhabitants of Uri, who boaſt their deſcent from the old Tau, bear a buffalo's head on their riſci, coat of arms; and the perſon who blows the great horn in time of war, is called the *bull of Uri*. In the Dominican church, a hole in the wall is always ſhown to ſtrangers, by means of which, it having a communication with the cell of a monk in an adjoining monaſtery, the pious fraud of making an image of the Virgin appear to ſpeak was once carried on, which for a while anſwered the purpoſes of the monks very well; but they were at laſt detected and puniſhed. This city, though larger, is not ſo populous nor ſo well built as that of Zurich. On the eaſt ſide of it is a handſome ſtone bridge; and near the great church is a very fine platform ſome hundred feet in height, which makes a moſt delightful walk, being planted with limes, and commanding a charming proſpect, particularly of the mountains of the Griſons, covered with ſnow in the midſt of ſummer. In 1654 a ſtudent of divinity, being on horſeback, and in liquor, leaped over this terrace without receiving any other hurt than breaking a leg, and lived many years after, but the horſe was killed. In the upper part of the city are always kept a number of bears in two encloſures, with fir-trees for them to clamber and play upon. Of the burghers of Bern, only thoſe are qualified for the government and magiſtracy of the city who are the deſcendants of ſuch as were made burghers before the year 1635. Other qualifications are alſo neceſſary; in particular, they muſt not be under 30 years of age, and muſt be enrolled in one of the 12 companies. To obtain a country government, or to hold any conſiderable employment, the candidate alſo muſt be married. The great council, in which the ſovereignty of the canton is veſted, conſiſts, when full, of 229; but is generally much ſhort of that number, 80 or more often dying before their places are filled up. The leſſer council ſenate, or, as it is called, the *daily council*, becauſe it meets every day, Sundays and holidays excepted, conſiſts of 27 members, including the two prætors or advoyers, the four tribunes of the people, the two treaſurers, and the two heimlichers or ſecrecymen, ſo called becauſe to them all ſecrets relating to the ſtate are diſcovered. The members of the great and little councils mutually fill up the vacancies that happen in theſe two colleges. How the bailiffs are choſen we have already taken notice. Our limits will not permit us to enter into any farther detail with reſpect to the government: only it is to be obſerved in general, that all the officers of any note are choſen out of the great or little councils; and that all the bailiffs and caſtellans of the canton continue ſix years in office. The trade of the city is not very great, but was leſs before the French refugees ſettled therein: ſome, however, doubt whether it has been a gainer by them; as by their introduction of French modes and luxury, they have helped to baniſh the ancient Helvetic ſimplicity and frugality. The territory immediately under its juriſdiction is divided into four governments, with which the four venners, or ſtandard-bearers, are inveſted. It declared for the Reformation in 1528, after a ſolemn diſputation. Here the Britiſh envoy to the cantons reſides.

Bern, Bern-Machine.

BERN-Machine, the name of an engine for rooting up trees, invented by Peter Sommer, a native of Bern in Switzerland.

This machine is repreſented by a figure on Plate LXXXVIII. drawn from a model in the machine-room of the Society for the Encouragement of Arts, &c. It conſiſts of three principal parts; the beam, the ram, and the lever. The beam ABC, (N° 1.) of which only one ſide is ſeen in the figure, is compoſed of two ſtout planks of oak three inches thick at leaſt, and ſeparated by two tranſverſe pieces of the ſame wood at A and C, about three inches thick. Theſe planks are bored through with correſponding holes, as repreſented in the figure, to receive iron pins, upon which the lever acts between the two ſides of the beam, and which is ſhifted higher and higher as the tree is raiſed or rather puſhed out of its place. The ſides are well ſecured at the top and bottom by ſtrong iron hoops. The iron pins on which the lever reſts ſhould be an inch and a quarter, and the holes through which they paſs an inch and a half in diameter. The poſition of theſe holes is ſufficiently indicated by the figure. The foot of the beam, when the machine is in action, is ſecured by ſtakes repreſented at G, driven into the earth. The ram D, which is made of oak, elm, or ſome other ſtrong wood, is capped with three ſtrong iron ſpikes, repreſented at *f*, which take faſt hold of the tree. This ram is ſix or eight inches ſquare;

Bern-Machine.

ſquare; and a ſlit is cut lengthwiſe through the middle of it, from its lower end at K to the firſt ferule *a*, in order to allow room for the chain *g h* to play round the pulley K, which ſhould be four inches thick, and nine inches in diameter. This ram is raiſed by means of the chain *g h*, which ſhould be about ten feet long, with links four inches and three quarters in length, and an inch thick. One end of this chain is faſtened to the top of the beam at C, while the other, after paſſing through the lower part of the ram, and over the pulley K, terminates in a ring or link repreſented N° 3. the two ears *m n* of which ſerve to keep it in a true poſition between the two planks of the beam. In this ring the hook P is inſerted. The hook is repreſented in profile, N° 2. where F is the part that takes hold of the ring. But it muſt be obſerved that the parts of this machine, repreſented in N° 2, 3. are drawn on a ſcale twice as large as the whole engine. The hook F, N° 2. ſhould be made of very tough iron, as well as the handle D, and the arch E *c*. This handle ſhould be two inches thick at ϰ, where it joins to the hook, and the thickneſs gradually leſſen by degrees up to the arch, which need not be more than half an inch thick. On each ſide of the pin ϰ, is a ſemicircular notch, *x*, *y*, which reſts alternately on the pins when the machine is worked. The hole D, and the arch E *c*, ſerve to fix a long lever of wood E F, N° 1. by means of two iron pins; and by this contrivance the lever is either raiſed or depreſſed at pleaſure, in order to render the working of the machine eaſy in whatever part of the beam the lever may be placed: for without this contrivance the extremity of the lever E F, would, when the handle is near the top of the beam, be much higher than men ſtanding upon the ground could reach. It muſt however be remembered, that the lever is often ſhortened by this contrivance, and conſequently its power leſſened.

The machine is worked in the following manner: It is placed againſt a tree, in the manner repreſented in the figure, ſo that the iron ſpikes at *f* may have hold of the tree, and the end of the beam A be ſupported by ſtakes repreſented at G. The iron handle, N° 2. is placed in the opening between the two planks of the beam, and the wooden lever fixed to it by means of the iron pins already mentioned. The hook F takes hold of the chain, and one of the iron pins is thruſt into the outer row of holes, by which means the outer notch *x* will reſt on the pin, which will be now the centre of motion; and the end of the lever E, N° 1. being preſſed downwards, the other notch *y*, N° 2. will be raiſed, and at the ſame time the chain, and conſequently the ram. The other iron pin is now to be thruſt into the hole in the inner row, next above that which was before the centre of motion, and the end of the lever E elevated or puſhed upwards, the latter pin on which the notch *y* reſts now becoming the centre of motion. By this alternate motion of the lever, and ſhifting the pins, the chain is drawn upwards over the pulley K, and conſequently the whole force of the engine exerted againſt the tree. There is a ſmall wheel at L, in order to leſſen the friction of that part of the machine.

From this account the reader will very eaſily perceive that the machine is nothing more than a ſingle pulley compounded with a lever of the firſt and ſecond order. It muſt however be remembered, that as the puſh of the engine is given in an oblique direction, it will exert a greater or leſſer force againſt the horizontal roots of the tree in proportion to the angle formed by the machine with the plane of the horizon; and that the angle of 45° is the maximum, or that when the machine will exert its greateſt force againſt the horizontal roots of the tree.

Bernacle, Bernard.

BERNACLE, a ſpecies of gooſe. See ANAS, ORNITHOLOGY *Index*.

BERNARD, St, the firſt abbot of Clairvaux, was born in the year 1091, in the village of Fountaine, in Burgundy. He acquired ſo great a reputation by his zeal and abilities, that all the affairs of the church appeared to reſt upon his ſhoulders, and kings and princes ſeemed to have choſen him for a general arbitrator of their differences. It was owing to him that Innocent II. was acknowledged ſovereign pontiff, and after the death of Peter Louis anti-pope, that Victor, who had been named *ſucceſſor*, made a voluntary abdication of his dignity. He convicted Abelard at the council of Sens, in the year 1140. He oppoſed the monk Raoul; he perſecuted the followers of Arnaud de Breſſe: and, in 1148, he got Gilbert de la Porvicé, biſhop of Poitiers, and Eonde l'Etoile, to be condemned in the council of Rheims. By ſuch zealous behaviour he verified (ſays Mr Bayle) the interpretation of his mother's dream. She dreamed, when ſhe was with child of him, that ſhe ſhould bring forth a white dog, whoſe barking ſhould be very loud. Being aſtoniſhed at this dream, ſhe conſulted a monk, who ſaid to her, "Be of good courage; you ſhall have a ſon who ſhall guard the houſe of God, and bark loudly againſt the enemies of the faith." But St Bernard went even beyond the prediction, for he barked ſometimes againſt chimerical enemies: he was more happy in exterminating the heterodox, than in ruining the infidels; and yet he attacked theſe laſt, not only with the ordinary arms of his eloquence, but alſo with the extraordinary arms of prophecy. He preached up the cruſade under Louis the Younger, and by this means he enlarged the troops of the cruſaders beyond expreſſion: but all the fine hopes with which he flattered the people were diſappointed by the event; and when complaint was made that he had brought an infinite number of Chriſtians to ſlaughter without going out of his own country, he cleared himſelf by ſaying that the ſins of the croiſes had hindered the effect of his prophecies. In ſhort, he is ſaid to have founded 160 monaſteries, and to have wrought a great number of miracles. He died on the 20th of Auguſt, 1153, at 63 years of age. The beſt edition of his works is that of 1690, by Father Mabillon.

BERNARD, *Dr Edward*, a learned aſtronomer, linguiſt, and critic, was born at Perry St Paul, on the 2d of May, 1638, and educated at Merchant-Taylor's ſchool, and St John's college, Oxford. During his ſtay at ſchool, he had laid in an uncommon fund of claſſical learning; ſo that, on his going to the univerſity, he was a great maſter of all the elegancies of the Greek and Latin tongues, and not unacquainted with the Hebrew. On his ſettling in the univerſity, he applied himſelf with great diligence to hiſtory, philology, and philoſophy; and made himſelf maſter of the Hebrew, Syriac, Arabic, and Coptic languages, and then applied himſelf to the ſtudy of the mathematics under the famous Dr Wallis. Having ſucceſſively taken the degrees

Bernard. degrees of bachelor and master of arts, and afterwards that of bachelor of divinity in 1668, he went to Leyden to consult several oriental manuscripts left to that university by Joseph Scaliger and Levinus Warnerus. At his return to Oxford, he collated and examined the most valuable manuscripts in the Bodleian library; which induced those who published any ancient authors, to apply to him for his observations or emendations from the manuscripts at Oxford; which he readily imparted, grudging neither time nor pains to serve the learned; and by this means he became engaged in a very extensive correspondence with the learned of most countries. In the year 1669, the famous Christopher Wren, Savilian professor of astronomy at Oxford, having been appointed surveyor-general of his majesty's works, and being much detained at London by this employment, he obtained leave to name a deputy at Oxford, and pitched upon Mr Bernard, which engaged the latter in a more particular application to the study of astronomy. In 1676, he was sent by the earl of Arlington to France, in order to be tutor to the dukes of Grafton and Northumberland, sons to King Charles II. by the duchess of Cleveland, who then lived with their mother at Paris: but the simplicity of his manners not suiting the gaiety of the duchess's family, he returned about a year after to Oxford, and pursued his studies; in which he made great proficiency, as his many learned astronomical and critical works show. He composed tables of the longitudes, latitudes, right ascensions, &c. of the fixed stars; Observations in Latin on the Obliquity of the Ecliptic; and other pieces inserted in the Philosophical Transactions. He also wrote, 1. A Treatise of the ancient Weights and Measures. 2. *Chronologiæ Samaritanæ Synopsis*, in two tables. 3. Testimonies of the Ancients concerning the Greek Version of the Old Testament by the Seventy; and several other learned works. He was a person of great piety, virtue, and humanity, and died on the 12th of January, 1696, in the 59th year of his age, leaving behind him a great number of learned and valuable manuscripts.

Bernard, *James*, professor of philosophy and mathematics, and minister of the Walloon church at Leyden, was born September 1. 1658, at Nions in Dauphine. Having studied at Geneva, he returned to France in 1679, and was chosen minister of Venterol, a village in Dauphiné. Some time after, he was removed to the church of Vinsobres in the same province. But the persecutions raised against the Protestants in France having obliged him to leave his native country, he retired to Holland, where he was received with great civility, and was appointed one of the pensionary ministers of Gauda. In July 1688, he began a political publication entitled *Histoire abregée de l'Europe*, &c. which he continued monthly till December 1688, and makes five volumes in 12mo. In 1692, he began his *Lettres Historiques*, containing an account of the most important transactions in Europe, with necessary reflections. He carried on this work, which was also published monthly, till the end of the year 1698. It was afterwards continued by other hands, and consists of a great many volumes. Mr Le Clerc having left off his *Bibliotheque Universelle*, in 1691, Mr Bernard wrote the greatest part of the 20th volume, and by himself carried on the five following to the year 1693. In 1698, he collected and published *Actes et Negociations de la paix de Ryswic*, in four volumes 12mo. In 1699 he began the *Nouvelles de la republique des lettres*, which continued till December 1710. Mr Bernard having acquired great reputation by his works, as well as by his sermons at Gauda, and the Hague, the congregation of the Walloon church at Leyden became extremely desirous to have him for one of their ministers; and a vacancy happening in 1705, he was unanimously chosen. About the same time, Mr de Volder professor of philosophy and mathematics at Leyden having resigned, Mr Bernard was appointed his successor; and the university presented him with the degrees of doctor of philosophy and master of arts. His public and private lectures took up a great part of his time; yet he did not neglect his pastoral function, but composed his sermons with great care: he wrote also two excellent treatises, one on a late repentance, the other on the excellency of religion. In 1716, he published a supplement to Moreri's dictionary in two volumes folio. The same year he resumed his *Nouvelles de la republique des lettres*; which he continued till his death, which happened the 27th of April, 1718, in the 60th year of his age. Bernard || Bernera.

Bernard, St, the Great; a mountain in Savoy and Switzerland, between Valais and the valley of Aoust, at the source of the rivers Drance and Doria. The top is always covered with snow; and there is a great monastery seated thereon, where the monks always entertain travellers without distinction of religion for three days.

BERNARDINE, St, was born at Massa in Tuscany, in 1380. In 1404 he entered into a Franciscan monastery near Sienna, where he became an eminent preacher; and was afterward sent to Jerusalem, as commissary of the Holy Land. On his return to Italy, he visited several cities, where he preached with such applause, that the cities of Ferrara, Sienna, and Urbino, desired Pope Eugenius IV. to appoint him their bishop: but Bernardine refused the honour, accepting only the office of vicar-general of the friars of the observance for all Italy. He repaired and founded above 300 monasteries in that country; died in 1444; was canonized in 1450 by Pope Nicholas; and his works were published at Venice in 1591, in 4 vols 4to.

BERNARDINES, an order of monks, founded by Robert abbot of Moleme, and reformed by St Bernard. They wear a white robe with a black scapulary; and when they officiate they are clothed with a large gown, which is all white, and hath great sleeves, with a hood of the same colour.—The Bernardines differ very little from the Cistercians. They had their origin toward the beginning of the 12th century.

BERNAY, a town of Upper Normandy in France, seated on the river Carantone, in E. Long. 0. 50. N. Lat. 49. 6.

BERNBURG, a town of Germany, in the circle of Upper Saxony, and principality of Anhalt, where a branch of the house of Anhalt resides. It is seated on the river Sara, in E. Long. 12. 30. N. Lat. 51. 55.

BERNERA, one of the Western Isles of Scotland, lying about two leagues to the southward of Harries. It is about five miles in circumference; the soil is sandy, but when manured with the alga marina, extremely fertile,

Bernera || Bernier.

fertile, producing an increaſe of thirty-fold of barley; nay, one grain has been known to produce 14 ears when the ſeaſon was remarkably favourable. The face of the iſland is extremely agreeable in ſummer, exhibiting a pleaſing variety of corn fields and clover paſtures. Here is a freſh water lake called *Lochbruis*, diverſified with ſmall iſlands, and abounding with eels, which the natives by the help of lights catch in the night-time, as they fall down a rivulet towards the ſea in heaps twiſted together. There are two chapels in this iſland dedicated to St Aſaph and St Columbas; and near the former is a ſtone ſtanding about eight feet above the ground. At the eaſt end of this iſland there is a ſtrange reciprocation of the flux and reflux of the ſea, and another no leſs remarkable upon the weſt ſide of the long iſland. The tides from the ſouth-weſt run along northward; ſo that during the ordinary courſe of the tides the flood runs eaſt in the frith, where Bernera lies, and the ebb runs weſt: thus the ſea ebbs and flows regularly for four days before, and as long after, the full and change of the moon; the ſpring tides generally riſing 14 feet perpendicular, and the others proportionably: but for four days before, and as many after, the quarter moons, there is a ſingular variation; at that time a ſoutherly moon making high water, the courſe of the tide being eaſtward, it begins to flow at half an hour after nine in the morning, and continues to flow till half an hour after three in the afternoon, when it is high water; but when it begins to ebb, the current ſtill runs eaſtward, until it is low water; ſo that the tide runs eaſtward 12 hours together, that is, from half paſt nine in the morning till half haſt nine at night; yet when the night-tide begins to flow, the current turns and runs weſtward all night for 12 hours, during both flood and ebb: thus the reciprocations continue, one flood and ebb running eaſtward and another weſtward, till within four days of the full and change of the moon; then they reſume their ordinary courſe, running eaſt during the ſix hours of flood, and weſt during the ſix hours of ebb. There is another phenomenon in theſe tides no leſs remarkable than that juſt now mentioned. Between the vernal and autumnal equinox, that is, during one half of the year, the tides about the quarter moons run all day eaſtward and all night weſtward; and during the other ſix months their courſe is reverſed, being weſtward in the day and eaſtward in the night.

BERNICLA, the trivial name of a ſpecies of gooſe. See Anas, Ornithology *Index*.

BERNICLE, a ſpecies of lepas. See Lepas, Conchology *Index*.

BERNIER, Nicholas, an eminent muſician and compoſer, was born at Mante on the Seine, in the year 1664. By his merit in his profeſſion he attained to be conductor of the muſic in the chapel of St Stephen, and afterwards in that of the king. The regent duke of Orleans admired his works, and patronized their author. This prince having given him a motet of his own compoſition to examine, and being impatient for his obſervations thereon, went to the houſe of Bernier, and entering his ſtudy, found the abbe de la Croix there criticiſing his piece, while the muſician himſelf was in another room carouſing and ſinging with a company of his friends. The duke broke in upon and interrupted their mirth, with a reprimand of Bernier for his attention to the taſk aſſigned him. This muſician died at Paris in 1734. His five books of Cantatas and Songs for one and two voices, the words of which were written by Rouſſeau and Fuſelier, have procured him great reputation. There are beſides of his compoſition Les Nuits de Sceaux, and many motets, which are ſtill in great eſteem.

Bernier || Bernouilli.

Bernier, *Francis*, ſurnamed the *Mogul*, on account of his travels and reſidence in that country, was born at Angers in France; and after he had taken his degree of doctor of phyſic at Montpellier, left his country in 1654, went to Egypt, to the Holy Land, and to the kingdom of the Mogul, where he was phyſician to that monarch, attended him in his journeys, and ſtayed there 12 years. Upon his return to France, he publiſhed the hiſtory of the countries he had viſited; and ſpent the remainder of his life in compoſing various other works, particularly an Abridgment of the philoſophy of Gaſſendus in 8 vols 12mo. His firſt work is eſteemed to be the beſt account we have of the countries which are the ſubject of it.

BERNINI, John Laurence, commonly called *Cavalier Bernin*, a Neapolitan, famous for his ſkill in painting, ſculpture, architecture, and mechanics. He firſt began to be known under the pontificate of Paul V. Rome is indebted to this artiſt for ſome of its greateſt ornaments; and there are in the church of St Peter no leſs than 15 different works of his hand. He died at Rome in 1680.

BERNO, abbot of Richenou, in the dioceſe of Conſtance, who flouriſhed about the year 1008, is celebrated as a poet, rhetor, muſician, philoſopher, and divine. He was the author of ſeveral treatiſes on muſic, particularly of one *De Inſtrumentis Muſicalibus*, beginning with the words *Muſicam non eſſe contem!* which he dedicated to Arrabon, archbiſhop of Mentz. He alſo wrote *De Menſura Monochordi*. But the moſt celebrated of his works is a treatiſe *De Muſica ſeu Tonis*, which he wrote and dedicated to Pelegrines archbiſhop of Cologne, beginning *Vero mundi iſti advenæ et peregrino*. This latter tract is part of the Baliol manuſcript, and follows the Enchiridion of Odo: it contains a ſummary of the doctrines delivered by Boetius, an explanation of the eccleſiaſtical tones, intermixed with frequent exhortations to piety, and the application of muſic to religious purpoſes. He was highly favoured by the emperor Henry II. for his great learning and piety; and ſucceeded ſo well in his endeavours to promote learning, that his abbey of Richenou was as famous in his time as thoſe of St Gaul and Cluni, then the moſt celebrated in France. He died in 1048; and was interred in the church of his monaſtery, which but a ſhort time before he had dedicated to St Mark.

BERNOUILLI, James, a celebrated mathematician, born at Baſil the 27th of December 1654. Having taken his degrees in the univerſity of Baſil, he applied himſelf to divinity, not ſo much from inclination as complaiſance to his father. He gave very early proofs of his genius for mathematics, and ſoon became a geometrician, without any aſſiſtance from maſters, and at firſt almoſt without books: for he was not allowed to have any books of this kind; and if one fell by chance into his hands, he was obliged to conceal it, that he might not incur the reprimands of his father, who deſigned him for other ſtudies. This ſeverity made

him

Bernouilli. him chooſe for his device, Phaeton driving the chariot of the ſun, with theſe words, *Invito patre ſidera verſo*, "I traverſe the ſtars againſt my father's inclination:" This had a particular reference to aſtronomy, the part of mathematics to which he at firſt applied himſelf. But the precautions of his father did not avail, for he purſued his favourite ſtudy with great application. In 1676 he began his travels. When he was at Geneva, he fell upon a method to teach a young girl to write, though ſhe had loſt her ſight when ſhe was but two months old. At Bourdeaux he compoſed univerſal gnomonic tables, but they were never publiſhed. He returned from France to his own country in 1680. About this time there appeared a comet, the return of which he foretold; and wrote a ſmall treatiſe upon it, which he afterwards tranſlated into Latin. He went ſoon after to Holland, where he applied himſelf to the ſtudy of the new philoſophy. After having viſited Flanders and Brabant, he went to Calais, and paſſed over from thence to England. At London he contracted an acquaintance with all the moſt eminent men in the ſeveral ſciences; and had the honour of being frequently preſent at the philoſophical ſocieties held at the houſe of the famous Mr Boyle. He returned to his native country in 1682; and he exhibited at Baſil a courſe of experiments in natural philoſophy and mechanics, which conſiſted of a variety of new diſcoveries. In 1682, he publiſhed his eſſay of a new ſyſtem of comets; and the year following, his diſſertation on the weight of air. Mr Leibnitz, about this time, having publiſhed in the *Acta Eruditorum* at Leipſic ſome eſſay of his new *Calculus differentialis*, or *infinimens petits*, but concealed the art and method of it; Mr Bernouilli, and one of his brothers, diſcovered, by the little which they ſaw, the beauty and extent of it: they endeavoured to unravel the ſecret; which they did with ſuch ſucceſs, that Mr Leibnitz declared, that the invention belonged to them as much as to himſelf. In 1687, the profeſſorſhip of mathematics at Baſil being vacant, Mr Bernouilli was appointed his ſucceſſor. He diſcharged this truſt with univerſal applauſe; and his reputation drew a great number of foreigners from all parts to hear his lectures. He had an admirable talent in teaching, and adapting himſelf to the different genius and capacity of his ſcholars. In 1699, he was admitted into the academy of ſciences at Paris as a foreign member, and in 1701 the ſame honour was conferred upon him by the academy of Berlin. He wrote ſeveral pieces in the *Acta Eruditorum* of Leipſic, the *Journal des Sçavans*, and the *Hiſtoire de l'Academie des Sciences*. His aſſiduous application to the ſtudies brought upon him the gout, and by degrees a ſlow fever, of which he died the 16th of Auguſt 1705, in the 58th year of his age.—Archimedes having found out the proportion of a ſphere to a cylinder circumſcribed about it, ordered it to be engraven upon his monument. In imitation of him, Mr Bernouilli appointed, that a ſpiral logarithmical curve ſhould be inſcribed upon his tomb, with theſe words, *Eadem mutata reſurgo*; in alluſion to the hopes of the reſurrection, which are repreſented in ſome meaſure by the properties of the curve which he had the honour of diſcovering.

Bernouilli, *Daniel*, a celebrated phyſician and philoſopher, was born at Groningen, February 9th 1700. He was intended by his parents for trade, but his genius led him to different purſuits. He paſſed ſome time in Italy, and at 24 refuſed to be preſident of an academy meant to have been eſtabliſhed at Genoa. He ſpent ſeveral years at St Peterſburg with great credit; and in 1733 returned to Baſil, where he ſucceſſively filled the chair of phyſic, natural and ſpeculative philoſophy. In his firſt work, *Exercitationes Mathematicæ*, he took the only title he then had, viz. "Son of John Bernouilli," and never would ſuffer any other to be added to it. This work appeared in Italy with the great inquiſitor's privilege added to it, and it claſſed Bernouilli in the rank of inventors. He gained or divided nine prizes, which were contended for by the moſt illuſtrious mathematicians in Europe, from the academy of ſciences. The only man who has had ſucceſs of the ſame kind is Euler, his countryman, diſciple, rival, and friend. His firſt prize he gained at 24 years of age. In 1734 he divided one with his father: but this hurt the family union; for the father conſtrued the conteſt itſelf into a want of reſpect; and the ſon did not ſufficiently conceal that he thought (what was really the caſe) his own piece better than his father's. Beſides this, he declared for Newton, againſt whom his father had contended all his life. In 1740, Mr Bernouilli divided the prize "On the Tides of the Sea" with Euler and Maclaurin. The academy at the ſame time crowned a fourth piece, whoſe only merit was that of being Carteſian; but this was the laſt public act of adoration paid by it to the authority of the author of the Vortices, which it had obeyed perhaps too long. In 1748, Mr Daniel Bernouilli ſucceeded his father in the academy of ſciences, and was himſelf ſucceeded by his brother John; this place, ſince its firſt erection, *i. e.* 84 years, never having been without a Bernouilli to fill it. He was extremely reſpected at Baſil; and to bow to Daniel Bernouilli, when they met him in the ſtreets, was one of the firſt leſſons which every father gave every child. He uſed to tell two little adventures, which he ſaid had given him more pleaſure than all the other honours he had received. He was travelling with a learned ſtranger, who, being pleaſed with his converſation, aſked his name: "I am Daniel Bernoulli," anſwered he, with great modeſty; "And I," ſaid the ſtranger (who thought he meant to laugh at him), "am Iſaac Newton." Another time he was giving a dinner to the famous Koenig the mathematician, who boaſted, with a ſufficient degree of ſelf-complacency, of a difficult problem he had reſolved with much trouble. Bernouilli went on doing the honours of his table; and, when they went to drink coffee, preſented him with a ſolution of the problem more elegant than his own. He died in March 1782. Bernouilli, Beroea.

BEROEA, in *Ancient Geography*, a noble city of Macedonia, to the ſouth of Edeſſa, or Ægæ, and ſouth-eaſt of Cyrtus. The people are commended in Scripture for their reception of the Goſpel on a fair and impartial examination.—Another *Beroea*, of Syria (Stephanus); called alſo *Beroe*, and by the inhabitants *Beroëa*. It was the ſtanding tradition for ſome ages, that it is the modern Aleppo; called *Chalep* in Nicetas, Nicephorus, and Zonaras; from which it is ſuppoſed the preſent appellation *Aleppo* is derived; diſtant 90 miles from the Levant ſea and the port of Scanderoon, and about 100 miles weſt of the Euphrates. E. Long. 36. 0. Lat. 36. 30.

BEROOT,

Beroot, Berosus.

BEROOT, or BAIROUT, a town of Phœnicia, a province of Syria in Turkey in Asia. It is the ancient Berytus; but there are now no remains of its former beauty, except its situation. It stands in a plain, which from the foot of Lebanon runs out into the sea, narrowing to a point, about two leagues from the ordinary line of the shore, and on the north side forms a pretty long road, which receives the river of Nahr-el-Salib, called also *Nahr-Bairout*. This river has such frequent floods in winter, as to have occasioned the building of a considerable bridge; but it is in so ruinous a state as to be impassable. The bottom of the road is rock, which chafes the cables, and renders it very insecure. From hence, as we proceed westward towards the point, we reach, after an hour's journey, the town of Bairout. This belonged to the Druzes, till lately that it was taken from them, and a Turkish garrison placed in it. Still however it continues to be the emporium of the Maronites and the Druzes, whence they export their cottons and silks, almost all of which are destined for Cairo. In return, they receive rice, tobacco, coffee, and specie, which they exchange again for the corn of the Bekaa and the Hauran. This commerce maintains near 6000 persons. The dialect of the inhabitants is justly censured as the most corrupt of any in the country: it unites in itself the 12 faults enumerated by the Arabian grammarians.—The port of Beroot, formed like all the others on the coast by a pier, is like them choaked up with sand and ruins. The town is surrounded by a wall, the soft and sandy stone of which may be pierced by a cannon ball without breaking or crumbling; which was unfavourable to the Russians in their attack: but in other respects this wall, and its old towers, are defenceless. Two inconveniences will prevent Beroot from ever becoming a place of strength; for it is commanded by a chain of hills to the south-east, and is entirely destitute of water, which the women are obliged to fetch from a well at the distance of half a quarter of a league, though what they find there is but indifferent. By digging in order to form reservoirs, subterraneous ruins have been discovered; from which it appears, that the modern town is built on the ancient one. The same may be observed of Latakia, Antioch, Tripoli, Saide, and the greater part of the towns on the coast, which has been occasioned by earthquakes that have destroyed them at different periods. We find likewise, without the walls to the west, heaps of rubbish, and some shafts of columns, which indicate that Beroot has been formerly much larger than at present. The plain around it is entirely planted with white mulberry trees, which are young and flourishing; by which means the silk produced here is of the very finest quality. In descending from the mountains (says M. Volney), no prospect can be more delightful than to behold, from their summits or declivities, the rich carpet of verdure formed by the tops of these useful trees in the distant bottom of the valley. In summer, it is inconvenient to reside at Beroot on account of the heat and the warmth of the water: the town, however, is not unhealthy, though it is said to have been so formerly. It has ceased to be unhealthy since the Emir Fakr-eldin planted the wood of fir trees, which is still standing a league to the southward of the town. E. Long. 35. 38. N. Lat. 34. 18.

BEROSUS, priest of the temple of Belus at Babylon, in the time of Ptolemy Philadelphus, wrote the History of Chaldea, which is often cited by the ancients, and of which Josephus gives some curious fragments. The Athenians, according to Pliny, caused his statue, with a golden tongue, to be placed in their Gymnasium.

Berre || Perriman.

BERRE, a town of France, in the department of the Mouths of the Rhone, seated on a lake of the same name. It is remarkable for the quantity and goodness of the salt that is made there, but the air is very unwholesome. E. Long. 4. 32. N. Lat. 43. 32.

BERRETINI DA CORTONA, PIETRO, painter of history and landscape, was born at Crotona in 1596; and, according to some writers, was a disciple of Andrea Commodi; though others affirm that he was the disciple of Baccio Ciarpi, and the author of the Abrege says he was successively the disciple of both: but he is allowed to have been as great and as enlarged a genius as any of his profession, and to have painted more agreeably than most of the artists who were his cotemporaries. He went young to Rome, and applied himself diligently to study the antiques, the works of Raphael, Buonaroti, and Polidoro; by which he so improved his taste and his hand, that he distinguished himself in a degree superior to any of the artists of his time. He worked with remarkable ease and freedom; his figures are admirably grouped; his distribution is truly elegant; the chiaro-scuro is judiciously observed; and through his whole compositions there appears uncommon grace: but De Piles observes, that it was not such a grace as was the portion of Raphael and Correggio; but a general grace, consisting rather in a habit of making the airs of his heads always agreeable, than in a choice of expressions suitable to each subject. In his large compositions, the colouring had a good effect; but his colouring in fresco is far superior to what he performed in oil: nor do his easel pictures appear as finished as might be expected from so great a master, when compared with what he painted in a larger size. By the best judges it seems to be agreed, that although this master was frequently incorrect; though not always judicious in his expressions; though irregular in his draperies, and apt to design his figures too short and too heavy; yet, by the magnificence of his composition, the delicate airs of his figures, the grandeur of his decorations, and the astonishing beauty and gracefulness of the whole together, he must be allowed to have been the most agreeable manneriſt that any age hath produced.—He died in 1669. Some of his most capital works are in the Barberini palace at Rome, and the Palazzo Pitti at Florence.

BERRETONI, NICOLO, history-painter, was born at Macerata in 1617, and was a disciple of Carlo Maratti, with whom he studied design and colouring for some years; and attained such excellence, that he excited even the jealousy and envy of his master, who seemed to be apprehensive of finding a powerful competitor and rival in his pupil.—His early works, after he quitted the school of Maratti, were in the style and taste of Guido; and they could not possibly have a more high encomium or recommendation. He died in 1682.

BERRIMAN, DR WILLIAM, was the son of Mr John Berriman apothecary in Bishopsgate-street, London, where he was born in 1688. He studied at Oriel-college, Oxford, where he took his several degrees, and become curate and lecturer of All-hallows

Berry || Berſabe.

in Thames-ſtreet, and lecturer of St Michael's, Queenhithe. In 1720, he was appointed domeſtic chaplain to Dr Robinſon biſhop of London, who ſoon after collated him to the living of St Andrew's Underſhaft; and in 1727, he was elected fellow of Eton-college. He died in 1750, in the 62d year of his age. He wrote, 1. A ſeaſonable Review of Mr Whiſton's Account of Primitive Doxologies. 2. A Hiſtorical Account of the Trinitarian Controverſy, in eight ſermons, at Lady Moyer's lecture. 3. Brief Remarks on Mr Chandler's Introduction to the Hiſtory of the Inquiſition. 4. Sermons at Boyle's lectures, 2 vols 8vo. 5. Chriſtian Doctrines and Duties explained and recommended, in 2 vols 8vo; and other works.

BERRY. See BACCA.

BERRY, a province of France, which had the title of a duchy. It now forms the two departments of Cher and Indre; and is bounded on the north by Solome, on the ſouth by Marche, on the eaſt by Nivernois and Bourbonnois, and on the weſt by Touraine. It is 90 miles in length from north to ſouth, and 73 in breadth from eaſt to weſt. The air is very temperate; and the ſoil produces wheat, rye, and wine little inferior to Burgundy; that of Sancerre, St Satur, and Lavernuſſe, is the beſt. The fruits are in plenty, and pretty good. The paſtures are proper to fatten ſheep. This country produces alſo a good deal of hemp and flax. There are mines of iron and ſilver, but they are neglected. The ſtone quarries, within half a league of Bourges, are very ſerviceable. In the pariſh of St Hilare there is a mine of ochre, made uſe of in melting metals and for painting. Near Bourges there is a cold mineral ſpring, which has a clammy fat pellicle over it every morning, of different colours. It lets fall a fine black ſmooth ſediment, which has the ſame ſmell, and almoſt the ſame taſte, as gunpowder, which makes ſome conclude it partakes of ſulphur, vitriol, and ochre. The pellicle is as thick as a crown-piece; and when put on a red-hot fire-ſhovel, will bounce and ſparkle, as will alſo the ſediment. It is certain there is ſaltpetre in theſe waters, though vitriol ſeems to be the moſt predominant. Theſe waters, drank on the ſpot, temperate the heat of the blood and humours, open obſtructions, and ſtrengthen the fibres. Berry is watered by ſeveral rivers; the principal of which are the Lore, the Creuſe, the Cher, the Indre, the Orron, the Evre, the Aurette, the Maulon, the Great and Little Saudre, the Nerre, &c. Near Liniers, there is a lake 20 miles round. Berry is divided into the Upper and the Lower, and Bourges is the capital city. The inhabitants of Bourges carry on a ſmall trade with corn down the Loire; but that of the wine above mentioned is much more conſiderable, it being tranſported to Paris by means of that river and the canal of Briare. But the principal commerce conſiſts in the fat cattle which they ſend to Paris, and the great number of ſheep; theſe laſt bear fine wool, which is uſed in the manufactures of this province and other parts of the kingdom. There are two ſorts of manufactures in Berry; the one for cloths and ſerges, and the other for knit and wove ſtockings. There is likewiſe a great quantity of hemp, which is tranſported elſewhere; for they have not yet got the art of manufacturing it themſelves. At Aubigny there are 2000 perſons generally employed in the making of cloth.

BERSABE, in *Ancient Geography*, a town in the tribe of Simeon (Joſhua); the ſouth boundary not only of its own tribe but of the whole land of Iſrael, as appears from the common expreſſion "from Dan to Berſabe:" in our tranſlation it is Beer-Sheba. It was the reſidence of the patriarchs; as firſt of Abraham, from whom it took its name, and of Iſaac. It ſignifies the well or fountain of the oath; dug by Abraham, and claimed as his property by covenant and the religion of an oath, againſt the inſults of the Philiſtines. Euſebius and Jerome ſay, that there was a citadel and large village of that name in their time. It was called *Beerſheba of Judah* in 1 Kings xix. 3. not to diſtinguiſh it from the Beerſheba of Galilee, which probably did not then exiſt, but to aſcertain the limits of the king of Judah. In the lower age called *Caſtrum Verſabini*.

Berſara || Berwick.

BERSARII, in writers of the middle age, a kind of hunters, or ſportſmen, who purſued wild beaſts in foreſts and chaſes. The word ſeems derived from the barbarous Latin *berſare*, "to ſhoot with a bow;" on which principle it ſhould properly denote archers only, or bowmen. Or it might be derived from *berſa*, "the fence *or* pales of a park;" in which view, it ſhould primarily import thoſe who hunt or poach in parks or foreſts.

Hincmar ſpeaks of a kind of inferior officers in the court of Charlemagne, under the denomination of *berſarii*, *veltrarii*, and *beverarii*. Spelman takes the firſt to denote thoſe who hunted the wolf; the ſecond, thoſe who had the ſuperintendency of the hounds for that uſe; and the third, thoſe who hunted the beaver.

BERSELLO, a fortified town of Italy in the Modeneſe. It was taken by Prince Eugene in 1702; and by the French in 1703, who were obliged to abandon it in 1707. It is ſeated near the confluence of the rivers Linza and Po, in E. Long. 10. 30. N. Lat. 44. 55.

BERSUIRE, a town of France in the department of the two Sevres. W. Long. 0. 27. N. Lat. 46. 52.

BERTINERO, a town of Romagna in Italy, with a ſtrong citadel. It is the ſee of a biſhop; and is ſeated on a hill, in E. Long. 11. 47. N. Lat. 44. 8.

BERTRAND, St, formerly an epiſcopal town of France in Gaſcony, now the department of Upper Garonne, and capital of the country of Comminges. E. Long. 0. 38. N. Lat. 43. 2.

BERVY, a ſea-port and parliament town in the county of Mearns in Scotland. W. Long. 2. 0. N. Lat. 56. 40.

BERWICK, THE DUKE OF, was natural ſon of James II. by Mrs Arabella Churchill, ſiſter to the great duke of Marlborough. He followed the fate of his father, and came into France after the revolution with James II. Here the duke of Berwick was recommended to the court by his ſuperior merit. He was created marſhal of France, knight of the Holy Ghoſt, duke and peer of France, grandee of Spain, commander in chief of the French armies; in all which ſtations his behaviour was ſuch, that few equalled, perhaps none ſurpaſſed, him. He lived in an age when the renowned prince of Orange and many other of the greateſt men commanded againſt him. His courage was of the cool ſteady kind; always poſſeſſing himſelf; taking all advantages; not fooliſhly, raſhly, or wantonly throwing away the lives of his ſoldiers. He kept up on all occaſions the moſt ſtrict diſcipline; and did not ſpare puniſhment among

Berwick. among his ſoldiers for marauding and other crimes, when properly deſerved; for which ſome inconſiderate people have blamed him. He has been reflected upon by the very zealous and violent adherents of the Stuart family for not being ſufficiently attached to that party, which was his own family. But by a cool examination of his actions, it will appear, that his behaviour in this particular was, as in moſt parts of his life, ſenſible and juſt. When he accepted of employments, received honours, dignities, and became a naturalized Frenchman, he thought it his duty, as an honeſt man, to become a Frenchman, and a real ſubject to the monarch who gave him bread; and to be, or not to be, in the intereſt of the Stuart family, according to the will and commands of the ſovereign whom he ſerved, and in the intereſt of France according to time and circumſtances; for there is no ſerving two maſters well. But when ordered by his king to be in that family's intereſt, he acted with the greateſt ſincerity; and took the moſt effectual and ſenſible methods to ſerve that unhappy houſe, as the following anecdote, if true, and it has great appearance and probability on its ſide, proves. The duke of Marlborough, after the ſigning of the treaty of Utrecht, was cenſured by the Britiſh parliament for ſome of the army contracts in relation to bread and forage; upon which he retired into France: and it was then credibly aſſerted, the duke of Marlborough was brought over to the intereſt of the Stuart family; for it is now paſt a doubt, that Queen Anne had a very ſerious intention of having her brother upon the throne of England after her death: and ſeveral circumſtances, as well as the time of that duke's landing in England, make many people believe he was gained over to the Stuart party. If the duke of Berwick was, directly or indirectly, the means of gaining his uncle over to that intereſt, he more effectually ſerved it than that raſh mock army of unhappy gentlemen who were taken priſoners at Preſton in 1715 had it in their power to do. In a word, the duke of Berwick was, without being a bigot, a moral and religious man; and ſhowed by his life and actions, that morality and religion are very compatible and conſiſtent with the life of a ſtateſman and a great general; and if they were oftener united in thoſe two profeſſions, it would be much happier for the reſt of mankind. He was killed by a cannon-ball at the ſiege of Philipſburg in 1738.

Berwick, a county of Scotland; bounded by the river Tweed, on the ſouth; by Eaſt Lothian, on the north; by the German ocean, on the eaſt; and on the weſt by the counties of Roxburgh, Peebles and Mid-Lothian. Its extent in length may be ſtated at 34 miles, and its breadth 19. This county is nominally divided into three diſtricts, viz. Lauderdale, Lammermuir, and Merſe or March. The firſt is that opening or valley in the Lammermuir hills, through which the river Leader runs. Lammermuir comprehends the ridge of hills which ſeparate this county from Eaſt-Lothian, extending from the head of Leader water to the ſea, below the town of Berwick. The Merſe or March includes that fertile and populous plain, ſtretching from the hills, along the banks of the Tweed. Berwickſhire contains one royal borough, viz. Lauder; and ſeveral large towns and villages, as Dunſe, Coldſtream, Coldingham, Ayton, and Eyemouth. The chief rivers are the Tweed, the Leader, the Eye, the Whittadder, and Blackadder. The two roads to London paſs through the county. In the Merſe the ſtate of agriculture is excellent; and, though ſo late as 60 years ago, the greater part was barren and uncultivated, it is now moſtly encloſed and improved. The county of Berwick exports from the ports of Berwick and Eyemouth, above 80,000 bolls of victual; and the ſame quantity is annually carried to the weekly markets of Edinburgh, Dalkeith, Haddington, and Dunbar. There is plenty of marl in the county; but the farmers prefer lime as the moſt profitable, though at the diſtance of 18 or 20 miles. The minerals in this diſtrict hitherto diſcovered, are few, and theſe are by no means valuable. Coal has been found only in ſmall quantities near Eyemouth. There is plenty of freeſtone fit for building, and both rock and ſhell marl are found in different places. Copper has been wrought in the neighbourhood of Lauder; and ſome years ago, a mine of the ſame metal was diſcovered in the pariſh of Bonkle. The pariſh of Mordington contains iron-ſtone, but of too ſmall value to render it an object of manufacture. The rocks which compoſe the Lammermuir hills, are chiefly *ſchiſtus*, with alternate ſtrata of ſandſtone. At Eyemouth is a rock of the ſpecies called puddingſtone, in the pieces of which it is not uncommon to find fragments of porphyry, granite, and even limeſtone. Near the Whittadder, in the pariſh of Chirnſide, is a ſpecies of gypſum, which has been of great uſe as a manure. The celebrated mineral well, called *Dunſe Spa*, which is ſomewhat ſimilar to Tunbridge, is ſituated about a mile from the town of Dunſe. The rivers contain trout, and ſalmon; of which laſt a great quantity is annually exported from Berwick to London. From the ſituation of this county, on the border of England, it was neceſſary that it ſhould be ſtrongly fortified; accordingly, there are numerous ſtrong caſtles and fortified places in almoſt every pariſh in the county. The following is the population of the county of Berwick according to the pariſhes, taken at two periods, from the Statiſtical Hiſtory of Scotland.

	Pariſh.	Population in 1755.	Population in 1790—1798.
1	Abbey	80	164
	Ayton	797	1245
	Buncle	691	622
	Channelkirk	531	600
5	Chirnſide	383	961
	Cockburnſpath	919	883
	Coldingham	2313	2391
	Cranſhaws	214	164
	Dunſe	2593	3324
10	Earlſton	1197	1351
	Eccles	1489	1780
	Edrom	898	1336
	Eymouth	792	1000
	Fogo	566	450
15	Fouldean	465	344
	Gordon	737	912
	Greenlaw	895	1210
	Home	959	1000
	Hutton	751	920
20	Ladykirk	386	590
	Langton	290	435
	Lauder	1795	2000

Berwick-upon-Tweed || Beryl.

	Pariſh.	Population in 1755.	Population in 1790—1798.
	Lennel	1493	2521
	Litgertwood	398	422
25	Longformacus	399	452
	Mertoun	502	557
	Mordington	181	335
	Nenthorn	497	400
	Polwarth	251	288
30	Swinton	494	898
	Weſtruther	591	730
32	Whitſome	399	590
		24946	30875
			24946
		Increaſe,	5929

BERWICK, *North*, a royal borough and ſea-port in the county of Eaſt Lothian in Scotland. W. Long. 2. 29. N. Lat. 5. 56.

BERWICK-upon-Tweed, is a town on the border of England and Scotland, and a county of itſelf. It ſtands on the north or the Scotiſh ſide of the river Tweed; and is pleaſantly ſituated on an eaſy declivity, almoſt cloſe to the ſea. It has a ditch on the north and eaſt; but on the ſouth and weſt it has high walls, regularly fortified, and planted with cannon, and to which the river ſerves as a moat. The houſes are generally well built; and the town-houſe is a handſome ſtructure, with a lofty turret, in which are eight bells, and a fine clock which tells the quarters, with four dials, one on each ſide the ſquare. The church is a neat building, but has no bells. The bridge is 947 feet long, and is ſupported by fifteen arches. The barracks form a large regular ſquare, and will hold two regiments of foot very conveniently. The town is governed by a mayor, recorder, town-clerk, and four bailiffs; and has a coroner, a treaſurer, four ſerjeants at mace, and a water bailiff. It had a ſtrong caſtle, which now lies quite in ruins. It has a market on Saturdays, extremely well ſupplied; and a fair on Friday in Trinity-week for black cattle and horſes. Corn and eggs are ſhipped from hence for London and other ports; but the principal trade is the ſalmon which are caught in the Tweed, and reckoned to be as good as any in the kingdom. Some are ſent alive, and ſome pickled in kits by perſons who ſubſiſt on that employment, and are called *ſalmon coopers*. The living is a rectory, rated at 20l. a-year in the king's books. Though this town is not admitted to be either in England or Scotland, the Engliſh judges hold aſſizes here; and it is ſubject to the biſhop of Durham. It ſends two members to parliament. W. Long. 1. 35. N. Lat. 55. 58.

BERY, or BURY, the villa or ſeat of habitation of a nobleman, a dwelling or manſion houſe, being the chief of a manor: from the Saxon *beorg*, which ſignifies a *hill* or *caſtle*; for heretofore noblemen's ſeats were caſtles ſituated on hills, of which we have ſtill ſome remains; as in Herefordſhire there are the *beries* of Stockton, Hope, &c. It was anciently taken for a ſanctuary.

BERY. See BERIA.

BERYL, in *Natural Hiſtory*, called by our lapidaries *aqua marina*, is a pellucid gem of a bluiſh green colour, found in the Eaſt Indies and about the gold mines of Peru: we have alſo ſome from Sileſia, but what are brought from thence are oftener coloured cryſtals than real beryls; and when they are genuine, they are greatly inferior both in hardneſs and luſtre to the oriental and Peruvian kinds. Beryl-Cryſtal || Beſancon.

The beryl, like moſt other gems, is met with both in the pebble and columnar form, but in the latter moſt frequently. In the pebble form it uſually appears of a roundiſh but flatted figure, and commonly full of ſmall flat faces, irregularly diſpoſed. In the columnar or cryſtalline form it always conſiſts of hexangular columns, terminated by hexangular pyramids. It never receives any admixture of colour into it, nor loſes the blue and green, but has its genuine tinge in the degrees from a very deep and duſky to the paleſt imaginable of the hue of ſea-water.

The beryl, in its perfect ſtate, approaches to the hardneſs of the garnet, but is often ſofter; and its ſize is from that of a ſmall tare to that of a pea, a horſe-bean, or even a walnut. It may be imitated by adding to 20 pounds of cryſtal-glaſs made without magneſia, ſix ounces of calcined braſs or copper, and a quarter of an ounce of prepared zaffre.—The properties of the beryl were very wonderful in the opinion of the ancient naturaliſts; it kept people from falling into ambuſcades of enemies, excited courage in the fearful, and cured diſeaſes of the eyes and ſtomach. It does none of theſe things now; becauſe people are not ſimple enough to believe it has the virtue to do them.

BERYL-cryſtal, in *Natural Hiſtory*, a ſpecies of what Dr Hill calls *ellipomacroſtyla*, or imperfect cryſtals, is of an extremely pure, clear, and equal texture, and ſcarce ever ſubject to the ſlighteſt films or blemiſhes. It is ever conſtant to the peculiarity of its figure, which is that of a long and ſlender column, remarkably tapering towards the top, and very irregularly hexangular. It is of a very fine tranſparence, and naturally of a pale brown; and carries ſuch evident marks of diſtinction from all brown cryſtals, that our lapidaries call it, by way of eminence, the *beryl cryſtal*, or ſimply the *beryl*.

BERYTUS, in *Ancient Geography*, a ſea-port town of Phœnicia on the Mediterranean, ſo ancient as to be thought to have been built by Saturn. It was deſtroyed by Tryphon, but rebuilt by the Romans. Agrippa placed here two legions, whence it became a colony. It enjoyed the *jus Italicum*, and had an excellent ſchool for the ſtudy of the law in Juſtinian's time. Now BEROOT; which ſee.

BES, or BESSIS, in Roman antiquity, two-thirds of the as. See AS.

BES alſo denotes two-thirds of the jugerum. See JUGERUM.

BESAILE, ſignifies the father of a grandfather.

BESAILE, in *Law*, a writ that lies where the great-grandfather was ſeized in fee of any lands, &c. at the time of his death: and after his deceaſe a ſtranger enters thereon, the ſame day, and keeps out the heir.

BESANCON, a city of France, capital of the Franche Compte, now the department of Doubs. It is one of the moſt ancient cities of Europe, was formerly the ſee of an archbiſhop, and had a parliament as well as a univerſity. It is ſeated on the river Dreux, which

Beſancon || Beſiſtan.

which divides it into two parts, the greateſt of which is a peninſula. The entrance is ſhut up by a mountain, on which they have built a large citadel, which commands all the city. There are many names of places in and about the city, that are plainly corruptions of the Latin, and are marks of its antiquity, as Chamars, *Campus Martis;* Chamuſe, *Campus Muſarum;* Chandane, *Campus Dianæ;* &c. The metropolitan church is built at the bottom of St Stephen's hill; and is a very handſome ſtructure with a high tower ſteeple. The great altar is placed in the middle choir, where on high days they expoſe reliques in ſilver ſhrines, enriched with gold and jewels. There are ſeveral tombs and other things remarkable in the churches; and after you have paſt the church of Notre Dame, and the ſquare that it looks into, you come to a triumphal arch, erected in honour of the emperor Aurelian, on which are ſeveral figures of men and animals, pretty entire. It ſerves as a gate to the cloiſter of St John the Great. The great hoſpital of the order of the Holy Ghoſt is a ſtructure worth ſeeing. The ſtreets are wide and handſome; and the houſes are well built with free-ſtone, and covered with ſlate, chiefly about the ſquare called *Battan*, which is adorned with a fountain, the water of which proceeds from a ſtatue of Bacchus. The river Dreux is paſſed over on a ſtone bridge, to enter from one part of Beſancon into the other. The market-place is at the entrance; and on the left is another ſquare, adorned with a fountain, where the great ſtreet begins, which traverſes all this part, from the bridge to St John the Great. The new ſquare is not far from this ſtreet, from whence you go to the town-houſe, which is a large ſtructure with four wings, before the front of which is the ſtatue of Charles V. in bronze, with a globe in one hand and a ſword in the other. The imperial eagle is raiſed over a large baſon, and ſpouts out water by both his beaks. The governor's palace is the moſt magnificent in the province, and there is a fountain a little farther, adorned with the figure of a naked woman, with water ſpringing out at her nipples. E. Long. 6. 10. N. Lat. 47. 26.

BESANT, or Bezant, a coin of pure gold, of an uncertain value, ſtruck at Byzantium, in the time of the Chriſtian emperors; from hence the gold offered by the king at the altar is called *beſant* or *biſant*.

BESANTED, or Bezanted. This word means *full of beſants;* and is uſed to denote a field, ordinary, or charge, covered with above eight beſants; for if there be but eight or fewer, their number muſt be particularly mentioned.

BESELEEL *and* Ooliah, architects, ſculptors, and painters, ſuppoſed to have made all the ornaments in braſs, ſilver, &c. of the firſt tabernacle in the wilderneſs, 1490 B. C.

BESIERS, or Beziers, an ancient town of France, in Lower Languedoc, now the department of Herault, formerly a biſhop's ſee, and the title of a viſcount. It has a delightful ſituation; and the country in which it ſtands is fertile in corn and oil, and produces excellent wine. It is ſeated on a hill near the river Orbe, in E. Long. 3. 23. N. Lat. 43. 21.

BESISTAN, or Berstein: Thus at Conſtantinople, Adrianople, and in ſome other towns within the Grand Signior's dominions, they call thoſe places where the merchants have their ſhops, and expoſe their merchandiſes to ſale. Each ſort of merchants have their particular beſiſtan, which muſt alſo be underſtood of the workmen, all thoſe of the ſame trade working in the ſame place. Theſe beſiſtans are commonly large galleries, vaulted over, whoſe gates are ſhut every night. Sometimes the wardens and keepers of the beſiſtans will anſwer for the merchandiſes, on paying them a very moderate perquiſite for every ſhop.

Beſſeria || Beſſarion.

BESLERIA. See Botany *Index*.

BESORCH, a coin of tin, or ſome alloyed metal, current at Ormus, at the rate of $\frac{7}{49}$ parts of a farthing ſterling.

BESOZZI, or Bezutius, Ambrogio, a painter of conſiderable eminence, was born at Milan in 1648. He worked ſome time under Gioſeffo Danedi, called *Montalti:* he afterwards went to Rome, where he ſtudied from the antiques and the pictures of the greateſt maſters; and at laſt perfected himſelf in the ſchool of Ciro Ferri. His great excellency conſiſted in painting architecture, friezes, imitations of baſs-relieves, and other decorations. He died at Milan in 1706, aged 58 years.

BESSARABIA, a territory of Turkey in Europe, lying between Moldavia, the Danube, the Black ſea, and Little Tartary. It is inhabited by independent Tartars, who maintain themſelves by their cattle, huſbandry, and by robbery. Their religion, manners and cuſtoms, are the ſame with thoſe of the Crim Tartars. When there are any forces ſent againſt them, they retire among the mountains near the Black ſea, where it it impoſſible to come at them on account of the moraſſes and defiles.

BESSARION, titular patriarch of Conſtantinople and archbiſhop of Nice, and one of thoſe illuſtrious perſons who contributed to the reſurrection of letters in the 15th century, was born at Trebiſond. He was very zealous to reunite the Greek with the Latin church, and engaged the emperor John Paleologus to intereſt himſelf in bringing this great work about. He paſſed into Italy, appeared at the council of Florence, harangued the fathers, and made himſelf admired as well by his modeſty as by his uncommon abilities. The Greek ſchiſmatics conceived ſo mortal an averſion to him, that he was obliged to remain in Italy; where Pope Eugenius IV. honoured him with the purple in 1439. He fixed his abode at Rome, and would have been raiſed to the Papal chair, if Cardinal Alain had not oppoſed it, as injurious to the Latin church, to chooſe a Greek however illuſtrious. He was employed in ſeveral embaſſies, but that to France proved fatal to him. When legate at this court, he happened to viſit the duke of Burgundy, before he ſaw Louis XI. which ſo diſconcerted the capricious haughty monarch, as to occaſion him a very ungracious reception. Nay, the king even took the cardinal legate by his moſt magnificent beard, ſaying in his fine Latin, *Barbara Græca genus retinent quod habere ſolebant:* and this affront ſo chagrined the cardinal, as to occaſion his death at Ravenna upon his return in 1472. This at leaſt is what Matthieu relates in his Hiſtory of Louis XI. Beſſarion loved the literati, and protected them. Argyropilus, Theodore of Gaza, Poggius, Laurentius Valla, &c. formed in his houſe a kind of academy His library was large and curious; and the ſenate of Venice, to whom he gave it, preſerve it to this day with attention

Beſſica || Betel.

attention and regard. He left ſome works, which rank among thoſe that helped to revive letters; as, *Defenſio Doctrinæ Platonicæ*, &c. Tranſlations of ſome Pieces of Ariſtotle, Orations, Epiſtles, &c.

BESSICA, in *Ancient Geography*, a diſtrict of Thrace towards Mount Hæmus, to the ſouth of the Hebrus. It was inhabited by a fierce and barbarous people noted for their robberies. Their chief city Uſcudama is now known by the name of *Adrianople*. They lived under their own kings till the conſulate of M. Licinius Lucullus and C. Caſſius Varus; when the conſul Lucullus invaded their country, and having gained a great victory over them, took their metropolis, and ſubjected the whole nation to the Roman laws. The Romans, notwithſtanding they had ſubdued them by force of arms, ſtill ſuffered them to live under their own kings; for Piſo, while he governed Macedon in quality of proconſul having treacherouſly ſeized Rabocentus, whom Suetonius calls *prince of the Beſſi*, cauſed him to be publicly beheaded. This affront ſo exaſperated the whole nation that they revolted; but were overthrown in a great battle by Octavius the father of Auguſtus. During the civil wars of Rome they attempted anew to recover their liberty, but were again defeated by the famous M. Brutus. In the reign of Auguſtus one Vologeſus, a native of the country, and prieſt of Bacchus, having, under pretence of religion, drawn together great crowds of people, made himſelf maſter of the whole country; and, entering the Cherſoneſus, committed there the moſt dreadful ravages. He was at laſt, however, overcome by L. Piſo; who obliged the ſavage inhabitants to lay down their arms, and ſubmit to ſuch conditions as he was pleaſed to impoſe upon them. From this time the Beſſi continued ſubject to the Romans without attempting any more to regain their liberty.

BESSIS. See Bes.

BESTAIL, or Bestial, in ancient ſtatutes, all kinds of beaſts or cattle, eſpecially thoſe purveyed for the king's proviſion.

BESTIARII, in *Roman Antiquity*, ſuch as fought againſt beaſts, or thoſe who were expoſed to them by ſentence of the law. There were four kinds of beſtiarii: the firſt were thoſe who made a trade of it, and fought for money; the ſecond were ſuch young men as, to ſhow their ſtrength and dexterity in managing their arms, fought againſt beaſts; the third kind was, where ſeveral beſtiarii were let looſe at once, well armed, againſt a number of beaſts; and the fourth kind were thoſe condemned to the beaſts, conſiſting either of enemies taken priſoners in war, or as being ſlaves, and guilty of ſome enormous crime; thoſe were all expoſed naked, and without defence.

BESTRICIA, a town of Tranſylvania, remarkable for the gold mines in its neighbourhood. E. Long. 22. 5. N. Lat. 48. 0.

BETA, the Beet. See Botany and Agriculture *Index*.

BETANZOS, a town of Galicia in Spain, ſeated on the Mandeo, and a bay of the ſea, in W. Long. 7. 50. N. Lat. 43. 21.

BETEL, or Betle, in *Botany*, an Indian plant (a ſpecies of Piper), of great uſe and eſteem in the eaſt, where it makes a conſiderable article of commerce. See Piper.

BETELFAGUI, a town of Aſia, in Arabia Felix, famous for the vaſt quantity of coffee bought and ſold there; being the mart where the country people bring their coffee to ſell; and where the Europeans come, or ſend their factors or brokers, to purchaſe it. E. Long. 57. 20. N. Lat. 15. 40. Betelfagui || Bethel.

BETHABARA, in *Ancient Geography*, a term denoting *a paſſage*; and therefore by many referred to the paſſage at Jericho, where the Iſraelites paſſed over dry-ſhod; by Lightfoot, to the paſſage at Scythopolis: but Cellarius refers it to the midway between both; becauſe there were doubtleſs ſeveral middle paſſages or fords on the Jordan. Here John is ſaid to have baptized on the other ſide Jordan, (Evangeliſts).

BETHAGLO, or Beth-hagla, in *Ancient Geography*, a town of the tribe of Benjamin (Joſhua xviii. 21.). In Jerome's time there was a village called *Agla*, ten miles from Eleutheropolis, towards Gaza, and ſuppoſed to be Bethagla.

BETHANY, in *Ancient Geography*, a village at the foot of Mount Olivet, on the ſide, about two miles to the eaſt of Jeruſalem, (John, Jerome); where Lazarus dwelt and was raiſed from the dead; and where happened the aſcenſion of our Saviour.

BETHARAMPHTHA, in *Ancient Geography*, a town of Galilee, (Ptolemy); of the Peræa, (Joſephus); which being walled round by Herod Antipas, was called *Julias*, after Julia, the daughter of Auguſtus, and conſort of Tiberius: it ſtood to the north of the lake of Geneſareth, at the influx of the Jordan into that lake; and here Dr Wells places Bethſaida.

BETHARAN, in *Ancient Geography*, a town of the Peræa, or on the other ſide Jordan. Said to be called *Livias*, or *Libias*, in the Greek manner, by Herod in honour of Livia, (Euſebius, Jerome); and of the ſame latitude almoſt with Jeruſalem, (Ptolemy); called *Julias* by Joſephus, who always calls the Livia of Auguſtus *lia*.

BETHAVEN, in *Ancient Geography*, a town in the tribe of Ephraim, and a name given Bethel by Hoſea, after the eſtabliſhment of the idolatry of Jeroboam there; meaning it to have become the houſe of iniquity, from being the houſe of God: but Bethaven was a diſtinct town (Joſhua vii. 2.) to the ſouth-eaſt of Bethel.

BETHEL, in *Ancient Geography*, a city of Samaria, on the borders of the tribe of Benjamin, anciently called *Luz*, (Moſes); but they ſeem to be diſtinguiſhed, (Joſhua xvi. 2.) They were, however, contiguous places. Bethel was properly the place of Jacob's viſion; and Luz, or Lus, an adjoining town, afterwards called *Bethel*, the former name being loſt in that of *Bethel*. It was twelve miles to the north-eaſt of Jeruſalem, (Jerome); and called *Bethaven* (Hoſea).

BETHESDA, (called in the Greek, κολυμβηθρα προβατικη, and thence in the Vulgate, *Piſcina Probatica*, becauſe, according to ſome, the ſheep were waſhed in it, which were appointed for ſacrifices), was the Hebrew name for a pool or public bath, which had five porticos, piazzas, or covered walks around it. This bath, for its ſingular uſefulneſs, was called Betheſda, בית חסדה, or *Beth Cheſda*, or the *houſe of Mercy*, becauſe, as Pool, in his Annotations, obſerves the erecting of baths was an act of great kindneſs to the common people, whoſe indiſpoſitions in hot countries required

Bethlehem. quired frequent bathing. However, ſome will have the word Bethesda to be בית אשדה, or the *ſink-houſe*, or *drain*, becauſe the waters which came from the temple, and the place where the victims were waſhed, flowed thither. From the Greek word κολυμβηθρα being uſed by Joſephus (*Antiq.* xv. 3.) to denote the baths at Jericho, Mr Macknight, in his Harmony of the Goſpels, concludes that their opinion ſeems to be without a proper foundation who affirm, that this pool ſerved for waſhing the ſheep deſigned for ſacrifice before they were driven into the temple, and for waſhing the entrails of the beaſts ſacrificed there: beſides, he thinks it inconſiſtent with the ſituation of Bethesda, *near the ſheep gate* (or *market* as our Engliſh tranſlators have rendered the Greek επι τη προβατικη κολυμβηθρα, though ſome copies have it, Εν τη, &c.) in the ſouth-eaſt wall of the city; or, according to the compilers of the Univerſal Hiſtory, in that which was on the north-eaſt, a great way from the temple. However this may be, we are told (John v. 2, 3, &c.) that in the porticoes of this bath, at the time of a certain feaſt (which is generally ſuppoſed to have been the paſſover), there lay a multitude of impotent folk, ſuch as the blind, halt, and withered, waiting for the moving of the water: for an angel went down at a certain ſeaſon into the pool, and troubled the water; that is, moved it in a ſenſible manner. Whoſoever then firſt, after the troubling of the water, ſtepped into it, was made whole of whatever diſeaſe he had. Some writers confine the miracle of the pool of Bethesda to the ſeaſon of this particular feaſt mentioned in verſe 1. of this chapter, becauſe they underſtand κατα καιρον, *by times* (verſe 4.), which our tranſlators render, *a certain ſeaſon*, meant *at that ſeaſon;* that is, the ſeaſon mentioned verſe 1.; and ſince the evangeliſt does not ſay that the waters of Bethesda had their ſanative quality at any other feaſt, we are at liberty to make what ſuppoſition ſeems moſt convenient. Perhaps the ſilence of Philo and Joſephus upon this miracle may induce ſome to think that it happened only at one paſſover; for though many infirm people lay in Bethesda, if the angel, as is probable, deſcended frequently during that ſolemnity, the miracle would be no ſooner known, than multitudes would come and wait at the pool to be cured by the moving of the waters: however, if the number of the ſick who gathered on this occaſion, and the phraſe κατα καιρον, ſhall incline any perſon to believe that the waters of Bethesda had an healing quality at other paſſovers alſo, Dr Macknight obſerves, that the ſilence of the writers before mentioned needs not be much regarded; it being well known that they have omitted greater tranſactions which they had an opportunity to know, viz. that multitude and variety of miracles which our Lord performed in the courſe of his miniſtry. That the waters of Bethesda ſhould at this time have obtained a miraculous healing quality was, without doubt, as that writer remarks, in honour of the perſonal appearance of the ſon of God on earth. Perhaps it was intended to ſhow that Ezekiel's (xlvii.) viſion of waters iſſuing out of the ſanctuary was about to be fulfilled, of which waters it is ſaid, (ib. verſe. 9.) "They ſhall be healed, and every thing ſhall live whither the river cometh." But it muſt be obſerved, that the fourth verſe of this chapter of St John is not in the Cambridge MSS. which formerly was Beza's, nor in one or two more of great authority. See Dr Mill's judgment of it in that part of his *Prolegomena* to which he refers the reader in his note on the text. But though it ſhould be rejected, the difficulty for which ſome would have it cancelled, Dr Macknight obſerves, remains ſtill: becauſe the ſeventh verſe implies that cures were performed in this pool, and that only one at a time was cured, and conſequently that theſe cures were miraculous. If ſo, it is as eaſy to conceive that an angel moved the water, and gave it its healing quality, as to fancy thoſe cures were performed miraculouſly any other way. Grotius thinks, that the angel is ſaid to have deſcended, not becauſe he was ever ſeen to do ſo, but becauſe the Jews were perſuaded that God brought ſuch things to paſs by the miniſtration of angels; ſo that from that violent motion of the water, and the cure following it, the preſence of an angel was with reaſon ſuppoſed. Dr Hammond ſuppoſes, that the waters became medicinal by being impregnated with a healing warmth from the blood and entrails of the ſacrificed beaſts that were waſhed there; and that the αλσελος, *angel*, or *meſſenger*, in the text is not to be underſtood of thoſe celeſtial beings that are uſually diſtinguiſhed by that name, but only of a common meſſenger, viz. an officer or ſervant of the prieſt, who at a proper ſeaſon was ſent by him to ſtir the pool. Bethlehem.

BETHLEHEM, a town of Paleſtine, famous for the birth of Jeſus Chriſt. It was once a flouriſhing town, but is now only a poor village. It is ſituated two leagues ſouth eaſt of Jeruſalem, on an eminence, in a country full of hills and valleys, and might be rendered very agreeable. The ſoil is the beſt in all thoſe diſtricts: fruits, vines, olives, and ſeſamum ſucceed here extremely well; but cultivation is wanting. They reckon about 600 men in this village capable of bearing arms upon occaſion; and this often occurs, ſometimes to reſiſt the pacha, ſometimes to make war with the adjoining villages, and ſometimes in conſequence of inteſtine diſſenſions. Of theſe 600 men, about 100 are Latin Chriſtians, who have a vicar dependent on the great convent of Jeruſalem. Formerly their whole trade conſiſted in the manufacture of beads; but the reverend fathers not being able to find a ſale for all they could furniſh, they have reſumed the cultivation of their lands. They make a white wine, which juſtifies the former celebrity of the wines of Judea, but it has the bad property of being very heady. The neceſſity of uniting for their common defence prevails over their religious differences, and makes the Chriſtians live here in tolerable harmony with the Mahometans, their fellow-citizens. Both are of the party *Yamani*, which, in oppoſition to that called, *Kaiſi*, divides all Paleſtine into two factions, perpetually at variance. The courage of theſe peaſants, which has been frequently tried, has rendered them formidable through all that country. Here is a church built by St Helena, in the form of a croſs, which is very large; and from its top may be ſeen all the country round about. The roof is lofty, flat, and compoſed of cedar on the inſide, and leaded without. Both ſides of the nave are ſupported by two rows of marble pillars, each made of one piece, and eleven in a row, inſomuch that they make as it were five naves, ſeparated from each other by theſe rows of pillars, in each of which is the picture of ſome ſaint. On the wall over the pillars there

Bethlehem || Bethoron.

is a very beautiful moſaic work, on a gold ground. The walls were formerly overlaid with fine marble, but the Turks have taken it to adorn their moſques. The three upper ends of the croſs terminate in three ſemicircles, having in each an altar. Over the chancel there is a ſtately cupola, covered with lead on the outſide, and within adorned with moſaic work. Cloſe to the church is the monaſtery of the Franciſcans; which is large, but indifferently built. The gardens are defended with ſtrong walls, and at the north-weſt of them ſtands a tower now almoſt in ruins. Their chapel is better taken care of. Through this there is a paſſage to a ſquare cave, where they ſay the Innocents were buried. Beyond this there are paſſages to the tombs of St Jerome, St Paula, Euſtochium, and Euſebius of Cremona. Beyond theſe there is a grot or cell, which they ſay was the lodging place of St Jerome when he tranſlated the Bible. Another entrance leads to a vault or chapel, 12 feet wide and 40 long, whoſe floor is paved, and ſides lined with white marble, and the roof is adorned with moſaic work, now much decayed. At the end of this there is an arched concavity, with an altar, over which is a picture of the nativity, and under it a vault, the middle of which is a ſtar made with ſtones of various colours, to mark the place where they ſay our Saviour was born; and near this is the manger where they pretend he was laid; it is hewn out of a rock, and is now flagged with white marble.

BETHLEHEM, a town of the Netherlands, in the province of Brabant, ſubject to the houſe of Auſtria. E. Long. 4. 40. N. Lat. 51. 2.

BETHLEHEMITES, or BETHLEMITES, in *Church Hiſtory*, a ſort of monks introduced into England in the year 1257, habited like the Dominicans, except that, on their breaſt, they wore a ſtar with five rays, in memory of the ſtar or comet which appeared over Bethlehem at the nativity of our Saviour. They were celled at Cambridge, and had only one houſe in England.

There is alſo an order of Bethlehemites ſtill ſubſiſting in Peru, who have convents at Lima; one called of the Incurables, the other of our Lady of Mount Carmel. Theſe Bethlehemites came originally from the city of Guatimala in Mexico, where they were inſtituted by the venerable Peter Joſeph of Betaneur, for the ſervice of the poor. Innocent XI. in 1687, approved the inſtitute. They have already nine convents in Peru.

The Bethlehemites, though outwardly of great ſimplicity, paſs for the moſt refined politicians; inſomuch as to be called the quinteſſence of the Carmelites and Jeſuits. They are all friars. For their almoner they chooſe a ſecular prieſt, whom they hire, and who has no vote in the chapter.

BETHORON, in *Ancient Geography*, a town of Samaria; Upper and Nether, and both in the tribe of Ephraim, built by Shera grand-daughter of Ephraim, 1 Chron. viii. 24. both which were reſtored by Solomon, after falling to decay, 1 Kings ix. 17. and 2 Chron. viii. 5. Their diſtance was almoſt the whole breadth of the tribe of Ephraim, the Upper being in the north, the Nether in the ſouth, of that tribe, Joſhua xvi. We know more of the Nether than of the Upper: it was ſituated on a mountain, and therefore Joſephus and Jerome mention going up or aſcending; and it ſtood on the public road to Lydda and Cæſarea, diſtant an hundred ſtadia, or twelve miles, from Jeruſalem: and on account of this vicinity, ſome allot it to the tribe of Benjamin.

Beth-Peor || Bethune.

BETH-PEOR, in *Ancient Geography*, a town of the Reubenites, on the other ſide Jordan, at Mount Fogor, over againſt Jericho, ſix miles above Livias. It had a temple ſacred to the idol Baal-Peor, Numbers xxv. 3. called Beel-Phegor by the Vulgate, interpreted Priapus by Jerome.

BETHPHAGE, in *Ancient Geography*, a place at the weſt deſcent or declivity of Mount Olivet, Matthew xxi. 1. From which it may be gathered, that the whole of that declivity, with a part of the valley, and the extreme ſkirts of the city, went under the common name of Bethphage.

BETHSAIDA. See BETHARAMPHTHA.

BETHSAN, or BETHSEAN, in *Ancient Geography*, a town of Samaria, in the half tribe of Manaſſeh, on the borders of Galilee, about half a league from Jordan, on this ſide, having half of its territory in the Peraea: it was afterwards called *Scythopolis:* it was diſtant from Tiberias, ſituated on the lake Geneſareth, 120 ſtadia, or 15 miles, to the ſouth; and from Jeruſalem to the north, 600 ſtadia, or 75 miles. As to the origin of the appellation Scythopolis, there ſcarce appears any thing in hiſtory that has a relation to it, but the irruption of the Scythians in the time of the Medes, when they overran all Aſia. It was the greateſt city of all the Decapolis, (Joſephus.) It is called Baeſon by Stephanus.

BETHUNE, MAXIMILIAN DE, duke of Sully, grand maſter of the artillery, and marſhal of France, ſovereign prince of Enrichemont and Bois-Bell, marquis of Roſny, and one of the ableſt and moſt upright miniſters France ever had, was deſcended from an illuſtrious houſe, and was born in 1560. He entered very young into the ſervice of Henry of Bourbon then king of Navarre, afterwards Henry IV. of France, who was only ſeven years older than Sully. He was bred in the reformed religion, and continued in the profeſſion of it to the end of his life, though from political motives he adviſed his maſter to abjure it, as the only method of putting an end to the miſeries of France. After Henry had gained poſſeſſion of the kingdom, Sully performed all the duties of a great and good miniſter, while his maſter exerciſed all the offices of a great and good king. He had been at the battles of Coutras, Arques, and Ivry; at the ſieges of Paris, Noyon, Rouen, and Laon; and ſignalized himſelf on every important occaſion. In 1597 he was made chief overſeer of the highways of France; and the following year was raiſed to the poſt of ſuperintendant of the finances. Though he was then but 40 years of age, and had hitherto ſignalized himſelf only in the army, he put the king's finances in ſuch order, that he paid his debts, which amounted to two hundred millions of livres, and laid up great ſums in the king's treaſury. In 1601 he was made grand-maſter of the artillery, the next year governor of the Baſtile, and afterwards ſuperintendant of the fortifications. He was then ſent into England as ambaſſador extraordinary; and had, at his return, the government of Poictou. At laſt Henry IV. in 1606, erected in his favour the territory of Sully on the Loire into a duchy and peerage, and made

Bethune || Betonica.

made him grand-maſter of the ports and havens. After the murder of that great prince in 1610, the duke of Sully, who had ſerved him with the greateſt zeal and fidelity, was obliged to retire to one of his houſes, where he enjoyed a private life; but in 1634 he was made marſhal of France, upon which he reſigned the poſt of grand-maſter of the artillery. He died in his caſtle of Villebon on the 21ſt of December 1641, at 82 years of age. His Memoirs are ranked among the beſt books of French hiſtory: they contain a moſt particular account of whatever paſſed from the peace of 1570 to the death of Henry IV. in 1610: and acquire additional value from the many curious perſonal anecdotes preſerved in them. They were tranſlated into Engliſh by Mrs Lennox in 1757.

Bethune, a town of France, in the department of the Straits of Calais, containing upwards of 5000 inhabitants. There is an entrance into this city through four gates, and it is ſurrounded with walls and fortified. The city and the caſtle taken together are of a triangular figure, but the caſtle itſelf is a very irregular building. The houſes are very indifferent, and the ſtreets ill paved; however, there is a large handſome ſquare, and ſeveral churches. In the marſhy lands near the city there are ſeveral canals cut for the conveniency of whitening linen. It is ſeated on a rock by the river Belſe. E. Long. 2. 48. N. Lat. 50. 32.

BETIS, governor of Gaza under Darius, famous for his valour and loyalty. He defended a place of conſequence with a few men againſt Alexander, who was there ſhot through the ſhoulder. Betis thinking him ſlain, returned triumphantly to the city; but in a ſecond aſſault he was wounded and brought to Alexander, who cruelly ordered him to be put to death.

BETLEY, a town of Staffordſhire in England. It is ſeated on the confines of the county, next to Cheſhire, in a barren ſandy ſoil. W. Long. 2. 15. N. Lat. 53. 0.

BETLIS, a ſtrong town of Armenia or Turcomania belonging to a bey or prince of the country, who is very powerful, and is ſubject to neither the grand ſignior nor king of Perſia. It lies on the road from Tauris to Aleppo, and the prince can ſtop caravans whenever he pleaſes; for the paſſage between the mountains is ſo narrow, that ten men can defend it againſt 1000. The town is ſeated between two mountains about a cannon-ſhot from each other, and the caſtle is on an eminence exactly in the middle. This eminence is in the ſhape of a ſugar-loaf; and is ſo ſteep on all ſides, that it is impoſſible to get up but by winding round about it. The people in and about the town are ſhepherds, but are ready to take up arms at the command of their prince. E. Long. 42. 40. N. Lat. 37. 20.

BETON, a name given by the French engineers to a kind of mortar, which they uſe in raiſing the foundations of maſonry under water. It conſiſts of twelve parts of pozzolana or Dutch tarraſs, ſix of good ſand, nine of unſlaked lime, thirteen of ſtone ſplinters about the ſize of an egg, and three of tile-duſt or cinders, or ſcales of iron out of a forge; this being well worked together, is left to ſtand for about 24 hours, or till it becomes ſo hard as not to be ſeparated without a pick-axe.

BETONICA, Betony. See Botany *Index*.

Betonica Aquatica. See Scrophularia, Botany *Index*.

Betonica Aquatica || Betterton.

Betonica Pauli. See Veronica, Botany *Index*.

BETONY. See Betonica, Botany *Index*.

BETROTHMENT, a mutual promiſe or compact between two parties for a future marriage. The word imports as much as giving one's troth; that is, true faith, or promiſe. Betrothment amounts to the ſame with what is called by civilians and canoniſts *ſponſalia*, or "eſpouſals; ſometimes *deſponſation*, and by the French *fiancailles*.

BETTERTON, Thomas, the celebrated actor, was the ſon of Mr Betterton, under-cook to King Charles I. and was born in Tothil-ſtreet Weſtminſter in the year 1635. Having received the firſt rudiments of a genteel education, his fondneſs for reading induced him to requeſt of his parents that they would bind him an apprentice to a bookſeller, which was readily complied with, fixing on one Mr Rhodes near Charing-croſs for his maſter. This gentleman, who had been wardrobe-keeper to the theatre in Blackfriars before the troubles, obtained a licenſe in 1659, from the powers then in being, to ſet up a company of players in the Cock-pit in Drury-Lane, in which company Mr Betterton entered himſelf, and, though not much above 20 years of age, immediately gave proof of the moſt capital genius and merit.

Soon after the reſtoration, two diſtinct theatres were eſtabliſhed by royal authority; the one in Drury-Lane in conſequence of a patent granted to Henry Killigrew, Eſq. which was called the *King's Company*: the other in Lincoln's-Inn-Fields, who ſtyled themſelves the *Duke of York's Servants*, the patentee of which was the ingenious Sir William Davenant: which laſt mentioned gentleman having long had a cloſe intimacy with and warm friendſhip for Mr Rhodes, engaged Mr Betterton, and all who had acted under Mr Rhodes, into his company; which opened in 1662 with a new play of Sir William's, in two parts, called the *Siege of Rhodes*. In this piece, as well as in the ſubſequent characters which Mr Betterton performed, he increaſed his reputation and eſteem with the public, and indeed became ſo much in favour with King Charles II. that by his majeſty's ſpecial command he went over to Paris to take a view of the French ſtage, that he might the better judge what would contribute to the improvement of our own; and it was upon this occaſion, as is generally ſuppoſed, that moving ſcenes were firſt introduced upon the Engliſh theatre, which before had been only hung with tapeſtry.

In the year 1670 he married one Mrs Sanderſon, a female performer on the ſame ſtage; who, both as an actreſs and a woman, was every thing that human perfection was capable of arriving at, and with whom he through the whole courſe of his remaining life poſſeſſed every degree of happineſs that a perfect union of hearts can beſtow.

When the duke's company removed to Dorſet-Gardens, he ſtill continued with them; and on the coalition of the two companies in 1684, he acceded to the treaty, and remained among them; Mrs Betterton maintaining the ſame foremoſt figure among the women that her huſband ſupported among the male performers. And ſo great was the eſtimation that they were both held in, that in the year 1675, when a paſtoral

Betterton. ſtoral called *Caliſto*, or the *Chaſte Nymph*, written by Mr Crown at the deſire of Queen Catharine conſort to Charles II. was to be performed at court by perſons of the greateſt diſtinction, our Engliſh Roſcius was employed to inſtruct the gentlemen, and Mrs Betterton honoured with the tutorage of the ladies, among whom were the two princeſſes Mary and Anne, daughters of the duke of York, both of whom ſucceeded to the crown of theſe realms. In grateful remembrance of which, the latter of them, when queen, ſettled a penſion of 100l. per annum on her old inſtructreſs.

In 1693, Mr Betterton having ſounded the inclinations of a ſelect number of the actors whom he found ready to join with him, obtained, through the influence of the earl of Dorſet, the royal licenſe for acting in a ſeparate theatre; and was very ſoon enabled, by the voluntary ſubſcriptions of many perſons of quality, to erect a new playhouſe within the walls of the Tennis-Court in Lincoln's-Inn-Fields. To this ſtep Mr Betterton is ſaid to have been induced, partly by ill treatment from the managers, and partly with a view to repair, by the more enlarged profits of a manager, the loſs of his whole fortune (upwards of 2000l.), which he had undergone in the year 1692, by adventuring it in a commercial ſcheme to the Eaſt Indies. Be this, however, as it will, the new theatre opened in 1695 with Mr Congreve's *Love for Love*, the ſucceſs of which was amazingly great. Yet in a few years it appeared that the profits ariſing from this theatre, oppoſed as it was by all the ſtrength of Cibber's and Vanbrugh's writings at the other houſe, were very inſignificant; and Mr Betterton growing now into the infirmities of age, and labouring under violent attacks of the gout, he gladly quitted at once the fatigues of management and the hurry of the ſtage.

The public, however, who retained a grateful ſenſe of the pleaſure they had frequently received from this theatrical veteran, and ſenſible of the narrowneſs of his circumſtances, reſolved to continue the marks of their eſteem to him by giving him a benefit. On the 7th of April 1709 the comedy of *Love for Love* was performed for this purpoſe, in which this gentleman himſelf, though then upwards of 70 years of age, acted the youthful part of Valentine; as in the September following he did that of Hamlet, his performance of which the author of the Tatler has taken a particular notice of. On the former occaſion, thoſe very eminent performers, Mrs Barry, Mrs Bracegirdle, and Mr Dogget, who had all quitted the ſtage ſome years before, in gratitude to one whom they had had ſo many obligations to, acted the parts of Angelica, Mrs Frail, and Ben; and Mr Rowe wrote an epilogue for that night, which was ſpoken by the two ladies, ſupporting between them this once powerful ſupporter of the Engliſh ſtage. The profits of this night are ſaid to have amounted to upwards of 500l. the prices having been raiſed to the ſame that the operas and oratorios are at preſent; and when the curtain drew up, almoſt as large an audience appearing behind as before it.

The next winter Mr Betterton was prevailed on by Mr Owen M'Swinney, then manager of the opera-houſe in the Hay-market (at which plays were acted four times a-week) to continue performing, though but ſeldom. In conſequence of which, in the enſuing ſpring, viz. on the 25th of April 1710, another play was given out for this gentleman's benefit, viz. The *Maid's Tragedy* of Beaumont and Fletcher, in which he himſelf performed his celebrated part of Melanthus. This, however, was the laſt time of his appearing upon the ſtage. For having been ſuddenly ſeized with the gout, and being impatient at the thoughts of diſappointing his friends, he made uſe of outward applications to reduce the ſwellings of his feet, which enabled him to walk on the ſtage, though obliged to have his foot in a ſlipper. But although he acted that day with unuſual ſpirit and briſkneſs, and met with univerſal applauſe, yet he paid very dear for this tribute he had paid to the public; for the fomentations he had made uſe of occaſioning a revulſion of the gouty humour to the nobler parts, threw the diſtemper up into his head, and terminated his life on the 28th of that month. On the 2d of May his body was interred with much ceremony in the cloiſter of Weſtminſter, and great honour paid to his memory by his friend the Tatler, who has related in a very pathetic, and at the ſame time the moſt dignified manner, the proceſs of the ceremonial. As an author, Mr Betterton had a conſiderable degree of merit. His dramatic works are, 1. Amorous Widow, a comedy. 2. Diocleſian, a dramatic opera. 3. Maſque in the Opera of the Propheteſs. 4. Revenge, a comedy. 5. Unjuſt Judge, a tragedy. 6. Woman made a juſtice, a comedy. As an actor, he was certainly one of the greateſt of either his own or any other age; but thoſe who are deſirous of having him painted out in the moſt lively colours to their imagination, we muſt refer to the deſcription given of him by his cotemporary and friend Colley Cibber, in the Apology for his own life.

Betterton || Bevelling.

BETUE, or BETAW, a territory of the Low Countries in the duchy of Guelderland, between the rivers Rhine and Leck. The ground is very moiſt, and the rains often render the roads impaſſable. It is divided into the Upper and Lower.

BETULA, the BIRCH-TREE. See BOTANY *Index*.

BETULEIUS, SIXTUS, an able grammarian, a good Latin poet and philoſopher, born at Memmingen in the year 1500; his true name was *Birck*. He taught the belles lettres and philoſophy with reputation; and became principal of the college of Augſburg, where he died on the 16th of June 1554. He publiſhed ſeveral works in proſe; and his dramatic pieces of Joſeph, Suſannah, and Judith, are eſteemed.

BEVECUM, a town of the Auſtrian Netherlands, in the province of Brabant. E. Long. 4. 50. N. Lat. 50. 45.

BEVEL, among maſons, carpenters, &c. a kind of ſquare, one leg whereof is frequently crooked, according to the ſweep of an arch or vault. It is moveable on a centre, and ſo may be ſet to any angle.

BEVEL-Angle, any other angle beſides thoſe of 90 or 45 degrees.

BEVELAND, NORTH and SOUTH, two iſlands in the province of Zealand, between the eaſtern and weſtern branches of the river Scheldt, making part of the United Provinces.

BEVELLING, in ſhip-building, the art of hewing a timber with a proper and regular curve, according to a mould which is laid on one ſide of its ſurface. "In order to hew any piece of timber to its proper bevel,

Beverage || Beverland.

bevel, it will be neceſſary, firſt, to make one ſide *fair* and *out of winding;* a term uſed to ſignify that the ſide of a timber ſhould be a plane. If this ſide be uppermoſt, and placed horizontally, or upon a level, it is plain, if the timber is to be hewed ſquare, it may be done by a plummet and line; but if the timber is not hewed ſquare, the line will not touch both the upper and lower edge of the piece; or if a ſquare be applied to it, there will be wood wanting either at the upper or lower ſide. This is called *within* or *without* a ſquare. When the wood is deficient at the under ſide, it is called *under-bevelling;* and when it is deficient on the upper ſide, it is called *ſtanding-bevelling:* and this deficiency will be more or leſs according to the depth of the piece; ſo that, before the proper bevellings of the timbers are found, it will be ſometimes very convenient to aſſign the breadth of the timbers; nay, in moſt caſes it will be abſolutely neceſſary, eſpecially afore and abaft: though the breadth of two timbers, or the timber and room, which includes the two timbers and the ſpace between them, may be taken without any ſenſible error, as far as the ſquare body goes. For as one line repreſents the moulding ſide of two timbers, the foreſide of the one being ſuppoſed to unite with the aftſide of the other; the two may be conſidered as one entire piece of timber." *Murray's Ship-building.*

BEVERAGE, in a general ſenſe, ſignifies a *drink*: hence nectar is ſaid to be the beverage of the gods. In writers of the middle age, beverage, *beveragium*, or *biberagium*, denotes money given to an artificer, or other perſon, to drink, over and above his hire or wages.

BEVERIDGE, William, a learned Engliſh biſhop, in the beginning of the 18th century, was born in the year 1638, and educated in St John's college Cambridge, where he diſtinguiſhed himſelf very early by his extenſive learning, and particularly by his knowledge of the oriental languages. Upon the deprivation of Dr Thomas Ken, biſhop of Bath and Wells, for not taking the oaths to the government in 1691, he refuſed the offer of that ſee, though he was then chaplain to King William and Queen Mary. In 1704 he was conſecrated to the biſhopric of St Aſaph; in which high function he ſo behaved himſelf all along, and diſcharged it in ſo exemplary a manner, that he approved himſelf a truly primitive prelate. He died at his lodgings in the Cloiſters in Weſtminſter-abbey in 1707, aged 69. As his whole life was ſpent in acts of piety and charity, ſo he gave remarkable inſtances of both at his death, leaving the bulk of his eſtate for the propagation of the goſpel, and promoting of Chriſtian knowledge, at home as well as abroad. His Private Thoughts upon a Chriſtian Life is a very popular, though in many points a very exceptionable, book. He wrote ſeveral other works on various ſubjects, particularly on the oriental tongues.

BEVERLAND, Hadrian, a man of excellent genius in the end of the 17th century, but who proſtituted it in the ſtudy and compoſition of books of a very obnoxious kind. He was a perfect maſter of Ovid, Catullus, Petronius, and authors of that ſtamp. He is famous for his book on Original Sin, in which he maintained, that Adam's ſin conſiſted in his commerce with his wife, and that original ſin is nothing elſe but the inclination of the ſexes to each other: it was condemned to be burnt. He led a ſcandalous life, but ſeems to have repented of his wicked manners and lewd writings; for he publiſhed a treatiſe in the end of his life, *De Fornicatione Cavenda*, in 1698. It is ſaid he died mad.

Beverley. Beverly.

BEVERLEY, a town of Yorkſhire, governed by a mayor, a recorder, 12 aldermen, &c. and ſends two members to parliament. The minſter here is a very fair and neat ſtructure, and the roof is an arch of ſtone. In it are ſeveral monuments of the Percies, earls of Northumberland, who had added a little chapel to the choir, in the windows whereof there are ſeveral pictures of that family painted on glaſs. At the upper end of the choir, at the right of the altar-place, ſtands the freed-ſtool, made of one entire ſtone, to which every one that fled had a right of protection. At the upper end of the body of the church, next the choir, hangs an ancient table, with the picture of King Athelſtane, who founded the church. Between them is this inſcription:

Als free make I thee,
As heart can wiſh, or egh can ſee.

Hence the inhabitants pay no toll in any town or port in England. In the body of the church ſtands an ancient monument, called the *Virgins Tomb*, becauſe two virgin-ſiſters lie buried there, who gave the town a piece of land, into which any free man may put three milk-cows from Lady-day to Michaelmas. At the lower end of the body of the church is a large font of agate ſtone.

Near the minſter, on the ſouth ſide of it, is a place called *Hall-Garth*, wherein they keep a court of record, called *Provoſt's Court*. In this cauſes ariſing within the liberties may be tried for any ſum. The liberties contain above 100 towns and parts of towns, in Holderneſſe and other parts of the eaſt-riding belonging to it. The town is a mile in length, having pleaſant ſprings running quite through it. It is beautified with two ſtately churches; and has a free-ſchool, with two fellowſhips, ſix ſcholarſhips, and three exhibitions in St John's college, Cambridge, belonging to it; beſides ſix alms-houſes, where none are admitted but thoſe that give bond to leave their effects to the poor when they die. The principal trade of this town is making malt, oat-meal, and tanned leather; and the poor people chiefly ſupport themſelves by making bone-lace. About a mile eaſt from the town, there is a mineral water, which cures eruptions of the ſkin, and is beneficial in the king's evil. E. Long. 0. 9. N. Lat. 53. 50.

BEVERLY, a ſea-port of Maſſachuſſets in North America, ſeparated from Salem by a bridge. It is 20 miles north of Boſton, in N. Lat. 42. 31. W. Long. 70. 50.

Beverly, *John* of, in Latin *Joannes Beverlacius*, archbiſhop of York in the eighth century, was born of a noble family at Harpham in Northumberland, and was juſtly eſteemed one of the beſt ſcholars of his time. He was firſt a monk, and afterwards abbot of the monaſtery of St Hilda, when his merit recommended him to the favour of Alfred king of Northumberland, who in the year 685 advanced him to the ſee of Haguſtald or Hexham, and in 687 tranſlated him to the archbiſhopric of York. This prelate was tutor to the famous Bede; and lived in the

Beverungen || Bevin.

ſtricteſt friendſhip with Acca and other Anglo-Saxon doctors, ſeveral of whom he engaged to write comments on the Holy Scriptures. In 704, he founded a college at Beverly for ſecular prieſts; and after he had governed the ſee of York 34 years, being tired of the tumults and confuſions that prevailed in the church, diveſted himſelf of his epiſcopal character, and retired to Beverly; where he died four years after, on the 7th of May 721.—Bede and other monkiſh writers aſcribe ſeveral miracles to him. Between 300 and 400 years after his death, his body was taken up by Alfric archbiſhopric of York, and placed in a ſhrine richly adorned with ſilver, gold, and precious ſtones; and in 1416, the day of his death was, by a ſynod held at London, appointed a feſtival. We are told that William the Conqueror, when he ravaged Northumberland with a numerous army, ſpared Beverly alone, out of a religious veneration for St John of that place. This prelate wrote ſome pieces which are mentioned by Bale and Pits, viz. 1. *Pro Luca exponenda.* 2. *Homiliæ in Evangelica.* 3. *Epiſtolæ ad Hildam Abbatiſſam.* 4. *Epiſtolæ ad Herebaldum, Andenum, et Bertinum.*

BEVERUNGEN, a town of Germany, in the dioceſe of Paderborn, ſeated at the confluence of the rivers Beve and Weſer, in E. Long. 9. 30. N. Lat. 51. 40.

BEVILE, in *Heraldry*, a thing broken or opening like a carpenter's rule: Thus we ſay, he beareth argent, a chief bevile, vert, by the name of *Beverlis*.

BEVIN, Elway, a muſician eminently ſkilled in the knowledge of practical compoſition, flouriſhed towards the end of Queen Elizabeth's reign. He was of Welch extraction, and had been educated under Tallis, upon whoſe recommendation it was that in 1589 he was ſworn in gentleman extraordinary of the chapel; from whence he was expelled in 1637, it being diſcovered that he adhered to the Romiſh communion. He was alſo organiſt of Briſtol cathedral, but forfeited that employment at the ſame time with his place in the chapel. Child, afterwards Doctor, was his ſcholar. He has compoſed ſundry ſervices, and a few anthems. Before Bevin's time the precepts for the compoſition of canon were known to few. Tallis, Bird, Waterhouſe, and Farmer, were eminently ſkilled in this moſt abſtruſe part of muſical practice. Every canon, as given to the public, was a kind of enigma. Compoſitions of this kind were ſometimes exhibited in the form of a croſs, ſometimes in that of a circle; there is now extant one reſembling a horizontal ſun-dial: and the *reſolution* (as it was called) of a canon, which was the reſolving it into its elements and reducing it into ſcore, was deemed a work of almoſt as great difficulty as the original compoſition. But Bevin, with a view to the improvement of ſtudents, generouſly communicated the reſult of many years ſtudy and experience in a treatiſe which is highly commended by all who have taken occaſion to ſpeak of it. This book was publiſhed in 4to, 1631, and dedicated to Goodman biſhop of Glouceſter, with the following title: 'A briefe and ſhort inſtruction of the art of muſic, to teach how to make diſcant of all proportions that are in uſe: very neceſſary for all ſuch as are deſirous to attain to knowledge in the art; and may by practice, if they can ſing, ſoon be able to compoſe, three, four, and five parts, and alſo to compoſe all ſorts of canons that are uſual, by theſe directions of two or three parts in one upon the plain ſong.' The rules contained in this book, for compoſition in general are very brief; but for the compoſition of canon there are in it a great variety of examples of almoſt all the poſſible forms in which it is capable of being conſtructed, even to the extent of 60 parts.

Hawkins's Hiſt. of Muſic.

Bewdly || Beza.

BEWDLY, a town of Worceſterſhire in England, ſeated on the bank of the river Severn, in W. Long. 2. 20. N. Lat. 52. 25. It has its name *Bewdley*, *Beawley*, or *Beaulieu*, from its pleaſant ſituation on the declivity of a hill overlooking the river, and commanding a fine proſpect of the country, and formerly of the foreſt of Wyre, remarkable for its tall ſtately oaks and other trees, which have ſince been either blown or cut down. It was formerly accounted ſo delightful a place, that Henry VII. built a houſe here for Prince Arthur, which he called *Tiken-hall*. Bewdley ſent burgeſſes to parliament very early, and had charters and great privileges from Edward IV. and Henry VII. which were confirmed, with the addition of others, by Henry VIII. in whoſe time it was annexed to the county of Worceſter. King James I. granted it a charter; of which a ſurrender was procured in Charles II.'s time, and the corporation was new modelled. King James II. compelled it to accept of a new charter; but the former ſurrender, upon a trial, was held void, and a new charter was obtained of Queen Anne. In conſequence of this it is governed by a bailiff and burgeſſes, recorder, ſteward, town-clerk, &c. The town is neat and well built; and carries on a conſiderable trade, by means of the Severn, in ſalt, glaſs, iron-ware, and Mancheſter goods; but its chief manufacture is in caps, commonly called *Monmouth Caps*. It has a good market for corn, malt, leather, and hops.

BEWITS, in *Falconry*, pieces of leather, to which a hawk's bells are faſtened, and buttoned to his legs.

BEY, among the Turks, ſignifies a governor of a country or town. The Turks write it *begh*, or *bek*, but pronounce it *bey*.

This word is particularly applied to a lord of a banner, whom, in the ſame language, they call *ſangiac beg* or *bey*. Every province in Turkey is divided into ſeven ſangiacs, or banners, each of which qualifies a bey; and theſe are all commanded by the governor of the province, whom they alſo call *begler-beg*, that is, lord of all the beghs or beys of the province: theſe beys are much the ſame as banners were formerly in England.

Bey of Tunis, denotes a prince or king thereof; anſwering to what at Algiers is called the *dey*. In the kingdom of Algiers, each province is governed by a bey, or viceroy, who is appointed and removed at pleaſure by the dey; but has a deſpotic power within his juriſdiction; and at the ſeaſon for collecting the tribute from the Arabs, is aſſiſted by a body of troops from Algiers.

BEYS, Giles, a celebrated printer at Paris, in the 16th century, and the firſt introducer of the conſonants j and v.

BEZA, Theodore, one of the principal pillars of the reformed church, was born at Vezelai, in Burgundy, June 24th, 1519. He brought up by his uncle

Beza. uncle Nicholas de Beza, counſellor of the parliament of Paris, till the month of December 1528, when he ſent him to ſtudy at Orleans, and afterwards at Bourges, where he was under the care of Melchior Wolmar, under whom he made an extraordinary progreſs in polite learning, and from him imbibed the principles of Calviniſm. His uncle intended him for the bar; but the law not ſuiting his diſpoſition, he ſpent moſt of his time in reading the Greek and Latin authors, and in compoſing verſes. In 1539, he took up his licentiate's degree, and went to Paris. He fell into ſnares in his youth, and wrote ſome licentious things. Sickneſs awakened him; and he purſued a vow he had formerly made, of entering into the reformed religion. According to this reſolution he went to Geneva and made public profeſſion of the reformed religion. In 1549, he accepted of the Greek profeſſorſhip at Lauſanne, where he alſo read lectures in French on the New Teſtament to the refugees of both ſexes who dwelt in that city. Having ſettled at Geneva, he adhered to Calvin in the ſtricteſt manner, and became in a little time his colleague in the church and in the univerſity. He was ſent to Nerac, at the ſolicitation of ſome great men of the kingdom, to convert the king of Navarre, and to confer with him upon affairs of importance. This was when the Guiſes had got the authority under the reign of Francis II. to the prejudice of the princes of the blood. The king of Navarre having teſtified, both by letters and deputies, that he deſired that Beza might aſſiſt at the conference of Poiſſi, the ſenate of Geneva conſented. The aſſembly hearkened attentively to his harangue, till, ſpeaking of the real preſence, he ſaid, that the body of Jeſus Chriſt was as diſtant from the bread and wine, as the higheſt heaven is from the earth. This made a murmur: ſome cried out, *Blaſphemavit!* others got up to go away. Cardinal de Tournon, who ſat in the firſt place, deſired the king and queen either to ſilence Beza, or to permit him and his company to withdraw. The king did not ſtir, nor any of the princes; and leave was given to go on. Throughout the whole conference he behaved himſelf with great ability. He often preached before the queen of Navarre, the prince of Condé, and in the ſuburbs of Paris. After the maſſacre of Vaſſi, he was deputed to the king to complain of this violence. The civil war followed ſoon after, during which the prince of Condé kept him with him; and while the prince was impriſoned, he lived with Admiral de Coligni, and did not return to Geneva till after the peace 1563. In 1571, he was choſen moderator at the national ſynod of Rochelle; and in the year after, aſſiſted at that of Niſmes; after this, he aſſiſted at the conferences of Montheliard, and at thoſe of Bern. The infirmities of old age beginning to fall heavy upon him in 1597, he could ſeldom ſpeak in public: and at laſt he left it off entirely in the beginning of the year 1600. However, in 1597, he wrote ſome animated verſes againſt the Jeſuits, on the occaſion of the report that was made of his death, and of his having before he died made profeſſion of the Roman faith. He lived till the 13th of October 1605. He was a man of extraordinary merit, and one who did great ſervices to the Proteſtant cauſe. This, however, expoſed him to innumerable ſlanders and calumnies; but he ſhowed both to the Catholics and Lutherans, that he underſtood how to defend himſelf. He wrote, 1. A Tranſlation of the New Teſtament; 2. Turned the Pſalms into Latin verſe; 3. Publiſhed a Treatiſe on the Sacraments; 4. Some Sermons on the Paſſion of Jeſus Chriſt and on Solomon's Song; 5. A Verſion of the Canticles, in lyric verſe; 6. A French tragi-comedy, entitled, The Sacrifice of Abraham; and many other pieces.

Bezans || Bezoar.

BEZANS, cotton cloths, which come from Bengal; ſome are white, and others ſtripped with ſeveral colours.

BEZANTLER, the branch of a deer's horns next below the brow-antler.

BEZOAR, in *Natural Hiſtory* and *Medicine*, a general name for certain animal-ſubſtances ſuppoſed to be effectual in preventing the fatal conſequences of poiſon. The word comes from the Perſian *badzcher*, *bazcher*, or *pahazar*, which ſignifies an antidote.

The firſt mention made of bezoar is in Avenzoar, an Arabian phyſician, who gives a very romantic account of its origin. He deſcribes it as generated of the tears or gum of the eyes of ſtags; who, after eating ſerpents, uſed to run into the water up to the noſe, where they ſtood till their eyes began to ooze a humour, which, collecting under the eye-lids, gradually thickened and coagulated, till, being grown hard, it was thrown off by the animal in rubbing frequently. Other opinions no leſs fabulous obtained till the time of Garcias al Horto, phyſician to the Portugueſe viceroy of the Indies, who gave the firſt genuine account of it. Kempfer afterwards gave a deſcription of it, with ſome new particulars.

The bezoar is a calculous concretion found in the ſtomach of certain animals of the goat kind. See Capra. It is compoſed of concentrical coats ſurrounding one another, with a little cavity in the middle, containing a bit of wood, ſtraw, hair, or the like ſubſtances.

There are two ſorts of bezoar; one brought from Perſia and the Eaſt-Indies, the other from the Spaniſh Weſt-Indies. The firſt or beſt ſort, called *oriental bezoar*, is of a ſhining dark-green or olive colour, and an even ſmooth ſurface; on removing the outward coat, that which lies underneath it appears likewiſe ſmooth and ſhining. The *occidental* has a rough ſurface, and leſs of a green colour than the foregoing; it is likewiſe much heavier, more brittle, and of a looſer texture; the coats are thicker, and on breaking exhibit a number of ſtriæ curiouſly interwoven. The oriental is generally leſs than a walnut; the occidental for the moſt part larger, and ſometimes as big as a gooſe egg. The firſt is univerſally moſt eſteemed, and is the only ſort now retained by the London college; the Edinburgh, in the edition of their pharmacopœia preceding the preſent, directed both; but they now ſeem to allow them to be uſed promiſcuouſly, retaining in their catalogue only the name *bezoar lapis*.

This ſtone is in high eſteem among the Perſians, and even of greater value than in Europe; which, with ſundry other circumſtances needleſs to relate here, has given occaſion to many to ſuſpect, that the true bezoar is never brought to us. Some authors relate with great confidence, that all the ſtones commonly ſold under this name are artificial compoſitions. That ſome of them are ſo, is evident; hence the great differences in the accounts which different perſons have given of their

qualities:

Bezoar || Foſſil Bezoar.

qualities: the ſtones examined by Slare as oriental bezoar did not diſſolve in acids; thoſe which Grew and Boyle made trial of, did; thoſe employed by Geoffroy (in ſome experiments related in the French memoirs 1710) did not ſeem to be acted on by rectified ſpirits; whilſt ſome of thoſe examined by Neumann at Berlin almoſt totally diſſolved therein. The common mark of the goodneſs of this ſtone, is its ſtriking a deep green colour on white paper that has been rubbed with chalk.

Bezoar was not known to the ancient Greeks, and is firſt taken notice of by the Arabians (as above mentioned), who extol it in a great variety of diſorders, particularly againſt poiſons. Later writers alſo beſtow extraordinary commendations on it as a ſudorific and alexipharmac; virtues to which it certainly has no pretence. It has no ſmell or taſte, is not degeſtible in the ſtomach of the animal in which it is found, and is ſcarce capable of being acted on by any of the juices of the human body. It cannot be conſidered in any other light than as an abſorbent; and is much the weakeſt of all the common ſubſtances of that claſs. It has been given to half a dram, and ſometimes a whole dram, without any ſenſible effect; though the general doſe (on account of its great price) is only a few grains.

Bezoar, in a more extenſive ſenſe, includes all ſubſtances formed ſtratum ſuper ſtratum in the ſtomachs or inteſtines of animals; in which ſenſe pearls, the concretions called *crabs-eyes*, &c. belong to the claſs of bezoars. To this alſo belong the hippolithus, or *bezoar equinum*, a ſtone ſometimes found in the ſtomach or inteſtines of a horſe: the monkey-bezoar, a ſtone ſaid to be found in the ſtomachs of certain monkeys in Brazil and the Eaſt Indies, harder than the oriental bezoar, of a dark-green colour, and very coſtly on account of its ſcarcity.—*Bezoar bovinum*, is a yellowiſh ſtone found in the ox's gall-bladder.—*Human bezoars* are ſtony ſubſtances found in the inteſtines of ſeveral perſons, formed from the ſtones of plums, or other fruits, retained in the cœcum or other guts, and growing coated over, of which we have an inſtance given by Dr Cole, Phil. Tranſ. N° 235.—*Bezoar microcoſmicum* is the ſame with the human calculus; and is various in its degrees of hardneſs, as well as in its ſize and figure. It has been uſed in the place of the more coſtly ſorts.—As to the *bezoar hyſtricis*, a concretion found in the gall-bladder of an Indian porcupine; and the German bezoar, or that found in mountain deer, eſpecially on the Alps; theſe, not being ſtones, are more properly called by late writers *egagrophilæ*; the former conſiſting of woolly fibres, and a bitter friable matter, having neither laminæ nor membranes; the latter being a ball of hair or herbs, or perhaps roots, compacted in the ſtomach of the animal.—They are all, as medicines, unworthy of regard.—The bezoar bovinum, or ox-bezoar, is uſed by miniature-painters in ſeveral caſts of yellow.

Bezoar-mineral. See Pharmacy *Index*.

Foſſil Bezoar, is a kind of figured ſtone, formed, like the animal bezoar, of ſeveral coats or ſtrata ranged round ſome extraneous body which forms a nucleus, and ſuppoſed to have the ſame virtues. It is found chiefly in Sicily, in ſand and clay pits. It is of a purple colour, with a rough ſurface, the ſize of a walnut, and light. When broken, it is found to be an irony cruſt, containing in its hollow a fine greeniſh white earth, reſembling pale bezoar. The earth is uſed and not the ſhells. It ſeems to be of the nature of bole armeniac. It is called *Sicilian earth*.

Bezoardic || Bianchini.

BEZOARDIC, an appellation given to whatever partakes of the nature of bezoar; alſo to compound medicines whereof bezoar makes an ingredient.

BIA, in *Commerce*, a name given by the Siameſe to thoſe ſmall ſhells which are called *cowries* throughout almoſt all the other parts of the Eaſt Indies. See Cowries.

BIÆUM, *βιαιον*, in *Rhetoric*, denotes a kind of counter argument, whereby ſomething alleged for the adverſary is retorted againſt him, and made to conclude a different way: for inſtance, *Occidiſti, quia adſtitiſti interfecto.*—Βιαιον, *Immo quia adſtiti interfecto, non occidi; nam ſi id eſſet, in fugam me conjeciſſem.* "You killed the perſon, becauſe you were found ſtanding by his body. *Biæum*, Rather I did not kill him becauſe I was found ſtanding by his body; ſince, in the other caſe, I ſhould have fled away."

Biæum, in the Grecian laws, was an action brought againſt thoſe who raviſhed women, or uſed violence to any man's perſon.

BIAFAR, or Biafra, a kingdom of Africa, ſituated to the eaſt of Benin, to the weſt of Medra, from which it is divided by a chain of mountains, and extending ſouthward to the fourth degree of north latitude. The natives are the moſt of all negroes addicted to, and infatuated with, magic; imagining themſelves capable of cauſing rain, thunder, and lightning: therefore they worſhip the devil with great zeal, and even ſacrifice their children to him.

BIAFORA, in the cuſtoms of the middle age, a form of cry or alarm to arms; on the hearing whereof the inhabitants of towns or villages were to iſſue forth, and attend their prince. The word ſeems originally from Gaſcony; and the Italians even now on a ſudden inſurrection of the people, commonly cry, *Via-fora*, by an uſual change of the letter B into V.

BIARCHUS, an officer in the court of the emperors of Conſtantinople, intruſted with the care and inſpection of the proviſions of the ſoldiery.

BIALOGOROD, or Akerman, a ſtrong town of Beſſarabia, in European Turkey. It is ſeated on a lake called *Vidono*, near the ſea-ſide, in E. Long. 22. 50. N. Lat. 46. 24.

BIANA, a town of Aſia, 50 miles weſt fron Agra, in the dominions of the Great Mogul, remarkable for its excellent indigo. E. Long. 77. 0. N. Lat. 26. 20.

BIANCHI, Francesco, called *Il Frari*, an eminent painter, was born at Modena; and had the honour of being maſter to one of the moſt eſteemed painters that ever appeared, Antonio Corregio. His colouring was delicately fine; his attitudes full of grace; and his invention extremely grand. His works had an aſtoniſhing beauty, and are prized as highly as even thoſe of Corregio. He died in 1520.

BIANCHINI, Francis, one of the moſt learned men of his time, was born at Verona in 1662, of a noble and ancient family. His taſte for natural philoſophy and mathematics induced him to eſtabliſh the academy at Aletofili, at Verona. He went to Rome in 1684; and

Bias || Bible.

and was made librarian to Cardinal Ottoboni, who was afterwards pope under the name of Alexander VIII. He alſo became canon of St Mary de la Rotonda, and at length of St Lawrence in Damaſo. He was eſteemed by the learned; and was a member of many academies. He publiſhed ſeveral ingenious diſſertations, &c. and died in 1729, aged 67.

BIAS, one of the ſeven ſages of Greece, flouriſhed about 608 before Chriſt. He was accuſtomed to ſay, "It was a ſickneſs of the mind to wiſh for impoſſible things." *During the ſiege of Priene, his native city, being aſked why he was the only one who retired from the place without carrying any thing with him, he replied, That he carried his all with him; meaning, that his knowledge and virtue were the only bleſſings that were peculiarly his own, ſince they could not be taken from him. He expired while pleading for one of his friends.

BIAS, or *Biaſs*, in a general ſenſe, the inclination or bent of a perſon's mind to one thing more than another.—It alſo ſignifies the lead or weight put into a bowl, that draws or turns the courſe of it any way to which the bias looks.

BIBERACH, a free and imperial city of Suabia in Germany. It has a large manufacture in fuſtians, and is ſeated in a pleaſant fertile valley on the river Ruſs. E. Long. 10. 2. N. Lat. 48. 4.

BIBERSBERG, a town of Upper Hungary, ſituated in E. Long. 17. 25. N. Lat. 48. 35.

BIBIENA, FERDINAND GALLI, an excellent painter and architect, was born at Bologna in 1657; and was ſurnamed *Bibiena* from a territory of that name in Tuſcany, in which his father was born. He acquired ſuch reputation by his ſkill in architecture, the decorations of the theatre and perſpective, that the duke of Parma invited him to his court, and made him his firſt painter and architect. Bibiena at length went to the emperor's court, where he had the ſame honours and advantages. He wrote two books of architecture; and died at Bologna, at above 80 years of age. His ſons followed with ſucceſs the ſame profeſſions.

BIBLE (in Greek βιβλος, *the book*), a name applied by Chriſtians by way of eminence or diſtinction to the collection of ſacred writings, or the holy ſcriptures of the Old and New Teſtaments; known alſo by various other appellations, as, the Sacred Books, Holy Writ, Inſpired Writings, Scriptures, &c. The Jews ſtyled the Bible (that is, the Old Teſtament) *mikra*; which ſignifies *Leſſon* or *Lecture*.

This collection of the ſacred writings containing thoſe of the Old and New Teſtament, is juſtly looked upon as the foundation of the Jewiſh as well as the Chriſtian religion. The Jews, it is true, acknowledged only the ſcriptures of the Old Teſtament, the correcting and publiſhing of which is unanimouſly aſcribed, both by the Jews and Chriſtians, to Ezra. Some of the ancient fathers, on no other foundation than that fabulous and apocryphal book, the ſecond book of Eſdras, pretend, that the ſcriptures were entirely loſt and deſtroyed at the Babyloniſh captivity, and that Ezra reſtored them all again by divine revelation. What is certain is, that in the reign of Joſiah there was no other book of the law extant beſides that found in the temple by Hilkiah; from which original, by order of that pious king, copies were immediately written out, and ſearch made for all the other parts of the ſcriptures, (2 Kings xxii.); by which means copies of the whole became multiplied among the people, who carried them with them into their captivity. After the return of the Jews from the Babyloniſh captivity, Ezra got together as many copies as he could of the ſacred writings, and out of them all prepared a correct edition, diſpoſing the ſeveral books in their proper order, and ſettling the canon of ſcripture for his time, Theſe books he divided into three parts. 1. The Law. 2. The Prophets. 3. The Cetubim or Hagiographia, i. e. *The Holy Writings*. Bible.

I. The Law contains, 1. Geneſis. 2. Exodus. 3. Leviticus. 4. Numbers. 5. Deuteronomy.

II. The writings of the prophets are, 1. Joſhua. 2. Judges, with Ruth. 3. Samuel, 4. Kings. 5. Iſaiah. 6. Jeremiah, with his Lamentations. 7. Ezekiel. 8. Daniel. 9. The twelve minor prophets. 10. Job. 11. Ezra. 12. Nehemiah. 13. Eſther.

III. And the Hagiographia conſiſts of, 1. The Pſalms. 2. The Proverbs. 3. Eccleſiaſtes. 4. The Song of Solomon. This diviſion was made for the ſake of reducing the number of the ſacred books to the number of the letters in their alphabet, which amount to 22. At preſent, the Jews reckon 24 books in their canon of ſcripture, in diſpoſing of which the law ſtands as it did in the former diviſion, and the prophets are diſtributed into the former and latter prophets.

The former prophets are,
Joſhua, Judges, Samuel, Kings.
The latter prophets are,
Iſaiah, Jeremiah, Ezekiel, and the 12 minor prophets.
And the hagiographia conſiſts of
The Pſalms, the Proverbs, Job, the Song of Solomon, Ruth, the Lamentations, Eccleſiaſtes, Eſther, Daniel, Ezra, the Chronicles.

Under the name of Ezra, they comprehend Nehemiah. It is true this order hath not always been obſerved, but the variations from it are of little or no moment.

The five books of the law are divided into 54 ſections. This diviſion many of the Jews hold to have been appointed by Moſes himſelf; but others, with more probability, aſcribe it to Ezra. The deſign of this diviſion was, that one of theſe ſections might be read in their ſynagogues every ſabbath-day. The number was 54, becauſe in their intercalated years a month being then added, there were 54 ſabbaths. In other years, they reduced them to 52, by twice joining together two ſhort ſections. Till the perſecution of Antiochus Epiphanes, they read only the law; but the reading of it being then prohibited, they ſubſtituted in the room of it 54 ſections out of the prophets; and when the reading of the law was reſtored by the Maccabees, the ſection which was read every ſabbath out of the law ſerved for their firſt leſſon, and the ſection out of the prophets for their ſecond. Theſe ſections were divided into verſes; of which diviſion, if Ezra was not the author, it was introduced not long after him, and ſeems to have been deſigned for the uſe of the Targumiſts or Chaldee interpreters: for after the return of the Jews from the Babyloniſh captivity, when the Hebrew language ceaſed to be their mother tongue, and the Chaldee grew into uſe inſtead of it, the cuſtom was that the law ſhould be firſt read in the original Hebrew,

Bible. brew, and then interpreted to the people in the Chaldee language, for which purpoſe theſe ſhorter ſections or periods were very convenient.

The diviſion of the ſcriptures into chapters, as we at preſent have them, is of much later date. Some attribute it to Stephen Langton, archbiſhop of Canterbury, in the reigns of John and Henry III. But the true author of the invention was Hugo de Sancto Caro, commonly called *Hugo Cardinalis*, becauſe he was the firſt Dominican that ever was raiſed to the degree of cardinal. This Hugo flouriſhed about the year 1240. He wrote a comment on the ſcriptures, and projected the firſt concordance, which is that of the vulgar Latin Bible. The aim of this work being for the more eaſy finding out any word or paſſage in the ſcriptures, he found it neceſſary to divide the book into ſections, and the ſections into ſubdiviſions; for till that time the vulgar Latin Bibles were without any diviſion at all. Theſe ſections are the chapters into which the Bible hath ever ſince been divided. But the ſubdiviſion of the chapters was not then into verſes, as it is now. Hugo's method of ſubdividing them was by the letters A, B, C, D, E, F, G, placed in the margin at an equal diſtance from each other, according to the length of the chapters. The ſubdiviſion of the chapters into verſes, as they now ſtand in our Bibles, had its original from a famous Jewiſh rabbi, named Mordecai Nathan, about the year 1445. This rabbi, in imitation of Hugo Cardinalis, drew up a concordance to the Hebrew Bible, for the uſe of the Jews. But though he followed Hugo in his diviſion of the books into chapters, he refined upon his invention as to the ſubdiviſion, and contrived that by verſes: this being found to be a much more convenient method, it has been ever ſince followed. And thus, as the Jews borrowed the diviſion of the books of the Holy Scriptures into chapters from the Chriſtians, in like manner the Chriſtians borrowed that of the chapters into verſes from the Jews.

The order and diviſion of the books of the Bible, as well as of the Old as the New Teſtament, according to the diſpoſition made by the council of Trent, by Decree I. ſeſſion iv. are as follow: where we are to obſerve, that thoſe books to which the aſteriſms are prefixed, are rejected by the Proteſtants as apocryphal.

Geneſis,
Exodus,
Leviticus,
Numbers,
Deuteronomy,
Joſhua,
Judges and Ruth,
1 Samuel, or 1 Kings,
2 Samuel, or 2 Kings,
1 Kings, otherwiſe called 3 Kings,
2 Kings, otherwiſe called 4 Kings,
1 Chronicles,
2 Chronicles,
1 Eſdras (as the LXX and Vulgate call it), or the book of Ezra,
2 Eſdras or (as we have it) the book of Nehemiah,
* Tobit,
* Judith,
Eſther,
Job,
Pſalms,
Proverbs,
Eccleſiaſtes,
Song of Solomon,
* The book of Wiſdom,
* Eccleſiaſticus,
Iſaiah,
Jeremiah and * Baruch,
Ezekiel,
Daniel,
Hoſea,
Joel,
Amos,
Obadiah,
Nahum, which we place immediately after Micah, before Habakkuk,
Jonah, which we place immediately after Obadiah.
Micah,
Habakkuk,
Zephaniah,
Haggai,
Zechariah,
Malachi,
* 1 Maccabees,
* 2 Maccabees.

Bible.

The books of the New Teſtament are,

The Goſpel of { St Matthew, St Mark, St Luke, St John,

The Acts of the Apoſtles.

The Epiſtle of St Paul to { the Romans, the Corinthians, I. the Corinthians, II. the Galatians, the Epheſians, the Philippians, the Coloſſians, the Theſſalonians, I. the Theſſalonians, II. Timothy, I. Timothy, II. Titus, Philemon, the Hebrews,

The general Epiſtle of { St James, St Peter, I. St Peter, II. St John, I. St John, II. St John, III. St Jude,

The Revelation of St John.

The apocryphal books of the Old Teſtament, according to the Romaniſts are, the book of Enoch (ſee Jude 14.), the third and fourth books of Eſdras, the third and fourth books of Maccabees, the prayer of Manaſſeh, the Teſtament of the twelve patriarchs, the Pſalter of Solomon, and ſome other pieces of this nature.

The apocryphal books of the New Teſtament are, the epiſtle of St Barnabas, the pretended epiſtle of St Paul

Bible. Paul to the Laodiceans, ſeveral ſpurious goſpels, Acts of the Apoſtles, and Revelations; the book of Hermas, entitled, the Shepherd, Jeſus Chriſt's Letter to Abgarus, the epiſtles of St Paul to Seneca, and ſeveother pieces of the like nature, as may be ſeen in the collection of the apocryphal writings of the New Teſtament made by Fabricius.

The books which are now loſt and cited in the Old Teſtament are theſe, the book of the *Righteous*, or of Jaſher, as our verſion of the Bible has it (Joſh. x. 13. and 2 Sam. i. 18.); the book of the wars of the Lord, (Numb. xxi. 14.); the annals of the kings of Iſrael, ſo often cited in the books of the Kings and Chronicles. The authors of theſe annals were the prophets, who lived in the kingdoms of Judah and Iſrael. We have likewiſe but a part of Solomon's 3000 proverbs and his 1005 ſongs, (1 Kings iv. 32.); and we have entirely loſt what he wrote upon plants, animals, birds, fiſhes, and reptiles.

Ezra, in the opinion of moſt learned men, publiſhed the Scriptures in the Chaldee character: for that language being grown wholly into uſe among the Jews, he thought proper to change the old Hebrew character for it, which hath ſince that time been retained only by the Samaritans, among whom it is preſerved to this day.

Prideaux is of opinion that Ezra made additions in ſeveral parts of the Bible, where any thing appeared neceſſary for illuſtrating, connecting, or completing, the work; in which he appears to have been aſſiſted by the ſame ſpirit in which they were firſt written. Among ſuch additions are to be reckoned the laſt chapter of Deuteronomy, wherein Moſes ſeems to give an account of his own death and burial, and the ſucceſſion of Joſhua after him. To the ſame cauſe our learned author thinks are to be attributed many other interpolations in the Bible, which created difficulties and objections to the authenticity of the ſacred text, no ways to be ſolved without allowing them. Ezra changed the names of ſeveral places which were grown obſolete, and inſtead of them put their new names, by which they were then called in the text. Thus it is that Abraham is ſaid to have purſued the kings who carried Lot away captive, as far as Dan; whereas that place in Moſes's time was called *Laiſh*; the name *Dan* being unknown till the Danites, long after the death of Moſes, poſſeſſed themſelves of it.

The Jewiſh canon of Scripture was then ſettled by Ezra, yet not ſo but that ſeveral variations have been made in it. Malachi, for inſtance, could not be put in the Bible by him, ſince that prophet is allowed to have lived after Ezra; nor could Nehemiah be there, ſince mention is made, in that book, of Jaddus, as high-prieſt, and of Darius Codomannus, as king of Perſia, who were at leaſt 100 years later than Ezra. It may be added, that in the firſt book of Chronicles, the genealogy of the ſons of Zerubbabel is carried down for ſo many generations as muſt neceſſarily bring it to the time of Alexander, and conſequently this book could not be in the canon in Ezra's days. It is probable, the two books of Chronicles, Ezra, Nehemiah, Eſther, and Malachi, were adopted into the Bible in the time of Simon the Juſt, the laſt of the men of the great ſynagogue.

The Jews, at firſt, were very reſerved in communicating their Scripture to ſtrangers: deſpiſing and ſhunning the Gentiles, they would not diſcloſe to them any of the treaſures concealed in the Bible. We may add, that the people bordering on the Jews, as the Egyptians, Phœnicians, Arabs, &c. were not very curious to know the laws or hiſtory of a people, whom in their turn they hated or deſpiſed. Their firſt acquaintance with theſe books was not till after the ſeveral captivities of the Jews, when the ſingularity of the Hebrew laws and ceremonies induced ſeveral to deſire a more particular knowledge of them. Joſephus ſeems ſurpriſed to find ſuch ſlight footſteps of the Scripture-hiſtory interſperſed in the Egyptian, Chaldean, Phœnician, and Grecian hiſtory; and accounts for it hence, that the ſacred books were not as yet tranſlated into Greek or other languages, and conſequently not known to the writers of thoſe nations. Bible.

The firſt verſion of the Bible was that of the SEPTUAGINT into Greek, in the time of Ptolemy Philadelphus; though ſome maintain that the whole was not then tranſlated, but only the Pentateuch; between which and the other books in the verſion called of the Seventy, the critics find a great diverſity in point of ſtyle and expreſſion, as well as of accuracy.

Hebrew BIBLES are either manuſcript or printed. The beſt manuſcript Bibles are thoſe copied by the Jews of Spain. Thoſe copied by the Jews of Germany are leſs exact, but more common. The two kinds are eaſily diſtinguiſhed from each other; the former being in beautiful characters, like the Hebrew Bibles of Bomberg, Stephens, and Plantin; the latter in characters like thoſe of Munſter and Gryphius. F. Simon obſerves, that the oldeſt manuſcript Hebrew Bibles are not above ſix or ſeven hundred years old; nor does Rabbi Menaham, who quotes a vaſt number of them, pretend that any of them exceed ſix hundred years.

Dr Kennicot, in his Diſſertatio Generalis prefixed to his Hebrew Bible, p. 21. obſerves, that the moſt ancient manuſcripts were written between the years 900 and 1100: but though thoſe that are the moſt ancient are not more than 800 or 900 years old, they were tranſcribed from others of a much more ancient date. The manuſcript preſerved in the Bodleian library is not leſs than 800 years old. Another manuſcript, not leſs ancient, is preſerved in the Cæſarean library at Vienna.

The moſt ancient printed Hebrew Bibles are thoſe publiſhed by the Jews of Italy, eſpecially of Peſaro and Breſſe. Thoſe of Portugal alſo printed ſome parts of the Bible at Liſbon, before their expulſion.—This may be obſerved in the general, that the beſt Hebrew Bibles are thoſe printed under the inſpection of the Jews; there being ſo many *minutiæ* to be obſerved, that it is ſcarce poſſible for any other to ſucceed in it.

In the beginning of the 16th century Dan. Bomberg printed ſeveral Hebrew Bibles in folio and quarto at Venice, moſt of which are eſteemed both by the Jews and Chriſtians: the firſt in 1517, which is the leaſt exact, and generally goes by the name of Felix Pratenſis, the perſon who reviſed it. This edition contains the Hebrew text, the targum, and the commentaries of ſeveral rabbins. In 1528, the ſame Bomberg

Bible. berg printed the folio Bible of Rabbi Benchajim, with his preface, the maſoretical diviſions, a preface of Aben Ezra, a double *maſora*, and ſeveral various readings. The third edition was printed in 1618; it is the ſame with the ſecond, but much more correct. From the former editions it was, that Buxtorf, the father, printed his rabbinical Hebrew Bible at Baſil in 1618; which though there are many faults in it, is more correct than any of the former. In 1623 appeared at Venice a new edition of the rabbinical Bible by Leo of Modena, a rabbin of that city, who pretended to have corrected a great number of faults in the former edition; but, beſides that it is much inferior to the other Hebrew Bibles of Venice, with regard to paper and print, it has paſſed through the hands of the inquiſitors, who have altered many paſſages in the commentaries of the rabbins.

As to Hebrew Bibles in 4to, that of R. Stephens is eſteemed for the beauty of the characters; but it is very incorrect. Plantin alſo printed ſeveral beautiful Hebrew Bibles at Antwerp: one, in eight columns, with a preface by Arias Montanus in 1571, which far exceeds the Complutenſian in paper and print, and contents; this is called the Royal Bible, becauſe it was printed at the expence of Philip II. of Spain: another at Geneva in 1619; beſides many more of different ſizes, with and without points. Manaſſeh Ben Iſrael, a learned Portugueſe Jew, publiſhed two editions of the Hebrew Bible at Amſterdam; the one in 4to in 1635; the other in 8vo in 1639: the firſt has two columns, and for that reaſon is commodious for the reader. In 1639, R. Jac. Lombroſo publiſhed a new edition in 4to at Venice, with ſmall literal notes at the bottom of each page, where he explains the Hebrew words by Spaniſh words. This bible is much eſteemed by the Jews at Conſtantinople: in the text they have diſtinguiſhed between words where the point *camets* is to be read with a *camets-katuph*, that is, by *o*, and not an *a*.

Of all the editions of the Hebrew Bible in 8vo, the moſt beautiful and correct are the two of Jo. Athias, a Jew of Amſterdam. The firſt, of 1661, is the beſt paper; but that of 1667 is the moſt exact; that, however, publiſhed ſince at Amſterdam by Vander Hooght, in 1705, is preferable to any of them.

After Athias, three Hebraizing Proteſtants engaged in reviſing and publiſhing the Hebrew Bible, viz. Clodius, Jablonſki, and Opitius. Clodius's edition was publiſhed at Franckfort in 1677, in 4to. At the bottom of the page it has the various readings of the former editions; but the author does not appear ſufficiently verſed in the accenting, eſpecially in the poetical books; beſides, as it was not publiſhed under his eye, many faults have crept in. That of Jablonſki in 1699, in 4to, at Berlin, is very beautiful as to letter and print: but, though the editor pretends he made uſe of the editions of Athias and Clodius, ſome critics find it ſcarce in any thing different from the 4to edition of Bomberg. That of Opitius is alſo in 4to at Keil, in 1709; the character is large and good, but the paper bad: it is done with a great deal of care; but the editor made uſe of no manuſcripts but thoſe of the German libraries; neglecting the French ones, which is an omiſſion common to all three. They have this advantage, however, that beſides the diviſions uſed by the Jews, both general and particular, into *paraſkes* and *peſukim*, they have alſo thoſe of the Chriſtians, or of the Latin Bibles, into chapters and verſes; the *keir ketib*, or various readings, Latin ſummaries, &c. which made them of conſiderable uſe, with reſpect to the Latin edition and the concordances. Bible.

The little Bible of R. Stephens, in 16to, is very much prized for the beauty of the character. Care, however, muſt be taken; there being another edition of Geneva exceedingly like it, excepting that the print is worſe, and the text leſs correct. To theſe may be added ſome other Hebrew Bibles without points, in 8vo and 24to, which are much coveted by the Jews; not that they are more exact, but more portable than the reſt, and are uſed in their ſynagogues and ſchools: of theſe there are two beautiful editions, the one of Plantin, in 8vo, with two columns, and the other in 24to reprinted by Raphalengius at Leyden, in 1610. There is alſo an edition of them by Laurence at Amſterdam in 1631, in a large character; and another in 12mo, at Franckfort, in 1694, full of faults, with a preface of M. Leuſden at the head of it.

Houbigant publiſhed an elegant edition of the Hebrew Bible at Paris, in 1753, contained in four vols. folio. The text is that of Van der Hooght, without points, to which he has added marginal notes, ſupplying the variations of the Samaritan copy. Dr Kennicott, after almoſt 20 years laborious collation of near 700 copies, manuſcript and printed, either of the whole or of particular parts of the Bible, did, in 1776, publiſh the firſt volume of the Hebrew Bible in folio. The text is that of Everand Van der Hooght, already mentioned, differing from it only in the diſpoſition of the poetical parts, which Dr Kennicott has printed in hemiſtichs, into which they naturally divide themſelves; however, the words follow one another in the ſame order as they do in the edition of Van der Hooght. This edition is printed on an excellent type; the Samaritan text, according to the copy in the London Polyglot, is exhibited in a column parallel with the Hebrew text; thoſe parts of it only being introduced in which it differs from the Hebrew. The numerous variations both of the Samaritan manuſcripts from the printed copy of the Samaritan text, and of the Hebrew manuſcripts from the printed text of Van der Hooght, are placed ſeparately at the bottom of the page, and marked with numbers referring to the copies from which they are taken. The editor regrets, that the diſſertatio generalis, which would help to enrich this article, is not to be publiſhed till the ſecond volume is ready.

Greek Bibles. There is a great number of editions of the Bible in Greek; but they may be all reduced to three or four principal ones, viz. that of Complutum, or Alcala de Henares, that of Venice, that of Rome, and that of Oxford. The firſt was publiſhed in 1515, by Cardinal Ximenes, and inſerted in the Polyglot Bible, uſually called the *Complutenſian Bible*: this edition is not juſt, the Greek of the Seventy being altered in many places according to the Hebrew text. It has, however, been reprinted in the Polyglot Bible of Antwerp, in that of Paris, and in the 4to Bible, commonly called *Vatablus's Bible*.

The ſecond Greek Bible is that of Venice, printed by

Bible. by Aldus in 1518. Here the Greek text of the Septuagint is reprinted juſt as it ſtood in the manuſcript, full of faults of the copyiſts, but eaſily amended. This edition was reprinted at Straſburg in 1526, at Baſil in 1545, at Franckfort in 1597, and other places, with ſome alterations to bring it nearer the Hebrew. The moſt commodious is that of Franckfort; there being added to this little *ſcholia*, which ſhow the different interpretations of the old Greek tranſlators: the author of this collection has not added his name, but it is commonly aſcribed to Junius.

The third Greek Bible is that of Rome, or the Vatican, in 1587, with Greek *ſcholia* collected from the manuſcripts in the Roman libraries by Pet. Morin. It was firſt ſet on foot by Cardinal Montalbo, afterwards Pope Sextus Quintus. This fine edition has been reprinted at Paris in 1628 by J. Morin, prieſt of the oratory, who has added the Latin tranſlation, which in the Roman was printed ſeparately with *ſcholia*. The Greek edition of Rome has been printed in the Polyglot Bible of London; to which are added, at bottom, the various readings of the Alexandrian manuſcript. This has been alſo reprinted in England in 4to and 12mo, with ſome alterations. It has been again publiſhed at Franeker in 1709 by Bos, who has added all the various readings he could find.

The fourth Greek Bible is that done from the Alexandrian manuſcript, begun at Oxford by Dr Grabe in 1707. In this the Alexandrian manuſcript is not printed ſuch as it is, but ſuch as it was thought it ſhould be; i. e. it is altered wherever there appeared any fault of the copyiſts, or any word inſerted from any particular dialect: this ſome think an excellence, but others a fault; urging, that the manuſcript ſhould have been given abſolutely and entirely of itſelf, and all conjectures as to the readings ſhould have been thrown into the notes.

Latin Bibles, how numerous ſoever, may be all reduced to three claſſes; the ancient vulgate, called alſo *Italica*, tranſlated from the Greek Septuagint; the modern vulgate, the greateſt part of which is done from the Hebrew text; and the new Latin tranſlations, done alſo from the Hebrew text, in the 16th century. We have nothing remaining of the ancient vulgate, uſed in the primitive times in the weſtern churches but the Pſalms, Wiſdom, and Eccleſiaſtes. Nobilius has endeavoured to retrieve it from the works of the ancient Latin fathers; but it was impoſſible to do it exactly, becauſe moſt of the fathers did not keep cloſe to it in their citations.

As to the modern vulgate, there is a vaſt number of editions very different from each other. Cardinal Ximenes has inſerted one in the Bible of Complutum, corrected and altered in many places. R. Stephens and the doctors of Louvain have taken great pains in correcting the modern vulgate.

The beſt edition of Stephens's Latin Bible is that of 1540, reprinted in 1545, in which are added on the margin the various readings of ſeveral Latin manuſcripts which he had conſulted. The doctors of Louvain reviſed the modern vulgate after R. Stephens; and added the various readings of ſeveral Latin manuſcripts. The beſt of the Louvain editions are thoſe at the end of which are added the critical notes of Francis Lucas of Bruges.

All theſe reformations of the Latin Bible were made before the time of Pope Sixtus V. and Clement VIII. Bible. ſince which people have not dared to make any alterations, excepting in comments and ſeparate notes. The correction of Clement VIII. in 1592, is now the ſtandard throughout all the Romiſh churches: that pontiff made two reformations; but it is the firſt of them that is followed. From this the Bibles of Plantin were done, and from thoſe of Plantin all the reſt; ſo that the common Bibles have none of the after corrections of the ſame Clement VIII. It is a heavy charge that lies on the editions of Pope Clement, viz. that they have ſome new texts added, and many old ones altered, to countenance and confirm what they call the Catholic doctrine; witneſs that celebated paſſage of St John, *tres ſunt*, &c. There are a great number of Latin Bibles of the third claſs, comprehending the verſions from the originals of the ſacred books made within theſe 200 years. The firſt is that of Santes Pagninus, a Dominican, under the patronage of Pope Leo X. printed at Lyons, in 4to, in 1527, much eſteemed by the Jews. This the author improved in a ſecond edition. In 1542, there was a beautiful edition of the ſame at Lyons, in folio, with *ſcholia*, publiſhed under the name of *Michael Villanovanus*, i. e. Michael Servetus, author of the *ſcholia*. Thoſe of Zurich have likewiſe publiſhed an edition of Pagninus's Bible in 4to; and R. Stephens reprinted it in folio, with the vulgate, in 1557, pretending to give it more correct than in the former editions. There is alſo another edition of 1586, in four columns, under the name of *Vatablus*: and we find it again in the Hamburgh edition of the Bible in four languages.

In the number of Latin Bibles is alſo uſually ranked the verſion of the ſame Pagninus corrected, or rather rendered literal, by Arias Montanus; which correction being approved of by the doctors of Louvain, &c. was inſerted in the Polyglot Bible of Philip II. and ſince in that of London. There have been various editions of this in folio, 4to, and 8vo; to which have been added the Hebrew text of the Old Teſtament, and the Greek of the New. The beſt of them all is the firſt, which is in folio, 1571.

Since the Reformation there have been ſeveral Latin verſions of the Bible from the originals by Proteſtants. The moſt eſteemed are thoſe of Munſter, Leo Juda, Caſtalio, and Tremellius; the three laſt whereof have been reprinted various times. Munſter publiſhed his verſion at Baſil in 1534, which he afterwards reviſed; he publiſhed a correct edition in 1546. Caſtalio's fine Latin pleaſes moſt people; but there are ſome who think it too much affected; the beſt edition thereof is that in 1573. Leo Juda's verſion altered a little by the divines of Salamanca, was added to the ancient Latin edition, as publiſhed by R. Stephens, with notes, under the name of *Vatablus's Bible*, in 1545. It was condemned by the Pariſian divines, but printed with ſome alterations by the Spaniſh divines of Salamanca. That of Junius and Tremellius is preferred, eſpecially by the Calviniſts, and has undergone a great number of editions.

One may add a fourth claſs of Latin Bibles, comprehending the vulgate edition corrected from the originals. The Bible of Iſidorus Clarus is of this number: that author, not being contented with reſtoring the

Bibles.

ancient Latin copy, has corrected the translator in a great number of places, which he thought ill rendered. Some Protestants have followed the same method; and among others, Andrew and Luke Osiander, who have each published a new edition of the vulgate, corrected from the originals.

Oriental BIBLES.—At the head of the Oriental versions of the Bible must be placed the Samaritan; as being the most ancient of all, though neither its age nor author have been yet ascertained, and admitting no more for holy scripture but the Pentateuch, or five books of Moses. This translation is made from the Samaritan Hebrew text, which is a little different from the Hebrew text of the Jews. This version has never been printed alone; nor anywhere but in the Polyglots of London and Paris.

Chaldee BIBLES, are only the glosses or expositions made by the Jews in the time when they spake the Chaldee tongue. These they call by the name of *Targumim*, or *paraphrases*, as not being any strict versions of the Scripture. They have been inserted entire in the large Hebrew Bibles of Venice and Basil; but are read more commodiously in the Polyglots, being there attended with a Latin translation.

Syriac BIBLES.—There are extant two versions of the Old Testament in the Syriac language: one from the Septuagint, which is ancient, and made probably about the time of Constantine; the other called *antiqua et simplex*, made from the Hebrew, as some suppose, about the time of the apostles. This version is printed in the Polyglots of London and Paris.

In the year 1562, Widmanstadius printed the whole New Testament in Syriac, at Vienna, in a beautiful character: after him there were several other editions; and it was inserted in the Bible of Philip II. with a Latin translation. Gabriel Sionita also published a beautiful Syriac edition of the Psalms, at Paris, in 1525, with a Latin interpretation.

Arabic BIBLES.—In the year 1516, Aug. Justinian, bishop of Nebio, printed at Genoa an Arabic version of the Psalter, with the Hebrew text and Chaldee paraphrase, adding Latin interpretations. There are also Arabic versions of the whole Scriptures in the Polyglots of London and Paris; and we have an edition of the Old Testament entire, printed at Rome in 1671, by order of the congregation *de propaganda fide;* but it is of little esteem, as having been altered agreeably to the vulgate edition. The Arabic Bibles among us are not the same with those used with the Christians in the east. Some learned men take the Arabic version of the Old Testament, printed in the Polyglots, to be that of Saadias, who lived about the year 900; at least in the main. Their reason is, that Aben Ezra, a great antagonist of Saadias, quotes some passages of his version, which are the same with those in the Arabic version of the Polyglots; yet others are of opinion, that Saadias's version is not extant. In 1622, Erpenius printed an Arabic Pentateuch, called also the Pentateuch of Mauritania, as being made by the Jews of Barbary, and for their use. This version is very literal, and esteemed very exact. The four Evangelists have also been published in Arabic, with a Latin version, at Rome, in 1591, folio. These have been since reprinted in the Polyglots of London and Paris, with some little alterations of Gabriel Sionita. Erpenius published an Arabic New Testament entire, as he found it in his manuscript copy, at Leyden, in 1616. Bibles.

There are some other Arabic versions of late date mentioned by Walton in his Prolegomena; particularly a version of the Psalms preserved in Sion College, London, and another of the Prophets at Oxford; neither of which have been published.

Cophtic BIBLES.—There are several manuscript copies of the Cophtic Bible in some of the great libraries, especially in that of the French king. Dr Wilkins published the Cophtic New Testament in 4to in the year 1716, and the Pentateuch also in 4to in 1731, with Latin translations. He reckons these versions to have been made in the end of the second, or the beginning of the third century.

Ethiopic BIBLES.—The Ethiopians have also translated the Bible into their language. There have been printed separately, the Psalms, Canticles, some chapters of Genesis, Ruth, Joel, Jonah, Zephaniah, Malachi, and the New Testament; all which have been since reprinted in the Polyglot of London. As to the Ethiopic New Testament, which was first printed at Rome in 1548, it is a very inaccurate work, and is reprinted in the English Polyglot with all its faults.

Armenian BIBLES.—There is a very ancient Armenian version of the whole Bible, done from the Greek of the Seventy, by some of their doctors about the time of Chrysostom. This was first printed entire in 1664, by one of their bishops at Amsterdam, in 4to; with the New Testament in 8vo.

Persian BIBLES.—Some of the fathers seem to say, that all the Scripture was formerly translated into the language of the Persians; but we have nothing now remaining of the ancient versions, which was certainly done from the Septuagint. The Persian Pentateuch printed in the London Polyglot is, without doubt, the work of Rabbi Jacob, a Persian Jew. It was published by the Jews at Constantinople, in the year 1551. In the same Polyglot we have likewise the four Evangelists in Persian, with a Latin translation; but this appears very modern, incorrect, and of little use. Wilton says this version was written above 400 years ago. Another version of the Gospels was published at Cambridge by Wheloc in the last century: there are also two Persian versions of the Psalms made in the last century from the vulgar Latin.

Gothic BIBLES.—It is generally said that Ulphilas, a Gothic bishop, who lived in the fourth century, made a version of the whole Bible, excepting the book of Kings, for the use of his countrymen. That book he omitted, because of the frequent mention of the wars therein; as fearing to inspire too much of the military genius into that people. We have nothing remaining of this version but the four Evangelists, printed in 4to, at Dort, in 1665, from a very ancient MS.

WHILST the Roman empire subsisted in Europe, the reading of the Scriptures in the Latin tongue, which was the universal language of that empire prevailed everywhere. But since the face of affairs in Europe has been changed, and so many different monarchies erected upon the ruins of the Roman empire, the Latin tongue has by degrees grown into disuse: whence has arisen a necessity of translating the Bible into the respective languages of each people; and this has produced

Bibles. ced as many different verſions of the Scriptures in the modern languages, as there are different nations profeſſing the Chriſtian religion. Hence we meet with French, Italian, Spaniſh, German, Flemiſh, Daniſh, Sclavonian, Poliſh, Bohemian, and Ruſſian or Muſcovite Bibles; beſides the Anglo-Saxon, and modern Engliſh and Iriſh Bibles.

French BIBLES. The oldeſt French Bible we hear of is the verſion of Peter de Vaux, chief of the Waldenſes, who lived about the year 1160. Raoul de Preſle tranſlated the Bible into French in the reign of Charles V. king of France, about the year 1380. Beſides theſe there are ſeveral old French tranſlations of particular parts of the Scripture. The doctors of Louvain publiſhed the Bible in French at Louvain by order of the emperor Charles V. in 1550. There is a verſion by Iſaac le Maitre de Sacy, publiſhed in 1672, with explanations of the literal and ſpiritual meaning of the text, which was received with wonderful applauſe, and has been often reprinted. As to the New Teſtaments in French, which have been printed ſeparately, one of the moſt remarkable is that of F. Amelotte of the oratory, compoſed by the direction of ſome French prelates, and printed with annotations in the year 1666, 1667, and 1670. The author pretends he had been at the pains to ſearch all the libraries in Europe, and collate the oldeſt manuſcripts. But, in examining his work, it appears that he has produced no conſiderable various readings, which had not before been taken notice of either in the London Polyglott or elſewhere. The New Teſtament of Mons printed in 1665, with the archbiſhop of Cambray's permiſſion, and the king of Spain's licenſe, made a great noiſe in the world. It was condemned by Pope Clement IX. in 1668, and by Pope Innocent XI. in 1679, and in ſeveral biſhoprics of France at ſeveral times. The New Teſtament publiſhed a Trevoux in 1702, by M. Simon, with literal and critical annotations upon difficult paſſages, was condemned by the biſhops of Paris and Meaux in 1702. F. Bohours, a Jeſuit, with the aſſiſtance of F. F. Michael Tellier, and Peter Bernier, Jeſuits likewiſe, publiſhed a tranſlation of the New Teſtament in 1697: but this tranſlation is, for the moſt part, harſh and obſcure, which was owing to the author's keeping too ſtrictly to the Latin text from which he tranſlated.

There are likewiſe French tranſlations publiſhed by Proteſtant authors; one by Robert Peter Olivetan, printed at Geneva in 1535, and ſince often reprinted with the corrections of John Calvin and others; another by Sebaſtian Caſtalio, remarkable for particular ways of expreſſion never uſed by good judges of the language. John Diodati likewiſe publiſhed a French Bible at Geneva in 1644; but ſome find fault with his method, in that he rather paraphraſes the text than tranſlates it. Faber Stapalenſis tranſlated the New Teſtament into French, which was reviſed and accommodated to the uſe of the reformed churches in Piedmont, and printed in 1534. Laſtly, M. John le Clerc publiſhed a New Teſtament in French at Amſterdam in 1703, with annotations taken chiefly from Grotius and Hammond; but the uſe of this verſion was prohibited in Holland by order of the States-General, as tending to revive the errors of Sabellius and Socinus.

Italian BIBLES. The firſt Italian Bible publiſhed by the Romaniſts is that of Nicholas Malerme, a Benedictine monk, printed at Venice in 1471. It was tranſ- Bibles. lated from the Vulgate. The verſion of Anthony Brucioli, publiſhed at Venice in 1532, was prohibited by the Council of Trent. The Calviniſts likewiſe have their Italian Bibles. There is one of John Diodati in 1607 and 1641, and another of Maximus Theophilus in 1551, dedicated to Francis de Medicis duke of Tuſcany. The Jews of Italy have no entire verſion of the Bible in Italian; the inquiſition conſtantly refuſing to allow them the liberty of printing one.

Spaniſh BIBLES. The firſt Spaniſh Bible that we hear of is that mentioned by Cyprian de Valera, which he ſays was publiſhed about the year 1500. The Epiſtles and Goſpels were publiſhed in that language by Ambroſe de Monteſin in 1512; the whole Bible by Caſſiodore de Reyna, a Calviniſt, in 1569; and the New Teſtament, dedicated to the emperor Charles V. by Francis Enzinas, otherwiſe called *Driander*, in 1543. The firſt Bible which was printed in Spaniſh for the uſe of the Jews was that printed at Ferrara in 1553, in Gothic characters, and dedicated to Hercules d'Eſt duke of Ferrara. This verſion is very ancient, and was probably in uſe among the Jews of Spain before Ferdinand and Iſabella expelled them out of their dominions in 1492.

German BIBLES. The firſt and moſt ancient tranſlation of the Bible in the German language is that of Ulphilas biſhop of the Goths, about the year 360. This biſhop left out the book of Kings, which treats chiefly of war, leſt it ſhould too much encourage the martial humour of the Goths. An imperfect manuſcript of this verſion was found in the abbey of Verden near Cologn, written in letters of ſilver, for which reaſon it is called *Codex Argenteus*; and it was publiſhed by Francis Junius in 1665. The oldeſt German printed Bible extant is that of Nuremberg, printed in 1447; but who the author of it was is uncertain. John Emzer, chaplain to George duke of Saxony, publiſhed a verſion of the New Teſtament in oppoſition to Luther. There is a German Bible of John Eckius in 1537, with Emzer's New Teſtament added to it; and one by Ulembergius of Weſtphalia, procured by Ferdinand duke of Bavaria, and printed in 1630. Martin Luther having employed eleven years in tranſlating the Old and New Teſtament, publiſhed the Pentateuch in 1522, the hiſtorical books and the Pſalms in 1524, the books of Solomon in 1527, Iſaiah in 1529, the Prophets in 1531, and the other books in 1530: he publiſhed the New Teſtament in 1522. The learned agree, that his language is pure, and the verſion clear and free from intricacies: it was reviſed by ſeveral perſons of quality, who were maſters of all the delicacies of the German language. The German Bibles which have been printed in Saxony, Switzerland, and elſewhere, are for the moſt part the ſame with that of Luther, with very little variation. In 1604 John Piſcator publiſhed a verſion of the Bible in German, taken from that of Junius and Tremellius: but his turn of expreſſion is purely Latin, and not at all agreeable to the genius of the German language: the Anabaptiſts have a German Bible printed at Worms in 1529. John Crellius publiſhed his verſion of the New Teſtament at Racovia in 1630; and Felbinger his at Amſterdam in 1660.

Flemiſh BIBLES. The Flemiſh Bibles of the Romaniſts are very numerous, and for the moſt part have no

author's

Bibles. author's name prefixed to them, till that of Nicolas Vinck, printed at Louvain in 1548. The Flemiſh verſions made uſe of by the Calviniſts till the year 1637, were copied principally from that of Luther. But the ſynod of Dort having in 1618 appointed a new tranſlation of the Bible into Flemiſh, deputies were named for the work, which was not finiſhed till the year 1637.

Daniſh Bibles. The firſt Daniſh Bible was publiſhed by Peter Palladius, Olaus Chryſoſtom, John Syningius, and John Maccabæus, in 1550, in which they followed Luther's firſt German verſion. There are two other verſions, the one by John Paul Reſenius biſhop of Zealand, in 1605; the other, being the New Teſtament only, by John Michel, in 1524.

Swediſh Bible. In 1534 Olaus and Laurence publiſhed a Swediſh Bible from the German verſion of Martin Luther. It was reviſed in 1617, by order of King Guſtavus Adolphus, and was afterwards almoſt univerſally received.

Bohemian, Poliſh, Ruſſian or Muſcovite, and Sclavonian Bibles. The Bohemians have a Bible tranſlated by eight of their doctors, whom they had ſent to the ſchools of Wirtemberg and Baſil, on purpoſe to ſtudy the original languages. It was printed in Moravia in the year 1539. The firſt Poliſh verſion of the Bible, it is ſaid, was that compoſed by Hadewich wife of Jagellon duke of Lithuania, who embraced Chriſtianity in the year 1390. In 1599 there was a Poliſh tranſlation of the Bible publiſhed at Cracow, which was the work of ſeveral divines of that nation, and in which James Wieck, a Jeſuit, had a principal ſhare. The Proteſtants, in 1596, publiſhed a Poliſh Bible from Luther's German verſion, and dedicated to Uladiſlaus IV. king of Poland. The Ruſſians or Muſcovites publiſhed the Bible in their language in 1581. It was tranſlated from the Greek by St Cyril, the apoſtle of the Sclavonians; but this old verſion being too obſcure, Erneſt Gliik, who had been carried priſoner to Moſcow after the taking of Narva, undertook a new tranſlation of the Bible in Sclavonian; who dying in 1705, the Czar Peter appointed ſome particular divines to finiſh the tranſlation: but whether it was ever printed, we cannot ſay.

Engliſh-Saxon Bibles. If we inquire into the verſions of the Bible of our own country, we ſhall find that Adelm biſhop of Shireborn, who lived in 709, made an Engliſh-Saxon verſion of the Pſalms; and that Eadfrid, or Ecbert, biſhop of Lindisferne, who lived about the year 730, tranſlated ſeveral of the books of Scripture into the ſame language. It is ſaid likewiſe, that venerable Bede, who died in 785, tranſlated the whole Bible into Saxon. But Cuthbert, Bede's diſciple, in the enumeration of his maſter's works, ſpeaks only of his tranſlation of the Goſpels; and ſays nothing of the reſt of the Bible. Some pretend, that King Alfred, who lived in 890, tranſlated a great part of the Scriptures. We find an old verſion in the Anglo-Saxon of ſeveral books of the Bible, made by Elfric abbot of Malmſbury: it was publiſhed at Oxford in 1699. There is an old Anglo-Saxon verſion of the four Goſpels, publiſhed by Matthew Parker archbiſhop of Canterbury in 1571, the author whereof is unknown. Dr Mill obſerves, that this verſion was made from a Latin copy of the old Vulgate.

Saxon Bibles.—The whole Scripture is ſaid by ſome to have been tranſlated into the Anglo-Saxon by Bede about the year 701, though others contend he only tranſlated the Goſpels. Bibles.

We have certain books or parts of the Bible by ſeveral other tranſlators; as, 1. The Pſalms, by Adelm biſhop of Shireborn, contemporary with Bede; though by others this verſion is attributed to King Alfred, who lived 200 years after. Another verſion of the Pſalms in Anglo-Saxon was publiſhed by Spelman in 1640. 2. The Evangeliſts, ſtill extant, done from the ancient vulgate, before it was reviſed by St Jerome, by an author unknown, and publiſhed by Matth. Parker in 1571. An old Saxon verſion of ſeveral books of the Bible, made by Elfric abbot of Malmeſbury, ſeveral fragments of which were publiſhed by Will. Lilly in 1638, the genuine copy by Edm. Thwaites in 1699, at Oxford.

Indian Bible.—A tranſlation of the Bible into the North American Indian language by Elliot was publiſhed in 4to at Cambridge in 1685.

Engliſh Bibles.—The firſt Engliſh Bible we read of was that tranſlated by J. Wickliffe about the year 1360; but never printed, though there are MS. copies of it in ſeveral of the public libraries. J. de Treviſa, who died about the year 1398, is alſo ſaid to have tranſlated the whole Bible; but whether any copies of it are remaining, does not appear.

Tindal's.—The firſt printed Bible in our language was that tranſlated by Will. Tindal, aſſiſted by Miles Coverdale, printed abroad in 1526; but moſt of the copies were bought up and burnt by Biſhop Tunſtal and Sir Thomas More. It only contained the New Teſtament, and was reviſed and republiſhed by the ſame perſon in 1530. The prologues and prefaces added to it reflect on the biſhops and clergy; but this edition was alſo ſuppreſſed, and the copies burnt. In 1532, Tindal and his aſſociates finiſhed the whole Bible except the Apocrypha, and printed it abroad: but while he was afterwards preparing for a ſecond edition, he was taken up and burnt for hereſy in Flanders.

Matthews's.—On Tindal's death, his work was carried on by Coverdale, and John Rogers ſuperintendant of an Engliſh church in Germany, and the firſt martyr in the reign of Queen Mary, who tranſlated the Apocrypha, and reviſed Tindal's tranſlation, comparing it with the Hebrew, Greek, Latin, and German, and adding prefaces and notes from Luther's Bible. He dedicated the whole to Henry VIII. in 1537, under the borrowed name of Thomas Matthews; whence this has been uſually called *Matthews's Bible.* It was printed at Hamburgh, and licenſe obtained for publiſhing it in England by the favour of Archbiſhop Cranmer and the biſhops Latimer and Shaxton.

Cranmer's.—The firſt Bible printed by authority in England, and publicly ſet up in churches, was the ſame Tindal's verſion, reviſed, compared with the Hebrew, and in many places amended, by Miles Coverdale afterwards biſhop of Exeter; and examined after him by Archbiſhop Cranmer, who added a preface to it: whence this was called *Cranmer's Bible.* It was printed by Grafton, of the largeſt volume, and publiſhed in 1540; and, by a royal proclamation, every pariſh was obliged to ſet one of the copies in their church, under the penalty of 40s. a month; yet, two

years

Bibles. years after, the Popiſh biſhops obtained its ſuppreſſion of the king. It was reſtored under Edward VI. ſuppreſſed again under Queen Mary, and reſtored again in the firſt year of Queen Elizabeth, and a new edition of it given in 1562.

Geneva.—Some Engliſh exiles at Geneva in Queen Mary's reign, Coverdale, Goodman, Gilbie, Sampſon, Cole, Whittingham, and Knox, made a new tranſlation, printed there in 1560, the New Teſtament having been printed in 1557; hence called the *Geneva Bible;* containing the variations of readings, marginal annotations, &c. on account of which it was much valued by the puritan party in that and the following reigns.

Biſhop's.—Archbiſhop Parker reſolved on a new tranſlation for the public uſe of the church, and engaged the biſhops and other learned men to take each a ſhare or portion. Theſe being afterwards joined together, and printed with ſhort annotations in 1568, in a large folio, made what was afterwards called the *Great Engliſh Bible*, and commonly the *Biſhop's Bible.* The following year it was alſo publiſhed in 8vo, in a ſmall but fine black letter: and here the chapters were divided into verſes; but without any breaks for them, in which the method of the Geneva Bible was followed, which was the firſt Engliſh Bible where any diſtinction of verſes was made. It was afterwards printed in large folio, with corrections, and ſeveral prolegomena, in 1572: this is called *Matthew Parker's Bible.* The initial letters of each tranſlator's name were put at the end of his part: *e. gr.* at the end of the Pentateuch, W. E. for William Exon; that is, William biſhop of Exeter, whoſe allotment ended there: at the end of Samuel, R. M. for Richard Menevenſis, or biſhop of St David's, to whom the ſecond allotment fell: and the like of the reſt. The archbiſhop overſaw, directed, examined, and finiſhed the whole. This tranſlation was uſed in the churches for 40 years, though the Geneva Bible was more read in private houſes, being printed above 30 times in as many years. King James bore it an inveterate hatred on account of the notes; which at the Hampton-court conference he charged as partial, untrue, ſeditious, &c. The Biſhop's Bible too had its faults. The king frankly owned he had yet ſeen no good tranſlation of the Bible in Engliſh; but he thought that of Geneva the worſt of all.

Rhemiſh.—After the tranſlation of the Bible by the biſhops, two other private verſions had been made of the New Teſtament: the firſt by Laur. Thomſon, made from Beza's Latin edition, together with the notes of Beza, publiſhed in 1582 in 4to, and afterwards in 1589, varying very little from the Geneva Bible; the ſecond by the Papiſts at Rheims in 1584, called the *Rhemiſh Bible*, or *Rhemiſh Tranſlation.* Theſe finding it impoſſible to keep the people from having the Scriptures in the vulgar tongue, reſolved to give a verſion of their own as favourable to their cauſe as might be. It was printed on a large paper, with a fair letter and margin. One complaint againſt it was its retaining a multitude of Hebrew and Greek words untranſlated, for want, as the editors expreſs it, of proper and adequate terms in the Engliſh to render them by; as the words *azymes*, *tunike*, *rational*, *holocauſt*, *prepuce*, *paſche*, &c. However, many of the copies were ſeized by the queen's ſearchers and confiſcated; and Th. Cartwright was ſolicited by Secretary Walſingham to refute it: but, after a good progreſs made therein, Archbiſhop Whitgift prohibited his further proceeding therein, as judging it improper the doctrine of the church of England ſhould be committed to the defence of a puritan, and appointed Dr Fulke in his place, who refuted the Rhemiſts with great ſpirit and learning. Cartwright's refutation was alſo afterwards publiſhed in 1618, under Archbiſhop Abbot. About 30 years after their New Teſtament, the Roman Catholics publiſhed a tranſlation of the Old at Doway, in 1609 and 1610, from the vulgate, with annotations; ſo that the Engliſh Roman Catholics have now the whole Bible in their mother-tongue; though it is to be obſerved, they are forbidden to read it without a licenſe from their ſuperiors. Bibles.

King James's.—The laſt Engliſh Bible was that which proceeded from the Hampton-court conference in 1603, where many exceptions being made to the Biſhop's Bible, King James gave orders for a new one; not, as the preface expreſſes it, for a tranſlation altogether new, nor yet to make of a bad one a good one, but to make a good one better, or of many good ones one beſt. Fifty-four learned perſons were appointed for this office by the king, as appears by his letter to the archbiſhop, dated in 1604; which being three years before the tranſlation was entered upon, it is probable ſeven of them were either dead or had declined the taſk, ſince Fuller's liſt of the tranſlators makes but 47; who being ranged under ſix diviſions, entered on their province in 1607. It was publiſhed in 1613, with a dedication to James, and a learned preface, and is commonly called *King James's Bible.* After this, all the other verſions dropped and fell into diſuſe, except the Epiſtles and Goſpels in the Common Prayer Book, which were ſtill continued according to the Biſhop's tranſlation till the alteration of the liturgy in 1661, and the Pſalms and Hymns, which are to this day continued as in the old verſion.

The judicious Selden, in his Table Talk, ſpeaking of the Bible, ſays, "The Engliſh tranſlation of the Bible is the beſt tranſlation in the world, and renders the ſenſe of the original beſt, taking in for the Engliſh tranſlation the Biſhop's Bible, as well as King James's. The tranſlators in King James's time took an excellent way. That part of the Bible was given to him who was moſt excellent in ſuch a tongue (as the Apocrypha to Andrew Downs), and then they met together, and one read the tranſlation, the reſt holding in their hands ſome Bible either of the learned tongues, or French, Spaniſh, Italian, &c. If they found any fault, they ſpoke; if not, he read on."

King James's Bible is that now read by authority in all the churches in Britain.

Welch Bibles.—There was a Welch tranſlation of the Bible made from the original in the time of Queen Elizabeth, in conſequence of a bill brought into the houſe of commons for this purpoſe in 1563. It was printed in folio in 1588. Another verſion, which is the ſtandard tranſlation for that language, was printed in 1620. It is called *Parry's Bible.* An impreſſion of this was printed in 1690, called *Biſhop Lloyd's Bible.* Theſe were in folio. The firſt 8vo impreſſion of the Welch Bible was made in 1630.

Iriſh Bible.—Towards the middle of the 16th century,

Bible || Bibliotheca

tury, Bedell, biſhop of Kilmore, ſet on foot a tranſlation of the Old Teſtament into the Iriſh language; the New Teſtament and the Liturgy having been before tranſlated into that language. The biſhop appointed one King to execute this work, who, not underſtanding the oriental languages, was obliged to tranſlate it from the Engliſh. This work was received by Bedell, who, after having compared the Iriſh tranſlation with the Engliſh, compared the latter with the Hebrew, the LXX. and the Italian verſion of Diodati. When this work was finiſhed, the biſhop would have been himſelf at the charge of the impreſſion, but his deſign was ſtopped upon advice given to the lord lieutenant and the archbiſhop of Canterbury, that it would prove a ſhameful thing for a nation to publiſh a Bible tranſlated by ſuch a deſpicable hand as King. However, the manuſcript was not loſt, for it went to preſs in the year 1685.

Erſe BIBLE.—There is alſo (lately finiſhed at Edinburgh) a verſion of the Bible in the Gaelic or Erſe language.

BIBLIANDER, THEODORE, profeſſor of divinity at Zurich in the 16th century. As he underſtood the oriental languages, he ſet about a new edition of the Koran; the text of which he corrected, by collating the Arabic and Latin copies. To this edition he ſubjoined the life of Mahomet and his ſucceſſors; and prefixed an apology by way of preface, which has been loudly exclaimed againſt.

BIBLIOGRAPHIA, a branch of archæographia, employed in the judging and peruſing of ancient manuſcripts, whether written in books, paper, or parchment.

The ſenſe of it is now extended; and it ſignifies a work intended to give information concerning the firſt or beſt editions of books, and the ways of ſelecting and diſtinguiſhing them properly. In ſhort, it is uſed for a *notitia* or deſcription of printed books, either in the order of the alphabet, of the times when printed, or of the ſubject matters. In which ſenſe, bibliographia amounts to much the ſame with what is otherwiſe called *bibliotheca*.

Literary journals afford alſo a kind of bibliographia.

BIBLIOMANCY, a kind of divination performed by means of the Bible. This amounts to much the ſame with what is otherwiſe called *ſortes biblicæ* or *ſortes ſanctorum*. It conſiſted in taking paſſages of Scripture at hazard, and drawing indications thence concerning things future; as in Auguſtine's *tolle et lege*. It was much uſed at the conſecration of biſhops.—F. J. Davidius, a Jeſuit, has publiſhed a bibliomancy under the borrowed name of *Veridicus Chriſtianus*.

BIBLIOTHECA, in its original and proper ſenſe, denotes a library or place for repoſiting books.

BIBLIOTHECA, in matters of literature, denotes a treatiſe giving an account of all the writers on a certain ſubject: thus, we have bibliothecas of theology, law, philoſophy, &c.

There are likewiſe univerſal bibliothecas, which treat indifferently of all kinds of books; alſo ſelect bibliothecas, which give account of none but authors of reputation.

Many of the bibliothecas agree, in moſt reſpects, with what are otherwiſe called memoirs or journals of literature, except that theſe laſt are confined to new books; but there are other bibliothecas, that differ in nothing from catalogues of the writers on certain ſubjects.

Biblists || Biddel.

BIBLISTS, ſo the Roman Catholics call thoſe Chriſtians who make Scripture the ſole rule of faith; in which ſenſe, all Proteſtants either are or ought to be biblists.

BIBLUS, βίβλος, in *Botany*, an aquatic plant in Egypt, called alſo *papyrus*; of the ſkin whereof the ancient Egyptians made their paper. See PAPYRUS.

BIBRACTE, in *Ancient Geography*, a citadel of the Ædui, according to Strabo; but Cæſar deſcribes it as a town well fortified, very large and populous, and of the greateſt authority among that nation: Now *Beurey*, or Bevray; a deſolate place four miles to the north-weſt of Autun.

BIBROCI, in *Ancient Geography*, an ancient people of Britain: Now the *Hundred of Bray* in Berks.

BICANER, a city of Aſia, on the river Ganges, belonging to the great Mogul. E. Long. 87. 20. N. Lat. 28. 40.

BICE, or BISE, among painters, a blue colour prepared from the lapis armenus.

Bice bears the beſt body of all bright blues uſed in common work, as houſe-painting, &c. but it is the paleſt in colour. It works indifferently well, but inclines a little to ſandy, and therefore requires good grinding. Next to ultramarine, which is too dear to be uſed in common work, it lies beſt near the eye of all other blues.

BICEPS, the name of ſeveral muſcles: as the biceps humeri, or cubiti; biceps tibiæ; &c. See ANATOMY, *Table of the Muſcles*.

BICESTER, a ſtraggling town of Oxfordſhire in England, ſeated on the road between Oxford and Buckingham.

BICHET, a quantity or meaſure of corn, which differs according to the places where it is uſed. The bichet is not a wooden meaſure, as the minot at Paris, or the buſhel at London, but is compounded of ſeveral certain meaſures. It is uſed in many parts of France, &c.

BICLINIUM, in *Roman Antiquity*, a chamber with two beds in it; or when two beds only were round a table.

BICORNES, an order of plants in the *fragmenta methodi naturalis* of Linnæus, ſo termed from the antheræ having in appearance two horns. See BOTANY.

BIDACHE, a town of France, in the department of the Lower Pyrenees, ſeated on the river Bidouſe. W. Long. 1. 9. N. Lat. 41. 31.

BIDAL, or BIDALE, in our ancient cuſtoms, denotes the invitation of friends to drink ale at ſome poor man's houſe, who in conſideration hereof expects ſome contribution for his relief. This cuſtom ſtill obtains in the weſt of England, and is mentioned in ſome of our ancient ſtatutes.

BIDDEL, JOHN, one of the moſt eminent Engliſh writers among the Socinians, was born at Wotton-under-Edge in Glouceſterſhire, and educated in the free ſchool of that place. Being a hopeful youth, he was taken notice of; particularly by Lord George Berkeley, who allowed him an exhibition of ten pounds a-year. This cauſed him vigorouſly to apply

Biddel ‖ Bidding.

ply himſelf to his ſtudies; and he was, while at ſchool, author of a tranſlation of Virgil's Bucolics, and of the two firſt ſatires of Juvenal. He continued at ſchool till he was 13 years of age. However, having manifeſted in that early period a ſingular piety and contempt of ſecular affairs, he was ſent to the univerſity of Oxford, and entered a ſtudent in Magdalen hall. In 1641, the magiſtrates of Glouceſter choſe him maſter of the free ſchool of that city; and he was much eſteemed: but falling into ſome opinions concerning the Trinity different from thoſe commonly received, and expreſſing his thoughts with too much freedom, he ſuffered various perſecutions and impriſonments in the time of the commonwealth. During one of theſe confinements, which laſted for ſeveral years, being reduced to great indigence, he was employed by Roger Daniel of London to correct the impreſſion of the Greek Septuagint Bible, which that printer was about to publiſh with great accuracy. In 1651, the parliament publiſhed a general act of oblivion, which reſtored him to his full liberty. He was afterwards impriſoned on account of his tenets; and at laſt the Protector baniſhed him for life to St Mary's caſtle in the iſle of Scilly, and ſent him thither in October 1665. Soon after, he was allowed 100 crowns a-year for ſubſiſtence. In 1658, he was ſet at full liberty. After the reſtoration of King Charles II. he was fined in 100l. and each of his hearers in 20l. to lie in priſon till paid; which being put in execution, the want of the freſh air and exerciſe made him contract a diſeaſe, of which he died on the 22d of September 1662, in the 47th year of his age. His life was publiſhed in Latin in 1682, by Mr Farrington of the Inner Temple, who repreſents him as poſſeſſed of extraordinary piety, charity, and humility. He would not diſcourſe of thoſe points in which he differed from others with thoſe that did not appear religious according to their knowledge; and was a ſtrict obſerver himſelf, and a ſevere exactor in others, of reverence in ſpeaking of God and Chriſt. He had ſo happy a memory, that he retained word for word the whole New Teſtament, not only in Engliſh, but in Greek, as far as the fourth chapter of the Revelations of St John.

BIDDIFORD, a town of Devonſhire, ſeated on the river Toridge, over which there is a fine ſtone-bridge with 24 arches. It is a large and populous place, and carries on a conſiderable trade. W. Long. 4. 10. N. Lat. 51. 10.

BIDDING, or OFFERING, denotes the raiſing the price of a thing at a ſale or auction. The French calls this *enchirer*. It anſwers to what the Romans called *licitari*: they uſed to bid by holding up the hand or finger.

BIDDING is alſo uſed for proclaiming or notifying. In which ſenſe we meet with *bidding of the* BANNS, the ſame with what is otherwiſe called *aſking*.

Bidding Prayer. It was one part of the office of the deacons in the primitive Chriſtian church, to be a ſort of monitors and directors of the people in the exerciſe of their public devotions in the church. To which end they made uſe of certain known forms of words, to give notice when each part of the ſervice began. This was called by the Greeks κηρυττειν, and by the Latins *prædicare*: which therefore does not ordinarily ſignify to *preach*, as ſome miſtake it; but to perform the office of a crier (κηρυξ, or *præco*) in the aſſembly: whence Syneſius and others call the deacons ἱερακηρυκες, the *holy criers* of the church, appointed to bid or exhort the congregation to pray and join in the ſeveral parts of the ſervice of the church. Agreeable to this ancient practice is the form *Let us pray*, repeated before ſeveral of the prayers in the Engliſh liturgy. Bidding ‖ Bie.

Bidding of the Beads, a charge or warning which the pariſh-prieſt gave to his pariſhioners at certain ſpecial times, to ſay ſo many pater-noſters, &c. on their beads.

BIDENS, WATER HEMP-AGRIMONY. See BOTANY *Index*.

BIDENTAL, in *Roman Antiquity*, a place blaſted with lightning; which was immediately conſecrated by an haruſpex, with the ſacrifice of a bidens. This place was afterwards accounted ſacred, and it was unlawful to enter it or to tread upon it; for which reaſon it was commonly ſurrounded with a ditch, wall, hedge, ropes, &c. See next article.

BIDENTALES, in *Roman Antiquity*, prieſts inſtituted to perform certain ceremonies and expiations when thunder fell on any place. Their principal office was the ſacrificing a ſheep of two years old, which in Latin is called *bidens*; from whence the place ſtruck with thunder got the name of *bidental*.

BIDENTES, in middle-age writers, denotes two yearlings, or ſheep of the ſecond year. The wool of theſe bidentes, or two years old ſheep, being the firſt ſheering, was ſometimes claimed as a heriot to the king, on the death of an abbot. Among the ancient Romans, the word was extended further to any ſorts of beaſts uſed for victims, eſpecially thoſe of that age: whence we meet with *ſues bidentes*.

BIDET, a nag or little horſe, formerly allowed each trooper and dragoon, for his baggage and other occaſions. Bidets are grown into diſuſe, on account of the expences thereof, and the diſorders frequently ariſing from thoſe who attended on them, &c.

BIDIS, in *Ancient Geography*, a ſmall city of Sicily, not far from Syracuſe, whoſe ruins are ſtill to be ſeen in the territory of Syracuſe, about 15 miles to the ſouth-weſt, with a church called *S. Giovanni di Bidini*.

BIDLOO, GODFREY, author of ſeveral treatiſes in anatomy, was born at Amſterdam, March 12. 1649. In 1688, he was profeſſor of anatomy at the Hague; and, in 1694, at Leyden; when King William III. of England appointed him his phyſician; which he would not accept but on condition of holding his profeſſorſhip, which was readily granted him. He publiſhed, in Latin, 1. The Anatomy of the human Body, demonſtrated in 105 cuts, explained by the diſcoveries of the ancient and modern writers. 2. An Oration upon the Antiquity of Anatomy. 3. A Letter to Anthony Leewenhoeck on the animals ſometimes found in the liver of ſheep and other animals. 4. Two Decades of Diſſertations in Anatomy and Chirurgery; and other pieces. He died at Leyden, in April 1713.

BIDON, a liquid meaſure, containing about five pints of Paris, that is, about five quarts Engliſh wine-meaſure. It is ſeldom uſed but among ſhips crews.

BIE, ADRIAN DE, an eminent painter, was born at Liere in 1594. After learning the rudiments of the art from different maſters, he travelled to Rome, where he ſpent ſix years in ſtudying the works of the beſt maſters. His induſtry was then rewarded with proportionable ſucceſs; for he found encouragement among

Bieez || Bier.

the moſt honourable perſons at Rome, and in every part of Italy through which he travelled, from perſons of the firſt diſtinction. His penciling was ſo exceedingly neat, and his touch and colouring ſo very delicate, that he was frequently employed to paint on jaſper, agate, porphyry, and other precious materials.

BIEEZ, a town of Poland, in the palatinate of Cracovia, remarkable for its mines of vitriol. It is ſeated on the river Weſeloke, in E. Long. 2. 21. N. Lat. 49. 50.

BIEL. See BIENNA.

BIELA, a town of Ruſſia, and capital of a province of the ſame name, ſeated on the river Opſchaw, in E. Long. 34. 55. N. Lat. 55. 0.

BIELA OSERO, or BELOZERO, a town of the Ruſſian empire, capital of a duchy, and ſituated on a lake of the ſame name, at the mouth of the river Conſa, in E. Long. 39. 10. N. Lat. 58. 55.

BIELA, a town of Piedmont in Italy, and capital of the Belleſe, near the river Cerva, in E. Long. 8. 3. N. Lat. 45. 22.

BIELSKI, a town of Poland, in the palatinate of Polachia, near one of the ſources of the river Narew. E. Long. 22. 55. N. Lat. 53. 50.

BIELSKOI, a town of Ruſſia, in the province of Smolenſko. E. Long. 35. 5. N. Lat. 56. 40.

BIENNA, a town of Switzerland, ſeated on a lake of the ſame name. The inhabitants are Proteſtants, and in alliance with thoſe of Bern, Soleure, and Friburg. E. Long. 7. 14. N. Lat. 47. 11.

BIENNIAL PLANTS; plants, as the title *biennial* imports, that are only of two years duration. Numerous plants are of this tribe, which being raiſed one year from ſeed, generally attain perfection either the ſame, or in about the period of a twelvemonth, or a little leſs or more, and the following ſpring or ſummer ſhoot up ſtalks, flower, and perfect ſeeds; ſoon after which they commonly periſh; or if any particular ſort ſurvive another year, they aſſume a dwindling and ſtraggling growth, and gradually die off; ſo that biennials are always in their prime the firſt or ſecond ſummer. Biennials conſiſt both of eſculents and flower plants. Of the eſculent kinds, the cabbage, ſavoy, carrot, parſnip, beet, onion, leek, &c. are biennials. Of the flowery tribe, the Canterbury-bell, French honey-ſuckle, wall-flower, ſtock-July-flower, ſweet-William, China-pink, common-pink, matted-pink, carnation, ſcabious, holly-hock, tree-mallow, vervain-mallow, tree-primroſe, honeſty, or moonwort, &c. are all of the biennial tribe; all of which being ſown in March, April, or May, riſe the ſame year, and in ſpring following ſhoot up into ſtalks, flower, and perfect ſeeds in autumn; after which moſt of them dwindle: though ſometimes the wall-flowers, hollyhocks, carnations, and pinks, will ſurvive and flower the following year; but the plants become ſtraggling, the flowers ſmall and badly coloured: it is therefore eligible to raiſe a ſupply annually from ſeed; although wall-flowers, carnations, and pinks, may be continued by ſlips and layers.

BIER, a wooden machine for carrying the bodies of the dead to be buried. The word comes from the French *biere*, which ſignifies the ſame. It is called in Latin *feretrum*, *à ferendo*. Among the Romans the common bier, whereon the poorer ſort were carried, was called *ſandapila*; that uſed for the richer ſort *lectica*, *lectica funebris*, ſometimes *lectus*. The former was only a ſort of wooden cheſt, *vilis arca*, which was burnt with the body; the latter was enriched and gilded for pomp. It was carried bare, or uncovered, when the perſon died a natural and eaſy death; when he was much diſfigured or diſtorted, it was veiled or covered over.

Bieroliet || Bigamy.

BIER, is more particularly uſed for that whereon the bodies of ſaints are placed in the church to reſt, and expoſed to the veneration of the devout. This is alſo called, in middle-age writers, *lectus*, *feretrum*, *lectica*, and *loculus*; and was uſually enriched with gold, ſilver, and precious ſtones, which was the cauſe that the bier of St Benedict was pillaged, and all its ornaments carried off.

BIEROLIET, a town of the Netherlands in Dutch Flanders, where William Bruckfield, or *Beukelings*, who invented the method of pickling herrings, died in 1397. E. Long. 3. 42. N. Lat. 51. 25.

BIFERÆ, plants that flower twice a-year, in ſpring and autumn, as is common between the tropics.

BIFRONS, a perſon double-fronted, or two-faced.

BIFRONS is more peculiarly an appellation of Janus, who was repreſented by the ancients with two faces, as being ſuppoſed to look both backwards and forwards: though other reaſons for it are recited by Plutarch. Sometimes he was painted with four faces, *quadrifrons*, as reſpecting the four ſeaſons.

BIGA, in *Antiquity*, a chariot drawn by two horſes abreaſt. Chariot-races, with two horſes, were introduced into the Olympic games in the 93d Olympiad: but the invention was much more ancient, as we find that the heroes in the Iliad fight from chariots of that kind. The moon, night, and the morning, are by mythologiſts ſuppoſed to be carried in *bigæ*, the ſun in *quadrigæ*. Statues in *bigæ* were at firſt only allowed to the gods, then to conquerors in the Grecian games; under the Roman emperors, the like ſtatues, with *bigæ*, were decreed and granted to great and well-deſerving men, as a kind of half triumph, being erected in moſt public places of the city. Figures of *bigæ* were alſo ſtruck on their coins. The drivers of *bigæ* were called *bigarii*; a marble buſt of one Florus a *bigarius* is ſtill ſeen at Rome.

BIGAMY, properly ſignifies being *twice married*; but with us is uſed as ſynonymous with polygamy, or having a plurality of wives at once. Such ſecond marriage, the former huſband or wife living, is ſimply void, and a mere nullity, by the eccleſiaſtical law of England: and yet the legiſlature has thought it juſt to make it felony, by reaſon of its being ſo great a violation of the public economy and decency of a well-ordered ſtate. For polygamy can never be endured under any rational civil eſtabliſhment, whatever ſpecious reaſons may be urged for it by the eaſtern nations, the fallaciouſneſs of which has been fully proved by many ſenſible writers: but in northern countries the very nature of the climate ſeems to reclaim againſt it; it never having obtained in this part of the world, even from the time of our German anceſtors, who, as Tacitus informs us, "*prope ſoli barbarorum ſingulis uxoribus contenti ſunt.*" It is therefore puniſhed by the laws both of ancient and modern Sweden with death. And in Britain it is enacted by ſtatute 1 Jac. I. c. 11. that if

Bigati ‖ Bignon.

if any perſon being married, do afterwards marry again, the former huſband or wife being alive, it is felony; but within the benefit of clergy. The firſt wife in this caſe ſhall not be admitted as an evidence againſt her huſband, becauſe ſhe is the true wife; but the ſecond may, for ſhe indeed is no wife at all: and ſo, *vice verſa*, of a ſecond huſband. This act makes an exception to five caſes, in which ſuch ſecond marriage, though in the three firſt it is void, is yet no felony. 1. Where either party hath been continually abroad for ſeven years, whether the party in England hath notice of the other's being alive or no. 2. Where either of the parties hath been abſent from the other ſeven years within this kingdom, and the remaining party hath had no knowledge of the other's being alive within that time. 3. Where there is a divorce (or ſeparation *à menſa et thoro*) by ſentence in the eccleſiaſtical court. 4. Where the firſt marriage is declared abſolutely void by any ſuch ſentence, and the parties looſed *à vinculo*. Or, 5. Where either of the parties was under the age of conſent at the time of the firſt marriage; for in ſuch caſe the firſt marriage was voidable by the diſagreement of either party, which the ſecond marriage very clearly amounts to. But, if at the age of conſent the parties had agreed to the marriage, which completes the contract, and is indeed the real marriage; and afterwards one of them ſhould marry again; Judge Blackſtone apprehends that ſuch ſecond marriage would be within the reaſon and penalties of the act.

BIGATI, in *Antiquity*, a kind of ancient Roman ſilver coins, on one ſide whereof was repreſented a *biga*, or chariot drawn by two horſes. The *bigatus* was properly the Roman denarius, whoſe impreſſion, during the times of the commonwealth, was a chariot driven by Victory, and drawn either by two horſes or four; according to which it was either denominated *bigatus* or *quadrigatus*.

BIGGAR, a town and pariſh in Lanarkſhire, Scotland, where are the ruins of a collegiate church which was founded in 1545.

BIGGLESWADE, a town in Bedfordſhire in England, ſeated on the river Ivel, over which there is a handſome bridge. The town is much more conſiderable now than formerly, on account of its commodious inns for paſſengers, it lying on the principal road from London to York. W. Long. 0. 15. N. Lat. 52. 5.

BIGHT, among ſeamen, denotes one roll or round of a cable or rope, when coiled up.

BIGNON, JEROME, a French writer, was born at Paris in 1590. He gained an uncommon knowledge, under the care of his father, in philoſophy, mathematics, hiſtory, civil law, and divinity, in a very ſhort time; and was almoſt at the end of his ſtudies at an age when it is uſual to ſend children to ſchool. At ten years of age he gave the public a ſpecimen of his learning, in a Deſcription of the Holy Land; and two years after, he publiſhed a Diſcourſe concerning the principal antiquities and curioſities of Rome: and a ſummary Treatiſe concerning the election of Popes. Henry IV. deſired to ſee him, and appointed him page to the dauphin, who was afterwards Louis XIII. He appeared at court with all the politeneſs of manners imaginable. He wrote at that time a treatiſe of the precedency of the kings of France, which he dedicated to Henry IV. who gave him an expreſs order to continue his reſearches on that ſubject: but the death of that prince interrupted his deſign. He publiſhed, in 1613, the Formulæ of Marculphus. He was in 1620 made advocate-general in the grand council; and diſcharged that poſt with ſuch reputation, that the king nominated him ſome time after counſellor of ſtate, and at laſt advocate-general in the parliament. He reſigned his offices in 1641; and the year following was appointed chief library-keeper of the king's library. He was obliged to reſume his office of advocate-general, and held it till his death. He was employed in the moſt important affairs of ſtate. At laſt this great man, who had always made religion the baſis of his other virtues, died with the moſt exemplary devotion in 1656.

Bignonia ‖ Bilander.

BIGNONIA, TRUMPET-FLOWER, or SCARLET JASMINE. See BOTANY *Index*.

BIGORRE, a territory or county of France, in the province of Gaſcony, which is now included in the department of the Upper Pyrenees. It is bounded on the eaſt by the valley of Aure, the viſcounty of Nebouſſa, Riviere Verdun, and Pardiac; by Bearne on the weſt; on the ſouth, by the valleys of Brotou and Penticouſe in Arragon; and on the north, by the county Riviere-Bas incorporated with Armagnac. It is 40 miles long from north to ſouth, and 30 in breadth from eaſt to weſt. It is divided into three parts, the mountains, the plains, and the Ruſtan. The mountains are encloſed between thoſe of the valley of Aure on the eaſt, thoſe of Arragon on the ſouth, and of Bearne on the weſt. This part contains two principal valleys, Lavedan and Barege. The valley of Bigorre is of an oval form, and has the hills of Ruſtan on the eaſt. The remarkable towns are Tarbes the capital, Bagneres, Lourd, &c. The mountains are a barrier between France and Spain, and there are four different paſſages which the inhabitants are obliged to guard. Bigorre yields marble, jaſper, ſtone, and ſlate; there are alſo mines of ſeveral ſorts, but they are not worked. The rivers are the Adour, the Elches, the Arroſet, and the Gave of Lavedan; there are alſo three lakes.

BIGOT, a perſon obſtinately and perverſely wedded to ſome opinion or practice, particularly of a religious nature. Camden, perhaps, has hit upon the true original of the word. He relates, that when Rollo, duke of Normandy, received Giſla, the daughter of Charles *the Fooliſh*, in marriage, together with the inveſtiture of that dukedom, he would not ſubmit to kiſs Charles's foot: and when his friends urged him by all means to comply with that ceremony, he made anſwer in the Engliſh tongue, NE SE BY GOD, i. e. *Not ſo by God*. Upon which, the king and his courtiers deriding him, and corruptly repeating his anſwer, called him *bigot*; from whence the Normans were called, *ligodi*, or *bigots*.

BIGOT, in Italian *bigontia*, is uſed to denote a Venetian liquid meaſure, containing the fourth part of the amphora, or half the boot.

BIHAEZ, a ſtrong town of Croatia in Hungary, ſeated in an iſle formed by the river Anna, in E. Long. 16. 2. Lat. 44. 35.

BILANDER, in *Navigation*, a ſmall merchant ſhip with two maſts, diſtinguiſhed from other veſſels of the ſame kind by the form of the main-ſail. Few veſſels

Bilbilis || Biledulgerid.

are now rigged in the manner of bilanders; the name has been variouſly applied in different countries.

BILBILIS, in *Ancient Geography*, a town of Hiſpania Citerior, the birth-place of Martial; now ſuppoſed to be Calatajud in Arragon, on the Xalon.

BILBOA, a large, handſome, and rich town of Spain, capital of Biſcay, with a well frequented harbour. It is remarkable for the wholeſomeneſs of its air and the fertility of the ſoil about it. The inhabitants have always preſerved themſelves from a mixture with the Jews and Moors; and therefore will admit no family to ſettle among them but who can prove themſelves to be of Chriſtian extraction, nor will they admit any ſlaves among them as in the other parts of Spain. The exports are wool, and ſword blades, with ſome other manufactures of iron and ſteel. The town is ſeated at the mouth of the river Ibaicabal, in W. Long. 4. 20. N. Lat. 43. 23.

BILBOWS, a puniſhment at ſea, anſwering to the ſtocks at land. The offender is laid in irons, or ſtocks, which are more or leſs ponderous according to the quality of the offence of which he is guilty.

BILDESTON, a town of Suffolk in England, ſeated on a creek on the river Breton. The principal manufacture is in woollen goods, eſpecially blankets. E. Long. 0. 45. N. Lat. 52. 20.

BILDGE of a ſhip, the bottom of her floor, or the breadth of the place the ſhip reſts on when ſhe is aground. Therefore, *bildge-water* is that which lies on her floor, and cannot go to the well of the pump: And *bildge-pumps*, or burr-pumps, are thoſe that carry off the bildge-water. They likewiſe ſay the ſhip is *bildged*, when ſhe has ſome of her timber ſtruck off on a rock or anchor, and ſprings a leak.

BILE, a yellow, bitter juice, ſeparated from the blood in the liver, collected in the porus bilarius and gall-bladder, and thence diſcharged by the common duct into the duodenum. See ANATOMY *Index*.

BILEDULGERID, or BELAD AL JERID, the *Country of dates*, a kingdom of Africa. It is almoſt of a ſquare form, extending itſelf more than 80 leagues every way, from 28. 30. to 32. 50. north latitude, and from 6 to 12 degrees of weſt longitude. It is bounded on the north by the kingdom of Tunis, on the eaſt by a ridge of lofty mountains which divide it from Tripoli and part of Guadamis, on the weſt by the countries of Zeb and Mezeb, and on the ſouth by the province of Verghela. The whole country is barren, ſandy, and mountainous, producing little or nothing beſides dates, which grow here in ſuch profuſion, that the face of half the kingdom is covered over with date-trees, and from hence the whole country takes its name. The climate is hot and unhealthy; the people lean, ſwarthy, and ſhrivelled in their complexions; with their eyes inflamed, owing to the reflection of the ſun-beams from the white hard ſoil: and the ſhowers of duſt and ſand driven by the high winds that blow here at certain ſeaſons are frequently ſo violent as to bury men and cattle under them. Another inconvenience with which the inhabitants are afflicted, for which no other reaſon is given beſides their conſtant living on dates, is an inveterate ſcurvy in their gums, whence all their teeth drop out; though it frequently ſpreads over their whole bodies, and then they become the moſt unhappy and loathſome objects. They are almoſt entirely free from other diſeaſes: ſo that when not afflicted with this, they live to a good old age; though it is obſervable that they diſcover a furrowed countenance, ſhrivelled ſkin, hoary locks, and other ſymptoms of old age, very early in life, and before decrepitude, infirmity, or any decay of their faculties, appear. The plague is not known in Biledulgerid, though ſo frequent in Barbary, and though a conſtant intercourſe is kept up between the two countries; whence it would ſeem, that in certain caſes this terrible diſtemper is not ſo infectious as it is uſually thought to be. The ſame may be ſaid of the ſmall-pox, a diſeaſe little leſs contagious and fatal in hot countries than the plague itſelf. The natives are repreſented as a lewd, treacherous, thieviſh, and ſavage people, who delight in murder and robbery. They are moſtly a mixture of Africans and wild Arabs who mingled themſelves with them. The former live with ſome regularity and civil order in a kind of villages compoſed of a number of little huts; the latter in tents, ranging from place to place in queſt of food and plunder. The Arabs, who pride themſelves in their ſuperiority of birth and talents above the primitive inhabitants, are wholly independent and free, frequently hiring themſelves in the ſervice of the neighbouring princes at war; from which policy ariſe the moſt valuable branches of their public revenue, if any thing can be called common or public in a nation of lawleſs robbers. The reſt purſue no other occupation beſides hunting and plundering; the firſt of which is their common employment, eſpecially hunting of oſtriches, which are ſaid to be of a prodigious ſtature in this country, and as high as a man mounted on a tall horſe. The inhabitants eat the fleſh of theſe animals; barter their feathers for corn, pulſe, and other things they want; uſe their hearts in their necromantic and religious rites, their fat as a medicine of ſovereign virtue, their talons for ear-pendants and other ornaments, and their ſkins they convert into pouches and knapſacks, ſo that not a part of the animal but is employed in ſome uſeful purpoſe. Beſides dates and oſtriches, the Arabs live likewiſe on the fleſh of goats and camels; drinking either the liquor or broth in which that fleſh is boiled, or the milk of their camels; for they ſeldom taſte water, that element being more ſcarce in this country than milk itſelf. In the whole country there is ſcarce a town of any note, or even ſtream of water that deſerves notice, or that is not dried up half the year.

Biledulgerid || Bill.

BILEVELT, a town of Germany in the circle of Weſtphalia and county of Ravenſburg, ſubject to the king of Pruſſia, in E. Long. 8. 20. N. Lat. 52. 0.

BILINGUIS, in a general ſenſe, ſignifies one that ſpeaks two languages; but in law, is uſed for a jury that paſſes in any caſe between an Engliſhman and a foreigner, whereof part ought to be Engliſh and part ſtrangers.

BILIOUS, in general, denotes ſomething belonging to, or partaking of, the nature of bile. Hence,

BILIOUS Fevers are thoſe occaſioned by the over copiouſneſs or bad qualities of the bile.

BILL, in mechanics, an inſtrument made of iron, edged in the form of a creſcent, and adapted to a handle. It is uſed by plumbers, to perform ſeveral parts of their work; by baſket-makers, to cut the largeſt pieces of cheſnut-trees and other wood: and by gardeners,

Bill. gardeners, to prune trees. When ſhort, it is called a *hand-bill;* and when long, a *hedge-bill.*

Bill, in *Law*, a declaration in writing, expreſſing either ſome wrong the complainant has ſuffered from the defendant, or a fault committed by the perſon complained of againſt ſome law or ſtatute.—This bill is ſometimes exhibited to juſtices at the general aſſizes, by way of indictment, or referred to others having juriſdiction; but it is more generally addreſſed to the lord chancellor. It contains the fact complained of, the damage ſuſtained, and a petition or proceſs againſt the defendant for redreſs; and is uſed both in criminal and civil caſes. In the former, the words *billa vera* are indorſed by the grand jury upon a preſentment, implying that they find the ſame founded on probable evidence, and therefore worthy of further conſideration.

In Scots law, every ſummary application in writing, by way of petition to the court of ſeſſion, is called a *bill.*

Bill of Attainder. See Attainder.

Bill of Appeal. See Appeal.

Bill ſignifies alſo a paper, either written or printed, in very large characters, which is poſted up in ſome open and public place, to give notice of the ſale of any merchandiſe or ſhip, or of the ſailing of any veſſel into foreign parts.

Bill, in *Trade*, both wholeſale and retail, as alſo among workmen, ſignifies an account of merchandiſes or goods delivered to a perſon, or of work done for one.

Bill, in *Commerce*, denotes a ſecurity for money under the hand and ſometimes ſeal of the debtor, without any condition or forfeiture in caſe of non-performance; in which it is diſtinguiſhed from a bond or obligation. It has been uſually defined, a writing wherein one man is bound to another to pay a ſum of money, on a day that is future, or preſently on demand, according to the agreement of the parties at the time when it is drawn; on which, in caſe of failure, diligence or execution may be immediately done to force payment. Theſe bills muſt be on ſtamped paper: if under 5ol. the ſtamp to be 6d.; if for 5ol. or upwards 1s.

Bank-Bill is a note or obligation ſigned on behalf of the company of the bank, by one of their caſhiers, for value received. Or it is an obligation to pay on demand either to the bearer or to order; in Scotland, it is underſtood to be to order.

Bill of Entry, an account of the goods entered at the cuſtom-houſe, both inwards and outwards. In this bill muſt be expreſſed, the merchant exporting or importing; the quantity of merchandiſe, and the divers ſpecies thereof; and whither tranſported, or from whence.

Bill of Exchange, is a ſecurity, orginally invented among merchants in different countries, for the more eaſy remittance of money from the one to the other, which has ſince ſpread itſelf into almoſt all pecuniary tranſactions. It is an open letter of requeſt from one man to another, deſiring him to pay a ſum named therein to a third perſon on his account; by which means a man at the moſt diſtant part of the world may have money remitted to him from any trading country. If A lives in Jamaica, and owes B who lives in England 1000l.; now if C be going from England to Jamaica, he may pay B this 1000l. and take a bill of exchange drawn by B in England upon A in Jamaica, and receive it when he comes thither. Thus does B receive his debt, at any diſtance of place, by transferring it to C; who carries over his money in paper credit, without danger of robbery or loſs. This method is ſaid to have been brought into general uſe by the Jews and Lombards, when baniſhed for their uſury and other vices; in order the more eaſily to draw their effects out of France and England into thoſe countries in which they had choſen to reſide. But the invention of it was a little earlier; for the Jews were baniſhed out of Guienne in 1287, and out of England in 1290, and in 1236 the uſe of paper-credit was introduced into the Mogul empire in China.—In common ſpeech, ſuch a bill is frequently called a *draught;* but a bill of exchange is the more legal as well as mercantile expreſſion. The perſon, however, who writes this letter is called, in law, the *drawer;* and he to whom it is written, the *drawee;* and the third perſon or negociator to whom it is payable (whether ſpecially named or the bearer generally) is called the *payee.* Bills.

Theſe bills are either foreign or inland; foreign, when drawn by a merchant reſiding abroad upon his correſpondent in England, or *vice verſa;* and inland, when both the drawer and the drawee reſide within the kingdom. Formerly foreign bills of exchange were much more regarded in the eye of the law than inland ones, as being thought of more public concern in the advancement of trade and commerce. But now by two ſtatutes, the one 9 and 10 W. III. c. 17. the other 3 and 4 Ann. c. 9. inland bills of exchange are put upon the ſame footing as foreign ones: what was the law and cuſtoms of merchants with regard to the one, and taken notice of merely as ſuch, being by thoſe ſtatutes expreſsly enacted with regard to the other. So that there is now in law no manner of difference between them. In drawing foreign bills of exchange, it is cuſtomary to give two or three of the ſame date and tenor to be ſent by different conveyances, that in caſe of accidents the perſon to whom they are ſent may not be diſappointed; in which caſe it is mentioned in the body of the bill, that is the 1ſt, 2d, or 3d bill of exchange; ſo that when one is paid it diſcharges all the reſt. Inland bills for any ſum muſt be on 6d. ſtamped paper.

Bill of Lading, an acknowledgment ſigned by the maſter of a ſhip, and given to a merchant, &c. containing an account of the goods which the maſter has received on board from that merchant, &c. with a promiſe to deliver them at an intended place for a certain ſalary. Each bill of lading muſt be treble, one for the merchant who loads the goods, another to be ſent to the perſon to whom they are conſigned, and the third to remain in the hands of the maſter of the ſhip. It muſt be obſerved, however, that a bill of lading is uſed only when the goods ſent on board a ſhip are but part of the cargo: for when a merchant loads a whole veſſel for his own perſonal account, the deed paſſed between him and the maſter of the ſhip is called *charter-party.* See *Charter-party.*

Bills of mortality, are accounts of the numbers of births and burials within a certain diſtrict, every week, month, quarter, or year. In this ſenſe we ſay *weekly bills,*

Bill. *bills*, *monthly bills*, *quarterly bills*, *yearly bills*. The London *bills of mortality*, which were the firſt, are compoſed by the company of pariſh-clerks, and expreſs the number of chriſtenings of each ſex, and the number of deaths from each diſeaſe.

Bill of Parcels, an account given by the ſeller to the buyer, containing the particulars of all the ſorts and prices of the goods bought.

Bill of Sale, is when a perſon wanting a ſum of money delivers goods as a ſecurity to the lender, to whom he gives this bill, impowering him to ſell the goods, in caſe the ſum borrowed is not repaid, with intereſt, at the appointed time.

Bill of Store, a licenſe granted at the cuſtom-houſe to merchants, by which they have liberty to carry, cuſtom-free, all ſuch ſtores and proviſions as they may have occaſion for during the voyage.

Bill of Sufferance, a licenſe granted to a merchant, at the cuſtom-houſe, ſuffering him to trade from one Engliſh port to another without paying cuſtom.

Lombard Bills, are inſtruments of an uncommon kind and figure, uſed in Italy and Flanders, and of late alſo in France; conſiſting of a piece of parchment, cut to an acute angle about an inch broad at top, and terminating in a point at bottom: chiefly given where private perſons are concerned in the fitting out a ſhip on any long voyage. The manner is thus: The party, who is deſirous to be concerned in the cargo or venture, carries his money to the merchant, who fits out the ſhip, where it is entered down in a regiſter; at the ſame time the merchant writes down on a piece of parchment, upwards of an inch broad, and ſeven or eight inches long, the name of the lender and the ſum lent; which being cut diagonal-wiſe, or from corner to corner, each party retains his half. On the return of the veſſel, the lender brings his moiety to the merchant; which being compared with the other, he receives his dividend accordingly. Much the ſame is practiſed in Holland by thoſe who lend money on pledges; the name of the borrower and the ſum are written on a like ſlip of parchment, which is cut into two, and half given to the borrower, and the other half ſtitched to the pledge; that, upon comparing them together again, the borrower may receive his goods on paying the money ſtipulated.

Bill in Parliament, a paper containing propoſitions, offered to the houſes to be paſſed by them, and then preſented to the king to paſs into a law.

To bring a bill into the houſe, if the relief ſought by it is of a private nature, it is firſt neceſſary to prefer a petition; which muſt be preſented by a member, and uſually ſets forth the grievance deſired to be remedied. This petition (when founded on facts that may be in their nature diſputed) is referred to a committee of members, who examine the matter alledged, and accordingly report it to the houſe; and then (or, otherwiſe, upon the mere petition) leave is given to bring in the bill. In public matters, the bill is brought in upon motion made to the houſe, without any petition at all. Formerly all bills were drawn in the form of petitions, which were entered upon the parliament-rolls, with the king's anſwer thereunto ſubjoined; not in any ſettled form of words, but as the circumſtances of the caſe required; and at the end of each parliament the judges drew them into the form of a ſtatute, which was entered on the ſtatute-rolls. In the reign of Henry V. to prevent miſtakes and abuſes, the ſtatutes were drawn up by the judges before the end of the parliament; and in the reign of Henry VI. bills in the form of acts, according to the modern cuſtom, were firſt introduced. Bill.

The perſons directed to bring in the bill, preſent it in a competent time to the houſe, drawn out on paper, with a multitude of blanks, or void ſpaces, where any thing occurs that is dubious, or neceſſary to be ſettled by the parliament itſelf (ſuch eſpecially as the preciſe date of times, the nature and quantity of penalties, or of any ſums of money to be raiſed; being indeed only the ſkeleton of the bill. In the houſe of lords, if the bill begins there, it is (when of a private nature) referred to two of the judges, who examine and report the ſtate of the facts alleged, to ſee that all neceſſary parties conſent, and to ſettle all points of technical propriety. This is read a firſt time, and at a convenient diſtance a ſecond time; and after each reading, the ſpeaker opens to the houſe the ſubſtance of the bill, and puts the queſtion, Whether it ſhall proceed any farther? The introduction of the bill may be originally oppoſed, as the bill itſelf may at either of the readings; and, if the oppoſition ſucceeds, the bill muſt be dropped for that ſeſſion; as it muſt alſo, if oppoſed with ſucceſs in any of the ſubſequent ſtages.

After the ſecond reading, it is committed; that is, referred to a committee: which is either ſelected by the houſe in matters of ſmall importance; or elſe, upon a bill of conſequence, the houſe reſolves itſelf into a committee of the whole houſe. A committee of the whole houſe is compoſed of every member; and, to form it, the ſpeaker quits the chair (another member being appointed chairman), and may ſit and debate as a private member. In theſe committees the bill is debated clauſe by clauſe, amendments made, the blanks filled up, and ſometimes the bill entirely new modelled. After it has gone through the committee, the chairman reports it to the houſe with ſuch amendments as the committee have made; and then the houſe reconſiders the whole bill again, and the queſtion is repeatedly put upon every clauſe and amendment. When the houſe hath agreed or diſagreed to the amendments of the committee, and ſometimes added new amendments of its own, the bill is then ordered to be engroſſed, or written in a ſtrong groſs hand, on one or more long rolls (or preſſes) of parchment ſewed together. When this is finiſhed, it is read a third time, and amendments are ſometimes then made to it; and if a new clauſe be added, it is done by tacking a ſeparate piece of parchment on the bill, which is called a *ryder*. The ſpeaker then again opens the contents; and, holding it up in his hands, puts the queſtion, Whether the bill ſhall paſs? If this is agreed to, the title to it is then ſettled; which uſed to be a general one for all the acts paſſed in the ſeſſion, till in the fifth year of Hen. VIII. diſtinct titles were introduced for each chapter. After this, one of the members is directed to carry it to the lords and deſire their concurrence; who, attended by ſeveral more, carries it to the bar of the houſe of peers, and there delivers it to their ſpeaker, who comes down from his woolſack to receive it.

It there paſſes through the ſame forms as in the other houſe (except engroſſing, which is already done); and,

Bill. if rejected, no more notice is, taken but it passes *sub silentio*, to prevent unbecoming altercations. But if it is agreed to, the lords send a message by two masters in chancery (or sometimes two of the judges) that they have agreed to the same: and the bill remains with the lords if they have made no amendment to it. But if any amendments are made, such amendments are sent down with the bill to receive the concurrence of the commons. If the commons disagree to the amendments, a conference usually follows between members deputed from each house; who for the most part settle and adjust the difference: but if both houses remain inflexible, the bill is dropped. If the commons agree to amendments, the bill is sent back to the lords by one of the members, with a message to acquaint them therewith. The same forms are observed, *mutatis mutandis*, when the bill begins in the house of lords. But when an act of grace or pardon is passed, it is first signed by his majesty, and then read once only in each of the houses, without any new engrossing or amendment. And when both houses have done with any bill, it always is deposited in the house of peers, to wait the royal assent; except in the case of a bill of supply, which after receiving the concurrence of the lords is sent back to the house of commons.

The royal assent may be given two ways: 1. In person; when the king comes to the house of peers, in his crown and royal robes, and sending for the commons to the bar, the titles of all the bills that have passed both houses are read; and the king's answer is declared by the clerk of the parliament in Norman-French: a badge it must be owned (now the only one remaining), of conquest; and which one could wish to see fall into total oblivion; unless it be reserved as a solemn memento to remind us that our liberties are mortal, having been once destroyed by a foreign force. If the king consents to a public bill, the clerk usually declares, *Le roy le veut*, "The king wills it so to be;" if to a private bill, *Soit fait comme il est desiré*, "Be it as it is desired." If the king refuses his assent, it is in the gentle language of *Le roy s'avisera*, "The king will advise upon it." When a bill of supply is passed, it is carried up and presented to the king by the speaker of the house of commons; and the royal assent is thus expressed, *Le roy remercie ses loyal subjects, accepte leur benevolence, et aussi le veut;* "The king thanks his loyal subjects, accepts their benevolence, and wills it so to be." In case of an act of grace, which originally proceeds from the crown and has the royal assent in the first stage of it, the clerk of the parliament thus pronounces the gratitude of the subject: *Les prelats, seigneurs, et commons, en ce present parliament assemblees, au nom de touts vous autres subjects, remercient tres humblement votre majeste, et prient a Dieu vous donner en sante bone vie et longue;* "The prelates, lords, and commons in this present parliament assembled, in the name of all your other subjects, most humbly thank your majesty, and pray to God to grant you in health and wealth long to live. 2. By the statute 33 Hen. VIII. c. 21. the king may give his assent by letters patent under his great seal, signed with his hand, and notified in his absence to both houses assembled together in the high house. And when the bill has received the royal assent in either of these ways, it is then, and not before, a statute or act of parliament.

This statute or act is placed among the records of the kingdom; there needing no formal promulgation to give it the force of a law, as was necessary by the civil law with regard to the emperor's edicts: because every man in Britain is, in judgment of law, party to the making of an edict of parliament, being present thereat by his representatives. However, a copy thereof is usually printed at the king's press for the information of the whole land. And formerly, before the invention of printing, it was used to be published by the sheriff of every county; the king's writ being sent to him at the end of every session, together with a transcript of all the acts made at that session, commanding him, *ut statuta illa, et omnes articulos in eisdem contentos, in singulis locis ubi expedire viderit, publice proclamari, et firmiter teneri et observari faciat.* And the usage was to proclaim them at his county court, and there to keep them, that whoever would, might read or take copies thereof; which custom continued till the reign of Henry VII.

Bill
Billiards.

An act of parliament thus made is the exercise of the highest authority that this kingdom acknowledges upon earth. It hath power to bind every subject in the land, and the dominions thereunto belonging; nay, even the king himself if particularly named therein. And it cannot be altered, amended, dispensed with, suspended, or repealed, but in the same forms and by the same authority of parliament: for it is a maxim in law, that it requires the same strength to dissolve as to create an obligation. It is true, it was formerly held that the king might in many cases dispense with penal statutes; but now by statute 1 Wil. and M. st. 2. c. 2. it is declared that the suspending or dispensing with laws by regal authority, without consent of parliament, is illegal.

Bill of Rights. See the article LIBERTY.

BILLERICAY, a town of Essex in England, seated on a hill, in E. Long. 0. 25. N. Lat. 51. 35.

BILLET, in *Heraldry*, a bearing in form of a long square. They are supposed to represent pieces of cloth of gold or silver; but Guillem thinks they represent a letter sealed up, and other authors take them for bricks. *Billeté* signifies that the escutcheon is all over strewed with billets, the number not ascertained.

Billet-Wood, small wood for fuel, cut three feet and four inches long, and seven inches and a half in compass; the assize of which is to be inquired of by justices.

BILLETING, in military affairs, is the quartering of soldiers in the houses of a town or village.—And, among fox-hunters, it signifies the ordure and dung of a fox.

BILLIARDS, an ingenious kind of game, played on a rectangular table, with little ivory balls, which are driven into hazards or holes, according to certain rules of the game.

This game was invented by the French, when it was played in a different manner from what it is at present, by having a pass or iron fixed on the table, through which the balls at particular periods of the game used to be played; but now this method is quite laid aside.

Soon after the French, the Germans, the Dutch, and Italians, brought this game into vogue throughout most parts of Europe, at which they became great proficients; and in a few years afterwards it became a favourite

Billiards. vourite diverſion in many parts of England, particularly with perſons of the firſt rank. Since that time, indeed, it has been in a great meaſure proſtituted by the deſigning and vulgar ſort of people: notwithſtanding, it will never be out of faſhion, being of itſelf very entertaining, and attended with that kind of moderate exerciſe which renders it the more agreeable.

The table on which the game is played is generally about twelve feet long and ſix feet wide, or rather in the exact form of an oblong; it is covered with fine green cloth, and ſurrounded with cuſhions to prevent the balls rolling off, and to make them rebound. There are ſix holes, nets, or pockets: theſe are fixed at the four corners, and in the middle, oppoſite to each other, to receive the balls, which when put into theſe holes or pockets are called hazards. The making of a hazard, that is, putting the adverſary's ball in, at the uſual game reckons for two in favour of the player.

The game is played with ſticks, called *maces*, or with cues; the firſt conſiſts of a long ſtraight ſtick, with a head at the end, and are the moſt powerful inſtruments of the two: the cue is a thick ſtick diminiſhing gradually to a point of about half an inch diameter; this inſtrument is played over the left hand, and ſupported by the fore-finger and thumb. It is the only inſtrument in vogue abroad, and is played with amazing addreſs by the Italians and ſome of the Dutch; but in England the mace is the prevailing inſtrument, which the foreigners hold in contempt, as it requires not near ſo much addreſs to play the game with, as when the cue is made uſe of; but the mace is preferred for its peculiar advantage, which ſome profeſſed players have artfully introduced, under the name of *trailing*, that is, following the ball with the mace to ſuch a convenient diſtance from the other ball as to make it an eaſy hazard. The degrees of trailing are various, and undergo different denominations amongſt the connoiſſeurs at this game; namely, the ſhove, the ſweep, the long ſtroke, the trail, and the dead trail or turn up, all which ſecure an advantage to a good player according to their various gradations: even the butt end of the cue becomes very powerful, when it is made uſe of by a good trailer.

Rules generally obſerved at the common or uſual game.—1. For the lead, the balls muſt be put at one end, and the player muſt ſtrike them againſt the farthermoſt cuſhion, in order to ſee which will be neareſt the cuſhion that is next to them. 2. The neareſt to the cuſhion is to lead and chooſe the ball if he pleaſes. 3. The leader is to place his ball at the nail, and not to paſs the middle pocket; and if he holes himſelf in leading, he loſes the lead. 4. He who follows the leader muſt ſtand within the corner of the table, and not place his ball beyond the nail. 5. He who plays upon the running ball loſes one. 6. He who touches the ball twice, and moves it, loſes one. But theſe two rules are ſeldom or ever enforced, eſpecially in England. 7. He who does not hit his adverſary's ball, loſes one. 8. He who touches both balls at the ſame time, makes a foul ſtroke, in which caſe if he ſhould hole his adverſary, nothing is gained by the ſtroke; but if he ſhould put himſelf in, he loſes two. 9. He who holes both balls, loſes two. 10. He who ſtrikes upon his adverſary's ball, and holes himſelf, loſes two. 11. He who plays at the ball without ſtriking it, and holes himſelf, loſes three. 12. He who ſtrikes both balls over the table, loſes two. 13. He who ſtrikes his ball over the table, and does not hit his adverſary's ball, loſes three. 14. He who retains the end of his adverſary's ſtick when playing, or endeavours to baulk his ſtroke, loſes one. 15. He who plays another's ball or ſtroke without leave, loſes one. 16. He who takes up his ball, or his adverſary's without leave, loſes one. 17. He who ſtops either ball when running, loſes one; and being near the hole, loſes two. 18. He who blows upon the ball when running loſes one, and, if near the hole, loſes two. 19. He who ſhakes the table when the ball is running, loſes one. 20. He who ſtrikes the table with the ſtick, or plays before his turn, loſes one. 21. He who throws the ſtick upon the table, and hits the ball, loſes one. 22. If the ball ſtands upon the edge of the hole, and after being challenged it falls in, it is nothing, but muſt be put up where it was before. 23. If any perſon, not being one of the players, ſtops a ball, the ball muſt ſtand in the place where it was ſtopped. 24. He who plays without a foot upon the floor and holes his adverſary's ball, gets nothing for it, but loſes the lead. 25. He who leaves the game before it is ended, loſes it. 26. Any perſon may change his ſtick in play. 27. If any difference ariſe between players, he who marks the game or the majority of the company muſt decide it. 28. Thoſe who do not play muſt ſtand from the table, and make room for the players. 29. If any perſon lays any wager, and does not play, he ſhall not give advice to the players upon the game. Billiards.

Different kinds of games played at billards.—Beſides the common winning game, which is twelve up, there are ſeveral other kinds of games, viz. the loſing game, the winning and loſing, choice of balls, bricole, carambole, Ruſſian carambole, the bar-hole, the one-hole, the four-game, and hazards.

The *loſing-game*, is the common game nearly reverſed; that is to ſay, except hitting the balls, which is abſolutely neceſſary, the player gains by loſing. By putting himſelf in, he wins two; by putting his adverſary in, he loſes two; but if he pockets both balls, he gets four. This game depends greatly upon particular ſtrengths, and is therefore very neceſſary to be known to play the winning game well.

The *winning and loſing game*, is a combination of both games; that is to ſay, all balls that are put in by ſtriking firſt the adverſary's ball, reckons towards game; and holing both balls reckons four. At this game and the loſing, knocking over or forcing the balls over the cuſhion, goes for nothing, the ſtriker only loſes the lead.

Choice of the balls, is chooſing each time which ball the player pleaſes, which is doubtleſs a great advantage, and is generally played againſt loſing and winning.

Bricole, is being obliged to hit a cuſhion, and make the ball rebound or return to hit the adverſary's ball, otherwiſe the player loſes a point. This is a great diſadvantage, and is reckoned between even players to be equal to receiving about eight or nine points.

Carambole, is a game newly introduced from France. It is played with three balls, one being red, which is neutral, and is placed upon a ſpot on a line with the

ſtringing

Billiards. ſtringing nail (i. e. that part of the table from whence the player ſtrikes his ball at firſt ſetting off, and which is generally marked with two braſs nails). Each antagoniſt at the firſt ſtroke of a hazard, plays from a mark which is upon a line with it at the other end of the table. The chief object at this game is, for the player to hit with his own ball the two other balls, which is called a *carambole*, and by which the player wins two. If he puts in the red ball he gets three, and when he holes his adverſary's ball he gets two; ſo that ſeven may be made at one ſtroke, by caramboling and putting in both balls. This game reſembles the loſing, depending chiefly upon particular ſtrengths, and is generally played with the cue. The game is ſixteen up; nevertheleſs it is reckoned to be ſooner over than the common game. The next object of this game, after making what we have diſtinguiſhed by the *carambole*, is the *baulk;* that is, making the white ball, and bringing the player's own ball and the red one below the ſtringing nail, from whence the adverſary's begin. By this means the opponent is obliged to play bricole from the oppoſite cuſhion; and it often happens that the game is determined by this ſituation.

The *Ruſſian carambole*, is a game that has ſtill more lately been introduced from abroad, and is played in the following manner: The red ball is placed as uſual on the ſpot made for that purpoſe; but the player when he begins, or after having been holed, never places his ball on any particular place or ſpot; he being at liberty to put it where he pleaſes. When he begins to play, inſtead of ſtriking at the red ball, he leads his own gently behind it, and his antagoniſt is to play at which he thinks proper: if he plays at the red ball and holes it, he ſcores three as uſual towards the game, which is twenty-four inſtead of ſixteen points; and the red ball is put upon the ſpot again, at which he may ſtrike again, or take his choice which of the two balls to puſh at, always following his ſtroke till both balls are off the table. He is entitled to two points each time that he caramboles, the ſame as at the other game; but if he caramboles and puts his own ball into any hole, he loſes as many as he might have got had he not holed himſelf: for example, if he ſtrikes at the red ball which he holes, at the ſame time caramboles and holes himſelf, he loſes five points; and if he holes both balls when he caramboles, and likewiſe his own, he loſes ſeven, which he would have got, if he had not holed his own ball. In other reſpects it is played like the common carambole game.

The *bar-hole*, is ſo called from the hole being barred which the ball ſhould be played for, and the player ſtriking for another hole; when this game is played againſt the common game, the advantage for the latter, between equal players, is reckoned to be about ſix.

The player at the *one-hole*, though it ſeems to thoſe who are not judges of the game to be a great diſadvantage, has in fact the beſt of it; for as all balls that go into the one hole reckon, the player endeavours to lay his ball conſtantly before the hole, and his antagoniſt frequently finds it very difficult to keep one or other ball out, particularly on the leads, when the one hole player lays his ball (which he does as often as he can) on the brink of the hole; leading for that purpoſe from the oppoſite end, which in reality he has no right to do; for the lead ſhould be given from the end of the table at which the hazard is made; but when a perſon happens to be a novice, this advantage is often taken. Billingham || Biſſon.

The *four-game*, conſiſts of two partners on each ſide, at the common winning game; who play by ſucceſſion after each hazard, or two points loſt. The game is fifteen up; ſo that the point or hazard is an odd number, which makes a miſs at this game of more conſequence than it is at another; being as much at four, ſix, or eight, as it is at five, ſeven, or nine, at the ſingle game.

Hazards, are ſo called becauſe they depend entirely upon the making of hazards, there being no account kept of any game. Any number of perſons may play by having balls that are numbered; but the number ſeldom exceeds ſix, to avoid confuſion. The perſon whoſe ball is put in, pays ſo much to the player according to what is agreed to be played for each hazard; and the perſon who miſſes, pays half the price of a hazard to him whoſe ball he played at. The only general rule is not to lay any ball a hazard for the next player, which may be in a great meaſure avoided, by always playing upon the next player, and either bringing him cloſe to the cuſhion, or putting him at a diſtance from the reſt of the balls. The table, when hazards are played, is always paid for by the hour.

BILLINGHAM, a town of Northumberland in England, ſeated in W. Long. 1. 35. N. Lat. 55. 20.

BILLON, in the *Hiſtory of Coins*, a compoſition of precious and baſe metals, where the latter predominate. Wherefore gold under twelve carats fine, is called *billon of gold;* and ſilver under ſix penny-weight, *billon of ſilver*. So little attention was paid formerly to the purity of gold and ſilver, that the term *billon of gold* was applied only to that which was under twenty-one carats, and *billon of ſilver* to that which was lower than ten penny-weight.

Billon, a town of Auvergne in France, ſituated in E. Long. 3. 30. N. Lat. 45. 36.

BILSDON, a ſmall town of Leiceſterſhire in England, ſituated in W. Long. 0. 15. N. Lat. 52. 40.

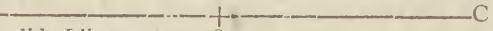
BILSEN, a town of Germany, in the circle of Weſtphalia and biſhopric of Liege, ſeated on the river Demer, in E. Long. 5. 42. N. Lat. 50. 48.

BILSON, Thomas, biſhop of Wincheſter, in which city he was born and educated. In 1565, he was admitted erpetual fellow of New college, and in 1570 completed his degrees in arts. He was made bachelor of divinity in 1579, and doctor the year following. His firſt preferment was that of maſter of Wincheſter ſchool; he was next made prebendary, and afterwards warden, of Wincheſter college. In 1596 he was conſecrated biſhop of Worceſter; and about a year after, tranſlated to the ſee of Wincheſter, and ſworn of Queen Elizabeth's privy council. He was one of the principal managers of the Hampton-court conference in 1604; and the Engliſh tranſlation of the Bible in the reign of King James I. was finally corrected by this prelate, and Dr Miles Smith biſhop of Glouceſter. He died in the year 1616; and was buried in Weſtminſter abbey, near the entrance of St Edmund's chapel, on the ſouth ſide of the monument of King Richard II. The ſeveral authors who have mentioned

Bimedial || Binary Arithmetic.

Biſhop Bilſon, agree in giving him the character of a learned divine, an able civilian, and an upright man. His ſtyle is in general much more eaſy and harmonious than that of cotemporary eccleſiaſtics. His works are, 1. *Several Latin poems and orations.* Manuſcript, in Ant. Wood's library. 2. *The true difference between Chriſtian ſubjection and unchriſtian rebellion.* Oxf. 1585, 4to. Lond. 1586, 8vo. 3. *The perpetual government of Chriſt's church.* Lond. 1593, 4to, Black Letter. 4. *The effect of certain ſermons touching the full redemption of mankind by the death and blood of Chriſt*, &c. Lond. 1599, 4to. 5. *The ſurvey of Chriſt's ſuffering for man's redemption, and of his deſcent to Hades or Hell.* Lond. 1604, fol. 6. *A ſermon preached before King James I. and his queen, at their coronation.* Lond. 1603, 8vo.

BIMEDIAL, in *Mathematics.* If two medial lines, as AB and BC, commenſurable only in power, containing a rational rectangle, are compounded, the whole line AC will be irrational, and is called a *firſt bimedial line.*



See Euclid, Lib. x. prop. 38.

BIMINI, one of the Lucaya iſlands in North America, near the channel of Bahama. It is about eight miles in length, and as much in breadth, covered with trees, and inhabited by the native Americans. It is very difficult of acceſs on account of the ſhoals, but is a very pleaſant place. W. Long. 79. 30. N. Lat. 25. 0.

BIMLIPATAN, a ſea-port town of Golconda in the Eaſt Indies, ſeated on the weſt ſide of the bay of Bengal. Here the Dutch have a very ſmall factory, deſigned for buying up the cloth manufactured by the inhabitants. E. Long. 83. 5. N. Lat. 18. 0.

BINACLE, a wooden caſe or box, which contains the compaſſes, log-glaſſes, watch-glaſſes, and lights to ſhow the compaſs at night. As this is called *bittacle* in all the old ſea-books, even by mariners, it appears evidently to be derived from the French term *habittacle* (a ſmall habitation), which is now uſed for the ſame purpoſe by the ſeamen of that nation. The binacle (Plate LXXXVIII. fig. 4.) is furniſhed with three apartments, with ſliding ſhutters: the two ſide ones, *a b*, have always a compaſs in each *d*, to direct the ſhip's way; while the middle diviſion, *c*, has a lamp or candle with a pane of glaſs on either ſide to throw a light upon the compaſs in the night, whereby the man who ſteers may obſerve it in the darkeſt weather, as it ſtands immediately before the helm on the quarter deck. There are always two binnacles on the deck of a ſhip of war, one being deſigned for the man who ſteers, and the other for the perſon who ſuperintends the ſteerage, whoſe office is called *conning*.

BINAROS, a ſmall town of Spain, in the kingdom of Valentia, remarkable for good wine. It is ſeated near the ſea, in E. Long. 0. 15. N. Lat. 40. 24.

BINARY ARITHMETIC, that wherein unity or 1 and 0 are only uſed. This was the invention of M. Leibnitz, who ſhows it to be very expeditious in diſcovering the properties of numbers, and in conſtructing tables: and Mr Dangecourt, in the hiſtory of the royal academy of ſciences, gives a ſpecimen of it concerning arithmetical progreſſionals; where he ſhows, that becauſe in binary arithmetic only two characters are uſed, therefore the laws of progreſſion may be more eaſily diſcovered by it than by common arithmetic. All the characters uſed in binary arithmetic are 0 and 1; and the cypher multiplies every thing by 2, as in the common arithmetic by 10. Thus 1 is one; 10, two; 11, three; 100, four; 101, five; 110, ſix: 111, ſeven; 1000, eight; 1001, nine; 1010, ten; which is built on the ſame principles with common arithmetic. Hence immediately appears the reaſon of the celebrated property of the duplicate geometrical proportion in whole numbers; viz. that one number of each degree being had, we may thence compoſe all the other whole numbers above the double of the higheſt degree. It being here, v. gr. as if one ſhould ſay, 111 is the ſum of 4, 2, and 1, which property may ſerve eſſayers to weigh all kinds of maſſes with a little weight; and may be uſed in coins, to give ſeveral values with ſmall pieces. This method of expreſſing numbers once eſtabliſhed, all the operations will be eaſy: in multiplication particularly, there will be no need for a table, or getting any thing by heart. The author, however, does not recommend this method for common uſe, becauſe of the great number of figures required to expreſs a number; adding, that if the common progreſſion were from 12 to 12, or from 16 to 16, it would be ſtill more expeditious; but its uſe is in diſcovering the properties of numbers, in conſtructing tables, &c. What makes the binary arithmetic the more remarkable is, that it appears to have been the ſame with that uſed 4000 years ago among the Chineſe, and left in *ænigma* by Fohi, the founder of their empire, as well as of their ſciences.

100	4
10	2
1	1
111	7

Binary Arithmetic || Binding.

Binary Meaſure, in *Muſic*, is a meaſure which is beaten equally, or where the time of riſing is equal to that of falling. This is uſually called *common time.*

Binary Number, that compoſed of two units.

BINCH, a ſmall fortified town of the Low Countries, in the county of Hainault, ſubject to the houſe of Auſtria. E. Long. 3. 21. N. Lat. 50. 23.

BIND, a country word for a ſtalk of hops.

Bind of Eels, a quantity, conſiſting of 250, or 10 ſtrikes, each containing 25 eels.

BIND-WEED, in BOTANY. See CONVOLVULUS, BOTANY *Index.*

BINDBROKE, a town of Lincolnſhire in England, ſeated in E. Long. 0. 10. N. Lat. 53. 32.

BINDING-JOISTS, in *Architecture*, are thoſe joiſts in a floor, into which the trimmers of ſtaircaſes, or well-holes of the ſtairs, and chimney-ways, are framed: they ought to be ſtronger than common joiſts.

BINDING, in the art of defence, a method of ſecuring or croſſing the adverſary's ſword with a preſſure, accompanied with a ſpring from the wriſt. See BEATING.

Unleſs a man by ſome kind of croſs, ſecure, as it were, or render his adverſary's ſword incapable to offend him during the time of his performing a leſſon upon him, it is impoſſible for him to be certain but that he may receive from his adverſary, either a fortuitous *contretemps*, or an exchanged thruſt, before the recovery of his body, or going off after a thruſt.—The great objection made by ſome people, particularly thoſe time-catchers, againſt the frequent uſe of binding,

Binding ‖ Biographer.

ing, is, that when a man, in performing it, cleaves too much to his adverſary's ſword, he is liable to his adverſary's ſlipping of him, and conſequently of receiving either a plain thruſt, or one from a feint.

BINDING is a term in falconry, which implies tiring, or when a hawk ſeizes.

BINDING of Books. See *BOOK-Binding.*

BING, in the alum-works, denotes a heap of alum thrown together in order to drain.

BINGAZI, a ſea-port town of Africa, in the kingdom of Tripoli. E. Long. 19. 10. N. Lat. 32. 20.

BINGEN, an ancient and handſome town of Germany, in the archbiſhopric of Mentz, ſeated at the place where the river Nave falls into the Rhine. E. Long. 7. 48. N. Lat. 50. 33.

BINGHAM, JOSEPH, a learned divine, born at Wakefield in Yorkſhire, in September 1668, educated at Univerſity college in Oxford, and afterwards preſented by John Radcliffe, M. D. to the rectory of Headbournworthy, near Wincheſter. In this country retirement he began his learned and laborious work, *Origines Eccleſiaſticæ*; or, The Antiquities of the Chriſtian church. The firſt volume of which was publiſhed in 1708, and it was completed afterwards in nine volumes more. He publiſhed alſo ſeveral other books. But notwithſtanding his great learning and merit, he had no other preferment than that of Headbournworthy till the year 1712, when he was collated to the rectory of Havant, near Portſmouth, by Sir Jonathan Trelawney biſhop of Wincheſter, to whom he dedicated ſeveral of his books. He died Auguſt 17th, 1723, in the 55th year of his age.

BINGHAM, a town of Nottinghamſhire in England, ſeated in the vale of Belvoir, in W. Long. 1. 10. N. Lat. 50. 3.

BINGIUM, in *Ancient Geography*, a village or town of the Vangiones in Gallia Belgica, ſeated at the confluence of the Nave and Rhine. Now BINGEN, which ſee.

BINGLEY, a town in the weſt riding of Yorkſhire, ſeated on the river Aire, in W. Long. 1. 35. N. Lat. 53. 20.

BINN, *binna*, a ſort of cheſt or cupboard, wherein to lock up bread, meat, or other proviſions. The word is alſo uſed for a place boarded up to put corn in.

BINN, or BIN. The peaſe and oatmeal, uſed at ſea, are apt to ſpoil in caſks. Dr Hales propoſes to prevent this, by putting them into large binns, with falſe bottoms of hair-cloths laid on bars, whereby freſh air may be blown upwards through them, at proper times, with ſmall ventilators.

BINOCULAR TELESCOPE, a kind of dioptric teleſcope fitted with two tubes, joined in ſuch a manner that one may ſee a diſtant object with both eyes at the ſame time. See OPTICS.

BINOMIAL, in *Algebra*, a root conſiſting of two members connected by the ſign + or —. Thus $a+b$, and 8—3, are binomials, conſiſting of the ſums and differences of theſe quantities. See ALGEBRA.

BINTAN, an iſland of Aſia, in the Eaſt Indies, to the ſouth of the peninſula of Malacca, ſituated in E. Long. 103. 50. N. Lat. 1. 0.

BIOGRAPHER, one who writes the lives of particular perſons, as Plutarch, Suetonius, &c. See the next article.

Biography ‖ Biquadratic.

BIOGRAPHY, a ſpecies of hiſtory which records the lives and characters of remarkable perſons. This is at once the moſt entertaining and inſtructive kind of hiſtory. It admits of all the painting and paſſion of romance; but with this capital difference, that our paſſions are more keenly intereſted, becauſe the characters and incidents are not only agreeable to nature, but ſtrictly true. No books are ſo proper to be put into the hands of young people. See HISTORY.

BION, a bucolic poet, native of Smyrna, lived at the ſame time with Ptolemy Philadelphus, whoſe reign reached from the fourth year of the 123d Olympiad to the ſecond year of the 133d. He was an incomparable poet, if we may believe the lamentations of his diſciple Moſchus. His few pieces which are left do not contradict this teſtimony. See MOSCHUS.

BION, ſurnamed *Boryſthenites*, becauſe he was of Boryſthenes, was a philoſopher of a great deal of wit, but of very little religion: he flouriſhed about the 120th Olympiad; but, falling ſick, he, like other profane perſons, became ſuperſtitious.

BIORNBURG, a town of North Finland in Sweden, ſeated on the river Kune near its mouth in the gulf of Bothnia. E. Long. 22. 35. N. Lat. 62. 6.

BIOTHANATI (from *βια*, *violence*, and *θανατος*, *death*), in ſome medical writers, denotes thoſe who die a violent death. The word is alſo written, and with more propriety, *biathanati*; ſometimes *biæothanti*.

In a more particular ſenſe, it denotes thoſe who kill themſelves, more properly called *autothanati*. In this ſenſe it is that the word is uſed both by Greek and Latin writers. By the ancient diſcipline of the church, they were puniſhed by denying them burial, and refuſing all commemoration of them in the prayers and offices of the church.

BIOTHANATI (ſuppoſed by ſome to be derived from *βιος*, *life*, and *θανατος*, *death*, and alluding to the belief of a future life after death), was alſo a name of reproach given by the Heathens to the primitive Chriſtians, for their conſtancy and forwardneſs to lay down their lives in martyrdom.

BIOTHANATOS is alſo uſed in ſome writers of the barbarous age for wicked, damnable, or accurſed.

BIOUAC, BIVOUAC, or BIOVAC, in the military art, a nightly guard performed by the whole army, when there is an apprehenſion of danger from the enemy. The word is formed by corruption from the German *weywaght*, a *double watch* or *guard*.

BIPENNIS, a two-edged axe, uſed anciently by the Amazons in fight; as alſo by the ſeamen, to cut aſunder the ropes and cordage of the enemy's veſſels. The bipennis was a weapon chiefly of the oriental nations, made like a double axe, or two axes joined back to back, with a ſhort handle. Modern writers uſually compare it to our halbard or partizan; from which it differed in that it had no point, or that its ſhaft or handle was much ſhorter.

BIQUADRATE, or BIQUADRATIC, is the next power above the cube, or the ſquare multiplied by itſelf.

BIQUADRATIC EQUATION, in *Algebra*, an equation raiſed to the fourth power, or where the unknown quantity of one of the terms has four dimenſions: Thus $x^4+ax^3+bx^2+cx+d=0$ is a biquadratic equation. See ALGEBRA.

Biquadratic Parabola || Birch.

Biquadratic Parabola, in *Geometry*, a curve line of the third order, having two infinite legs tending the ſame way. See Parabola.

Biquadratic Power of any number, is the fourth power or ſquared ſquare of that number: Thus 16 is the biquadratic power of 2; for $2\times2=4$, and $4\times4=16$.

Biquadratic Root of any number, is the ſquare root of the ſquare root of that number: Thus the biquadratic root of 81 is 3; for the ſquare root of 81 is 9, and the ſquare root of 9 is 3.

BIQUALAR, in the cuſtoms of the Algerines, a cook of the divan.—The janizaries, whom the Algerines call *oldachis*, after ſerving a certain term as common ſoldiers, are preferred to be biqualars, or cooks of the divan, which is the firſt ſtep towards arriving at higher preferment. Biqualars have the care of furniſhing the officers and commanders of the Algerine ſoldiery with meat and drink in the camp, in garriſon, &c. From biqualars they are made odobachis; that is, corporals of companies, or commanders of ſquadrons.

BIQUINTILE, an aſpect of the planets, when they are 144 degrees diſtant from each other. It is thus called, becauſe they are diſtant from one another by twice the fifth part of 360 degrees.

BIR, or Berr, a town of the province of Diarbeck in Turkey in Aſia, with a caſtle where the governor reſides, ſeated on the eaſtern bank of the river Euphrates, near a high mountain in a very pleaſant and fertile country. E. Long. 38. 6. N. Lat. 36. 10.

BIRAGUE, Clement, a Milaneſe engraver, and the inventor of the art of cutting diamonds, flouriſhed about the year 1580.

BIRCH-tree. See Betula, Botany *Index*.

Birch-Bark, being bituminous, and conſequently warm and emollient, is uſed in fumigations to correct a diſtempered air. The inner ſilken bark was anciently uſed for writing-tables before the invention of paper; though Ray rather aſſigns the office of paper to the cuticle, or outer ſkin, which peels off yearly. And with the outward, thicker, and coarſer part, are houſes in Ruſſia, Poland, and other northern tracts, covered inſtead of ſlates and tyle. The Indians make pinnaces with white cedar, which they cover with large flakes of birch-bark; ſewing them with thread of ſpruce roots, and pitching them, as the ancient Britons did, with the willow. Pliny ſpeaks of a bitumen actually procured from the birch tree.

Fungus of Birch, an excreſcence growing on its trunk. It is aſtringent, and good againſt hemorrhagies. When boiled, beaten, and dried in an oven, it makes excellent ſpunk or touchwood.

Birch-Leaves are of uſe in the dropſy, itch, &c. either internally or externally applied.

Birch-Twigs ſerve to make rods and brooms: ſmeered with bird-lime, they are uſed by fowlers; to ſay nothing of the ancient faſces carried by lictors.

Birch-Wine is made by fermenting the vernal juice. Formerly it was in great repute againſt all nephritic diſorders, but is left out in the modern London practice. The preparation of birch-wine is well and amply deſcribed in a book entitled *Vinetum Britannicum*.

Birch, *Dr Thomas*, an eminent hiſtorical and biographical writer, was born in London in 1705. His parents were both of them Quakers; and his father, Joſeph Birch, was a coffee-mill maker by trade. Thomas being put to ſchool, was indefatigable in his application, and ſtole many hours from ſleep to increaſe his ſtock of knowledge. By this unremitting diligence, though he had not the happineſs of an univerſity education, he ſoon became qualified to take holy orders in the church of England, to the ſurpriſe of his acquaintance. In 1728 he married the daughter of the Rev. Mr Cox, to whom he was curate: but his felicity was of ſhort duration, Mrs Birch dying of a puerperal fever in leſs than 12 months after their marriage; an event which he deplores in a very elegant and pathetic poem, preſerved in Nichols's Collection. In 1732 he was recommended to the friendſhip and favour of the late lord high chancellor Hardwicke, then attorney general; to which noble peer, and to the preſent earl of Hardwicke, he was indebted for all his preferments. The firſt proof he experienced of his patron's regard was the living of Ulting in the county of Eſſex, in the gift of the crown, to which he was preſented 1732. In 1734 he was appointed one of the domeſtic chaplains to the unfortunate earl of Kilmarnock, who was beheaded in 1746. Mr Birch was choſen a member of the Royal Society, Feb. 20. 1734-5; and of the Society of Antiquaries, Dec. 11. 1735, of which he afterwards became director till his death. Before this, the Mariſchal college of Aberdeen had conferred on him, by diploma, the degree of maſter of arts. In 1743, by the intereſt of Lord Hardwicke, he was preſented by the crown to the ſinecure rectory of Landewy Welfrey in the county of Pembroke; and in 1743-4 was preferred, in the ſame manner, to the rectory of Sidington in St Peter's, in the county and dioceſe of Glouceſter. We find no traces of his having taken poſſeſſion of this living; and indeed it is probable that he quitted it immediately for one more ſuitable to his inclinations and to his literary engagements, which required his almoſt conſtant reſidence in town; for on the 24th of February 1743-4, he was inſtituted to the united rectories of St Michael Woodſtreet, and St Mary Staining; and in 1745-6, to the united rectories of St Margaret Pattens and St Gabriel, Fenchurch-ſtreet (by lord chancellor Hardwicke, in whoſe turn the preſentation then was). In January 1752, he was elected one of the ſecretaries of the Royal Society, in the room of Dr Cromwell Mortimer, deceaſed. In January 1753, the Mariſchal college of Aberdeen created him doctor of divinity; and in that year the ſame degree was conferred on him by Archbiſhop Herring. He was one of the truſtees of the Britiſh Muſeum; for which honour he was probably indebted to the preſent earl of Hardwicke, as he was for his laſt preferment, the rectory of Depden in Eſſex, to which he was inducted Feb. 26. 1761. In the latter part of his life he was chaplain to the Princeſs Amelia. In 1765 he reſigned his office of ſecretary to the Royal Society, and was ſucceeded by Dr Morton. His health declining about this time, he was ordered to ride for the recovery of it; but being a bad horſeman, and going out Jan. 9. 1766, he was unfortunately thrown from his horſe, on the road betwixt London and Hampſtead, and died on the ſpot, in the 61ſt year of his age, to the great regret of the doctor's numerous

Birch.

Birch. numerous literary friends; and was buried in St Margaret Pattens. Dr Birch had in his lifetime been very generous to his relations; and none that were nearly allied to him being living at his deceaſe, he bequeathed his library of books and manuſcripts, with his picture painted in 1735, and all his other pictures and prints not otherwiſe diſpoſed of by his will, to the Britiſh Muſeum. He likewiſe left the remainder of his fortune, which amounted to not much more than 500l. to be laid out in government-ſecurities, for the purpoſe of applying the intereſt to increaſe the ſtipend of the three aſſiſtant librarians; thus manifeſting at his death, as he had done during his whole life, his reſpect for literature, and his deſire to promote uſeful knowledge. To the Royal Society he bequeathed his picture painted by Wills in 1737, being the original of the mezzotinto print done by Fauber in 1741. His principal publications were, 1. The General Dictionary, Hiſtorical and Critical; including a new tranſlation of Mr Bayle, and interſperſed with ſeveral thouſand new lives. Dr Birch's aſſociates in this undertaking were, the Reverend John Peter Bernard, Mr John Lockman, and Mr George Sale. The whole deſign was completed in 10 volumes folio. 2. Dr Cudworth's Intellectual Syſtem (improved from the Latin edition of Moſheim), his Diſcourſe on the true Notion of the Lord's Supper, and two Sermons, with an account of his Life and Writings, 2 vols 4to, 1743. 3. The Life of the Hon. Robert Boyle, 1744; prefixed to an edition of that excellent philoſopher's works, reviſed by Dr Birch. 4. The Lives of Illuſtrious Perſons of Great Britain, annexed to the engravings of Houbraken and Vertue, 1747—1752. 5. An Inquiry into the Share which King Charles I. had in the Tranſactions of the Earl of Glamorgan, 1747, 8vo. 6. An edition of Spenſer's Fairy Queen, 1751, 3 vols quarto, with prints from deſigns by Kent. 7. The Miſcellaneous Works of Sir Walter Raleigh; to which was prefixed the Life of that great, unfortunate, and injured man, 1751, 2 vols 8vo. 8. The Theological, Moral, Dramatic, and Poetical Works of Mrs Catharine Cockburn; with an Account of the Life of that very ingenious Lady, 1751, 2 vols 8vo. 9. The Life of the Moſt Reverend Dr John Tillotſon, Lord Archbiſhop of Canterbury. Compiled chiefly from his original Papers and Letters, 1752, 8vo. 10. Milton's Proſe Works, 1753, 2 vols 4to; with a new Life of that great poet and writer. 11. Memoirs of the Reign of Queen Elizabeth, from the year 1581 till her death. In which the ſecret intrigues of her court, and the conduct of her favourite Robert earl of Eſſex, both at home and abroad, are particularly illuſtrated. From the original papers of his intimate friend Anthony Bacon, Eſq; and other manuſcripts never before publiſhed, 1754, 2 vols 4to. 12. The Hiſtory of the Royal Society of London for improving natural knowledge, from its firſt riſe. In which the moſt conſiderable of thoſe papers communicated to the Society, which have hitherto not been publiſhed, are inſerted in their proper order as a ſupplement to the Philoſophical Tranſactions, 1756 and 1757, 4 vols 4to. 13. The Life of Henry Prince of Wales, eldeſt Son of King James I. Compiled chiefly from his own papers and other manuſcripts, never before publiſhed, 1760, 8vo. His numerous communications to the Royal Society may be ſeen in the Philoſophical Tranſactions; and his poetical talents are evident from the verſes already referred to. Bird, Bird-Call.

BIRD, William, an eminent muſician and compoſer, was one of the children of the chapel in the reign of Edward VI. and, as it is aſſerted by Wood in the Aſhmolean MS. was bred up under Tallis. It appears, that in 1575 Tallis and Bird were both gentlemen and alſo organiſts of the royal chapel; but the time of their appointment to this latter office cannot now be aſcertained.

The compoſitions of Bird are many and various; thoſe of his younger years were moſtly for the ſervice of the church. He compoſed a work entitled *Sacrarum Cantionum, quinque vocum*, printed in 1589; among which is that noble compoſition *Civitas ſancti tui*, which for many years paſt has been ſung in the church as an anthem to the words "Bow thine ear, O Lord." He was alſo the author of a work entitled *Gradualia, ac Cantiones ſacræ, quinis, quaternis, triniſque vocibus concinnatæ, lib. primus.* Of this there are two editions, the latter publiſhed in 1610. Although it appears by theſe his works that Bird was in the ſtricteſt ſenſe a church muſician, he occaſionally gave to the world compoſitions of a ſecular kind: and he ſeems to be the firſt among Engliſh muſicians that ever made an eſſay in the compoſition of that elegant ſpecies of vocal harmony, the madrigal; the *La Verginella* of Arioſto, which he ſet in that form for five voices, being the moſt ancient muſical compoſition of the kind to be met with in the works of Engliſh authors. Of his compoſitions for private entertainment, there are extant, "Songs of ſundry natures, ſome of gravitie, and others of myrth, fit for all companies and voyces, printed in 1589;" and two other collections of the ſame kind, the laſt of them printed in 1611. But the moſt permanent memorials of Bird's excellencies are his motets and anthems; to which may be added, a fine ſervice in the key of D with the minor third, the firſt compoſition in Dr Boyce's Cathedral Muſic, vol. iii. and that well-known canon of his, *Non nobis Domine.*

Beſides his ſalaries and other emoluments of his profeſſion, it is to be ſuppoſed that Bird derived ſome advantages from the patent granted by Queen Elizabeth to Tallis and him, for the ſole printing of muſic and muſic-paper: Dr Ward ſpeaks of a book which he had ſeen with the letters T. E. for Thomas Eaſt, Eſt, or Eſte, who printed muſic under that patent. Tallis dying in 1585, the patent, by the terms of it, ſurvived to Bird, who, no doubt for a valuable conſideration, permitted Eaſt to exerciſe the right of printing under the protection of it; and he in the title-page of moſt of his publications ſtyles himſelf the *aſſignee of William Byrd.* Bird died in 1623.

BIRD, in *Zoology*. See Anatomy, and Ornithology *Index*.

Beam-Bird, or *Petty-chaps*. See Motacilla.

Black-Bird.
Blue-Bird.
Canary-Bird.
Dung-Bird.
Humming-Bird.
Mocking-Bird.
Bird of Paradiſe.
} See Ornithology *Index*.

Bird-Call, a little ſtick cleft at one end, in which

Bird-Catching.

is put a leaf of ſome plant, wherewith to counterfeit the cry or call of ſeveral birds, and bring them to the net, or ſnare, or lime-twig, to be taken. A laurel-leaf fitted on the bird-call, counterfeits the voice of lapwings; a leek that of nightingales, &c.

Bird-Catching, the art of taking birds or wild-fowl, whether for food, for the pleaſure of their ſong, or for their deſtruction as pernicious to the huſbandman, &c. The methods are by bird-lime, nets, decoys, &c. See *Bird-Lime*, infra; and Decoy.

Britiſh Zoology, vol. ii. append. N° iv. By the Honourable Daines Barrington.

In the ſuburbs of London (and particularly about Shoreditch) are ſeveral weavers and other tradeſmen, who, during the months of October and March, get their livelihood by an ingenious, and, we may ſay, a ſcientific, method of *bird-catching*, which is totally unknown in other parts of Great Britain. The reaſon of this trade being confined to ſo ſmall a compaſs, ariſes from their being no conſiderable ſale for ſinging-birds except in the metropolis: as the apparatus for this purpoſe is alſo heavy, and at the ſame time muſt be carried on a man's back, it prevents the bird-catchers going to above three or four miles diſtance.

This method of bird-catching muſt have been long practiſed, as it is brought to a moſt ſyſtematical perfection, and is attended with a very conſiderable expence.

The nets are a moſt ingenious piece of mechaniſm; are generally twelve yards and a half long, and two yards and a half wide; and no one, on bare inſpection, would imagine that a bird (who is ſo very quick in all its motions) could be catched by the nets flapping over each other, till he becomes eye-witneſs of the pullers ſeldom failing.

The wild birds *fly* (as the bird-catchers term it) chiefly during the month of October, and part of September and November; as the flight in March is much leſs conſiderable than that of Michaelmas. It is to be noted alſo, that the ſeveral ſpecies of birds of *flight* do not make their appearance preciſely at the ſame time, during the months of September, October, and November. The pippet (A), for example, begins to fly about Michaelmas; and then the woodlark, linnet, goldfinch, chaffinch, greenfinch, and other birds of flight ſucceed; all of which are not eaſily to be caught, or in any numbers, at any other time, and more particularly the pippet and the woodlark.

Theſe birds, during the Michaelmas and March flights, are chiefly on the wing from day-break to noon, though there is afterwards a ſmall flight from two till night; but this however is ſo inconſiderable, that the bird-catchers always take up their nets at noon.

It may well deſerve the attention of the naturaliſt whence theſe periodical flights of certain birds can ariſe. As the ground, however, is ploughed during the months of October and March for ſowing the winter and lent corn, it ſhould ſeem that they are thus ſupplied with a great profuſion both of ſeeds and inſects, which they cannot ſo eaſily procure at any other ſeaſon. Bird-Catching.

It may not be improper to mention another circumſtance, to be obſerved during their flitting, viz. that they fly always againſt the wind: hence there is great contention amongſt the bird-catchers who ſhall gain that point; if (for example) it is weſterly, the bird-catcher who lays his nets moſt to the eaſt, is ſure almoſt of catching every thing, provided his call-birds are good: a gentle wind to the ſouth-weſt generally produces the beſt ſport.

The bird-catcher, who is a ſubſtantial man, and hath a proper apparatus for this purpoſe, generally carries with him five or ſix linnets, (of which more are caught than any ſinging bird), two gold-finches, two green-finches, one wood-lark, one red-poll, a yellow-hammer, tit-lark, and aberdavine, and perhaps a bull-finch; theſe are placed at ſmall diſtances from the nets in little cages. He hath, beſides, what are called *flur-birds*, which are placed within the nets, are raiſed upon the flur (B), and gently let down at the time the wild bird approaches them. Theſe generally conſiſt of the linnet, the gold-finch, and the green-finch, which are ſecured to the flur by what is called a *brace* (C); a contrivance that ſecures the birds without doing any injury to their plumage.

It having been found that there is a ſuperiority between bird and bird, from the one being more in ſong than the other; the bird-catchers contrive that their call-birds ſhould moult before the uſual time. They therefore, in June or July, put them into a cloſe box under two or three folds of blankets, and leave their dung in the cage to raiſe a greater heat; in which ſtate they continue, being perhaps examined but once a-week to have freſh water. As for food, the air is ſo putrid, that they eat little during the whole ſtate of confinement, which laſts about a month. The birds frequently die under the operation; and hence the value of a ſtopped bird riſes greatly. When the bird hath thus prematurely moulted, he is in ſong whilſt the wild birds are out of ſong, and his note is louder and more piercing than that of a wild one; but it is not only in his note he receives an alteration, the plumage is equally improved. The black and yellow in the wings of the gold-finch, for example, become deeper and more vivid, together with a moſt beautiful gloſs, which is not to be ſeen in the wild bird. The bill, which in the latter is likewiſe black at the end, in the ſtopped-bird becomes white and more taper, as do its legs: in ſhort, there is as much difference between a wild and a ſtopped-bird, as there is between a horſe which is kept in body-clothes and one at graſs.

When the bird-catcher hath laid his nets, he diſpoſes of his call-birds at proper intervals. It muſt be owned

(A) A ſmall ſpecies of lark, but which is inferior to other birds of that genus in point of ſong.

(B) A moveable perch to which the bird is tied, and which the bird-catcher can raiſe at pleaſure by means of a long ſtring faſtened to it.

(C) A ſort of bandage, formed of a ſlender ſilken ſtring that is faſtened round the bird's body, and under the wings, in ſo artful a manner as to hinder the bird from being hurt, let it flutter ever ſo much in the raiſing.

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owned, that there is moſt malicious joy in theſe call-birds to bring the wild ones into the ſame ſtate of captivity; which may likewiſe be obſerved with regard to the decoy ducks. See DECOY.

Their ſight and hearing infinitely excels that of the bird-catcher. The inſtant that the (D) wild birds are perceived, notice is given by one to the reſt of the call-birds, (as it is by the firſt hound that hits on the ſcent to the reſt of the pack); after which, follows the ſame ſort of tumultuous ecſtacy and joy. The call-birds, while the bird is at a diſtance, do not ſing as a bird does in a chamber; they invite the wild ones by what the bird-catchers call *ſhort jerks*, which, when the birds are good, may be heard at a great diſtance. The aſcendency by this call or invitation is ſo great, that the wild bird is ſtopped in its courſe of flight; and, if not already acquainted with the nets (E), lights boldly within 20 yards of perhaps three or four bird-catchers, on a ſpot which otherwiſe it would not have taken the leaſt notice of. Nay, it frequently happens, that if half a flock only are caught, the remaining half will immediately afterwards light in the nets, and ſhare the ſame fate; and ſhould only one bird eſcape, that bird will ſuffer itſelf to be pulled at till it is caught; ſuch a faſcinating power have the call-birds.

While we are on this ſubject of the jerking of birds, we cannot omit mentioning, that the bird-catchers frequently lay conſiderable wagers whoſe call-bird can jerk the longeſt, as that determines the ſuperiority. They place them oppoſite to each other, by an inch of candle; and the bird who jerks the oftenеſt, before the candle is burnt out, wins the wager. We have been informed, that there have been inſtances of a bird's giving 170 jerks in a quarter of an hour; and we have known a linnet, in ſuch a trial, perſevere in its emulation till it ſwooned from the perch: thus, as Pliny ſays of the nightingale, *victa morte finit ſæpe vitam, ſpiritu prius deficiente quam cantu*†. It may be here obſerved, that birds when near each other, and in ſight, ſeldom jerk or ſing. They either fight, or uſe ſhort and wheeling calls; the jerking of theſe call-birds, therefore, face to face, is a moſt extraordinary inſtance of contention for ſuperiority in ſong.

† Lib. x. c. 29.

To theſe we may add a few particulars that fall within our notice during our inquiries among the bird-catchers; ſuch as, that they immediately kill the hens of every ſpecies of birds they take, being incapable of ſinging, as alſo being inferior in plumage; the pippets likewiſe are indiſcriminately deſtroyed, as the cock does not ſing well: they ſell the dead birds for threepence or four-pence a dozen. Theſe ſmall birds are ſo good, that we are ſurpriſed the luxury of the age neglects ſo delicate an acquiſition to the table. The modern Italians are fond of ſmall birds, which they eat under the common name of *beccaficos*: and the dear rate a Roman tragedian paid for one diſh of ſinging birds is well known; (ſee the article ÆSOP).

Another particular we learned, in converſation with at London bird-catcher, was the vaſt price that is ſometimes given for a ſingle ſong-bird, which had not learned to whiſtle tunes. The greateſt ſum we heard of, was five guineas for a chaffinch, that had a particular and uncommon note, under which it was intended to train others: and we alſo heard of five pounds ten ſhillings being given for a call-bird linnet. Bird-Catching.

A third ſingular circumſtance, which confirms an obſervation of Linnæus, is, that the male chaffinches fly by themſelves, and in the flight precede the females; but this is not peculiar to the chaffinches. When the tit-larks are caught in the beginning of the ſeaſon, it frequently happens, that forty are taken and not one female among them: and probably the ſame would be obſerved with regard to other birds (as has been done with relation to the wheat-ear), if they were attended to. An experienced and intelligent bird-catcher informed us, that ſuch birds as breed twice a year, generally have in their firſt brood a majority of males, and in their ſecond, of females, which may in part account for the above obſervation.

We muſt not omit mention of the bulfinch, though is does not properly come under the title of a ſinging bird, or a bird of flight, as it does not often move farther than from hedge to hedge; yet, as the bird ſells well on account of its learning to whiſtle tunes, and ſometimes flies over the fields where the nets are laid, the bird-catchers have often a call-bird to enſnare it, though moſt of them can imitate the call with their mouths. It is remarkable with regard to this bird, that the female anſwers the purpoſe of a call-bird as well as the male, which is not experienced in any other bird taken by the London bird-catchers.

The nightingale is not a bird of flight, in the ſenſe the bird-catchers uſe this term. Like the robin, wren, and many other ſinging birds, it only moves from hedge to hedge, and does not take the periodical flights in October and March. The perſons who catch theſe birds, make uſe of ſmall trap-nets, without call-birds; and are conſidered as inferior in dignity to other bird-catchers who will not rank with them. The arrival of the nightingale is expected by the trappers in the neighbourhood of London, the firſt week in April: at the beginning, none but cocks are taken; but in a few days the hens make their appearance, generally by themſelves, though ſometimes a few males come along with them. The latter are diſtinguiſhed from the females not only by their ſuperior ſize, but by a great ſwelling of their vent, which commences on the firſt arrival of the hens. They are caught in a net-trap, the bottom of which is ſurrounded with an iron ring; the net itſelf is rather larger than a cabbage net. When the trappers hear or ſee them, they ſtrew ſome freſh mould under the place, and bait the trap with a meal-worm from the baker's ſhop. Ten or a dozen nightingales have been thus caught in a day.

The common way of taking larks, of which ſo many are uſed at our tables (ſee ALAUDA), is in the night,

(D) It may be alſo obſerved, that the moment they ſee a hawk, they communicate the alarm to each other by a plaintive note; nor will they then jerk or call though the wild birds are near.

(E) A bird, acquainted with the nets, is by the bird-catchers termed a *ſharper*; which they endeavour to drive away, as they can have no ſport whilſt it continues near them.

Bird-Catching.

night, with thoſe nets which are called *trammels*. Theſe are uſually made of 36 yards in length, and about ſix yards over, with ſix ribs of pack-thread, which at the ends are put upon two poles of about 16 feet long, and made leſſer at each end. Theſe are to be drawn over the ground by two men, and every ſive or ſix ſteps the net is made to touch the ground, otherwiſe it will paſs over the birds without touching them, and they will eſcape. When they are felt to fly up againſt the net, it is clapped down, and then all are ſafe that are under it. The darkeſt nights are propereſt for this ſport; and the net will not only take larks, but all other birds that rooſt on the ground; among which are woodcocks, ſnipes, partridge, quails, fieldfares, and ſeveral others. In the depth of winter people ſometimes take great numbers of larks by nooſes of horſe-hair. The method is this: Take 100 or 200 yards of packthread; faſten at every ſix inches a nooſe made of double horſe-hair; at every 20 yards the line is to be pegged down to the ground, and ſo left ready to take them. The time to uſe this is when the ground is covered with ſnow, and the larks are to be allured to it by ſome white oats ſcattered all the way among the nooſes. They muſt be taken away as ſoon as three or four are hung, otherwiſe the reſt will be frighted; but though the others are ſcared away juſt where the ſportſman comes, they will be feeding at the other end of the line, and the ſport may be thus continued for a long time. Thoſe caught in the day are taken in clap-nets of fifteen yards length, and two and a half in breadth; and are enticed within the reach by means of bits of looking-glaſs, fixed in a piece of wood, and placed in the middle of the nets, which are put in a quick whirling motion by a ſtring the larker commands; he alſo makes uſe of a decoy lark. Theſe nets are uſed only till the 14th November: for the larks will not *dare*, or frolic in the air, except in fine ſunny weather; and of courſe cannot be inveigled into the ſnare. When the weather grows gloomy, the larker changes his engine, and makes uſe of a trammel net, twenty-ſeven or twenty-eight feet long, and five broad; which is put on two poles, eighteen feet long, and carried by men under each arm, who paſs over the fields and quarter the ground as a ſetting dog: when they hear or feel a lark hit the net, they drop it down, and ſo the birds are taken.

Multitudes of the inhabitants of each cluſter of the Orkney iſles feed during the ſeaſon on the eggs of the birds of the cliffs. The method of taking them is ſo very hazardous, as to ſatisfy one of the extremity to which the poor people are driven for want of food. Copinſha, Hunda, Hoy, Foula, and Noſs-head, are the moſt celebrated rocks; and the neighbouring natives the moſt expert climbers and adventurers after the game of the precipice. The height of ſome is above fifty fathoms; their faces roughened with ſhelves or ledges ſufficient only for the birds to reſt and lay their eggs. To theſe the dauntleſs fowlers will aſcend, paſs intrepidly from the one to the other, collect the eggs and birds, and deſcend with the ſame indifference. In moſt places the attempt is made from above: they are lowered from the ſlope contiguous to the brink, by a rope, ſometimes made of ſtraw, ſometimes of the briſtles of the hog: they prefer the laſt even to ropes of hemp, as it is not ſo liable to be cut by the ſharpneſs of the rocks; the former is apt to untwiſt. They truſt themſelves to a ſingle aſſiſtant, who lets his companion down, and holds the rope, depending on his ſtrength alone; which often fails, and the adventurer is ſure to be daſhed to pieces, or drowned in the ſubjacent ſea. The rope is often ſhifted from place to place, with the impending weight of the fowler and his booty. The perſon above receives ſignals for the purpoſe, his aſſociate being far out of ſight who, during the operation, by help of a ſtaff, ſprings from the face of the rock, to avoid injury from the projecting parts.

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But the moſt ſingular ſpecies of bird-catching is on the holm of Noſs, a vaſt rock ſevered from the iſle of Noſs by ſome unknown convulſion, and only about ſixteen fathoms diſtant. It is of the ſame ſtupendous height as the oppoſite precipice, with a raging ſea between; ſo that the intervening chaſm is of matchleſs horror. Some adventurous climber has reached the rock in a boat, gained the height, and faſtened ſeveral ſtakes on the ſmall portion of earth which is to be found on the top; correſpondent ſtakes are placed on the edge of the correſpondent cliffs. A rope is fixed to the ſtakes on both ſides, along which a machine, called a cradle, is contrived to ſlide; and, by the help of a ſmall parallel cord faſtened in like manner, the adventurer wafts himſelf over, and returns with his booty.

The manner of bird-catching (ſee Pl. XC. fig. 7.) in the Feroe iſlands is ſo very ſtrange and hazardous, that the deſcription ſhould by no means be omitted. Neceſſity compels mankind to wonderful attempts. The cliffs which contain the objects of their ſearch are often two hundred fathoms in height, and are attempted from above and below. In the firſt caſe, the fowlers provide themſelves with a rope 80 or 100 fathoms in length. The fowler faſtens one end about his waiſt and between his legs, recommends himſelf to the protection of the Almighty, and is lowered down by ſix others, who place a piece of timber on the margin of the rock, to preſerve the rope from wearing againſt the ſharp edge. They have beſides a ſmall line faſtened to the body of the adventurer, by which he gives ſignals that they may lower or raiſe him, or ſhift him from place to place. The laſt operation is attended with great danger, by the looſening of the ſtones, which often fall on his head, and would infallibly deſtroy him, was it not protected by a ſtrong thick cap; but even that is found unequal to ſave him againſt the weight of the larger fragments of rock. The dexterity of the fowlers is amazing; they will place their feet againſt the front of the precipice, and dart themſelves ſome fathoms from it, with a cool eye ſurvey the places where the birds neſtle, and again ſhoot into their haunts. In ſome places the birds lodge in deep receſſes. The fowler will alight there, diſengage himſelf from the rope, fix it to a ſtone, and at his leiſure collect the booty, faſten it to his girdle, and reſume his pendulous ſeat. At times he will again ſpring from the rock, and in that attitude, with a fowling-net placed at the end of a ſtaff, catch the old birds which are flying to and from their retreats. When he hath finiſhed his dreadful employ, he gives a ſignal to his friends above, who pull him up, and ſhare the hard-earned profit. The feathers are preſerved for exporta-

Bird-Catching.

tion: the flesh is partly eaten fresh, but the greater portion dried for winter's provision.

The fowling from below has its share of danger. The party goes on the expedition in a boat; and when it has attained the base of the precipice, one of the most daring having fastened a rope about his waist, and furnished himself with a long pole with an iron hook at one end, either climbs or is thrust up by his companions, who place a pole under his breech, to the next footing spot he can reach. He, by means of the rope brings up one of the boat's crew; the rest are drawn up in the same manner, and each is furnished with his rope and fowling-staff. They then continue their progress upwards in the same manner, till they arrive at the region of birds; and wander about the face of the cliff in search of them. They then act in pairs; one fastens himself to the end of his associate's rope, and, in places where birds have nestled beneath his footing, he permits himself to be lowered down, depending for his security on the strength of his companion, who has to haul him up again; but it sometimes happens that the person above is overpowered by the weight, and both inevitably perish. They fling the fowl into the boat, which attends their motions, and receives the booty. They often pass seven or eight days in this tremendous employ, and lodge in the crannies which they find in the face of the precipice.

Plate XC. fig. 8.

In some remote parts of Russia there is practised a singular invention for taking great quantities of gelinottes or grous. They choose the most open places in the birch woods; and there they plant long forks in the earth opposite the larger trees. On these forks is laid a horizontal stick, gallows-wise, to which are tied small bundles of ears of corn. At a small distance from this part of the contrivance, is a kind of large funnel or inverted cone, made with long birch twigs, thin and flexible, the lower extremities of which are stuck in the earth, very near to one another; but by spreading towards the top, forms there an opening of above a yard in diameter. In this opening is placed a wheel made of two circles that intersect each other, and are surrounded with straw and ears of corn. This wheel turns on an axis fastened to the sides of the funnel in such a manner, that there is room enough between the sticks of the cone and the circles to admit of the wheel's turning freely about. The birds first perch upon the transverse stick near the tree; and when they have a mind to fall upon the corn tied to the wheel, they must necessarily stand upon one of the projecting parts of the circles of which it is composed. At that instant the wheel turns, and the gelinotte falls, head foremost, to the bottom of the trap, which is there so contracted that he cannot get out. They sometimes find the machine half full of gelinottes.

The following method of netting or catching of wild pigeons is eagerly pursued as a diversion in different parts of Italy, particularly by the inhabitants of Cava in the Hither Principato, and is thus described by Mr Swinburne. The people "assemble in parties; and if any stranger chances to stray to their rendezvous, give him a most cordial welcome. I am not in the least surprised (says Mr Swinburne) at their passionate fondness for this sport, as I found it extremely bewitching, keeping the attention constantly alive, and the springs of the mind pleasingly agitated by expectation; the situations where the toils are spread are incomparably beautiful, the air is pure and balsamic, and every thing around breathes health and satisfaction. When the periodical flights of stock-doves return from the northern and western parts of Europe to gain warmer regions for their winter abode, the fowler repairs to the mountain and spreads his nets across the intermediate hollows, the passes through which the birds direct their course, to avoid unnecessary elevation in their flight. These nets are hung upon a row of large trees planted for the purpose. The branches being very thick and close at top, and the bole lofty and bare, a great opening is left below for the toils, which reach to the ground; and, by means of pulleys, fall in a heap with the least effort. Sometimes they are extended upon poles that exceed the height of the trees. At a small distance is a lofty circular turret, like a column with a little capital or cap, upon which a man is stationed to watch the approach of the game. As he commands a free view over all the country, and practice has made his sight as acute as that of the lynx, he descries the birds at a wonderful distance. The doves advance with great velocity; but the alert watchman is prepared for them; and just as they approach his post, hurls a stone above them with a sling; upon this the whole flock, whose fears have birds of prey for their great object, supposing the stone to be an enemy of that kind ready to pounce them, dart down like lightning to avoid the blow by passing under the trees; but there they rush into the jaws of death, by dashing against the net, which instantly drops and so entangles them that not one of them can escape the active hands of the fowler. These birds are sometimes taken by dozens at one fall, and are accounted fine eating. The dexterity with which the slingers manage their weapon is very remarkable; they throw the stone to a great height without any violent effort, and even without whirling the sling round before they discharge the pellet. In the Pyrenean mountains, where the same diversion is followed, the watchmen use a bow and arrow, trimmed with the feathers of a hawk."

Bird-Catching. Bird-Lime.

The following simple but ingenious method of catching aquatic birds is used in Mexico by the natives. The lakes of the Mexican vale, as well as others of the kingdom, are frequented by a prodigious multitude of ducks, geese, and other water-birds. The Mexicans leave some empty gourds to float upon the water, where those birds resort, that they may be accustomed to see and approach them without fear. The bird-catcher goes into the water so deep as to hide his body, and covers his head with a gourd; the ducks come to peck at it; and then he pulls them by the feet under water, and in this manner secures as many as he pleases.

Bird-Lime, a viscid substance, prepared after different ways. The most common bird-lime among us is made from holly-bark, boiled ten or twelve hours; when the green coat being separated from the other, it is covered up a fortnight in a moist place; then pounded into a tough paste, so that no fibres of the wood are discernible, and washed in a running stream till no motes appear; put up to ferment four or five days, skimmed

Bird-Lime. skimmed as often as any thing ariſes, and laid up for uſe. To uſe it, a third part of nut-oil, or thin greaſe, muſt be incorporated with it over the fire.

The juice of holly-bark is a very peculiar ſubſtance. But if trials were made, it ſeems probable, that many other juices would be found to have the ſame clammy nature. The miſletoe affords a juice even ſuperior to that of the holly; and if a young ſhoot of the common alder be cut through, there will a ſtringy juice draw out in threads, and follow the knife like bird-lime or the juice of the holly. It ſeems in this tree to be lodged, not in the bark, but in certain veins juſt within the circle of the wood. The roots of all the hyacinths alſo afford a tough and ſtringy juice of the ſame kind; and ſo does the aſphodel, the narciſſus, and the black bryony root, in a ſurpriſing quantity.

When twigs, &c. ſmeared with bird-lime, are to be put in places ſubject to wet, the common bird-lime is apt to have its force ſoon taken away. It is neceſſary, therefore, to have recourſe to a particular ſort, which from its property of bearing water unhurt, is called *water bird-lime*; and is prepared thus: Take a pound of ſtrong and good bird-lime; waſh it thoroughly in ſpring-water, till the hardneſs is all removed; and then beat it well, that the water may be clean ſeparated, ſo as not a drop remains; then dry it well, and put it into an earthen pot; add to it as much capon's greaſe as will make it run. Then add two ſpoonfuls of ſtrong vinegar, one ſpoonful of oil, and a ſmall quantity of Venice turpentine. Let the whole boil for ſome minutes over a moderate fire, ſtirring it all the time. Then take it off; and when there is occaſion to uſe it, warm it, and cover the ſticks well with it. This is the beſt ſort of bird-lime for ſnipes and other birds that love wet places.

The moſt ſucceſsful method of uſing the common bird-lime is this: Cut down the main branch or bough of any buſhy tree whoſe twigs are thick, ſtraight, long, and ſmooth, and have neither knots nor prickles. The willow and the birch-tree afford the beſt of this kind. Let all the ſuperfluous ſhoots be trimmed off, and the twigs all made neat and clean; they muſt all be well covered with the bird-lime, within four inches of the bottom; but the main bough from which they grow muſt not be touched with the lime. No part of the bark, where the lime ſhould come, muſt be left bare: but it is a nice matter to lay it on properly; for if it be too thick it will give the birds a diſtaſte, and they will not come near it; and if there be too little of it, it will not hold them when they are there. When the buſh is thus prepared, it muſt be ſet up in ſome dead hedge, or among ſome growing buſhes near the outſkirts of a town, a farmer's back-yard, or the like, if it be in the ſpring; for theſe places are the reſort of the ſmall birds at that time. If it be uſed in ſummer, the buſh muſt be placed in the midſt of a quick-ſet hedge, or in groves, buſhes, or white-thorn trees, near fields of corn, hemp, flax, and the like; and in the winter, the proper places are about ſtacks of corn, hovels, barns, and the like. When the lime-buſh is thus planted, the ſportſman muſt ſtand as near it as he can, without being diſcovered; and with the mouth, or otherwiſe, make ſuch ſorts of notes as the birds do when they attack or call to one another. There are bird-calls to be bought for this uſe; but the moſt expert method is to learn the notes of call of the ſeveral birds, and imitate them by a ſort of whiſtling. When one bird is thus enticed to the buſh, and hung faſt, the buſineſs of the ſportſman is not to run up to take it, but to be patient; for it will hang itſelf more faſt by its ſtruggling to get away; and its fluttering will bring more to the buſh, ſo that ſeveral may be taken together. The time of the day for this ſport is from ſunriſe to ten o'clock, and from one to ſunſet. Another very good method of bringing the birds together, is by a ſtale: a bat makes a very good ſtale; but it muſt be faſtened, ſo as to be in ſight at a diſtance. An owl is a ſtill better ſtale; for this bird never goes abroad but it is followed by all the ſmall birds in the neighbourhood. They will gather together in great numbers about it; and having no convenient place to ſit on but the lime-buſh, will be taken in great numbers. If a living owl or bat is not to be had, the ſkin ſtuffed will ſerve the purpoſe, and will laſt twenty years. Some have uſed the image of an owl carved in wood, and painted in the natural colours; and it has been found to ſucceed very well.

Divination by Birds || Birds-Neſts.

Divination by BIRDS. See AUGURY.

Migration of BIRDS. See ORNITHOLOGY *Index*.

Nidification of BIRDS. See ORNITHOLOGY *Index*.

Singing BIRDS are, the nightingale, blackbird, ſtarling, thruſh, linnet, lark, throſtle, Canary-bird, bullfinch, goldfinch, &c. See ſome very curious experiments and obſervations on the ſinging of birds, Phil. Tranſ. vol. lxiii. part ii. N° 31. Their firſt ſound is called *chirp*, which is a ſingle ſound repeated at ſhort intervals; the next *call*, which is a repetition of one and the ſame note; and the third ſound is called *recording*, which a young bird continues to do for ten or eleven months, till he is able to execute every part of his ſong; and when he is perfect in his leſſon, he is ſaid to *ſing his ſong round*. Their notes are no more innate than language in man; they all ſing in the ſame key. The honourable author Daines Barrington has there attempted to reduce their comparative merits to a ſcale: and to explain how they firſt came to have particular notes. See *Song of Birds*, ORNITHOLOGY *Index*.

Methods of preſerving BIRDS. See ORNITHOLOGY *Index*.

BIRDS, in *Heraldry*, according to their ſeveral kinds, repreſent either the contemplative or active life. They are the emblems of liberty, expedition, readineſs, ſwiftneſs, and fear. They are more honourable bearings than fiſhes, becauſe they participate more of air and fire, the two nobleſt and higheſt elements, than of earth and water. Birds muſt be borne in coat-armour, as is beſt fitting the propriety of their natural actions of going, ſitting, ſtanding, flying, &c. Birds that are either whole-footed, or have their feet divided, and yet have no talons, are ſaid to be *membered*; but the cock, and all birds of prey with ſharp and hooked beaks and talons for encounter or defence, are termed *armed*. In the blazoning of birds, if their wings be not diſplayed, they are ſaid to be borne cloſe; as, *he beareth an eagle*, &c. cloſe.

BIRDS-Neſts, in *Cookery*, the neſt of a ſmall Indian ſwallow *, very delicately taſted, and frequently mixed among ſoups. On the ſea-coaſts of China, at certain ſeaſons of the year, there are ſeen vaſt numbers of theſe birds;

* See *Hirundo*.

Birds-Nests || Biretum.

birds; they leave the inland country at their breeding time, and come to build in the rocks, and faſhion their neſts out of a matter which they find on the ſhore, waſhed thither by the waves. The nature of this ſubſtance is ſcarcely yet aſcertained. According to Kempfer, it is molluſcæ or ſea worms; according to M. le Poivre, fiſh-ſpawn; according to Dalrymple, ſea-weeds; and according to Linnæus, it is the animal ſubſtance frequently found on the beach, which fiſhermen call *blubbers* or *jellies*. The neſts are of a hemiſpheric figure, and of the ſize of a gooſe's egg, and in ſubſtance much reſemble the ichthyocolla or *iſinglaſs*. The Chineſe gather theſe neſts, and ſell them to all parts of the world; they diſſolve in broths, &c. and make a kind of jelly of a very delicious flavour.

Theſe neſts (Mr Marſden informs us) are found in great abundance in the iſland of Sumatra, particularly about Croe, near the ſouth end of the iſland. Four miles up the river of that name is a large cave, where the birds build in vaſt numbers. The neſts are diſtinguiſhed into white and black; of which the firſt are by far the more ſcarce and valuable, being found in the proportion of one only to twenty-five. "The white ſort (ſays Mr Marſden) ſells in China at the rate of 1000 to 1500 Spaniſh dollars the pecul; the black is uſually diſpoſed of at Batavia for about 20 dollars the ſame weight, where it is chiefly converted into glue, of which it makes a very ſuperior kind. The difference between the two has by ſome been ſuppoſed to be owing to the mixture of the feathers of the birds with the viſcous ſubſtance of which the neſts are formed; and this they deduce from the experiment of ſteeping the black neſts for a ſhort time in hot water, when they are ſaid to become in a great degree white. Among the natives I have heard a few aſſert that they are the work of a different ſpecies of bird. It was ſuggeſted to me, that the white might probably be the recent neſts in which they were taken; and the black, ſuch as has been uſed for a number of years ſucceſſively. This opinion appearing plauſible, I was particular in my inquiries as to that point, and learned what ſeemed much to corroborate it. When the natives prepare to take the neſts, they enter the caves with torches, and forming ladders according to the uſual mode, of a ſingle bamboo notched, they aſcend and pull down the neſts, which adhere in numbers together, from the ſide and top of the rock. They informed me, that the more frequently and regularly the cave is ſtripped, the greater proportion of white neſts they are ſure to find, and that on this experience they often make a practice of beating down and deſtroying the old neſts in larger quantities than they trouble themſelves to carry away, in order that they may find white neſts the next ſeaſon in their room. The birds, during the building time, are ſeen in large flocks on the beach, collecting in their bills the foam which is thrown up by the ſurf, of which there is little doubt but they conſtruct their neſts, after it has undergone perhaps a preparation, from a commixture with their ſaliva, or other ſecretion with which nature has provided them for that purpoſe."

BIREMIS, in Roman antiquity, a veſſel with two rows of oars; concerning the diſpoſition of which authors are not agreed.

BIRETUM, or BIRRETUM, a ſort of black bonnet, or covering of the head, in form of a pyramid, much uſed in Italy and France, about 500 or 600 years ago, as a badge of victory, honour, or ſacerdotal preferment.

Birkenhead || Birmingham.

BIRKENHEAD, or BERKENHEAD, SIR JOHN, a famous political author, was born about the year 1615. Being recommended to Dr William Laud archbiſhop of Canterbury, he became his ſecretary; in which office he ſhowed ſuch capacity and diligence, that the archbiſhop, by his diploma, created him maſter of arts in 1639; and in the year following, by letter commendatory from the ſame prelate, he was choſen probationer fellow of All-Soul's College. This obliged him to reſide conſtantly at Oxford; and on King Charles I.'s making that city his head-quarters during the civil war, our author was made choice of to write a kind of journal in defence of the royal cauſe, by which he gained great reputation. By his majeſty's recommendation, he was choſen reader in moral philoſophy; which employment he enjoyed till 1648, when he was expelled by the parliament viſitors. He retired afterwards to London, where he wrote ſeveral poetical pieces; and having adhered ſteadily to his principles, he acquired the title of the *loyal poet*, and ſuffered ſeveral impriſonments. He publiſhed, while he thus lived in obſcurity, ſome very ſatirical compoſitions, moſtly levelled againſt the republican grandees, and written with great poignancy. Upon the reſtoration of King Charles II. our author was rewarded for his loyalty. He was created, April 16. 1661, on the king's letters ſent for that purpoſe, doctor of the civil law by the univerſity of Oxford; and in that quality, as an eminent civilian, was conſulted by the convocation on the queſtion, Whether biſhops ought to be preſent in capital caſes? He was about the ſame time elected to ſerve in parliament for Wilton in the county of Wilts. He was knighted November 14. 1662; and upon Sir Richard Fanſhaw's going in a public character to the court of Madrid, he was appointed to ſucceed him as maſter of requeſts. He lived afterwards in credit and eſteem, and received various favours from the court, which, however, drew upon him ſome very ſevere attacks from thoſe who oppoſed the court. Mr Wood has treated him with great ſeverity; but his memory has been tranſmitted with honour to poſterity by others, particularly by Dryden, Langbaine, and Winſtanly. He died in Weſtminſter December 4. 1679; and was interred in St Martin's in the Fields.

BIRKENFIELD, a town of Germany, capital of a county of the ſame name in the circle of the Upper Rhine. It is ſeated near the river Nave, in E. Long. 7. 9. N. Lat. 49. 35.

BIRMINGHAM, a very large town of Warwickſhire in England, ſituated in W. Long. 1. 35. N. Lat. 52. 30. It is no corporation, being only governed by two conſtables and two bailiffs; and it is therefore free for any perſon to come and ſettle there; which has contributed greatly not only to the increaſe of the buildings, but alſo of the trade, which is the moſt flouriſhing of any in England for all ſorts of iron work, beſides many other curious manufactures. The town ſtands on the ſide of a hill, nearly in the form of a half-moon. The lower part is filled with the workſhops and warehouſes of the manufacturers, and conſiſts chiefly of old buildings. The upper part of the

Biron || Birth.

town contains a number of new and regular ſtreets, and a handſome ſquare elegantly built. It has ſeveral churches; particularly one in the lower part of the town, which is an ancient building with a very tall ſpire; and another, which is a very grand modern ſtructure, having a ſquare ſtone tower with a cupola and turret above it. The houſes in this town amount to between 7000 and 8000, and their number is continually increaſing.

BIRON, Armand de Gontault, Lord of, Marſhal of France, and a celebrated general in the 16th century, ſignalized himſelf by his valour and conduct in ſeveral ſieges and battles. He was made grand maſter of the artillery in 1569, and no body dared to aſſault him at the maſſacre of St Bartholomew. He was the firſt who declared for Henry IV. He brought a part of Normandy under his ſubjection, and diſſuaded him from retiring to England or Rochelle. But he was killed by a cannon-ball, at the ſiege of Epernay, on the 26th of July 1592. He was a very univerſal ſcholar: and uſed to carry a pocket-book, in which he wrote down every thing that appeared remarkable; which gave riſe to a proverb very much uſed at court: When a perſon happened to ſay any thing uncommon, they told him, *You have found that in Biron's pocket-book.*

BIROTA, or Birotum, in Roman antiquity, a kind of vehicle, ſo denominated from its moving upon two wheels. It carried about 200 pound weight, and was drawn by three mules.

BIRRUS, in Roman antiquity, a cloak, made of woollen cloth, worn by the ſoldiers. Alſo a robe anciently worn by the prieſts or biſhops.

BIRTH, in *Midwifery*, ſignifies the ſame with delivery. See Midwifery.

Birth is alſo uſed for a perſon's deſcent; and is ſaid to be high or low according to the circumſtances of his anceſtry.

There is ſcarcely any truth (Mr Knox obſerves in his Eſſays) of which the world has been more frequently reminded by the moraliſts, than the unreaſonableneſs of that veneration which is paid to birth. They have been told, that virtue alone is true nobility; but though they have acknowledged the aſſertion to be founded in reaſon, they have continued, with uniform perſeverance, in the ſame error. The luminous glory of an illuſtrious anceſtor, ſeems to have diffuſed a brilliancy over a long line of deſcendants, too opaque of themſelves to emit any original irradiations.

"Gratitude (continues our elegant author), which firſt raiſes a benefactor to a diſtinguiſhed rank in civil honours, is willing to continue its kindneſs to his immediate offſpring. The diſtinction is rendered hereditary. This predilection for an anceſtor ſoon leads to the accumulation of honours and poſſeſſions in his ſucceſſors; and the incenſe originally offered, becauſe it was deſerved, is at laſt laviſhed at the ſhrine of opulence, independently of merit.

"Subordination is, indeed, eſſential to ſociety. The order of nobles, as hereditary guardians of the laws, is found an uſeful political eſtabliſhment; and none ſeem ſo well adapted to ſupply it, as they who have been raiſed to eminence by their anceſtors, and who poſſeſs a territorial patrimony in the land which they are to protect. All that is contended for is, that the recommendation of birth may not ſet aſide or depreciate real merit, the praiſe of learning, and the intrinſic value of virtuous exertions. Birth.

"It is a remarkable circumſtance in the hiſtory of mankind, that ſome of the beſt books have been written, and ſome of the greateſt atchievements performed, by thoſe whoſe origin was truly plebeian. The politeſt and genteeleſt books, whether the ſentiments or the ſtyle be conſidered, have been produced by ſlaves, or the deſcendants of ſlaves. Horace, Phœdrus, and Terence, wrote in a ſtyle which muſt have been the ſtandard of a court, to an intercourſe with which they were by no means entitled by their extraction. The founders of the moſt diſtinguiſhed families emerged from the middle and the lower claſſes, by the ſuperior vigour of their natural abilities, or by extraordinary efforts, aſſiſted by fortune: and unleſs the adventitious circumſtances of wealth and civil honours can effect a change in the conſtituent principles of the mind and body, there is certainly no real ſuperiority to be derived in a boaſted pedigree of Tudors and Plantagenets. And yet there have appeared flatterers, who have indirectly ſuggeſted, that the minds of the nobility ſeem to be caſt in a finer mould, and to have an elegance inherent in their original conſtitution. According to this hypotheſis we muſt go on to ſuppoſe, that the mind of a commoner exalted to the higher order of ſenators, catches this elegance by the contagion of inviſible effluvia. On his creation he undergoes a kind of new birth, and puts off the exuviæ which incumbered and degraded him in the lower regions. Thus are all the occult perfections of noble blood to be infuſed by the mandate of a monarch. 'But no,' ſaid Maximilian to a man who aſked to be ennobled by him, 'though I can give you riches and a title, I cannot make you noble.'

"In truth, there is many a nobleman, according to the genuine idea of nobility, even at the loom, at the plough, and in the ſhop; and many more in the middle ranks of mixed ſociety. This genuine idea contains in it generoſity, courage, ſpirit, and benevolence, the qualities of a warm and open heart, totally unconnected with the accidental advantages of riches and honour; and many an Engliſh ſailor has poſſeſſed more of the real hero than a lord of the admiralty.

"If indeed there is any ſubſtantial difference in the quality of their blood, the advantage is probably on the ſide of the inferior claſſes. Their indigence and their manual employments require temperance and exerciſe, the beſt purifiers of the animal juices. But the indolence which wealth excites, and the pleaſures which faſhionable life admits without reſtraint, have a natural tendency to vitiate and enfeeble the body as well as the mind: and among the many privileges inherited by him who boaſts nobility in his veins, he commonly receives the ſeeds of the moſt painful and the impureſt diſeaſes. He diſplays indeed a coronet on his coat of arms, and he has a long pedigree to peruſe with ſecret ſatisfaction; but he has often a gout or a ſcrophula, which make him wiſh to exchange every drop derived from his Norman anceſtors, for the pure tide that warms a peaſant's boſom.

"The ſpirit of freedom, moral, mental, and political, which prevails in Britain, precludes that unreaſonable

Birth. ſonable attachment to birth, which, in the countries of deſpotiſm, tends to elevate the noble to a rank ſuperior to humanity. In our neighbour's land, the region of external elegance united with real meanneſs, the implicit veneration paid to birth adds to the weight of legal oppreſſion. A Frenchman of the plebeian order attends to a count or a marquis with all the ſilent ſubmiſſion of idolatry: on the contrary, there is no doubt but that an Engliſh gondolier would box with the beſt lord in the land, if he were affronted by him, without the leaſt regard for his ſtar and ribbon. It would indeed be an additional pleaſure to the natural delight of conqueſt, to have bruiſed a puny lord. Even the more refined and poliſhed do not idolize illuſtrious birth. In truth, wealth appears to be the object of more univerſal veneration. Noble blood and noble titles, without an eſtate to ſupport them, meet with great compaſſion indeed, but with little reſpect; nor is the man who has raiſed himſelf to eminence, and who behaves well in it, neglected and deſpiſed becauſe he derives no luſtre from his forefathers. In a commercial country, where gain is the general object, they who have been moſt ſucceſsful in its purſuit will be revered by many, whatever was their origin. In France, where honour is purſued from the monarch to the cleanſer of a jakes, the diſtinction of birth, even with extreme poverty, is enviable. The brother of a marquis would rather ſtarve on a beggarly penſion, than pollute himſelf with a trade by which he might acquire the revenues of a German kingdom. In our land of good ſenſe this folly is loſing ground; and the younger brothers of noble houſes often think it no diſgrace to rival the heir in a princely fortune acquired by honourable merchandiſe.

"As the world becomes more enlightened, the exorbitant value which has been placed on things not really valuable will decreaſe. Of all the effects of man's capricious admiration, there are few leſs rational than the preference of illuſtrious deſcent to perſonal merit, of diſeaſed and degenerate nobility to health, to courage, to learning, and to virtue. Of all the objects of purſuit which are not in our own power, the want of diſtinguiſhed birth may moſt eaſily be diſpenſed with, by thoſe who poſſeſs a ſolid judgment of that which makes and keeps us happy. There may be ſome reaſon to repine at the want of wealth and fame; but he who has derived from his parent health, vigour, and all the powers of perception, need not lament that he is unnoticed at the herald's office.

"It has been obſerved, that virtue appears more amiable when accompanied with beauty; it may be added, that it is more uſeful when recommended to the notice of mankind by the diſtinction of an honourable anceſtry. It is then greatly to be wiſhed, that the nobly born would endeavour to deſerve the reſpect which the world pays them with alacrity, by employing their influence to benevolent purpoſes; to thoſe purpoſes which can at all times be accompliſhed, even when the patriotic exertions of the field and cabinet are precluded."

Birth, or *Berth*, the ſtation in which a ſhip rides at anchor either alone or in a fleet, or the diſtance between the ſhip and any adjacent object, comprehending the extent of the ſpace in which ſhe ranges at the length of her cables: as, *ſhe lies in a good birth*, i. e. in a convenient ſituation, or at a proper diſtance from the ſhore and other veſſels; and where there is good anchoring ground, and ſhelter from the violence of the wind and ſea. Birth ‖ Biſcara.

Birth alſo ſignifies the room or apartment where any particular number of the officers and ſhip's company uſually meſs and reſide. In a ſhip of war there is commonly one of theſe between every two guns.

Birth-Day, the anniverſary return of the day whereon a perſon was born. The ancients placed a good deal of religion in the celebration of birth-days, and took omens from thence of the felicity of the coming year. The manner of celebrating birth-days was by a ſplendid dreſs: wearing a ſort of rings peculiar to that day: offering ſacrifices; the men to their genius, of wine, frankincenſe; the women to Juno: giving ſuppers, and treating their friends and clients; who in return made them preſents, wrote and ſung their panegyrics, and offered vows and good wiſhes for the frequent happy returns of the ſame day. The birth-days of emperors were alſo celebrated with public ſports, feaſts, vows, and medals ſtruck on the occaſion. But the ancients, it is to be obſerved, had other ſorts of birth-days beſides the days on which they were born. The day of their adoption was always reputed as a birth-day, and celebrated accordingly. The emperor Adrian, we are told, obſerved three birth-days; viz. the day of his nativity, of his adoption, and of his inauguration. In thoſe times it was held, that men were not born only on thoſe days when they firſt came into the world, but on thoſe alſo when they arrived at the chief honours and commands in the commonwealth, e. gr. the conſulate. Hence that of Cicero in his oration *ad Quirites*, after his return from exile: *A parentibus, id quod neceſſe erat, parvus ſum procreatus; a vobis natus ſum conſularis.*

Birthwort. See Aristolochia, Botany *Index*.

BIRVIESCA, a town of Old Caſtile in Spain, and capital of a ſmall territory called *Bureva*. W. Long. 2. 15. N. Lat. 42. 35.

BIRZA, a town of Poland in the province of Samogitia. E. Long. 25. 5. N. Lat. 56. 35.

BISA, or Biza, a coin of Pegu, which is current there for half a ducat. It is alſo a weight uſed in that kingdom.

BISACCIA, a ſmall handſome town of Italy, in the Ulterior Principato, and in the kingdom of Naples, with a biſhop's ſee. E. Long. 15. 35. N. Lat. 41. 3.

BISACUTA, in middle-age writers, an axe with two edges, or which cuts either way; or a miſſive weapon pointed at both ends. Walſingham repreſents the *ſecuris biſacuta* as peculiar to the Scottiſh nation. See *Battle-Axe*.

BISBÆA, a feaſt celebrated by the Meſſapii after the pruning of their vines, to obtain of the gods that they might grow again the better. The word is formed from βισθη, uſed by ſome for a vine.

BISCARA, a town of Africa in the kingdom of Algiers, ſeated in the eaſtern or Levantine government, in E. Long. 5. 50. N. Lat. 35. 10. This city belonged to the province of Zeb in Numidia, which lies ſouth of the kingdom of Labez; but the Algerines, in their annual inroads to carry off ſlaves, made themſelves maſters

Biſcay. ſters of Biſcara, in order to facilitate their entrance into the ſouthern provinces. It retains ſtill ſome remains of the ancient city that gave name to this territory; and hath a garriſon to keep the inhabitants in awe, and who uſually bring lions, tigers, and other wild beaſts for ſale to ſtrangers. The city of Algiers is never without a great number of Biſcarans, who are employed in the hardeſt and loweſt office, as cleanſing of ſtreets, emptying of vaults, ſweeping chimneys, &c.; and when they have got about 10 or 12 crowns by this drudgery, they return to their country, where they are reſpected as worthy men on account of their money, the inhabitants of this province being almoſt entirely deſtitute of coin, and reckoned the moſt miſerable of all the Arabian tribes.

BISCAY, a province of Spain, bounded on the north by the ſea called the *Bay of Biſcay*, on the ſouth by Old Caſtile, on the weſt by Aſturias of Santilana, and on the eaſt by the territories of Alava and Guipuſcoa. It is in length about ſeventy-four miles; but the breadth is much leſs, and very unequal. This country in general is mountainous and barren; but in ſome places it produces corn, and everywhere a great quantity of apples, oranges, and citrons. They make cyder with the apples, which is their common drink. Beſides this, they have wine called *chacolino*, which is pleaſant, but will not keep long, and therefore is uſed inſtead of ſmall beer. Their valleys produce a little flax, and their hills a great deal of timber for ſhips. The ſea affords them excellent fiſh of all ſorts. The wool that is exported here comes from Old Caſtile; but their greateſt riches are produced by their mines of iron; which metal is extremely good, and is tranſported to all parts. They have likewiſe artificers that work in iron; and are, in particular, famous for working ſwords and knives. Biſcay is the country of the ancient Cantabri, ſo imperfectly ſubdued by Auguſtus, and ſo ſlightly annexed to the Roman empire. Their mountains have in all ages afforded them temptations and opportunities of withdrawing themſelves from every yoke that has been attempted to be impoſed upon them. Their language is accounted aboriginal, and unmixed with either Latin, French, or Spaniſh. It is ſo totally different from the Caſtilian, that we ſeldom meet with any of the peaſants that underſtand one word of Spaniſh. The Biſcayners are ſtout, brave, and choleric to a proverb. The beſt ſailors in Spain belong to the ports of Biſcay, and its mountains produce a very valuable race of ſoldiers. Their privileges are very extenſive, and they watch over them with a jealous eye. They have no biſhops in the province, and ſtyle the king only *Lord of Biſcay*. The men are well-built and active, like all mountaineers. The moſt ſingular thing in their dreſs is the covering of their legs: they wrap a piece of coarſe grey or black woollen cloth round them, and faſten it on with many turns of tape. The women are beautiful, tall, light, and merry; their garb is neat and paſtoral; their hair falls in long plaits down their backs; and a veil or handkerchief, twiſted round in a coquetiſh manner, ſerves them for a very becoming head-dreſs. On Sundays they generally wear white, tied with roſe-coloured knots. The chief towns in it are Bilboa, Ordunna, Durango, Fontarabia, St Sebaſtian, Toloſa, and Victoria.

BISCAY, *New*, a province of North America, in the audience of Guadalajara. It has New Mexico on the north, Culiacan on the weſt, Zacatecas on the ſouth, and Panuca with Florida on the eaſt. It is about 300 miles from eaſt to weſt, and 360 from north to ſouth. In general it is well watered, fruitful, moderately temperate, and abounds in all ſorts of proviſions, except the mountains of Topia, which are barren. The original inhabitants are not all brought under ſubjection, they having four large towns in the moraſſes, that are of difficult acceſs; for this reaſon the Spaniards have built three ſmall fortified towns, which are well inhabited, for the defence of their ſilver mines. The latitude is from 25 to 28 degrees.

Biſchofisheim ‖ Biſhop.

BISCHOFISHEIM, a town of Germany, in the archbiſhopric of Mentz, and circle of the Lower Rhine, ſeated on the river Tauber, near the frontiers of Franconia. E. Long. 9. 37. N. Lat. 49. 40.

BISCHOFF-ZELL, a town of Switzerland, belonging to the biſhop of Conſtance. There is a caſtle wherein the biſhop's bailiff reſides, who receives half the fines; but he has nothing to do with the town, nor is there any appeal from the council of the town. It is ſeated on the Thur, at the place where the Sitter falls into this river almoſt half way between Conſtance and St Gall. E. Long. 9. 23. N. Lat. 47. 33.

BISCHOP, or BISKOP, JOHN DE, an excellent artiſt, born at the Hague in 1646. He is ſpoken of with great commendation as a painter, and his drawings from the great maſters are held in the higheſt eſtimation by the curious. In theſe he had ſucceeded ſo happily, as to preſerve with the greateſt exactneſs the ſtyle of the painter whoſe pictures he copied. But as an engraver he is moſt generally known; and his works are numerous. They are chiefly etchings, harmonized with the graver; and though ſlight, yet free, ſpirited, and pleaſing. He gives a richneſs to the colour, and a roundneſs to the figures, far beyond what is uſually done with the point, ſo little aſſiſted by the graver. His figures in general are well drawn; but in a mannered, rather than a correct, ſtyle. The extremities indeed are not always well marked, or his heads equally expreſſive or beautiful. It is ſaid of him, that he owed his excellence to his own genius alone, having never ſtudied under any maſter by whoſe inſtruction he might have been benefited. He worked chiefly at Amſterdam, where he died in 1686, aged 40 years.

BISCHOP, *Cornelius*, portrait and hiſtory painter, was born at Antwerp in 1630, and was the diſciple of Ferdinand Bol. His pencil, his tint of colouring, his ſtyle and manner, had a ſtrong reſemblance of his maſter; and by many competent judges he is eſteemed not inferior to him in hiſtorical ſubjects as well as in portrait, having been always aſſiduous to ſtudy after nature. A painting by this maſter, conſiſting of a few figures by candle light, was ſo much admired by Louis XIV. that he purchaſed it at a high price, and placed it in the royal collection; and the king of Denmark admitted his works among thoſe of the beſt maſters. However, notwithſtanding the encomiums beſtowed on this maſter by the Flemiſh writers, an impartial judge would perhaps think his compoſitions but heavy and without expreſſion, and his works in general not worthy of all that commendation which is laviſhed upon them. He died in 1674.

BISCHOP, *Abraham*, ſon of Cornelius Biſchop, was inſtructed

Bischweller
||
Biserta.

instructed by his father to design historical subjects and portraits; but preferred the painting of fowl, particularly those of the domestic kind, to any other subjects which were recommended to him. He designed every object after nature, and usually painted in a large size, such as ornamental furniture for grand halls; and every species of fowl was so exactly like nature in its attitude, character, and plumage, that his works were beheld with universal approbation.

BISCHWELLER, a fortress of Alsace, seated in E. Long. 7. 0. N. Lat. 48. 40.

BISCHROMA, in *Music*, the same as our triple quaver. See CHROMA.

BISCUTELLA, BUCKLER-MUSTARD, or *Bastard Mithridate-mustard*. See BOTANY *Index*.

BISEGLIA, a populous town of Italy in the kingdom of Naples and Terra de Bari, with a bishop's see, seated near the gulf of Venice, in E. Long. 16. 49. N. Lat. 41. 18.

BISERRULA. See BOTANY *Index*.

BISERTA, a town of the kingdom of Tunis in Africa, seated on a gulf of the same name, in E. Long. 10. 40. N. Lat. 37. 20. The gulf is a very large one, and the *Sinus Hipponensis* of the ancients. It is formed by the Capes Blanco and Ziebeb; and has a beautiful sandy inlet near four leagues wide, which once admitted the largest vessels, but through the negligence of the Turks can now admit only those of the smallest size, and is in danger in a short time of being totally choked up. Some remains of the great pier of Hippo are still extant; by which it appears to have run out into the sea so as to break the north-east wind, and make this one of the safest and most beautiful havens in these parts. On the south, this gulf hath a communication with a lake of the same name, so as to form a kind of canal between it and the Mediterranean sea. Through this canal a constant stream is observed alternately discharging itself from the sea to the lake, and from the lake to the sea, in the same manner as the Atlantic ocean is observed to do in the Mediterranean, and back again; so that what the lake loses by exhalations is soon recruited by the sea, which in hot seasons runs into it with a very brisk current to keep up the equilibrium. The millets of this lake are the best in Barbary; great quantities of their roes dried and made into BOTARGO, are sent from hence into the Levant, where they are accounted a great dainty. The town was formerly very considerable; and, though not above a mile in circuit, is said to have contained 6000 houses; whereas both it and the villages under it now scarcely contain that number of inhabitants. It has still, however, some strong castles and batteries to defend it, especially towards the sea. There are also two very capacious prisons for slaves, a large magazine or warehouse for merchandise, and two towers with some other outworks to defend the entrance of the haven. The city, though so near the sea, is well supplied with fresh water from springs that surround it on every side towards the land. It is likewise well furnished with variety of fish from the adjacent lake. Most of the inhabitants of Biserta, as well as of the adjacent country on both sides of the canal, are employed in the fishing trade, which begins about the end of October, and ends in the beginning of May; for the rains then sweetening the waters, make the fish come into it in vast quantities during that season; but afterwards they either disappear or grow lean, dry, and unfit to eat. The people here are extremely poor; yet very proud, ill-natured, and faithless; insomuch that Muley Hasun Bey, one of their sovereigns, used to say, that none of his subjects deserved his resentment so much as they, since neither fear nor love could keep them faithful.—Biserta hath about eight villages under its government; a large plain called *Matter* or *Mater*; and the territory of Choros, the *Clypea* or *Corobis* of the ancients. This is a tract of great extent, and would be very fertile were it not for the frequent incursions of the Arabs. The people are very poor, live meanly, and go worse clad. Their choicest dainty is their couscou, a kind of cake made of flour, eggs, and salt, which they dry and keep all the year round. Their dress is nothing else than a piece of coarse cloth wrapped round their bodies, and another round their heads by way of a turban; and most of them go barefooted and barelegged. The poorer sort have nothing but a few skins laid on the floor to sleep upon; but the rich have narrow couches fixed against the wall, about five or six feet high, to which they mount by a ladder. They are very expert horsemen, as most in these countries are, and ride without saddle or bridle; nor do they ever shoe their horses. They are still more miserable from the neighbourhood of the Arabs, who living altogether by plunder, robbery, and murder, oppress the poor inhabitants with their frequent inroads and cruel exactions. The Bisertines, both of the city and country, are the most superstitious people in Barbary, scarcely going any where without hanging a quantity of amulets about their own, or if they ride, their horses neck also. These amulets are only scraps of parchment or paper, with some strange characters written upon them, which they sew up in a piece of leather, silk, &c. and imagine when worn about them to be a preservative against all accidents.

Biserta
||
Bishop.

BISET, CHARLES EMANUEL, a painter of considerable eminence, was born at Mechlin in 1633; and even in his early productions showed a lively and ready invention. He was remarkable for introducing a multitude of figures into his designs, with an extraordinary variety of drapery peculiar to every nation. His general subjects were conversations, balls, concerts, and assemblies of gay and genteel persons, which were correctly designed and well coloured; though their actions and attitudes were sometimes very indelicate. His pictures had a strong effect at a distance; yet when they were more nearly inspected, they showed a neatness of pencil, a spirited touch, and a good expression.

BISHOP, a prelate or person consecrated for the spiritual government and direction of a diocese. The word comes from the Saxon *bischop*, and that from the Greek επισκοπος, an *overseer* or *inspector*: which was a title the Athenians gave to those whom they sent into the provinces subject to them, to see whether every thing were kept in order; and the Romans gave the same title to those who were inspectors and visitors of the bread and provision. It appears from a letter of Cicero, that he himself had a bishopric; being *episcopus Oræ & Campaniæ*.

A bishop differs from an archbishop in the following particulars: That an archbishop with bishops consecrate a bishop as a bishop with priests ordain a priest; that

Biſhop. that the archbiſhop viſits a province as the biſhop a dioceſe; that the archbiſhop convocates a provincial ſynod as the biſhop a dioceſan one; and that the archbiſhop has canonical authority over all the biſhops of his province as the biſhop over the prieſts in his dioceſe. It is a long time ſince biſhops have been diſtinguiſhed from mere prieſts or preſbyters; but whether that diſtinction be of divine or human right, whether it was ſettled in the apoſtolical age or introduced ſince, is much controverted. But whether the apoſtles ſettled any thing of this kind themſelves, or whether they left the ſpiritual economy in the hands of the preſbyters, or of thoſe together with the people, it appears that in a little time the functions of the prieſthood were divided, and the prieſts diſtinguiſhed into degrees; the political part of religion being, according to ſome, aſſigned principally to biſhops, and the evangelical to the prieſts, &c. Or, according to others, the functions of teaching and preaching were reſerved to the biſhop, and that of ordination ſuperadded; which was their principal diſtinction, and the mark of their ſovereignty in their dioceſe.

By the ancient diſcipline, biſhops were to be married once, and not to put away their wives on pretence of religion; but a ſecond marriage was a diſqualification for this order. If they lived chaſte, they were ranked as confeſſors. Some biſhops, in the middle age, on account of their *regalia* or temporalities, were obliged to a military ſervice called *hoſtis*, by which they were to lead their vaſſals into the field, and attend the king in his military expeditions. This Charlemagne excuſed, and even forbid: but the prohibition was little regarded; ſince we find the thing often practiſed afterwards.

The election of biſhops was anciently placed in the clergy, and the people of the pariſh, province, or dioceſe; but afterwards, princes and magiſtrates, patriarchs and popes, uſurped the power. The election was to be within three months after the vacancy of the ſee; and the perſon to be choſen out of the clergy of that church. Formerly the biſhop claimed a ſhare in the election of an archbiſhop: but this was ſet aſide by the popes.

In England, during the Saxon times, all eccleſiaſtical dignities were conferred by the king in parliament. At length, however, after ſeveral conteſts, eſpecially between archbiſhop Anſelm and Henry I. in conſequence of a grant of King John, recognized in Magna Charta, and eſtabliſhed by ſtat. 25 Edw. III. ſtat. 6. § 3. biſhops were elected by the chapters of monks or canons, ſome ſhadow of which ſtill remains in the preſent method of diſpoſing of biſhoprics; but by ſtat. 25 Hen. VIII. cap. 20. the right of nomination was reſtored to the crown.

Ordinarily at leaſt three biſhops are required in the ceremony of conſecrating a biſhop; but in ſome caſes a ſingle one might ſuffice. The Engliſh ſucceſſion of Proteſtant biſhops ſtands on this laſt ground. In England, the king being certified of the death of a biſhop by the dean and chapter, and his leave requeſted to elect another, the *conge d' elire* is ſent to them, with a letter miſſive, nominating the perſon whom he would have choſen. The election is to be within twelve days after the receipt of it, otherwiſe the king by letters patent appoints whom he pleaſes; and the chapter, in caſe of refuſing the perſon named by the king, incurs a *præmunire*. After election, and its being accepted of the biſhop, the king grants a mandate under the great ſeal for confirmation; which the biſhop conſigns to his vicar-general; conſiſting moſtly in a ſolemn citation of ſuch as have any objections to the biſhop elect, a declaration of their contumacy in not appearing, and an adminiſtration of the oaths of allegiance and ſupremacy, of ſymony, and canonical obedience. Sentence being read by the vicar-general, the biſhop is inſtalled in the province of Canterbury by the archdeacon; the fact is recorded by a public notary; and the biſhop is inveſted with full powers to exerciſe all ſpiritual juriſdictions, though he cannot ſue for his temporalities till after conſecration. Then follows the conſecration by the archbiſhop or ſome other biſhop appointed by lawful commiſſions, and two aſſiſtant biſhops: the ceremony of which is much the ſame as in the Romiſh church, ſave that having put on the epiſcopal robes, the archbiſhop and biſhops lay their hands on the new prelate's head, and conſecrate him with a certain form of words. The proceſs of the tranſlation of a biſhop to another biſhopric only differs in this, that there is no conſecration. The age of a biſhop is to be at leaſt thirty years; and by the ancient diſcipline, none were to be choſen but thoſe who had paſſed through all the inferior orders; but in ſome caſes of neceſſity this was diſpenſed with, and deacons, nay laymen, were raiſed *per ſaltum* to the epiſcopal dignity. Biſhop.

The form of conſecrating a biſhop is different in different churches. In the Greek church, the biſhop elect, being by the aſſiſtant biſhops preſented for conſecration, and the inſtrument of election put in his hand; after ſeveral prayers (the firſt called *diaconicum*) demanding conſecration, makes profeſſion of his faith; after which he receives a benediction. He is then interrogated as to the belief of the Trinity; to which he anſwers by a *long profeſſion of faith*, and receives a ſecond benediction. Laſtly, he is aſked what he thinks of the *incarnation;* to which he anſwers in a *third profeſſion of faith;* which is followed by a third benediction: after which the conſecrator gives him the paſtoral ſtaff: then he is led up to the altar; where, after certain prayers, and three croſſes on his head, he receives the *pallum*, if he be an archbiſhop or patriarch; he then receives the kiſs of peace of his conſecrator and two aſſiſtants; and ſitting down, reads, prays, and gives the communion to his conſecrators and others.

In the Romiſh church, the biſhop elect being preſented by the elder aſſiſtant to the conſecrator, takes the oath: he is then examined as to his faith; and after ſeveral prayers, the New Teſtament is drawn over his head, and he receives the chriſm or unction on his head. The paſtoral ſtaff, ring, and Goſpel, are then given him; and after communion, the mitre is put on his head; each ceremony being accompanied with proper prayers, &c. the conſecration ends with *Te Deum*. Theſe laſt mentioned ceremonies are laid aſide in the conſecration of Engliſh biſhops. Nevertheleſs, the book of conſecration ſet forth in the time of Edward VI. and confirmed by act of parliament, in which ſome of them are enjoined, is declared to be the ſtandard for this purpoſe by the thirty-ſixth article.

The function of a biſhop in England may be conſidered

Biſhop's-Stortford. sidered as twofold, viz. what belongs to his order, and what belongs to his juriſdiction. To the epiſcopal order belong the ceremonies of dedication, confirmation, and ordination; to the epiſcopal juriſdiction, by the ſtatute law, belong the licenſing of phyſicians, chirurgeons, and ſchoolmaſters, the uniting ſmall pariſhes (though this laſt privilege is now peculiar to the biſhop of Norwich), aſſiſting the civil magiſtrate in the execution of ſtatutes relating to eccleſiaſtical matters, and compelling the payment of tenths and ſubſidies due from the clergy. By the common law, the biſhop is to certify the judges, touching legitimate and illegitimate births and marriages; and by that and the eccleſiaſtical law, he is to take care of the probate of wills and granting adminiſtrations; to collate to benefices, grant inſtitutions on the preſentation of other patrons, command induction, order the collecting and preſerving the profits of vacant benefices for the uſe of the ſucceſſors, defend the liberties of the church, and viſit his dioceſe once in three years. To the biſhop alſo belong ſuſpenſion, deprivation, depoſition, degradation, and excommunication.

All biſhops of England are peers of the realm, except the biſhop of Man; and, as ſuch, ſit and vote in the houſe of lords; they are barons in a threefold manner, viz. feudal, in regard to the temporalities annexed to their biſhoprics; by writ, as being ſummoned by writ to parliament; and laſtly, by patent and creation: accordingly they have the precedence of all other barons, and vote as barons and biſhops; and claim all the privileges enjoyed by the temporal lords, excepting that they cannot be tried by their peers, becauſe, in caſes of blood, they themſelves cannot paſs upon the trial, for they are prohibited by the canons of the church (as already obſerved) to be judges of life and death. They have the title of *Lords and Right Reverend fathers in God.* Beſides two archiſhops, there are 24 biſhops in England; excluſive of the biſhops of Sodor and Man, who has no ſeat in the houſe of peers: The biſhops of London, Durham, and Wincheſter, take place from the other biſhops, who are to rank after them according to their ſeniority of conſecration.—There is now alſo a biſhop in our ſettlement of Nova Scotia. In Scotland, before the Preſbyterian eſtabliſhment, there were two archbiſhoprics and 12 biſhoprics.

Biſhop's Court, an eccleſiaſtical court, held in the cathedral of each dioceſe, the judge whereof is the biſhop's chancellor, who judges by the civil and canon law; and if the dioceſe be large, he has his commiſſaries in remote parts, who hold what they call *conſiſtory courts*, for matters limited to them by their commiſſion.

Biſhop and his Clerks, ſome little iſlands and rocks on the coaſt of Pembrokeſhire near St David's in Wales, which are very dangerous to mariners.

Biſhop's-Aukland. See AUKLAND.

Biſhop's-Caſtle, a town of Shropſhire in England, ſeated near the river Clun. It is a corporation, ſends two members to parliament, and its market is much frequented by the Welch. W. Long. 2. 55. N. Lat. 52. 30.

Biſhop's-Stortford, a town of Hertfordſhire in England, ſeated on the ſide of a hill, in E. Long. 0. 25. N. Lat. 51. 50. It has ſeveral good inns, but the ſtreets are not paved. It has a large church, one Preſbyterian and one Quaker meeting. Here was formerly a caſtle called *Weymore caſtle*, wherein a garriſon was kept, but no remains of it are now left. Biſhoping Sea-Biſkuit.

BISHOPING, a term among horſe-dealers, to denote the ſophiſtications uſed to make an old horſe appear young, a bad one good, &c.

BISHOPRIC, the diſtrict over which a biſhop's juriſdiction extends, otherwiſe called a dioceſe.

In England there are 24 biſhoprics beſides that of Sodor and Man; in Ireland 18.

BISI, BONAVENTURA, a celebrated miniature painter, was born at Bologna, and was a diſciple of Lucio Maſſari. But his ſole delight was in miniature painting, and in that way he arrived at great excellence. Inſtead of working from his own invention, or original deſign, he employed himſelf to imitate, in ſmall ſize, the pictures of Guido, Correggio, Titian, and other great maſters, and thoſe he finiſhed with aſtoniſhing grace, neatneſs, and beauty. A great number of the works of this maſter are in the duke's gallery at Modena, and are highly valued. He died in 1662, his age unknown.

BISIGNANO, a town of Italy, in the kingdom of Naples, and in the Hither Calabria. It hath a ſtrong fort, a biſhop's ſee, and the title of a principality. It is ſeated on a mountain near the river Boccona, in E. Long. 16. 40. N. Lat. 39. 37.

BISK, or BISQUE, in *Cookery*, a rich ſort of broth or ſoup, made of pigeons, chickens, force-meat, mutton-gravy, and other ingredients. The word is French, formed, as ſome think, from *biſcocta;* becauſe the biſque, conſiſting of a diverſity of ingredients, needs ſeveral repeated coctions to bring it to perfection. There is alſo a *demi-biſque*, made at a low expence, in which only half the ingredients are uſed; and a biſque of fiſh, made of carps minced with their roes and lobſters.

BISKUIT, or BISCUIT, a kind of bread prepared by the confectioners, of fine flour, eggs, and ſugar, and roſe or orange water; or of flower, eggs, and ſugar, with aniſeeds and citron peel, baked again and again in the oven, in tin or paper moulds. There are divers ſorts of biſkuits; as ſeed-biſkuit, fruit-biſkuit, long-biſkuit, round-biſkuit, Naples biſkuit, ſponge-biſkuit, &c.

Sea-BISKUIT is a ſort of bread much dried by paſſing the oven twice, to make it keep for ſea-ſervice. For long voyages they bake it four times, and prepare it ſix months before the embarkation. It will keep good a whole year.

To preſerve ſea-biſkuit from inſects, Mr Hales adviſes to make the fumes of burning brimſtone paſs through the caſks full of bread. Biſkuit may be likewiſe preſerved a long time, by keeping it in caſks well calked, and lined with tin.

The ancients had their biſkuit prepared after the like manner, and for the like uſe, as the moderns. The Greeks called it ἄρτον δίπυρον, *q. d.* bread put twice to the fire. The Romans give it the name of *panis nauticus*, or *capta*. Pliny denominates it *vetus aut nauticus panis tuſus atque iterum coctus.* By which it appears, that, after the firſt baking, they ground or pound it down again for a ſecond. In ſome middle-aged writers, it is called *paximas*, *paximus*, and *panis paximatus*. Among the Romans we alſo meet with

Biſkop || Biſnagar.

a kind of land-biſkuit for the camp-ſervice, called *buccellatum*, ſomtimes *expeditionalis annona*, which was baked much, but to make it lighter for carriage, and leſs liable to corrupt, the coction being continued till the bread was reduced one-fourth of its former weight.

BISKOP. See BISCHOP.

BISMILLAH, a ſolemn form uſed by the Mahometans at the beginning of all their books and other writings, ſignifying, *In the name of the moſt merciful God.*

BISMILLAH is alſo uſed among the Arabs as a word of invitation to eat. An Arab prince will frequently ſit down to eat in the ſtreet before his own door, and call to all that paſs, even beggars, in this word, who do not fail to come and ſit down to eat with him; for the Arabs are great levellers, and ſet every body upon a footing with them.

BISMUTH, or TIN GLASS, a metal of a reddiſh or yellowiſh-white colour and a lamellated texture. See CHEMISTRY and MINERALOGY *Index*.

BISNAGAR, formerly a very large and powerful kingdom of Aſia, comprehending the kingdoms of Kanara, Meſſowr, Travankor, Madura, Marava, and Tanjour. It was called *Biſnagar* from its capital city, and took the name of *Narſinga* from one of its rajahs or kings. We know nothing certain concerning this kingdom before the year 1520, when Khriſna Rajah, king of Biſnagar, made war with Adel Khan king of Viſiapur, from whom he reſolved to take the city of Rachol, ſituated in the iſland of Salſette near Goa, which he ſaid had belonged to his anceſtors. The king of Biſnagar's army conſiſted of 733,000 foot, 35,000 horſe, 586 elephants with towers on their backs, each of which had four men in it; beſides theſe were 12,000 water-carriers, and the army was followed by 20,000 common women. The city, however, reſiſted this formidable army for three months; at the end of which, Adel Khan came to its relief with an army of 120,000 foot, 18,000 horſe, 150 elephants, and many heavy cannon. In the engagement the king of Biſnagar proved victorious, and almoſt entirely deſtroyed the army of Adel Khan, taking from him 4000 horſes, 100 elephants, 400 cannon, &c. Soon after he took the city by aſſault; but conſented to reſtore the booty taken in the former battle, provided Adel Khan conſented to come and kiſs his foot as the ſovereign lord of Kanara. This baſe condition was accepted, but accidentally prevented from being put in execution. From this time we hear of nothing remarkable till the year 1558, when a Portugueſe of the city of *Meliapur* or *St Thomas*, on the coaſt of Coromandel, perſuaded Ramah Rajah, then king of Biſnagar, to march againſt that place, telling him the plunder would be worth 2,000,000, and that the deſtruction of Meliapur would be of great ſervice to the images in the Pagods which were thrown down by the Chriſtians. The king ſet out accordingly with an army of 500,000 men; but the inhabitants, inſtead of preparing for their defence, ſent him a preſent of 4000 ducats. This ſomewhat appeaſed him: however, he would not enter the city, but ordered the inhabitants of both ſexes, with all their valuable effects, to be brought into his preſence; which being done, he found that the value of their whole ſubſtance did not exceed 80,000 ducats. On this he ordered the informer to be thrown to the elephants, who tore him in pieces; after which he diſmiſſed the citizens, and reſtored all their goods ſo punctually, that only a ſilver ſpoon happening to be miſſing, it was ſought for, and returned to the owner. In 1565, the happy ſtate of this kingdom excited the envy of the kings of Dekan; who, having raiſed an army of 500,000 foot and 50,000 horſe, defeated and killed the king of Biſnagar, though at the head of an army almoſt twice as numerous, and took the royal city itſelf. They are ſaid to have ſpent five months in plundering it, although the inhabitants had before carried off 1550 elephants loaded with money and jewels to the amount of upwards of 100,000,000 of gold; beſides the royal-chair for ſtate days, whoſe price could not be eſtimated. The victors, however, found a diamond of the ſize of an ordinary egg, beſides another of a ſize ſomewhat inferior, and ſeveral other jewels of immenſe value. Afterwards, however, they were forced to abandon the kingdom, as being too large for them to keep in their hands. From this time the kingdom of Biſnagar remained pretty much unmoleſted till about the year 1627, when it was ſubdued by Aurengzebe, ſecond ſon to Shah Jehan, and hath ever ſince remained ſubject to the Great Mogul. In ſome places of this kingdom it is ſaid the roads have great foreſts of bamboos on each ſide, which are ſo thick that it is impoſſible for a man to paſs. Theſe foreſts are full of monkeys: and what is ſingular, thoſe on the one ſide ſeem to be enemies to thoſe on the other; for if a baſket of rice is ſet down on the road with a parcel of ſmall ſticks about it, the monkeys on each ſide will come out and fall a-fighting with the ſticks till one of the parties retreats. This, it is ſaid, is often done by travellers for diverſion. They catch the wild elephants here in pitfalls, and then tame them by means of others already tamed: the latter ſeldom fail of beating the wild ones into a good behaviour. The town of Biſnagar is ſituated in E. Long. 78. 0. N. Lat. 13. 20.

Biſnagar || Biſiagos.

BISNOW, or BISCHNOU, a ſect of the Banians in the Eaſt Indies; they call their god Ram-ram, and give him a wife: They adorn his image with golden chains, necklaces of pearls, and all ſorts of precious ſtones. They ſing hymns in honour of their god, mixing their devotion with dances and the ſound of drums, flagelets, brazen baſons, and other inſtruments. This ſect lives wholly upon herbs and pulſe, butter and milk. In this ſect, the wives do not burn themſelves after their huſbands death, as is practiſed by thoſe of the *ſamarath* ſect; but content themſelves with a perpetual widowhood.

BISOMUM, or DISOMUM, in Roman antiquity, a tomb for two dead bodies, or the aſhes of two. The ancients frequently buried two, three, or four bodies in the ſame ſepulchre, diſpoſed aſide of each other: for it was held an impiety to lay one a-top of another. Hence the ſepulchres of the primitive Chriſtians had the words *biſomi*, *triſomi*, *quadriſomi*, &c. inſcribed on them to indicate the number of bodies depoſited in them.

BISON, in *Zoology*, the trivial name of a ſpecies of bos. See BOS, MAMMALIA *Index*.

BISQUIT, or BISKUIT. See BISKUIT.

BISSAGOS, a cluſter of iſlands on the coaſt of Negroeland in Africa, ſituated between the mouth of the

Biſſao. the river Gambia and Rio Grande. Their names are, *Bulam*, *Caſſuabac*, *La Gallinci*, *Cazegut*, *Calacha*, and *Oranguana*, with ſome other ſmall iſlands; but the only one which merits a particular deſcription is that of Bulam. Each of theſe iſlands is governed by a king of its own; and as all thoſe petty monarchs are quite independent, they frequently make war with each other, yet they always unite againſt the inhabitants of Biafara, who are their common enemies. They have canoes that carry from 25 to 40 men with their proviſions and arms, which are ſabres, and bows and arrows. The inhabitants are negroes; who are tall, ſtrong, and healthy, though they live only on fiſh, nuts, and palm-oil; chooſing rather to ſell the rice, mullet, and other grain produced in their country, to the Europeans, than not to gratify their paſſion for trinkets and ornaments. In general they are idolaters; cruel and ſavage in their diſpoſition, not only to ſtrangers but to one another, when they happen to quarrel, as they frequently do about trifles; and if they happen to be diſappointed of their revenge, they frequently drown or ſtab themſelves.

BISSAO, an iſland on the coaſt of Africa, a few leagues to the ſouth-eaſt of the river Gambia, and ſeparated from the continent only by the channel of the river Geves. In this iſland the French have a factory, and there is alſo a fort belonging to the Portugueſe, at both of which a great trade is carried on. The iſland is about 35 or 40 miles in circumference, having an agreeable proſpect to the ſea, from which it riſes by a gentle aſcent on every ſide to an eminence in the centre of the iſland. There are however a great many hills inferior in height to that in the middle, and ſeparated by beautiful and fertile valleys divided by little rivulets, which at the ſame time augment the richneſs and elegance of the ſcene. So rich is the ſoil of Biſſao, that wheat and maiſe ſpring up to the ſize of Indian corn, or rather reſemble a field covered over with reeds or bamboos. The cattle alſo are of an extraordinary ſize, and ſeem to keep pace with the extravagant growth of the corn. Milk and wine are in the greateſt abundance; but the iſland affords neither hogs nor horſes. The former are forbid by the natives to be imported; and ſomething in the ſoil or climate renders it unfit for the increaſe of the latter, which never thrive here. The dreſs of the men of all ranks in Biſſoa is only a ſkin fixed to the girdle before and behind. The dreſs of the married women conſiſts of a cotton petticoat; but virgins go entirely naked, wearing only bracelets of different kinds on their arms and legs. If they are of high quality, their bodies are marked or painted with a variety of hideous forms of ſnakes and other figures, which as their colour is jet-black, gives their ſkins ſomewhat the appearance of flowered ſattin. Even the princeſs royal herſelf, the eldeſt daughter of the emperor, is only diſtinguiſhed from other women by the elegance of thoſe paintings and the richneſs of her bracelets. One very extraordinary ornament uſed in this country is a large iron ring with a flat round ſurface on the outſide inſtead of a ſtone, upon which the ring changes with a bit of iron, in ſuch a manner as to converſe with the greateſt facility by means of the different ſounds produced; but this kind of language is uſed only among the polite and the great. All the Biſſaons are idolaters, nor has commerce introduced the ſmalleſt change in their manners, but their ideas of religion are exceedingly confuſed. Their chief idol is a little image called *China*, of which the worſhippers give very abſurd accounts; but, beſides this, every man invents a god for himſelf: trees are held ſacred; and if not adored as gods, are worſhipped as the reſidence of ſome divinity. The government is deſpotic, the will of the emperor being a law to his people. Of this we have an inſtance in Biſſao, not to be matched in any other country whatever. This is no other than a preſent which one ſubject may make of the houſe and eſtate of his neighbour to the emperor; and as it is moſt commonly his majeſty's pleaſure to accept of ſuch preſents, the proprietor dares not reſiſt, but immediately ſets about building another houſe, though even this he cannot do without the prince's leave; and if this ſhould not be readily granted, he muſt live with his family in the open air till permiſſion to build a new houſe can be obtained. Biſſat, Biſſenpour.

BISSAT, Peter, profeſſor of canon law in the univerſity of Bononia in Italy, was deſcended from the earls of Fife in Scotland, and born in that county in the reign of James V. He was educated at St Andrews: from thence he removed to Paris; and, having ſpent ſome time in that univerſity, proceeded to Bononia, where he commenced doctor of laws, and was afterwards appointed profeſſor of canon law. He continued in that honourable employment ſeveral years with great reputation, and died in the year 1568. He is ſaid to have been not only a learned civilian, but an excellent poet, orator, and philoſopher. *Patricii Biſſarti opera omnia*, viz. *poemata*, *orationes*, *lectiones feriales*, *&c. Lib. de irregularitate*, *&c.* were publiſhed at Venice in 1565, 4to.

BISSENPOUR, a ſmall diſtrict of the kingdom of Bengal in the Eaſt Indies, which has all along preſerved its independence. It has been governed time immemorial by a Bramin family of the tribe of Rajahputs. Here the purity and equity of the ancient political ſyſtem of the Indians is found unadulterated. This ſingular government, the fineſt and moſt ſtriking monument in the world, has till now been beheld with too much indifference. We have no remains of ancient nations but braſs and marble, which ſpeak only to imagination and conjecture, thoſe uncertain interpreters of manners and cuſtoms that no longer exiſt. Were a philoſopher tranſported to Biſſenpour, he would immediately be a witneſs of the life led by the firſt inhabitants of India many thouſand years ago; he would converſe with them: he would trace the progreſs of this nation, celebrated as it were from its very infancy; he would ſee the riſe of a government which, being founded in happy prejudices, in a ſimplicity and purity of manners, in the mild temper of the people, and the integrity of the chieftains, has ſurvived thoſe innumerable ſyſtems of legiſlation, which have made only a tranſitory appearance in the ſtage of the world with the generations they were deſigned to torment. More ſolid and durable than thoſe political ſtructures, which raiſed by impoſture and enthuſiaſm, are the ſcourges of human kind, and are doomed to periſh with the fooliſh opinions that gave them birth, the government of Biſſenpour, the offſpring of a juſt attention to order and the laws of nature, has been eſtabliſhed and

Biſſenpour || Biſtoury.

maintained upon unchangeable principles, and has undergone no more alteration than thoſe principles themſelves. The ſingular ſituation of this country has preſerved to the inhabitants their primitive happineſs and the gentleneſs of their character, by ſecuring them from the danger of being conquered, or of imbruing their hands in the blood of their fellow-creatures. Nature has ſurrounded them with water; and they need only open the ſluices of their rivers to overflow the whole country. The armies ſent to ſubdue them have ſo frequently been drowned, that the plan of enſlaving them has been laid aſide; and the projectors of it have thought proper to content themſelves with an appearance of ſubmiſſion.

Liberty and property are ſacred in Biſſenpour. Robbery, either public or private, is never heard of. As ſoon as any ſtranger enters the territory, he comes under the protection of the laws, which provide for his ſecurity. He is furniſhed with guides at free coſt, who conduct him from place to place, and are anſwerable for his perſon and effects. When he changes his conductors, the new ones deliver to thoſe they relieve an atteſtation of their conduct, which is regiſtered and afterwards ſent to the raja. All the time he remains in the country, he is maintained and conveyed with his merchandiſe at the expence of the ſtate, unleſs he deſires leave to ſtay longer than three days in the ſame place. In that caſe, he is obliged to defray his own expences; unleſs he is detained by any diſorder, or other unavoidable accident. This beneficence to ſtrangers is the conſequence of the warmth with which the citizens enter into each others intereſts. They are ſo far from being guilty of an injury to each other, that whoever finds a purſe, or other thing of value, hangs it upon the firſt tree he meets with, and informs the neareſt guard, who give notice of it to the public by beat of drum. Theſe maxims of probity are ſo generally received, that they direct even the operations of government. Out of about 350,000l. on an average it annually receives, without injury to agriculture or trade, what is not wanted to ſupply the unavoidable expences of the ſtate, is laid out in improvements. The raja is enabled to engage in theſe humane employments, as he pays the Moguls only what tribute and at what times he thinks proper.

BISSEXTILE, in *Chronology*, a year conſiſting of 366 days, being the ſame with our leap-year. See Chronology.

BISTI, in *Commerce*, a ſmall coin of Perſia: Some ſay that it is among the current ſilver coins of Perſia, and worth only a little above three farthings of our money; others ſpeak of it again as a money of account.

BISTONIS, in *Ancient Geography*, a lake of Thrace near Abdera, on which dwelt the Biſtones: hence *Biſtonius Tyrannus* is by Lucan uſed to denote Diomedes king of Thrace, who fed his horſes with human fleſh; and *Biſtonius turbo*, a wind blowing from Thrace.

BISTORT, or Knotgrass. See Polygonum, Botany *Index*.

BISTOURY, in *Surgery*, an inſtrument for making inciſions; of which there are different kinds, ſome being of the form of a lancet, others ſtraight and fixed in the handle like a knife, and others crooked with the ſharp edge on the inſide.

Biſtre || Bit.

BISTRE, among painters, ſignifies the burnt oil extracted from the ſoot of wood.

It is of a brown tranſparent colour, having much the ſame effect in water-painting, where alone it is uſed, as brown pink in oil. Though this colour is extremely ſerviceable in water colours, and much valued by thoſe who know and can procure it; yet it is not in general uſe here, perhaps on account of its not being eaſily procured of a perfect kind; hardly any of it being good, except that imported from France. Perhaps the principal reaſon for this is, that dry beech-wood affords the beſt ſoot for making it: and it is not eaſy to procure ſuch here without mixture of the ſoot of green wood, or other combuſtibles that deprave it for this purpoſe: or it is poſſible that they who have pretended to prepare it, have been ignorant of the proper means; there not being any recipe or directions in books that treat of theſe matters, from whence they could learn the proper proceſs.

Biſtre may, however, be prepared with great eaſe in the following manner.—Take any quantity of ſoot, of dry wood, but let it be of beech wherever that can be procured. Put it into water in the proportion of two pounds to a gallon; and boil them half an hour: then after the fluid has ſtood ſome little time to ſettle, but while yet hot, pour off the clearer part from the earthy ſediment at the bottom; and if on ſtanding longer it forms another earthy ſediment, repeat the ſame method, but this ſhould be done only while the fluid remains hot: then evaporate the fluid to dryneſs: and what remains will be good biſtre, if the ſoot was of a proper kind.—The goodneſs of biſtre may be perceived by its warm deep brown colour, and tranſparency when moiſtened with water.

BISTRICZ, a handſome ſtrong town of Tranſilvania, ſeated on a river of the ſame name, in E. Long. 25. 3. N. Lat. 47. 33.

BIT, or Bitt, an eſſential part of a bridle. Its kinds are various. 1. The muſrol, ſnaffle, or watering-bit. 2. The canon-mouth, jointed in the middle. 3. The canon with a faſt mouth, all of a piece, only kneed in the middle, to form a liberty or ſpace for the tongue; fit for horſes too ſenſible, or tickliſh, and liable to be continually bearing on the hand. 4. The canon-mouth, with the liberty in form of a pigeon's neck; proper where a horſe has too large a tongue. 5. The canon with a port-mouth, and an upſet or mounting liberty; where a horſe has a good mouth, but large tongue. 6. The ſcatch mouth, with an upſet; ruder but more ſecure than a canon-mouth. 7. The canon-mouth with a liberty; proper for a horſe with a large tongue, and round bars. 8. The maſticadour, or ſlavering bit, &c. The ſeveral parts of a ſnaffle, or curb-bit, are the mouth-piece, the cheeks and eyes, guard of the cheek, head of the cheeks, the port, the welts, the campanel or curb and hook, the boſſes, the bolſters and rabbets, the water-chains, the ſide-bolts, and rings, kirbles of the bit or curb, trench, top-rol, flap and jieve. The importation of bits for bridles is now prohibited.

Bit, or *Bitts*, in *Ship-Building*, the name of two great timbers, uſually placed abaft the manger, in the

ſhip's

Bit ‖ Biturex.

ſhip's looſ, through which the croſs-piece goes: The uſe of it is to belay the cable thereto while the ſhip is at anchor.

Bit is alſo uſed in commerce for a piece of coin current in Jamaica, and valued at 7½d.

BITBURGH, a town of the Netherlands, in the duchy of Luxemburg. E. Long. 6. 43. N. Lat. 50. 0.

BITCH, the female of the dog kind. See Canis.

BITCHE, a town of Lorrain, capital of a territory of the ſame name, and ſeated at the foot of the mountains near the river Swolbe. E. Long. 7. 44. N. Lat. 49. 5.

BITETO, a town of Italy, in the kingdom of Naples, and in the Terra di Bari. E. Long. 16. 56. N. Lat. 41. 8.

BITHYNIA, an ancient kingdom of Aſia, formerly known by the names of *Myſia*, *Mygdonia*, *Babryicia*, *Mariandynia*, and *Bithynia*. It was bounded on the weſt by the Boſporus Thracius and part of the Propontis, on the ſouth by the river Rhyndacus and Mount Olympus, on the north by the Euxine ſea, and on the eaſt by the river Parthenius. The chief cities were *Myrlea*, *Nicomedia*, *Chalcedon*, *Heraclea*, and *Pruſa*.—As to its hiſtory, we find nothing of moment recorded; except the famous conduct of Pruſſias, one of its kings, in delivering up to the Romans Hannibal, the great Carthaginian general, who fled to him for protection. His great grandſon Nicomedes IV. bequeathed the kingdom to the Romans. From them it was taken by the Turks, to whom it ſtill remains ſubject, but has no modern name.

BITONTO, an epiſcopal town of Italy, in the kingdom of Naples and Terra di Bari. It is ſeated in a plain eight miles ſouth of the gulf of Venice, in E. Long. 16. 52. N. Lat. 41. 13.

BITTACLE. See Binacle.

BITTER, an epithet given to all bodies of an oppoſite taſte to ſweetneſs. For the medical virtues of bitters, ſee Materia Medica.

Bitter, a ſea-term, ſignifying any turn of the cable about the bits, ſo as that the cable may be let out by little and little. And when a ſhip is ſtopped by a cable, ſhe is ſaid *to be brought up by a bitter*. Alſo that end of the cable which is wound about the bits is called *the bitter end of the cable*.

Bitter-Apple. See Colocynthis, Botany *Index*.

Bitter Salt. See *Epsom-Salt*.

Bitter-Sweet. See Solanum, Botany *Index*.

BITTERN. See Ardea, Ornithology *Index*.

Bittern, in the ſalt-works, the brine remaining after the ſalt is concreted: this they ladle off, that the ſalt may be taken out of the pan, and afterwards put in again; when, being farther boiled, it yields more ſalt. See Salt.

BITUMENS, in *Natural Hiſtory*, are oily matters, of a ſtrong ſmell, and of different conſiſtencies, which are found in many places within the earth. See Chemistry and Mineralogy.

BITUMEN judaicum. See Asphaltum, Mineralogy *Index*.

BITUREX, Bituriges, or *Bituricæ*, afterwards corrupted to *Bourges*; the name of *Avaricum*, from the cuſtom of the lower age of calling towns from the names of the people. See Avaricum.

BITURIGES (Cæſar); *Bituriges Cubi* (Strabo, Pliny, Ptolemy): a people in that part of Galliia Celtica afterwards aſſigned to Aquitania. Now called *Berry*. Bituriges ‖ Black.

Bituriges Vibiſci (Ptolemy), a people of Aquitain.

BIVALVES, a term ſometimes uſed for ſuch ſhells as conſiſt of two pieces.—It is alſo an appellation given by botaniſts to ſuch pods or capſules as conſiſt of two valves encloſing the ſeeds.

BIVENTER, in *Anatomy*, called alſo *digaſtric*, or *two-bellied*, a muſcle of the lower jaw. See Anatomy, *Table of the Muſcles*.

BIUMBRES, in *Geography*, an appellation given to the inhabitants of the torrid zone, by reaſon, at two different ſeaſons of the year, their ſhadows are projected two different ways. The biumbres are the ſame with thoſe otherwiſe denominated *amphiſcii*.

BIXA, the Roucou or *Arnotto Tree*. See Botany *Index*.

BIZARRE, denoting *capricious*, &c. a term uſed among floriſts for a particular kind of carnation, which has its flowers ſtriped or variegated with three or four colours.

BIZARRO, in the Italian muſic, denotes a fanciful kind of compoſition, ſometimes faſt, ſlow, ſoft, ſtrong, &c. according to the fancy of the compoſer.

BIZOCHI, or Bisochi, in *Church-Hiſtory*, certain heretical monks, ſaid to have aſſumed the religious habit contrary to the canons, rejected the ſacraments, and maintained other errors.

BLACK, Dr Joseph, diſtinguiſhed for his diſcoveries in chemiſtry, was born in France, on the banks of the Garonne in the year 1728. His father was a native of Belfaſt, but deſcended from a Scotch family who had been ſome time ſettled there. Mr Black, the father, was engaged in the wine trade, and for the purpoſe of carrying it on, he reſided chiefly at Bourdeaux.

He is repreſented as a man of extenſive information, of candid and liberal ſentiments, and of amiable manners; but particularly diſtinguiſhed by the ſtrength of his attachments and the warmth of his heart. Theſe amiable and eſtimable qualities in the character of Mr Black, attracted the attention, and procured the friendſhip and intimacy of the diſcerning and benevolent Monteſquieu, who was one of the preſidents of the court of juſtice in the province while Mr Black reſided at Bourdeaux. Letters and fragments of correſpondence between the preſident and Mr Black are ſtill preſerved in the family as precious relics and memorials of the intercourſe honourable to both, which ſubſiſted between that great man and their anceſtor.

Some time before Mr Black retired from buſineſs, he ſent his ſon Joſeph, then in his twelfth year, to Belfaſt, on account of his education. And having completed the uſual courſe of inſtruction in a grammer ſchool, he was ſent to the univerſity of Glaſgow in the year 1746. During the time which he ſtudied at that ſeminary, his attention ſeems to have been chiefly directed to phyſical ſcience; and he became a favourite pupil of Dr Dick, then profeſſor of natural philoſophy. When Dr Black had finiſhed the ordinary courſe of general ſtudy at the univerſity, he made choice of the profeſſion of medicine; and he directed his views to

Black. thoſe purſuits and ſtudies which were neceſſary to qualify him for that profeſſion.

It was about this time that Dr Cullen had been appointed to the lectureſhip of chemiſtry in the univerſity of Glaſgow. Hitherto this ſcience had been only treated as a curious and in ſome reſpect a uſeful art. This great man, conſcious of his own ſtrength, and taking a wide and comprehenſive view, ſaw the unoccupied field of philoſophical chemiſtry open before him. He was ſatisfied that it was ſuſceptible of great improvement by means of liberal inquiry and rational inveſtigation. He was therefore determined to enter the unbeaten path, and to lead his followers to thoſe unexplored regions which are included in the wide ranges of this comprehenſive and attractive ſcience. It was at this time that Dr Black became the pupil of Dr Cullen; and it was perhaps to this fortunate coincidence that Dr Black was indebted for the foundation of his future reputation as a philoſopher and a chemiſt. The liberal and extenſive views of Cullen happily accorded with the enlarged habits of thought which the young philoſopher had previouſly acquired. Dr Cullen took a deep intereſt in the progreſs of his ſtudents. He delighted in encouraging and aiding their efforts; and therefore perceiving the bias of Black's purſuits, ſoon attached him to himſelf. And by the intercourſe and intimacy which followed he was led into the ſame train of thought, and conducted into the ſame courſe of ſtudies. He was received into a cloſer connexion, and became a valuable aſſiſtant in all Dr Cullen's chemical operations. The experiments of Black were frequently adduced to prove facts which were ſtated in the lecture, and they were conſidered as good authority. Thus commenced a mutual confidence and friendſhip which was highly honourable to both, and was never afterwards mentioned by Dr Black but with gratitude and reſpect.

In the year 1751 Dr Black went to Edinburgh to complete the courſe of his medical ſtudies. There he reſided in the houſe of his couſin-german, Mr Ruſſel, profeſſor of natural philoſophy in that univerſity, a gentleman of enlarged views and liberal ſentiments, whoſe converſation and ſtudies muſt have been both agreeable and profitable to his young friend.

At this time the mode of action of lithontriptic medicines, but particularly lime-water in alleviating the pains of ſtone and gravel, divided the opinions of profeſſors and practitioners. This ſubject became extremely intereſting both to the phyſician and chemiſt. And as it is uſual for the ſtudents to enter warmly into thoſe diſcuſſions which give riſe to much difference of opinion among the teachers, this ſubject, quite ſuited to his taſte, particularly attracted and intereſted the attention of Mr Black, who was then one of Dr Cullen's moſt zealous and intelligent pupils. It appears from ſome of his memorandums, that he at firſt held the opinion that the cauſticity of alkalis is owing to the igneous matter which they derive from quicklime. But having proſecuted his experiments on magneſia, this grand ſecret of nature was laid open to his view. This led him to conclude, that the acrimony of theſe ſubſtances was not owing to their combination with igneous particles; that it was their peculiar property; and that they loſt this property and became mild, by combining with a certain portion of air, to which he gave the name of *fixed air;* becauſe it was fixed or became ſolid in the ſubſtances in the compoſition of which it entered. Black.

This grand diſcovery, which forms one of the moſt important eras of chemical ſcience, was the ſubject of his inaugural diſſertation, publiſhed at the time that he was admitted to his medical degree in the univerſity of Edinburgh. He had not availed himſelf of the time he had ſtudied at Glaſgow, but took the whole courſe preſcribed by the rules of the univerſity. This delay, it has been ſuppoſed, may have been owing to the inveſtigation of the ſubject in which he had engaged not having been completed, which determined him to proceed with caution till he had eſtabliſhed his doctrine by a train of deciſive experiments.

About the time that Dr Black obtained his medical degree, Dr Cullen was removed to Edinburgh, which made a vacancy in the chemical chair at Glaſgow. While he remained at that univerſity, Dr Black had been a diligent and attentive ſtudent; and the diſcovery publiſhed in his inaugural eſſay had added much to his reputation. He was therefore looked up to as a perſon amply qualified to fill the vacant chair; and accordingly, in the year 1756, he was appointed profeſſor of anatomy, and lecturer on chemiſtry in the univerſity of Glaſgow. And it was perhaps fortunate for himſelf, fortunate for the public and for ſcience, that a ſituation ſo favourable preſented itſelf, a ſituation which allowed him full time to dedicate his talents chiefly to the cultivation of chemiſtry, which had now become his favourite ſcience.

Along with the lectureſhip on chemiſtry, Dr Black's firſt appointment in the univerſity of Glaſgow, was to the profeſſorſhip of anatomy. The latter branch of medical ſtudy was either not ſo ſuitable to his taſte, or he did not conſider himſelf ſo well qualified to be uſeful in it; for ſoon after, arrangements were made with the profeſſor of medicine, by which the profeſſors exchanged departments, when Dr Black undertook that of the inſtitutes and practice of medicine.

At this time, his lectures on medicine formed his chief taſk. And the perſpicuity and ſimplicity, the caution and moderation which he diſcovered in the doctrines which he delivered, gave great ſatisfaction. The time and attention which were occupied in theſe lectures and in the medical practice in ſome meaſure neceſſarily connected with his ſituation, are ſuppoſed by ſome to have been the principal cauſe of Dr Black's having ſuddenly ſtopped ſhort in that brilliant career on which he at firſt ſo ſucceſsfully entered. It is, however, more probable, that the calm and unambitious temper which ſeems to have been a ſtriking feature of his character, and which a leſs friendly hand than his learned biographer would have ſet down as nearly allied to indolence, cheeked the ſpirit of ardour and perſeverance which was neceſſary to encourage and carry him forward in the path of diſcovery and reſearch. Whatever may have been the cauſe, it is to be regretted, that Dr Black, ſo conſpicuous for his patient, judicious, and elegant mode of inveſtigation, and ſo diſtinguiſhed for the ſimplicity, perſpicuity, and preciſion of his reaſonings and deductions, ſhould have contributed ſo little in rearing the noble ſuperſtructure of chemical ſcience, the foundation of which he had been the means of eſtabliſhing on a firm and ſolid baſis.

The

Black. The theory of the nature of quicklime, and the cauſe of its cauſticity was ſoon known to the German chemiſts, and from them it met with ſtrong oppoſition. Various myſterious doctrines at this time prevailed in the German ſchools concerning the peculiar nature of fire. As their notions of the cauſticity of alkaline ſubſtances involved ſome of theſe doctrines, a great many objections were ſtarted to a theory which threatened to overthrow long eſtabliſhed and favourite opinions. The moſt formidable opponent to the new theory was Profeſſor Meyer of Oſnaburgh. All the phenomena of the cauſticity and mildneſs of lime and alkalies, were, according to his explanation, to be accounted for, by the action of a ſubſtance of a peculiar nature, to which he gave the name of *acidum pingue*. This ſubſtance, which was ſuppoſed to be formed in the line during calcination, conſiſted of an igneous matter in a certain ſtate of combination with other ſubſtances. It is a matter of ſome ſurpriſe that Dr Black ſhould have experienced any uneaſineſs on account of the oppoſition made to his diſcovery by mere hypotheſis unſupported by facts or even by plauſible argument, when his own doctrine had been fully and irrefragably eſtabliſhed by the ſure teſt of deciſive experiment. Nor is it leſs ſurpriſing, that he ſhould have taken great pains for ſeveral years in the courſe of his lectures in refuting the arguments and in combating the objections of Meyer to his own theory.

Dr Black's reception at the univerſity of Glaſgow was highly flattering and encouraging. As a ſtudent, he had not only done himſelf much credit by his ſucceſsful progreſs in the different purſuits in which he was engaged, but he had alſo during his reſidence there conciliated the attachment and affection of the profeſſors in a high degree. When he returned as a profeſſor, he was immediately connected in the ſtricteſt friendſhip with Dr Adam Smith, then profeſſor of moral philoſophy in that univerſity. And this friendſhip, which now commenced, grew ſtronger and ſtronger, and was never interrupted through the whole of their lives. A ſimplicity and ſenſibility, an incorruptible integrity, the ſtricteſt delicacy and correctneſs of manners, marked the character of each of the philoſophers, and firmly bound them in the cloſeſt union.

At Glaſgow, Dr Black ſoon acquired great reputation as a profeſſor, and became a favourite phyſician in that large and active city. His engaging countenance, his agreeable and attractive manners, free from all ſtudied endeavour to pleaſe, and the kind concern he took in the caſes intruſted to his care, made him a moſt welcome viſitor in every family.

It was between the years 1759 and 1763, that he brought to maturity his ſpeculations concerning heat, which had occupied his attention at intervals, from the very firſt dawn of his philoſophical inveſtigations. His diſcoveries in this department of ſcience were by far the moſt important of all that he made, and perhaps indeed the moſt valuable which appeared during the buſy period of the 18th century. To enter fully into the nature of his inveſtigations would be improper in this place; but the ſum of them all was uſually expreſſed by him in the following propoſitions.

When a ſolid body is converted into a fluid, there enters into it and unites with it, a quantity of heat, the preſence of which is not indicated by the thermometer, and this combination is the cauſe of the fluidity which the body aſſumes. On the other hand, when a fluid body is converted into a ſolid, a quantity of heat ſeparates from it, the preſence of which was not formerly indicated by the thermometer. And this ſeparation is the cauſe of the ſolid form which the fluid aſſumes. Black.

When a liquid body is raiſed to the boiling temperature, by the continued and copious application of heat, its particles ſuddenly attract to themſelves a great quantity of heat, and by this combination their mutual relation is ſo changed that they no longer attract each other, but are converted into an elaſtic fluid like air. On the other hand, when theſe elaſtic fluids, either by condenſation or by the application of cold bodies, are reconverted into liquids, they give out a vaſt quantity of heat, the preſence of which was not formerly indicated by the thermometer.

Thus water when converted into ice gives out 140° of heat, and ice when converted into water abſorbs 140° of heat, and water when converted into ſteam abſorbs about 1000° of heat without becoming ſenſibly hotter than 212°. Philoſophers had been long accuſtomed to conſider the thermometer as the ſureſt method of detecting heat in bodies, yet this inſtrument gives no indication of the 140° of heat which enter into air when it is converted into water, nor of the 1000° which combine with water when it is converted into ſteam. Dr Black, therefore, ſaid that the heat is concealed *(latet)* in the water and ſteam, and he briefly expreſſed this fact by calling the heat in that caſe *latent heat*.

Dr Black having eſtabliſhed this diſcovery by ſimple and deciſive experiments, drew up an account of the whole inveſtigation, and read it to a literary ſociety which met every Friday, in the faculty-room of the college, conſiſting of the members of the univerſity and ſeveral gentlemen of the city, who had a reliſh for philoſophy and literature. This was done April 23. 1762, as appears by the regiſters. This doctrine was immediately applied by its author to the explanation of a vaſt number of natural phenomena, and in his experimental inveſtigations he was greatly aſſiſted by his two celebrated pupils Mr Watt and Dr Irvine.

As Dr Black never publiſhed an account of his doctrine of latent heat, though he detailed it every year ſubſequent to 1762 in his lectures, which were frequented by men of ſcience from all parts of Europe; it became known only through that channel, and this gave an opportunity to others to pilfer it from him piece-meal. Dr Crawford's ideas reſpecting the capacity of bodies for heat, were originally derived from Dr Black, who firſt pointed out the method of inveſtigating that ſubject.

The inveſtigations of Lavoiſier and Laplace concerning heat, publiſhed many years after, were obviouſly borrowed from Dr Black, and indeed conſiſted in the repetition of the very experiments which he had ſuggeſted. Yet theſe philoſophers never mention Dr Black at all: every thing in their diſſertation aſſumes the air of originality; and indeed they appear to have been at great pains to prevent the opinions and diſcoveries of Dr Black from being known among their countrymen. But perhaps the moſt extraordinary procedure was that of Mr Deluc; this philoſopher had

expreſſed

Black. expreſſed his admiration of Dr Black's theory of latent heat, and had offered to become his editor. Dr Black, after much entreaty, at laſt conſented, and the proper information was communicated to Mr Deluc. At laſt the *Idées ſur la Meteorologie* of that philoſopher appeared in 1788. But what was the aſtoniſhment of Dr Black and his friends, when they found the doctrine claimed by Deluc as his own, and an expreſſion of ſatisfaction at the knowledge which he had acquired of Dr Black's coincidence with him in opinion!

Dr Black continued in the univerſity of Glaſgow, from 1756 to 1766. In 1766 Dr Cullen was appointed profeſſor of medicine in the univerſity of Edinburgh, and thus a vacancy was made in the chemical chair of that univerſity. Dr Black was with univerſal conſent appointed his ſucceſſor. In this new ſcene his talents were more conſpicuous, and more extenſively uſeful. He ſaw this, and while he could not but be highly gratified by the great concourſe of pupils which the high reputation of the medical ſchool of Edinburgh brought to his lectures, his mind was forcibly impreſſed by the importance of his duties as a teacher. This had an effect which perhaps was on the whole rather unfortunate. He directed his whole attention to his lectures, and his object was to make them ſo plain that they ſhould be adapted to the capacity of the moſt illiterate of his hearers. The improvement of the ſcience ſeems to have been laid aſide by him altogether. Never did any man ſucceed more completely. His pupils were not only inſtructed but delighted. Many became his pupils merely in order to be pleaſed. This contributed greatly to extend the knowledge of chemiſtry. It became in Edinburgh a faſhionable part of the accompliſhment of a gentleman.

Perhaps alſo the delicacy of his conſtitution precluded him from exertion, the ſlighteſt cold, the moſt trifling approach to repletion, immediately affected his breaſt, occaſioned feveriſhneſs, and if continued for two or three days brought on a ſpitting of blood. Nothing reſtored him but relaxation of thought and gentle exerciſe. The ſedentary life to which ſtudy confined him was manifeſtly hurtful, and he never allowed himſelf to indulge in any intenſe thinking without finding theſe complaints ſenſibly increaſed.

So completely trammeled was he in this reſpect, that although his friends ſaw others diſingenuous enough to avail themſelves of the novelties announced by Dr Black in his lectures, and therefore repeatedly urged him to publiſh an account of what he had done, this remained unaccompliſhed to the laſt. Dr Black often began the taſk, but was ſo nice in his notions of the manner in which it ſhould be executed, that the pains he took in forming a plan of the work, never failed to affect his health, and oblige him to deſiſt. Indeed he peculiarly diſliked appearing as an author. His inaugural diſſertation was the work of duty. His *experiments on Magneſia, Quick-lime, and other alkaline ſubſtances*, was neceſſary to put what he had indicated in his inaugural diſſertations on a proper foundation. His *Obſervations on the more ready freezing of Water that has been boiled*, publiſhed in the Philoſophical Tranſactions for 1774, was alſo called for; and his *Analyſis of the Waters of ſome boiling ſprings in Iceland*, made at the requeſt of his friend T. I. Stanley, Eſq. was read to the Royal Society of Edinburgh, and publiſhed by the council. And theſe are the only works of his which have appeared in print. Black.

The aſpect of Dr Black was comely and intereſting. His countenance exhibited that pleaſing expreſſion of inward ſatisfaction, which by giving eaſe to the beholder, never fails to pleaſe. His manner was unaffected and graceful. He was affable, and readily entered into converſation, whether ſerious or trivial. He was a ſtranger to none of the elegant accompliſhments of life. He had a fine muſical ear, with a voice which would obey it in the moſt perfect manner; for he ſung and performed on the flute with great taſte and feeling, and could ſing a plain air at ſight, which many inſtrumental performers cannot do. Without having ſtudied drawing, he had acquired a conſiderable power of expreſſing with his pencil, and ſeemed in this reſpect to have the talents of a hiſtory painter. Figure indeed of every kind attracted his attention. Even a retort, or a crucible, was to his eye an example of beauty or deformity.

He had the ſtrongeſt claim to the appellation of a man of propriety and correctneſs. Every thing was done in its proper ſeaſon, and he ever ſeemed to have leiſure in ſtore. He loved ſociety, and felt himſelf beloved in it; never did he loſe a ſingle friend, except by the ſtroke of death.

His only apprehenſion was that of a long continued ſick bed, leſs perhaps from any ſelfiſh feeling, than from the conſideration of the trouble and diſtreſs which it would occaſion to attending friends: and never was this generous wiſh more completely gratified. On the 26th Nov. 1799, and in the 71ſt year of his age, he expired without any convulſions, ſhock, or ſtupor, to announce or retard the approach of death. Being at table with his uſual fare, ſome bread, a few prunes, and a meaſured quantity of milk diluted with water, and having the cup in his hand, when the laſt ſtroke of the pulſe was to be given, he ſet it down on his knees which were joined together, and kept it ſteady with his hand in the manner of a perſon perfectly at eaſe; and in this attitude expired without ſpilling a drop, and without a writhe in his countenance, as if an experiment had been required to ſhow to his friends the facility with which he departed. His ſervant opened the door to tell him that ſome one had left his name; but getting no anſwer, ſtepped about half-way towards him, and ſeeing him ſitting in that eaſy poſture, ſupporting his baſon of milk with one hand, he thought that he had dropt aſleep, which ſometimes happened after his meals. He went back and ſhut the door, but before he went down ſtairs, ſome anxiety which he could not account for, made him return again and look at his maſter. Even then he was ſatisfied after coming pretty near him, and turned to go away; but returning again and coming cloſe up to him, he found him without life. (*Preface to Black's Lect.* by Dr Robiſon.)

Black, a well known colour, ſuppoſed to be owing to the abſence of light, moſt of the rays falling upon black ſubſtances being not reflected but abſorbed by them. Concerning the peculiar ſtructure of ſuch bodies as fits them for appearing of this or that particular colour, ſee Colour and Dyeing.

Black-

Black-Act || Black-Legs.

Black-Act; the ſtatute of 9 Geo. I. c. 22. is commonly called the *Waltham black act*, becauſe it was occaſioned by the devaſtations committed near Waltham in Eſſex, by perſons in diſguiſe, or with their faces blacked. By this ſtatute it is enacted, that perſons hunting armed and diſguiſed, and killing or ſtealing deer, or robbing warrens, or ſtealing fiſh out of any river, &c. or any perſons unlawfully hunting in his majeſty's foreſts, &c. or breaking down the head of any fiſh-pond, or killing, &c. of cattle, or cutting down trees or ſetting fire to houſe, barn, or wood, or ſhooting at any perſon, or ſending letters either anonymous or ſigned with a fictitious name demanding money, &c. or reſcuing ſuch offenders, are guilty of felony, without benefit of clergy. This act is made perpetual by 31 Geo. II. c. 42.

Black Bird. See Turdus, Ornithology *Index.*

Black-Book of the Exchequer. See Exchequer.

Black-Books, a name given to thoſe which treat of necromancy, or, as ſome call it, *negromancy*. The black-book of the Engliſh monaſteries was a detail of the ſcandalous enormities practiſed in religious houſes, compiled by order of the viſitors under King Hen. VIII. to blacken, and thus haſten their diſſolution.

Black-Cap. See Motacilla, Ornithology *Index.*

Black-Cock. See Tetrao, Ornithology *Index.*

Black-Eagle. See Falco, Ornithology *Index.*

Black-Eunuchs, in the cuſtoms of the eaſtern nations, are Ethiopians caſtrated, to whom their princes commonly commit the care of their women. See Eunuch.

Black-Foreſt, a foreſt of Germany, in Suabia, running from north to ſouth between Ortnau, Briſgaw, part of the duchy of Wirtemberg, the principality of Fuſtemburg towards the ſource of the Danube, as far as the Rhine above Baſil. It is part of the ancient Hyrcanian foreſt.

Black-Friars, a name given to the Dominican order; called alſo *predicants* and *preaching friars*; in France, *jacobins*.

Black-Jack, or *Blende*, is a mineral called alſo *falſe galena*, *blinde*, &c. See Blende, Mineralogy *Index.*

Black-Land, in *Agriculture*, a term by which the huſbandmen denote a particular ſort of clayey ſoil, which, however, they know more by its other properties than by its colour, which is rarely any thing like a true black, and often but a pale gray. This, however pale when dry, always blackens by means of rains, and when ploughed up at theſe ſeaſons it ſticks to the ploughſhares, and the more it is wrought the muddier and duſkier coloured it appears. This ſort of ſoil always contains a large quantity of ſand, and uſually a great number of ſmall white ſtones.

Black Lead. See Plumbago, Mineralogy *Index.*

Black-Leather, is that which has paſſed the curriers hands, where, from the ruſſet as it was left by the tanners, it is become black, by having been ſcored and rubbed three times on the grain-ſide with copperas water. See Leather.

Black-Legs, a name given in Leiceſterſhire to a diſeaſe frequent among calves and ſheep. It is a kind of jelly which ſettles in their legs, and often in the neck, between the ſkin and fleſh.

Black-Mail || Black-Whytlof.

Black-Mail, a certain rate of money, corn, cattle, or other matter, anciently paid by the inhabitants of towns in Weſtmorcland, Cumberland, Northumberland, and Durham, to divers perſons inhabiting on or near the borders, being men of name, and allied with others in thoſe parts, known to be great robbers and ſpoil-takers; in order to be by them freed and protected from any pillage. Prohibited by 43 El. c. 13. The origin of this word is much conteſted, yet there is ground to hold the word *black* to be here a corruption of blank or white, and conſequently to ſignify a rent paid in a ſmall copper coin called *blanks*. This may receive ſome light from a phraſe ſtill uſed in Picardy, where ſpeaking of a perſon who has not a ſingle halfpenny, they ſay, *il n' a pas une blanque maille*.

Black-Monks, a denomination given to the Benedictines, called in Latin *nigri monachi*, or *nigro monachi*; ſometimes *ordo nigrorum*, "the order of blacks."

Black Oats. See Oats.

Black-Proceſſion, in eccleſiaſtical writers, that which is made in black habits, and with black enſigns and ornaments. See Procession. Anciently at Malta there was a black proceſſion every Friday, where the whole clergy walked with their faces covered with a black veil.

Black-Rent, the ſame with black-mail, ſuppoſed to be rents formerly paid in proviſions and fleſh, not in ſpecie.

Black-Rod. See Rod.

Black-Row Grains, a ſpecies of iron-ſtone or ore found in the mines about Dudley in Staffordſhire.

Black-Sea. See *Euxine-Sea.*

Black-Sheep, in the *Oriental Hiſtory*, the enſign or ſtandard of a race of Turkmans ſettled in Armenia and Meſopotamia; hence called the *dynaſty of the black ſheep*.

Black-Stones and *Gems*, according to Dr Woodward, owe their colour to a mixture of tin in their compoſition.

Black-Strakes, a range of planks immediately above the wales in a ſhip's ſide. They are always covered with a mixture of tar and lamp-black.

Black-Tin, in *Mineralogy*, a denomination given to the tin-ore when dreſſed, ſtamped, and waſhed ready for the blowing-houſe, or to be melted into metal. It is prepared into this ſtate by means of beating and waſhing; and when it has paſſed through ſeveral buddles or waſhing-troughs, it is taken up in form of a black powder, like fined ſand, called *black-tin*.

Black-Wadd, in *Mineralogy*, a kind of ore of manganeſe, remarkable for its property of taking fire when mixed with linſeed oil in a certain proportion. It is found in Derbyſhire, and is uſed as a drying ingredient in paints; for when ground with a large quantity of oily matter it loſes the property above mentioned. See Manganese, Mineralogy *Index.*

Black-Water, the name of two rivers in Ireland; one of which runs through the counties of Cork and Waterford, and falls into Youghal bay; and the other, after watering the county of Armagh, falls into Lough-Neagh.

Black-Whytlof, in our old writers, bread of a middle fineneſs betwixt white and brown, called in ſome parts *ravel-beard*. In religious houſes, it was the bread

Black-Work || Blacklock.

made for ordinary guefts, and diftinguifhed from their houfehold loaf, or *panis conventualis*, which was pure manchet, or white bread.

Black-Work, iron wrought by the blackfmith; thus called by way of oppofition to that wrought by whitefmiths.

BLACKALL, Dr Offspring, bifhop of Exeter in the beginning of the 18th century, was born at London 1654, and educated at Catharine-Hall, Cambridge. For two years he refufed to take the oath of allegiance to King William and Queen Mary, but at laft fubmitted to the government, though he feemed to condemn the Revolution, and all that had been done purfuant to it. He was a man of great piety, had much primitive fimplicity and interigity, and a conftant evenneſs of mind. In a fermon before the houfe of commons, Jan. 30th 1699, he animadverted on Toland's affertion in his life of Milton, that Charles I. was not the writer of the *Icon Baſilike*, and for fome infinuations againft the authenticity of the Holy Scriptures; which produced a controverfy between him and that author. In 1700, he preached a courfe of fermons in St Paul's at Boyle's lecture, which were afterwards publifhed; and was confecrated bifhop of Exeter in 1707. He died at Exeter in 1716, and was interred in the cathedral there.

BLACKBANK, a town of Ireland, in the county of Armagh and province of Ulfter, feated in W. Long. 6. 55. N. Lat. 54. 12.

BLACKBERRY. See Rubus, Botany *Index*.

BLACKBURN, a town of Lancafhire in England, feated near the river Derwent. It takes its name from the brook Blackwater which runs through it. W. Long. 2. 15. N. Lat. 53. 40.

BLACKING is fometimes ufed for a factitious black; as lamp-black, fhoe-black, &c. A mixture of ivory or lamp-black with linfeed-oil makes the common oil blacking. For a fhining blacking, fmall-beer or water is ufed inftead of oil, in the proportion of about a pint to an ounce of the ivory-black, with the addition of half an ounce of brown fugar, and as much gum arabic. The white of an egg fubftituted for the gum makes the black more fhining; but is fuppofed to hurt the leather, and make it apt to crack.

BLACKLOCK, Dr Thomas, a clergyman, was born at Annan in the fouth of Scotland in the year 1721. His father was a bricklayer, but though in this humble fphere of life, was of a refpectable character, and not deficient in knowledge and urbanity. The fon was not quite fix months old when he loft his eyefight in the fmallpox. This misfortune rendered him incapable of learning any of the mechanical arts; and therefore his father kept him at home, and with the aſſiſtance of fome friends foftered that inclination which, at a very early period, he fhewed for books. This was done by reading to him firft the fimple fort of publications which are commonly put into the hands of children, and then feveral of our beft authors, fuch as Milton, Spencer, Prior, Pope, and Addifon. His companions, whom his early gentlenefs and kindnefs of difpofition, as well as their compaffion for his misfortune, ftrongly attached to him, were very aſſiduous in their good offices, in reading to inftruct and amufe him. By their aſſiſtance he acquired fome knowledge of the Latin tongue, but he never was at a grammar-fchool till at a more advanced period of life. Poetry was even then his favourite reading; and he found an enthufiaftic delight in the works of the beft Engliſh poets, and in thofe of his countryman Allan Ramfay. Even at an age fo early as twelve he began to write poems, one of which is preferved in the collection that was publifhed after his death, and is not perhaps inferior to any of the premature compofitions of boys aſſiſted by the beft education, which are only recalled into notice by the future fame of their authors. Blacklock.

He had attained the age of nineteen when his father was killed by the accidental fall of a malt-kiln belonging to his fon-in-law. This lofs, heavy to any one at that early age, would have been, however, to a young man poſſeſſing the ordinary means of fupport, and the ordinary advantages of education, comparatively light; but to him—thus fuddenly deprived of that fupport on which his youth had leaned—deftitute almoft of every refource which induftry affords to thofe who have the bleffings of fight—with a body feeble and delicate from nature, and a mind congenially fufceptible—it was not furprifing that this blow was doubly fevere, and threw on his fpirits that defpondent gloom to which he then gave way in the following pathetic lines, and which fometimes overclouded them in the fubfequent period of his life.

" Dejecting profpect! foon the hapleſs hour
" May come; perhaps this moment it impends,
" Which drives me forth to penury and cold,
" Naked, and beat by all the ftorms of heav'n,
" Friendleſs and guideleſs to explore my way;
" Till, on cold earth this poor unſhelter'd head
" Reclining, vainly from the ruthleſs blaſt
" Reſpite I beg, and in the ſhock expire."

He lived with his mother for about a year after his father's death, and began to be diftinguifhed as a young man of uncommon parts and genius. Thefe were at that time unaſſiſted by learning; the circumftances of his family affording him no better education than the fmattering of Latin which his companions had taught him, and the perufal and recollection of the few Engliſh authors which they, or his father in the intervals of his profeſſional labours, had read to him. Poetry, however, though it attains its higheft perfection in a cultivated foil, grows perhaps as luxuriantly in a wild one. To poetry, as we have before mentioned, he was devoted from his earlieft days; and about this time feveral of his poetical productions began to be handed about, which conſiderably enlarged the circle of his friends and acquaintance. Some of his compofitions being fhewn to Dr Stevenfon, an eminent phyfician of Edinburgh, who was accidentally at Dumfries on a profeſſional viſit, that gentleman formed the benevolent deſign of carrying him to the Scotch metropolis and giving to his natural endowments the aſſiſtance of a claſſical education. He came to Edinburgh in the year 1741, and was enrolled a ſtudent of divinity in the univerſity there, though at that time without any particular view of entering into the church. In that univerſity he continued his ſtudies under the patronage of Dr Stevenfon till the year 1745, when he retired to Dumfries, and reſided in the houſe of Mr M'Murdo, who had married his ſiſter, during the whole time of the civil war, which then raged in the country, and particularly

Blacklock. cularly disturbed the tranquillity of the metropolis. When peace was restored to the nation, he returned to the university, and pursued his studies for six years longer. During this last residence in Edinburgh, he obtained, among other literary acquaintance, that of the celebrated Mr Hume, who attached himself warmly to Mr Blacklock's interests, and was afterwards particularly useful to him in the publication of the 4to edition of his Poems, which came out by subscription in London in the year 1756. Previously to this, two editions in 8vo had been published at Edinburgh, the first in 1746, and the second in 1754.

In the course of his education at Edinburgh, he acquired a proficiency in the learned languages, and became more a master of the French tongue than was then common in that city. For this last acquisition he was chiefly indebted to the social intercourse to which he had the good fortune to be admitted in the house of Provost Alexander, who had married a native of France. At the university he attained a knowledge of the various branches of philosophy and theology, to which his course of study naturally led, and acquired at the same time a considerable fund of learning and information in those various departments of science and belles lettres, from which his want of sight did not absolutely preclude him.

In 1757, he began a course of study, with a view to give lectures in oratory to young gentlemen intended for the bar or the pulpit. On this occasion he wrote to Mr Hume, informed him of his plan, and requested his assistance in the prosecution of it. But Mr Hume doubting the probability of its success, he abandoned the project; and then, for the first time, adopted the decided intention of going into the church of Scotland. After applying closely for a considerable time to the study of theology, he passed the usual trials in the presbytery of Dumfries, and was by that presbytery licensed a preacher of the gospel in the year 1759. As a preacher he obtained high reputation, and was fond of composing sermons, of which he has left some volumes in manuscript, as also a Treatise on Morals.

In 1762 he married Miss Sarah Johnston, daughter of Mr Joseph Johnston surgeon in Dumfries; a connexion which formed the great solace and blessing of his future life, and gave him, with all the tenderness of a wife, all the zealous care of a guardian and a friend. This event took place a few days before his being ordained minister of the town and parish of Kircudbright, in consequence of a presentation from the crown, obtained for him by the earl of Selkirk, a benevolent nobleman, whom Mr Blacklock's situation and genius had interested in his behalf. But the inhabitants of the parish, whether from that violent aversion to patronage, which was then so universal in the southern parts of Scotland, from some political disputes which at that time subsisted between them and his noble patron, or from those prejudices which some of them might naturally enough entertain against a pastor deprived of sight, or perhaps from all these causes united, were so extremely disinclined to receive him as their minister, that after a legal dispute of nearly two years, it was thought expedient by his friends, as it had always been wished by himself, to compromise the matter, by resigning his right to the living, and accepting a moderate annuity in its stead. With this slender provision he removed in 1764 to Edinburgh; and to make up Blacklock. by his industry a more comfortable and decent subsistence, he adopted the plan of receiving a certain number of young gentlemen as boarders into his house, whose studies in languages and philosophy he might, if necessary, assist. In this situation he continued till the year 1787, when he found his time of life and state of health required a degree of quiet and repose which induced him to discontinue the receiving of boarders. In 1767 the degree of doctor in divinity was conferred on him by the university and Marischal college of Aberdeen.

In the occupation which he thus exercised for so many years of his life, no teacher was perhaps ever more agreeable to his pupils, nor master of a family to its inmates, than Dr Blacklock. The gentleness of his manners, the benignity of his disposition, and that warm interest in the happiness of others which led him so constantly to promote it, were qualities that could not fail to procure him the love and regard of the young people committed to his charge; while the society, which esteem and respect for his character and his genius often assembled at his house, afforded them an advantage rarely to be found in establishments of a similar kind.

In this mixed society he appeared to forget the privation of sight, and the melancholy which it might at other times produce in his mind. He entered, with the cheerful playfulness of a young man, into all the sprightly narrative, the sportful fancy, and the humorous jest that rose around him. Next to conversation, music was perhaps the source of his greatest delight; for he not only relished it highly, but was himself a tolerable performer on several instruments, particularly the flute. He generally carried in his pocket a small *flageolet*, on which he played his favourite tunes; and was not displeased when asked in company to play or to sing them; a natural feeling for a blind man, who thus adds a scene to the drama of his society.

Of the happiness of others, however, we are incompetent judges. Companionship and sympathy bring forth those gay colours of mirth and cheerfulness which they put on for a while, to cover perhaps that sadness which we have no opportunity of witnessing. Of a blind man's condition we are particularly liable to form a mistaken estimate; we give him credit for all those gleams of delight which society affords him, without placing to their full account those dreary moments of darksome solitude to which the suspension of that society condemns him. Dr Blacklock had from nature a constitution delicate and nervous, and his mind, as is almost always the case, was in a great degree subject to the indisposition of his body. He frequently complained of a lowness and depression of spirits, which neither the attentions of his friends, nor the unceasing care of a most affectionate wife, were able entirely to remove. The imagination we are so apt to envy and admire serves but to irritate this disorder of the mind; and that fancy in whose creation we so much delight, can draw, from sources unknown to common men, subjects of disgust, disquietude, and affliction. Some of his later poems express a chagrin, though not of an ungentle sort, at the supposed failure of his imaginative powers, or at the fastidiousness of modern times, which he despaired to please.

Blacklock, Blackmore.

" Such were his efforts, ſuch his cold reward,
" Whom once thy partial tongue pronounc'd a bard;
" Excurſive, on the gentle gales of ſpring,
" He rov'd, whilſt favour imp'd his timid wing;
" Exhauſted genius now no more inſpires,
" But mourns abortive hopes, and faded fires;
" The ſhort-liv'd wreath, which once his temple grac'd,
" Fades at the ſickly breath of ſqueamiſh taſte;
" Whilſt darker days his fainting flames immure
" In chearleſs gloom and winter premature."

Theſe lines are, however, no proof of " exhauſted genius," or " faded fires." " Abortive hopes," indeed, muſt be the lot of all who, like Dr Blacklock, reach the period of old age. In early youth the heart of every one is a poet; it creates a ſcene of imagined happineſs and deluſive hopes; it clothes the world in the bright colours of its own fancy; it refines what is coarſe, it exalts what is mean; it ſees nothing but diſintereſtedneſs in friendſhip, it promiſes eternal fidelity in love. Even on the diſtreſſes of its ſituation it can throw a certain romantic ſhade of melancholy that leaves a man ſad, but does not make him unhappy. But at a more advanced age, " the fairy viſions fade," and he ſuffers moſt deeply who has indulged them the moſt.

About the time that theſe verſes were written, Dr Blacklock was, for the firſt time, afflicted with what to him muſt have been peculiarly diſtreſsful. He became occaſionally ſubject to deafneſs, which, though he ſeldom felt it in any great degree, was ſufficient, in his ſituation, to whom the ſenſe of hearing was almoſt the only channel of communication with the external world, to cauſe very lively uneaſineſs. Amidſt theſe indiſpoſitions of body, however, and diſquietudes of mind, the gentleneſs of his temper never forſook him, and he felt all that reſignation and confidence in the Supreme Being which his earlieſt and his lateſt life equally acknowledged. In ſummer 1791 he was ſeized with a feveriſh diſorder, which at firſt ſeemed of a ſlight, and never roſe to a very violent kind; but a frame ſo little robuſt as his was not able to reſiſt it, and after about a week's illneſs it carried him off on the 7th day of July 1791.

Dr Blacklock's writings conſiſt chiefly of poems, of which an edition in 4to was publiſhed in 1793. To that edition was added, An Eſſay on the Education of the Blind, tranſlated from the French of M. Hauy. He was alſo the author of the article Blind in the laſt edition of this work.

BLACKMORE, Sir Richard, a phyſician, and voluminous writer of theological, poetical, and phyſical works. Having declared himſelf early in favour of the Revolution, King William, in 1697, choſe him one of his phyſicians in ordinary, and conferred the honour of knighthood on him. On Queen Anne's acceſſion, Sir Richard was alſo appointed one of her phyſicians, and continued ſo for ſome time. Dryden and Pope treated the poetical performances of Blackmore with great contempt; and in a note to the mention made of him in the Dunciad, we are informed that his " indefatigable muſe produced no leſs than ſix epic poems: *Prince and King Arthur*, 20 books; *Eliza*, 10; *Alfred*, 12; *The Redeemer*, 6: beſide *Job*, in folio; the whole book of *Pſalms*; *The Creation*, ſeven books; *Nature of Man*, three books; and many more." But notwithſtanding Blackmore was much ridiculed by the wits, he is not without merit; and Addiſon has, in the Spectator, beſtowed ſome liberal commendations on his poem on the Creation. It muſt be mentioned too in honour of Sir Richard, that he was a chaſte writer, and a warm advocate for virtue, at a time when an almoſt univerſal degeneracy prevailed. He had been very free in his cenſures on the libertine writers of his age; and it was owing to ſome liberty he had taken of this kind, that he drew upon him the reſentment of Mr Dryden. He had likewiſe given offence to Mr Pope; for having been informed by Mr Curl that he was the author of a traveſtie on the firſt Pſalm, he took occaſion to reprehend him for it in his Eſſay on Polite Learning. Beſides what are above mentioned, Sir Richard wrote ſome theological tracts, and ſeveral treatiſes on the plague, ſmall-pox, conſumptions, the ſpleen, gout, dropſy, &c. and many other poetical pieces. He died October 9. 1729.

Blackneſs || Blackſtone.

BLACKNESS, the quality of a black body; or a colour ariſing from ſuch a texture and ſituation of the ſuperficial parts of the body as does, as it were, deaden, or rather abſorb, the light falling on it, without reflecting any, or very little of it, to the eye.—In which ſenſe, *blackneſs* ſtands directly oppoſed to *whiteneſs*; which conſiſts in ſuch a texture of parts as indifferently reflects all the rays thrown upon it, of what colour ſoever they be.

Deſcartes, ſays Dr Prieſtly, though miſtaken with reſpect to the nature of light and colours, yet diſtinguiſhes juſtly between black and white; obſerving, that black ſuffocates and extinguiſhes the light that falls upon it, but that white reflects them. See Black.

BLACKS, in *Phyſiology*. See Negroes.

Blacks, is alſo a name given to an aſſociation of diſorderly and ill-deſigning perſons, formerly herding chiefly about Waltham in Eſſex, who deſtroyed deer, robbed fiſh-pounds, ruined timber, &c. See *Black-Act*.

BLACKSTONE, Sir William, an eminent Engliſh lawyer, was born at London in July 1723. His father, Mr Charles Blackſtone, a ſilk-man, citizen, and bowyer of London, died ſome months before the birth of our author, who was the youngeſt of four children; and their mother died before he was 12 years old. Even from his birth, the care both of his education and fortune was kindly undertaken by his maternal uncle Mr Thomas Bigg, an eminent ſurgeon in London, and afterwards, on the death of his elder brothers, owner of the Chilton eſtate, which is ſtill enjoyed by that family. In 1730 being about ſeven years old, he was put to ſchool at the Charter-houſe; and in 1735 was, by the nomination of Sir Robert Walpole, on the recommendation of Charles Wither of Hall in Hampſhire, Eſq; his couſin by the mother's ſide, admitted upon the foundation there. In this excellent ſeminary he applied himſelf to every branch of youthful education, with the ſame aſſiduity which accompanied his ſtudies through life. His talents and induſtry rendered him the favourite of his maſters, who encouraged and aſſiſted him with the utmoſt attention: ſo that at the age of 15 he was at the head of the ſchool, and although ſo young, was thought well qualified to be removed to the univerſity. He was accordingly entered a commoner at Pembroke college

Blackſtone. lege in Oxford, on the 30th of November 1738, and was the next day matriculated. At this time he was elected to one of the Charter-houſe exhibitions by the governors of that foundation, to commence from the Michaelmas preceding; but was permitted to continue a ſcholar there till after the 12th of December, being the anniverſary commemoration of the founder, to give him an opportunity of ſpeaking the cuſtomary oration which he had prepared, and which did him much credit. About this time alſo he obtained Mr Benſon's gold prize-medal of Milton, for verſes on that poet. In the February following, the ſociety of Pembroke college unanimouſly elected him to one of Lady Holford's exhibitions for Charter-houſe ſcholars in that houſe. Here he proſecuted his ſtudies with unremitting ardour; and although the claſſics, and particularly the Greek and Roman poets, were his favourites, they did not entirely engroſs his attention: logic, mathematics, and the other ſciences, were not neglected. At the early age of 20, he compiled a treatiſe entitled *Elements of Architecture*, intended for his own uſe only, and not for publication; but eſteemed by thoſe judges who have peruſed it, in no reſpect unworthy his maturer judgment and more exerciſed pen.

Having determined on his future plan of life, and made choice of the law for his profeſſion, he was entered in the Middle Temple on the 20th of November 1741. He now found it neceſſary to quite the more amuſing purſuits of his youth, for the ſeverer ſtudies to which he had dedicated himſelf; and betook himſelf ſeriouſly to reading law. He expreſſed his diſagreeable ſenſations on this occaſion in a copy of verſes, ſince publiſhed by Dodſley in vol. iv. of his miſcellanies, entitled *The Lawyer's Farewell to his Muſe;* in which the ſtruggle of his mind is expreſſed ſo ſtrongly, ſo naturally, with ſuch elegance of ſenſe and language, and harmony of verſification, as muſt convince every reader that his paſſion for the muſes was too deeply rooted to be laid aſide without much reluctance; and that, if he had purſued that flowery path, he would perhaps have proved inferior to few of our Engliſh poets. Several little fugitive pieces beſides this, have at times been communicated by him to his friends; and he left (but not with a view of publication) a ſmall collection of juvenile pieces, both originals and tranſlations, inſcribed with this line from Horace,

Nec luſiſſe pudet, ſed non incidere ludum.

Some notes on Shakeſpeare, which juſt before his death he communicated to Mr Steevens, and which were inſerted by him in his laſt edition of that author, ſhow how well he underſtood the meaning, as well as the beauties, of that his favourite among the Engliſh poets.

In November 1743, he was elected into the ſociety of All-Souls college; and in the November following, he ſpoke the anniverſary ſpeech in commemoration of archbiſhop Chiceley the founder, and the other benefactors to that houſe of learning, and was admitted actual fellow. From this period he divided his time between the univerſity and the Temple, where he took chambers in order to attend the courts: in the former he purſued his academical ſtudies, and on the 12th of June 1745 commenced bachelor of civil law; in the latter he applied himſelf cloſely to his profeſſion, both in the hall and in his private ſtudies, and on the 28th of November 1746 was called to the bar. Though he was little known or diſtinguiſhed in Weſtminſter hall, he was actively employed, during his occaſional reſidence at the univerſity, in attending to its intereſts, and mingling with and improving its interior concerns. In May 1749, as a ſmall reward for his ſervices, and to give him further opportunities of advancing the intereſts of the college, Mr Blackſtone was appointed ſteward of their manors. And in the ſame year, on the reſignation of his uncle Seymour Richmond, Eſq. he was elected recorder of the borough of Wallingford in Berkſhire, and received the king's approbation on the 30th of May. The 26th of April 1750, he commenced doctor of civil law, and thereby became a member of the convocation, which enabled him to extend his views beyond the narrow circle of his own ſociety, to the general benefit of the univerſity at large. In the ſummer 1753, he took the reſolution of wholly retiring to his fellowſhip and an academical life, ſtill continuing the practice of his profeſſion as a provincial counſel. Blackſtone.

His Lectures on the Laws of England appear to have been an early and favourite idea; for in the Michaelmas term, immediately after he quitted Weſtminſter-hall, he entered on the province of reading them at Oxford; and we are told by the author of his life, that even at their commencement, ſuch were the expectations formed from the acknowledged abilities of the lecturer, they were attended by a very crowded claſs of young men of the firſt families, characters, and hopes; but it was not till the year 1758, that the lectures in the form they now bear were read at the univerſity. Mr Viner having by his will left not only the copyright of his abridgment, but other property to a conſiderable amount, to the univerſity of Oxford, to found a profeſſorſhip, fellowſhips, and ſcholarſhips of common law, he was on the 20th of October 1758 unanimouſly elected Vinerian profeſſor; and on the 25th of the ſame month read his firſt introductory lecture, which he publiſhed at the requeſt of the vice-chancellor and heads of houſes, and afterwards prefixed to the firſt volume of his Commentaries. His lectures now had gained ſuch univerſal applauſe, that he was requeſted by a noble perſonage who ſuperintended the education of our preſent ſovereign then prince of Wales, to read them to his royal highneſs; but as he was at that time engaged to a numerous claſs of pupils in the univerſity, he thought he could not, conſiſtently with that engagement, comply with this requeſt, and therefore declined it. But he tranſmitted copies of many of them for the peruſal of his royal highneſs; who, far from being offended at an excuſe grounded on ſo honourable a motive, was pleaſed to order a handſome gratuity to be preſented to him. It is doubtful whether the Commentaries were originally intended for the preſs; but many imperfect and incorrect copies having got abroad, and a pirated edition of them being either publiſhed, or preparing for publication in Ireland, the learned lecturer thought proper to print a correct edition himſelf; and in November 1765 publiſhed the firſt volume under the title of *Commentaries on the Laws of England;* and in the courſe of the four ſucceeding years, the remaining parts of this admirable work.

Blackſtone, Blackwall.

work. It ought to be remarked, that before this period the reputation his lectures deſervedly acquired him had induced him to reſume his practice in Weſtminſter-hall; and in a courſe ſomewhat inverted from the general progreſs of his profeſſion, he who had quitted the bar for an academic life, was ſent back from the college to the bar, with a conſiderable increaſe of buſineſs. He was likewiſe elected into parliament, firſt for Hindon, and afterwards for Weſtbury in Wilts; but in neither of theſe departments did he equal the expectations his writings had raiſed. The part he took in the Middleſex election drew upon him the attack of ſome perſons of ability in the ſenate, and likewiſe a ſevere animadverſion of one of the keeneſt polemical writers* in the paper war of that day. This circumſtance probably ſtrengthened the averſion he profeſſed to parliamentary attendance; "where, (he ſaid) amidſt the rage of contending parties, a man of moderation muſt expect to meet with no quarter from any ſide:" and when, on the reſignation of Mr Dunning in 1770, he was offered the place of ſolicitor-general, he refuſed that office; but ſhortly afterwards, on the promotion of Sir Joſeph Yates to a ſeat in the court of common-pleas, accepted a ſeat on the bench, and by the death of Sir Joſeph ſucceeded him there alſo. As a judge, he was not inactive; but, when not occupied in the duties of his ſtation, was generally engaged in ſome ſcheme of public utility. The act for detached houſes for hard labour for convicts, as a ſubſtitute for tranſportation, owed its origin in a great meaſure to him.

* *Junius.*

It ought not to be omitted, that the laſt augmentation of the judges ſalaries, calculated to make up the deficiencies occaſioned by the heavy taxes they are ſubject to, and thereby render them more independent, was obtained in a great meaſure by his induſtry and attention. This reſpectable and valuable man died on the 14th of February 1780, in the 50th year of his age.

BLACKWALL, Anthony, A. M. a learned author, after completing his academical education at Emanuel college, Cambridge, was appointed head maſter of the free ſchool at Derby, and lecturer of All-hallows there, where he firſt diſtinguiſhed himſelf in the literary world by an edition of Theognis, printed at London in 1706, and was afterwards head maſter of the free ſchool at Market-Boſworth in Leiceſterſhire. The Grammar whereby he initiated the youth under his care into Latin, was of his own compoſing, and ſo happily fitted for the purpoſe, that he was prevailed on to make it public, though his modeſty would not permit him to fix his name to it, becauſe he would not be thought to preſcribe to other inſtructors of youth. It is entitled, "A New Latin Grammar; being a ſhort, clear, and eaſy Introduction of young Scholars to the Knowledge of the Latin Tongue; containing an exact Account of the two firſt Parts of Grammar." In his "Introduction to the Claſſics," firſt publiſhed in 1718, 12mo, he diſplayed the beauties of thoſe admirable writers of antiquity, to the underſtanding and imitation even of common capacities; and that in ſo conciſe and clear a manner, as ſeemed peculiar to himſelf. But his greateſt and moſt celebrated work was, "The Sacred Claſſics defended and illuſtrated; or, An Eſſay humbly offered towards preſerving the Purity, Propriety, and True Eloquence of the Writers of the New Teſtament," in 2 vols. Mr Blackwall had the felicity to bring up many excellent ſcholars in his ſeminaries at Derby and Boſworth; among others, the celebrated Richard Dawes, author of the *Miſcellanea Critica*. A gentleman who had been his ſcholar, being patron of the church of Clapham in Surrey, preſented him to that living as a mark of his gratitude and eſteem. This happening late in life, and Blackwall having occaſion to wait upon the biſhop of the dioceſe, he was ſomewhat pertly queſtioned by a young chaplain as to the extent of his learning. "Boy (replied the indignant veteran), I have forgot more than ever you knew!" He died at Market-Boſworth, April 8. 1730.

Blackwell.

BLACKWELL, Thomas, an eminent Scottiſh writer, was ſon of a miniſter at Aberdeen, and born there 1701. He had his grammatical learning at a ſchool in Aberdeen, ſtudied Greek and philoſophy in the Mariſchal college there, and took the degree of M. A. in 1718. Being greatly diſtinguiſhed by uncommon parts, and an early proficiency in letters, he was, Dec. 1723, made Greek profeſſor in the college where he had been educated; and continued to teach that language with applauſe even to his death. In 1737, was publiſhed at London, but without his name, "An Enquiry into the life and writings of Homer," 8vo; a ſecond edition of which appeared in 1736; and not long after, "Proofs of the Enquiry into Homer's life and writings," which was a tranſlation of the Greek, Latin, Spaniſh, Italian, and French notes, ſubjoined to the original work. In 1748, he publiſhed "Letters concerning Mythology," 8vo; without his name alſo. The ſame year, he was made principal of the Mariſchal college in Aberdeen, and is the only layman who hath been appointed principal of that college, ſince the patronage came to the Crown, by the forfeiture of the Mariſchal family, in 1716; all the other principals having been miniſters of the church of Scotland. March 1752, he took the degree of doctor of laws: and the year following came out the firſt volume of his Memoirs of the Court of Auguſtus, 4to. The ſecond volume appeared in 1755; and the third, which was poſthumous, and left incomplete by the author, was fitted for the preſs by John Mills, Eſq. and publiſhed in 1764. At the ſame time was publiſhed a third edition of the two former volumes: Which is a proof of the good reception the work met with from the public; though it muſt be acknowledged that the parade with which it is written, and the peculiarity of its language, expoſed it to ſome ſeverity of cenſure.

Soon after he became principal of his college, he married a merchant's daughter of Aberdeen, by whom he had no children. Several years before his death, his health began to decline: his diſorder was of the conſumptive kind, and thought to be forwarded by an exceſs of abſtemiouſneſs which he impoſed upon himſelf. His diſeaſe increaſing, he was adviſed to travel, and accordingly ſet out in Feb. 1757; however, he was not able to go farther than Edinburgh, in which city he died the 8th of March following, in his 56th year. He was a very ingenious and very learned man: he had an equable flow of temper, and a truly philoſophic ſpirit,

Blackwell, Bladder.

ſpirit, both which he ſeems to have preſerved to the laſt; for on the day of his death he wrote to ſeveral of his friends.

BLACKWELL, *Alexander*, ſon of a dealer in knithoſe at Aberdeen, where he received a liberal education, ſtudied phyſic under Boerhaave at Leyden, took the degree of M. D. and acquired a proficiency in the modern languages. On his return home, happening to ſtay ſome time at the Hague, he contracted an intimacy with a Swediſh nobleman. Marrying a gentleman's daughter in the neighbourhood of Aberdeen, he propoſed practiſing his profeſſion in that part of the kingdom; but in two years finding his expectations diſappointed, he came to London, where he met with ſtill leſs encouragement as a phyſician, and commenced corrector of the preſs for Mr Wilkins a printer. After ſome years ſpent in this employment; he ſet up as a printer himſelf; and carried on ſeveral large works till 1734, when he became bankrupt. In what manner he ſubſiſted from this event till the above-mentioned application we do not learn, unleſs it was by the ingenuity of his wife, who publiſhed "A curious Herbal containing 500 Cuts of the moſt uſeful Plants which are now uſed in the Practice of Phyſic, engraved on folio Copperplates, after Drawings taken from the Life, by Elizabeth Blackwell. To which is added a ſhort Deſcription of the Plants, and their common Uſes in Phyſic, 1739," 2 vols folio. In or about the year 1740 he went to Sweden, and renewing his intimacy with the nobleman he knew at the Hague, again aſſumed the medical profeſſion, and was very well received in that capacity; till turning projector, he laid a ſcheme before his Swediſh majeſty for draining the fens and marſhes, which was well received, and many thouſands employed in proſecuting it under the doctor's direction, from which he had ſome ſmall allowance from the king. This ſcheme ſucceeded ſo well, he turned his thoughts to others of greater importance, which in the end proved fatal to him. He was ſuſpected of being concerned in a plot with Count Teſſin, and was tortured; which not producing a confeſſion, he was beheaded Auguſt 9. 1748; and ſoon after this event appeared "A genuine Copy of a Letter from a merchant in Stockholm, to his correſpondent in London; containing an Impartial Account of Doctor Alexander Blackwell, his Plot, Trial, Character, and Behaviour, both under Examination and at the Place of Execution; together with a Copy of a Paper delivered to a Friend upon the Scaffold." He poſſeſſed a good natural genius, but was ſomewhat ſlighty and a little conceited. His converſation, however, was facetious and agreeable; and he might be conſidered on the whole as a well-bred accompliſhed gentleman.

BLADDER, in *Anatomy*, a thin expanded membranous body, found in ſeveral parts of an animal, ſerving as a receptacle of ſome juice, or of ſome liquid excrement; from whence it takes various denominations, as *urine-bladder*, *gall-bladder*, &c.

BLADDER, by way of eminence, is a large veſſel which ſerves as a receptacle of the urine of animals, after its ſecretion from the blood in the kidneys. This is ſometimes alſo called, by way of diſtinction, the *urinary bladder*, *veſica urinaria*. The bladder is ſituated in the pelvis of the abdomen; in men immediately on the rectum; in women on the vagina uteri. See ANATOMY *Index*.

Though the urinary bladder be naturally ſingle, yet there have been inſtances of nature's varying from herſelf in this particular. The bladder of the famous Caſaubon, upon diſſecting his body after his death, was found to be double; and in the Philoſophical Tranſactions, we have an account of a triple bladder found in the body of a gentleman who had long been ill and no one could gueſs the cauſe.

Bladder-Nut || Bladum.

The urinary bladders of brutes are differently contrived from the human bladder, and from each other according to the ſtructure, economy, and manners of living of each creature. See ANATOMY *Index*.

Bladders, when below a certain magnitude, are more uſually denominated by the diminutive veſicles, *veſiculæ*. Of theſe we meet with many ſorts both in the animal and vegetable world; ſome natural, as in the lungs, eſpecially of frogs, and, as ſome alſo imagine, in the muſcles; others morbid or preternatural, as the *hydatidis*, and thoſe obſervable in the itch. Naturaliſts have alſo diſcovered bladders in the thorax and abdomen of birds, as well as others in the belly of fiſhes, called *air-bladders*, and *ſwims*.

Vegetable bladders are found everywhere in the ſtructure of the bark, the fruit, pith, and *parenchyma* or pulp; beſides thoſe morbid ones raiſed on the ſurface of leaves by the puncture of inſects.

BLADDER-Nut. See STAPHYLÆA, BOTANY *Index*.

BLADDER-Senna. See COLUTEA, BOTANY *Index*.

BLADE, in *Commerce*, a thin ſlender piece of metal either forged by the hammer or run and caſt in moulds to be afterwards ſharpened to a point, edge, or the like.

Sword-blades are made by the armourers, knife-blades by the cutlers, &c. The Engliſh and Damaſcus blades are moſt eſteemed among the French, thoſe of Vienne in Dauphiny have the preference. The conditions of a good blade of a ſmall ſword are, that it be light and tough, apter to bend than break. When it will ſtand in the bend, it is called *a poor man's blade*.

BLADEN, MARTIN, a tranſlator and dramatic author, was formerly an officer in the army, bearing the commiſſion of a lieutenant-colonel in Queen Anne's reign, under the great duke of Marlborough, to whom he dedicated a tranſlation of Cæſar's Commentaries, which he had completed, and which is to this day a book held in good eſtimation. In 1714, he was made one of the Lords Commiſſioners of Trade and Plantations; and in 1717 was appointed envoy extraordinary to the court of Spain, in the room of —— Brett, Eſq. but declined it, chooſing rather to keep the poſt he already had, which was worth 1000l. per annum, and which he never parted with till his death, which was in May 1746. He was alſo many years member of parliament for the town of Portſmouth. He wrote two dramatic pieces; both of which (for the one is only a maſque introduced in the third act of the other) were printed in the year 1705, without the author's conſent. Their names are, 1. Orpheus and Euridice, a maſque. 2. Solon, a tragic comedy.

BLADUM, in middle-age writers, is taken for all ſort of ſtanding corn in the blade and ear. The word is alſo written *blatum*, *blava*, and *blavium*.

In our old charters, the word bladum included the whole

Blaeu || Blair.

whole product of the ground, fruit, corn, flax, grafs, &c. and whatever was oppofed to living creatures. It was fometimes alfo applied to all forts of grain or corn threfhed on the floor. But the word was more peculiarly appropriated to bread-corn, or wheat, called in French *blé*. Thus the knights Templars are faid to have granted to Sir Wido de Meriton's wife *duas fummas bladi*.

BLAEU, William, a famous printer of Amfterdam, a difciple and friend of Tycho Brahe's: his Atlas, his Treatife of the Globes, Aftronomical Inftitutions, &c. and his fine impreffions, have fecured his memory. He died in 1638.

BLAFART, in *Commerce*, a fmall coin, current at Cologn, worth fomething more than a farthing of our money.

BLAGRAVE, John, the fecond fon of John Blagrave, of Bulmarfh-court near Sunning in Berkfhire, defcended of an ancient family in that country. From a grammar-fchool at Reading he was fent to St John's college in Oxford, where he applied himfelf chiefly to the ftudy of mathematics, and without taking any degree, afterwards retired to his patrimonial feat of Southcole-lodge near Reading, where he fpent the remainder of his life. In this manfion he died in the year 1611; and was buried in the church of St Lawrence, where a fumptuous monument was erected to his memory. Having never married, he bequeathed to all the pofterity of his three brothers, the fum of 50l. each payable at the age of 26; and he calculated his donation fo well, that near fourfcore of his nephews and their defcendants have reaped the benefit of it. He alfo fettled certain lands at Swallowfield in the fame county, as a provifion for the poor for ever. Among other charities, he left ten pounds to be annually difpofed of in the following manner: On good-Friday, the church-wardens of each of the three parifhes of Reading fend to the town-hall *one virtuous maid, who has lived five years with her maf ter*: there, in the prefence of the magiftrates, thefe three virtuous maids throw dice for the ten pounds. The two lofers are returned with a freth one the year following, and again the third year, till each has had three chances. He is faid to have been not more remarkable for his mathematical knowledge than for his candour and generofity to his acquaintance. His works are, 1. *A mathematical jewel*. Lond. 1585, fol. 2. *Of the making and ufe of the familiar ftaff*. Lond. 1590, 4to. 3. *Aftrolabium uranicum generale*. Lond. 1596, 4to. 4. *The art of dialing*. Lond. 1609, 4to.

BLAIN, among farriers, a diftemper incident to beafts, being a certain bladder growing on the root of the tongue, againft the windpipe, which fwells to fuch a pitch as to ftop the breath. It comes by great chaffing and heating of the ftomach, and is perceived by the beaft's gaping and holding out his tongue, and foaming at the mouth. To cure it, caft the beaft, take forth his tongue, and then, flitting the bladder, wafh it gently with vinegar and a little falt.

BLAIR, Dr Hugh, a diftinguifhed clergyman of the church of Scotland, was born in Edinburgh in 1718. His father, John Blair, was a merchant in that city, and grandfon of the famous Mr Robert Blair, minifter of St Andrews, and chaplain to King Charles I.; and one of the moft diftinguifhed clergymen of the period in which he lived. The views of Dr Blair, from his earlieft youth, were turned toward the church and his education received a fuitable direction. After the ufual grammatical courfe at fchool, he entered the Humanity Clafs in the univerfity of Edinburgh, in October 1730, and fpent eleven years at that celebrated feminary, affiduoufly employed in the literary and fcientific ftudies prefcribed by the church of Scotland to all who are to become candidates for her licenfe to preach the gofpel. During this important period he was diftinguifhed among his companions both for diligence and proficiency; and obtained from the profeffors under whom he ftudied repeated teftimonies of approbation. One of them deferves to be mentioned particularly, becaufe in his own opinion it determined the bent of his genius toward polite literature. An eflay, Περι του καλου, *On the Beautiful*, written by him when a ftudent of logic in the ufual courfe of academical exercifes, had the good fortune to attract the notice of Profeffor Stevenfon, and, with circumftances honourable to the author, was appointed to be read in public at the concluflon of the feffion. This mark of diftinction made a deep impreffion on his mind; and the eflay which merited it he ever after recollected with partial affection, and preferved to the day of his death as the firft earneft of his fame. Blair.

At this time Dr Blair commenced a method of ftudy which contributed much to the accuracy and extent of his knowledge, and which he continued to practife occafionally even after his reputation was fully eftablifhed. It confifted in making abftracts of the moft important works which he read, and in digefting them according to the train of his own thoughts. Hiftory, in particular, he refolved to ftudy in this manner; and, in concert with fome of his youthful affociates, he conftructed a very comprehenfive fcheme of chronological tables for receiving into its proper place every important fact that fhould occur. The fcheme devifed by this young ftudent for his own private ufe was afterwards improved, filled up, and given to the public by his learned friend Dr John Blair, prebendary of Weftminfter, in his valuable work, "Chronology and Hiftory of the World."

In the year 1739, Dr Blair took his degree of A. M. On that occafion he printed and defended a thefis *De Fundamentis et Obligatione Legis Naturæ*, which contains a fhort but mafterly difcuffion of this important fubject, and exhibits, in elegant Latin, an outline of the moral principles which have been fince more fully unfolded and illuftrated in his Sermons.

The univerfity of Edinburgh, about this period, numbered among her pupils many young men who were foon to make a diftinguifhed figure in the civil, the ecclefiaftical, and the literary hiftory of their country. With moft of them Dr Blair entered into habits of intimate connexion, which no future competition or jealoufy occurred to interrupt, which held them united through life in their views of public good, and which had the moft beneficial influence on their own improvement, on the progrefs of elegance and tafte among their contemporaries, and on the general intereffs of the community to which they belonged.

On the completion of his academical courfe, he underwent the cuftomary trials before the presbytery of Edinburgh, and received from that venerable body a licenfe

Blair. licenſe to preach the goſpel on the 21ſt of October 1741. His public life now commenced with very favourable proſpects. The reputation which he brought from the univerſity was fully juſtified by his firſt appearance in the pulpit; and, in a few months, the fame of his eloquence procured for him a preſentation to the pariſh of Coleſſie in Fife, where he was ordained to the office of the holy miniſtry on the 23d of September 1742. But he was not permitted to remain long in this rural retreat. A vacancy in the ſecond charge of the Canongate of Edinburgh furniſhed to his friends an opportunity of recalling him to a ſtation more ſuited to his talents. And, though one of the moſt popular and eloquent clergymen in the church was placed in competition with him, a great majority of the electors decided in favour of this young orator, and reſtored him in July 1743, to the bounds of his native city.

In this ſtation Dr Blair continued eleven years, diſcharging with great fidelity and ſucceſs the various duties of the paſtoral office. His diſcourſes from the pulpit in particular attracted univerſal admiration. They were compoſed with uncommon care; and occupying a middle place between the dry metaphyſical diſcuſſion of one claſs of preachers, and the looſe incoherent declamation of another, they blended together, in the happieſt manner, the light of argument with the warmth of exhortation, and exhibited captivating ſpecimens of what had hitherto been rarely heard in Scotland—the poliſhed, well compacted, and regular didactic oration.

In conſequence of a call from the town-council and general ſeſſion of Edinburgh, he was tranſlated from the Canongate to Lady Yeſter's, one of the city churches, on the 11th of October 1754: and on the 15th of June 1758, he was promoted to the High church of Edinburgh, the moſt important eccleſiaſtical charge in the kingdom. To this charge he was raiſed at the requeſt of the lords of council and ſeſſion, and of the other diſtinguiſhed official characters, who have their ſeats in that church. And the uniform prudence, ability, and ſucceſs which, for a period of more than forty years, accompanied all his miniſterial labours in that conſpicuous and difficult ſtation, ſufficiently evince the wiſdom of their choice.

Hitherto his attention ſeems to have been devoted almoſt excluſively to the attainment of profeſſional excellence, and to the regular diſcharge of his parochial duties. No production of his pen had yet been given to the world by himſelf, except two ſermons preached on particular occaſions, ſome tranſlations in verſe, of paſſages of Scripture, for the pſalmody of the church, and a few articles in the Edinburgh Review; a publication begun in 1755, and conducted for a ſhort time by ſome of the ableſt men in the kingdom. But ſtanding as he now did at the head of his profeſſion, and releaſed by the labour of former years from the drudgery of weekly preparation for the pulpit, he began to think ſeriouſly on a plan for teaching to others that art which had contributed ſo much to the eſtabliſhment of his own fame. With this view, he communicated to his friends a ſcheme of Lectures on Compoſition; and having obtained the approbation of the univerſity, he began to read them in the college on the 11th of December 1759. To this undertaking he brought all the qualifications requiſite for executing it well; and along with them a weight of reputation which could not fail to give effect to the leſſons he ſhould deliver. Blair. For beſide the teſtimony given to his talents by his ſucceſſive promotions in the church, the univerſity of St Andrews, moved chiefly by the merit of his eloquence, had, in June 1757, conferred on him the degree of D. D. a literary honour which at that time was very rare in Scotland. Accordingly his firſt courſe of lectures was well attended, and received with great applauſe. The patrons of the univerſity, convinced that they would form a valuable addition to the ſyſtem of education, agreed in the following ſummer to inſtitute a rhetorical claſs, under his direction, as a permanent part of their academical eſtabliſhment; and on the 7th of April 1762, his majeſty was graciouſly pleaſed "To erect and endow a profeſſorſhip of rhetoric and belles lettres in the univerſity of Edinburgh, and to appoint Dr Blair, in conſideration of his approved qualifications, Regius profeſſor thereof, with a ſalary of 70l." Theſe lectures he publiſhed in 1783, when he retired from the labours of the office; and the general voice of the public has pronounced them to be a moſt judicious, elegant, and comprehenſive ſyſtem of rules for forming the ſtyle, and cultivating the taſte of youth.

About the time in which he was occupied in laying the foundations of this uſeful inſtitution, he had an opportunity of conferring another important obligation on the literary world, by the part which he acted in reſcuing from oblivion the poems of Oſſian. It was by the ſolicitation of Dr Blair and Mr John Home that Mr Macpherſon was induced to publiſh his *Fragments of Ancient Poetry;* and their patronage was of eſſential ſervice in procuring the ſubſcription which enabled him to undertake his tour through the Highlands, for collecting the materials of Fingal, and of thoſe other delightful productions which bear the name of Oſſian. To theſe productions Dr Blair applied the teſt of genuine criticiſm; and ſoon after their publication gave an eſtimate of their merits in a *Diſſertation*, which, for beauty of language, delicacy of taſte, and acuteneſs of critical inveſtigation, has few parallels. It was printed in 1763, and ſpread the reputation of its author throughout Europe.

The great objects of his literary ambition being now attained, his talents were for many years conſecrated ſolely to the important and peculiar employments of his ſtation. It was not till the year 1777, that he could be induced to favour the world with a volume of the ſermons which had ſo long furniſhed inſtruction and delight to his own congregation. But this volume being well received, the public approbation encouraged him to proceed: three other volumes followed at different intervals; and all of them experienced a degree of ſucceſs of which few publications can boaſt. They circulated rapidly, and widely, wherever the Engliſh tongue extends; they were ſoon tranſlated into almoſt all the languages of Europe; and his preſent majeſty, with that wiſe attention to the intereſts of religion and literature which diſtinguiſhes his reign, was graciouſly pleaſed to judge them worthy of a public reward. By a royal mandate to the exchequer in Scotland, dated the 25th of July 1780, a penſion of 200l. a-year was conferred on their author, which continued unaltered till his death.

The motives which gave riſe to the fifth volume

Blair.

are ſufficiently explained by himſelf in his addreſs to the reader. The ſermons which it contains were compoſed at very different periods of his life, but they were all written out anew in his own hand, and in many parts recompoſed, during the courſe of the ſummer 1800, after he had completed his eighty-ſecond year. They were delivered to the publiſhers about ſix weeks before his death in the form and order in which they now appear. And it may gratify his readers to know that the laſt of them which he compoſed, though not the laſt in the order adopted for publication, was the ſermon on *a Life of Diſſipation and Pleaſure*—a ſermon written with great dignity and eloquence, and which ſhould be regarded as his ſolemn parting admonition to a claſs of men whoſe conduct is highly important to the community, and whoſe reformation and virtue he had long laboured moſt zealouſly to promote.

The ſermons which he has given to the world are univerſally admitted to be models in their kind; and they will long remain durable monuments of the piety, the genius, and ſound judgment of their author. But they formed only a ſmall part of the diſcourſes he prepared for the pulpit. The remainder modeſty led him to think unfit for the preſs; and, influenced by an excuſable ſolicitude for his reputation, he left behind him an explicit injunction that his numerous manuſcripts ſhould be deſtroyed. The greatneſs of their number was creditable to his profeſſional character, and exhibited a convincing proof that his fame as a public teacher had been honourably purchaſed by the moſt unwearied application to the private and unſeen labours of his office. It reſted on the uniform intrinſic excellence of his diſcourſes in point of matter and compoſition, rather than on foreign attractions; for his delivery, though diſtinct, ſerious, and impreſſive, was not remarkably diſtinguiſhed by that magic charm of voice and action which captivates the ſenſes and imagination, and which, in the eſtimation of ſuperficial hearers, conſtitutes the chief merit of a preacher.

In that department of his profeſſional duty which regarded the government of the church, Dr Blair was ſteadily attached to the cauſe of moderation. From diffidence, and perhaps from a certain degree of inaptitude for extemporary ſpeaking, he took a leſs public part in the conteſts of eccleſiaſtical politics than ſome of his cotemporaries; and, from the ſame cauſes, he never would conſent to become moderator of the general aſſembly of the church of Scotland. But his influence among his brethren was extenſive: his opinion, guided by that ſound uprightneſs of judgment which formed the predominant feature of his intellectual character, had been always held in high reſpect by the friends with whom he acted, and for many of the laſt years of his life it was received by them almoſt as a law. The great leading principle in which they cordially concurred with him, and which directed all their meaſures, was to preſerve the church on the one ſide from a ſtaviſh corrupting dependence on the civil power, and on the other from a greater infuſion of democratical influence than is compatible with good order, and the eſtabliſhed conſtitution of the country.

The reputation which he acquired in the diſcharge of his public duties was well ſuſtained by the great reſpectability of his private character. Deriving from family aſſociations a ſtrong ſenſe of clerical decorum, feeling on his heart deep impreſſions of religious and moral obligation, and guided in his intercourſe in the world by the ſame correct and delicate taſte which appeared in his writings, he was eminently diſtinguiſhed through life, by the prudence, purity, and dignified propriety of his conduct. His mind, by conſtitution and culture, was admirably formed for enjoying happineſs:—well balanced in itſelf by the nice proportion and adjuſtment of its faculties, it did not incline him to any of thoſe eccentricities, either of opinion or of action, which are too often the lot of genius; free from all tincture of envy, it delighted cordially in the proſperity and fame of his companions; ſenſible to the eſtimation in which he himſelf was held, it diſpoſed him to dwell at times on the thought of his ſucceſs with a ſatisfaction which he did not affect to conceal; inacceſſible alike to gloomy and to peeviſh impreſſions, it was always maſter of its own movements, and ready, in an uncommon degree, to take an active and pleaſing intereſt in every thing, whether important or trifling, that happened to become for the moment the object of his attention. This habit of mind, tempered with the moſt unſuſpecting ſimplicity, and united to eminent talents and inflexible integrity, while it ſecured to the laſt his own reliſh of life, was wonderfully calculated to endear him to his friends, and to render him an invaluable member of any ſociety to which he belonged. Accordingly there have been few men more univerſally reſpected by thoſe who knew him, more ſincerely eſteemed in the circle of his acquaintance, or more tenderly beloved by thoſe who enjoyed the bleſſings of his private and domeſtic connexion.

Blair.

In April 1748, he married his couſin Catharine Bannatine, daughter of the Rev. James Bannatine, one of the miniſters of Edinburgh. By her he had a ſon who died in infancy, and a daughter who lived to her twenty-firſt year, the pride of her parents, and adorned with all the accompliſhments that became her age and ſex. Mrs Blair herſelf, a woman of great good ſenſe and ſpirit, was alſo taken from him a few years before his death, after ſhe had ſhared with the tendereſt affection in all his fortunes, and contributed near half a century to his happineſs and comfort.

Dr Blair had been naturally of a feeble conſtitution of body; but as he grew up his conſtitution acquired greater firmneſs and vigour. Though liable to occaſional attacks from ſome of the ſharpeſt and moſt painful diſeaſes that afflict the human frame, he enjoyed a general ſtate of good health; and, through habitual cheerfulneſs, temperance, and care, ſurvived the uſual term of human life. For ſome years he had felt himſelf unequal to the fatigue of inſtructing his very large congregation from the pulpit; and, under the impreſſion which this feeling produced, he has been heard at times to ſay, with a ſigh, 'that he was left almoſt the laſt of his cotemporaries.' Yet he continued to the end in the regular diſcharge of all his other official duties, and particularly in giving advice to the afflicted, who from different quarters of the kingdom ſolicited his correſpondence. His laſt ſummer was devoted to the preparation of his fifth volume of ſermons; and in the courſe of it he exhibited a vigour of underſtanding and capacity of exertion equal to that of his beſt days.

He began the winter pleaſed with himſelf on account of the completion of this work, and his friends were

Blair. were flattered with the hope that he might live to enjoy the acceſſion of emolument and fame which he expected it would bring. But the ſeeds of a mortal diſeaſe were lurking unperceived within him. On the 24th of December 1800, he complained of a pain in his bowels, which, during that and the following day, gave him but little uneaſineſs; and he received as uſual the viſits of his friends. On the afternoon of the 26th, the ſymptoms became violent and alarming: He felt that he was approaching the end of his appointed courſe: and retaining to the laſt moment the full poſſeſſion of his mental faculties, he expired on the morning of the 27th, with the compoſure and hope which became a Chriſtian paſtor.

Blair, *John*, a Scottiſh author, was contemporary with, and the companion, ſome ſay the chaplain, of Sir William Wallace. He attended that great hero in almoſt all his exploits: and, after his death, which left ſo great a ſtain on the character of Edward I. of England, he wrote his memoirs in Latin. The injury of time has deſtroyed this work, which might have thrown the greateſt light on the hiſtory of a very buſy and remarkable period. An inaccurate fragment of it only has deſcended to us, from which little can be learned, and which was publiſhed, with a commentary, by Sir Robert Sibbald.

Blair, *James*, an eminent divine, was born and bred in Scotland, where he had at length a benefice in the epiſcopal church; but meeting with ſome diſcouragements he came to England, in the latter end of the reign of King Charles II. and was ſent by Dr Compton as a miſſionary to Virginia, and was afterwards, by the ſame biſhop, made commiſſary for that colony, the higheſt office in the church there. He diſtinguiſhed himſelf by his exemplary conduct and unwearied labours in the work of the miniſtry; and finding that the want of proper ſeminaries for the advancement of religion and learning was a great damp upon all attempts for the propagation of the goſpel, he formed a deſign of erecting and endowing a college at Williamſburgh, in Virginia, for profeſſors and ſtudents in academical learning. He therefore not only ſet on foot a voluntary ſubſcription; but, in 1693, came to England to ſolicit the affair at court: when Queen Mary was ſo well pleaſed with the noble deſign, that ſhe eſpouſed it with particular zeal; and King William readily concurring with her majeſty, a patent was paſſed for erecting and endowing a college by the name of the *William and Mary college*, of which Mr Blair was appointed preſident, and enjoyed that office near 50 years. He was alſo rector of Williamſburgh, and preſident of the council in that colony. He wrote, Our Saviour's divine Sermon on the Mount explained in ſeveral ſermons, 4 vols, octavo; and died in 1743.

Blair, *John*, an eminent chronologiſt, was educated at Edinburgh; and coming to London was for ſome time uſher of a ſchool in Hedge-Lane. In 1754, he preſented to the world that valuable publication, "The Chronology and Hiſtory of the World, from the Creation to the year of Chriſt 1753. Illuſtrated in LVI. Tables; of which four are introductory and contain the centuries prior to the firſt Olympiad; and each of the remaining LII. contain in one expanded View 50 Years, or half a Century." This volume, which is dedicated to Lord Chancellor Hardwicke, was publiſhed by ſubſcription, on account of the great expence of the plates, for which the author apologized in his preface, where he acknowledged great obligations to the earl of Bath, and announced ſome chronological diſſertations, wherein he propoſed to illuſtrate the diſputed points, to explain the prevailing ſyſtems of chronology, and to eſtabliſh the authorities upon which ſome of the particular eras depend. In January 1755, he was elected a fellow of the Royal Society; and in 1761 of the Society of Antiquaries. In 1756 he publiſhed a ſecond edition of his "Chronological Tables." In September 1757, he was appointed chaplain to the Princeſs Dowager of Wales, and mathematical tutor to the duke of York; and on Dr Townſhend's promotion to the deanery of Norwich, the ſervices of Dr Blair were rewarded, March 10. 1761, with a prebendal ſtall at Weſtminſter. The vicarage of Hinckley happening to fall vacant ſix days after, by the death of Dr Morres, Dr Blair was preſented to it by the dean and chapter of Weſtminſter; and in Auguſt that year he obtained a diſpenſation to hold with it the rectory of Burton Coggles in Lincolnſhire. In September 1763 he attended his royal pupil the duke of York in a tour to the continent; had the ſatisfaction of viſiting Liſbon, Gibraltar, Minorca, moſt of the principal cities in Italy, and ſeveral parts of France, and returned with the duke in Auguſt 1764. In 1768 he publiſhed an improved edition of his "Chronological Tables," which he dedicated to the princeſs of Wales, who had expreſſed her early approbation of the former edition. To the new edition were annexed, "Fourteen Maps of Ancient and Modern Geography, for illuſtrating the Tables of Chronology and Hiſtory. To which is prefixed a Diſſertation on the Progreſs of Geography." In March 1771, he was preſented by the dean and chapter of Weſtminſter to the vicarage of St Bride's in the city of London; which made it neceſſary for him to reſign Hinckley, where he had never reſided for any length of time. On the death of Mr Sims, in April 1776, he reſigned St Bride's, and was preſented to the rectory of St John the Evangeliſt in Weſtminſter; and in June that year obtained a diſpenſation to hold the rectory of St John with that of Horton, near Colebrooke Bucks. His brother Captain Blair falling glorioufly in the ſervice of his country in the memorable ſea-fight of April 12. 1782, the ſhock accelerated the Doctor's death. He had at the ſame time the influenza in a ſevere degree, which put a period to his life, June 24. 1782. His library was ſold by auction December 11-13th, 1782; and a courſe of his "Lectures on the Canons of the Old Teſtament" hath ſince been advertiſed as intended for publication by his widow.

Blair, Blaiſe.

Blair of Athol, a caſtle belonging to the duke of Athol, ſeated in a diſtrict of the ſame name, in Perthſhire in Scotland. W. Long. 3. 30. N. Lat. 56. 46. This caſtle was beſieged by the Highland army in 1746; and bravely defended by Sir Andrew Agnew, who was reduced to eat horſe's fleſh, until he was relieved by the Heſſians under the earl of Crawford.

BLAISE, a military order inſtituted by the kings of Armenia, in honour of St Blaiſe, anciently biſhop of Sebaſta in that country, the patron ſaint of that nation.

Blaiſois, Blake.

Juſtinian calls them knights of St Blaiſe and St Mary, and places them not only in Armenia, but in Paleſtine. They made a particular vow to defend the religion of the church of Rome, and followed the rule of St Baſil. The preciſe year of the inſtitution of the knights of St Blaiſe is not known; but they appear to have commenced about the ſame time with the knights Templars and Hoſpitallers; to the former of which they bore a near affinity, the regulars being the ſame in both.

BLAISOIS, a late province of France, bounded on the north of Beauce, on the eaſt by the Orleannois, on the ſouth by Berry, and on the weſt by Touraine. It now forms the department of Loire and Cher. Blois is the capital town.

BLAKE, Robert, a famous Engliſh admiral, born Auguſt 1589 at Bridgewater in Somerſetſhire, where he was educated at the grammar-ſchool. He went from thence to Oxford in 1615, where he was entered at St Alban's Hall. From thence he removed to Wadham college: and on the 10th of February 1617, he took the degree of bachelor of arts. In 1623, he wrote a copy of verſes on the death of Mr Cambden, and ſoon after left the univerſity. He was tinctured pretty early with republican principles, and diſliking that ſeverity with which Dr Laud, then biſhop of Bath and Wells, preſſed uniformity in his dioceſe, he began to fall into the puritanical opinions. His natural bluntneſs cauſing his principles to be well known, the puritan party returned him member for Bridgewater in 1640; and he ſerved in the parliament army with great courage during the civil war: but when the king was brought to trial, he highly diſapproved the meaſure as illegal, and was frequently heard to ſay, *he would as freely venture his life to ſave the king, as ever he did to ſerve the parliament*. But this is thought to have been chiefly owing to the humanity of his temper, ſince after the death of the king he fell in wholly with the republican party, and, next to Cromwell, was the ableſt officer the parliament had.

In 1648-9, he was appointed, in conjunction with Colonel Dean and Colonel Popham, to command the fleet; and ſoon after blocked up Prince Maurice and Prince Rupert in Kinſale harbour. But theſe getting out, Blake followed them from port to port: and at laſt attacked them in that of Malaga, burnt and deſtroyed their whole fleet, two ſhips only excepted, the Reformation in which Prince Rupert himſelf was, and the Swallow commanded by his brother Prince Maurice. In 1652, he was conſtituted ſole admiral; when he defeated the Dutch fleet commanded by Van Trump, Ruyter, and De Wit, in three ſeveral engagements, in which the Dutch loſt 11 men of war, 30 merchant ſhips, and, according to their own accounts, had 15,000 men ſlain. Soon after Blake and his colleagues, with a grand fleet of 100 ſail, ſtood over to the Dutch coaſt; and forced their fleet to fly for ſhelter into the Texel, where they were kept for ſome time by Monk and Dean, while Blake ſailed northward. At laſt, however, Trump got out, and drew together a fleet of 120 men of war; and, on the 3d of June, the generals Dean and Monk came to an engagement with the enemy off the north Foreland with indifferent ſucceſs: but the next day Blake coming to their aſſiſtance with 18 ſhips, gained a complete victory; ſo that if the Dutch had not ſaved themſelves on Calais ſands, their whole fleet had been ſunk or taken. Blake.

In April 1653, Cromwell turned out the parliament, and ſhortly after aſſumed the ſupreme power. The ſtates hoped great advantages from this; but were diſappointed. Blake ſaid on this occaſion to his officers, "It is not for us to mind ſtate affairs, but to keep foreigners from fooling us."—In November 1654 Cromwell ſent him with a ſtrong fleet into the Mediterranean, with orders to ſupport the honour of the Engliſh flag, and to procure ſatisfaction for the injuries that might have been done to our merchants. In the beginning of December, Blake came into the road of Cadiz, where he was treated with all imaginable reſpect; a Dutch admiral would not hoiſt his flag while he was there; and his name was now grown ſo formidable, that a French ſquadron having ſtopped one of his tenders, which had been ſeparated from Blake in a ſtorm, the admiral, as ſoon as he knew to whom it belonged, ſent for the captain on board, and drank Blake's health before him with great ceremony, under a diſcharge of five guns, and then diſmiſſed him. The Algerines were ſo much afraid of him, that, ſtopping the Sallee rovers, they obliged them to deliver up what Engliſh priſoners they had on board, and then ſent them freely to Blake, in order to purchaſe his favour. This, however, did not prevent his coming on the 10th of March before Algiers, and ſending an officer on ſhore to the dey to demand ſatisfaction for the piracies committed on the Engliſh, and the releaſe of all the Engliſh captives. The dey, in his anſwer, alleged, that the ſhips and captives belonged to private men, and therefore he could not reſtore them without offending all his ſubjects, but that he might eaſily redeem them: and if he thought good, they would conclude a peace with him, and for the future offer no acts of hoſtility to the Engliſh: and having accompanied this anſwer with a large preſent of freſh proviſions, Blake left Algiers, and ſailed on the ſame errand to Tunis; the dey of which place not only refuſed to comply with his requeſt, but denied him the liberty of taking in freſh water. "Here (ſaid he), are our caſtles of Goletto and Porto Ferino; do your worſt." Blake, at hearing this, began, as his cuſtom was when highly provoked, to curl his whiſkers; and after a ſhort conſultation with his officers, bore into the bay of Porto Ferino with his great ſhips and their ſeconds; and coming within muſket-ſhot of the caſtle and the line, fired on both ſo warmly, that in two hours time the caſtle was rendered defenceleſs, and the guns on the works along the ſhore were diſmounted, though 60 of them played at a time on the Engliſh. Blake found nine ſhips in the road, and ordered every captain to man his long boat with choice men, to enter the harbour and fire the Tuniſeens; which they happily effected, with the loſs of 25 men killed and 48 wounded, while he and his men covered them from the caſtle by playing continually on them with their great guns. This daring action ſpread the terror of his name through Africa and Aſia. From Tunis he ſailed to Tripoli, cauſed the Engliſh ſlaves to be ſet at liberty, and concluded a peace with that government. Thence returning to Tunis, the Tuniſeens implored his mercy, and begged him to grant them peace, which he did upon terms highly advantageous to England. He next ſailed to Malta, and obliged the knights to reſtore the effects taken

Blake. taken by their privateers from the Engliſh; and by theſe great exploits ſo raiſed the glory of the Engliſh name, that moſt of the princes and ſtates in Italy thought fit to pay their compliments to the Protector, by ſending ſolemn embaſſies to him.

He paſſed the next winter either in lying before Cadiz, or in cruiſing up and down the Straits; and was at his old ſtation, at the mouth of that harbour, when he received information that the Spaniſh Plate fleet had put into the bay of Sancta Cruz, in the iſland of Teneriffe: upon this he weighed anchor, with 25 men of war, on the 13th of April 1657; and on the 20th rode with his ſhips off the bay of Sancta Cruz, where he ſaw 16 Spaniſh ſhips lying in the form of a half-moon. Near the mouth of the haven ſtood a caſtle furniſhed with great ordnance; beſides which there were ſeven forts round the bay, with ſix, four, and three guns on each, joined to each other by a line of communication manned with muſketeers. To make all ſafe, Don Diego Diagues, general of the Spaniſh fleet, cauſed all the ſmaller ſhips to be moored cloſe along the ſhore; and the ſix large galleons ſtood farther out at anchor, with their broadſides towards the ſea. Blake having prepared for the fight, a ſquadron of ſhips was drawn out to make the firſt onſet, commanded by Captain Stayner in the Speaker frigate: who no ſooner received orders, than he ſailed into the bay, and fell upon the Spaniſh fleet, without the leaſt regard to the forts, which ſpent their ſhot prodigally upon them. No ſooner were theſe entered into the bay, but Blake, following after, placed ſeveral ſhips to pour broadſides into the caſtle and forts; and theſe played their parts ſo well, that, after ſome time, the Spaniards found their forts too hot to be held. In the mean time, Blake ſtruck in with Stayner, and bravely fought the Spaniſh ſhips, out of which the enemy were beaten by two o'clock in the afternoon; when Blake, finding it impoſſible to carry them away, ordered his men to ſet them on fire; which was done ſo effectually, that they were all reduced to aſhes, except two, which ſunk downright, nothing remaining above the water but part of the maſts. The Engliſh having now obtained a complete victory, were reduced to another difficulty by the wind, which blew ſo ſtrong into the bay, that they deſpaired of getting out. They lay under the fire of the caſtles and of all the forts, which muſt in a little time have torn them to pieces. But the wind ſuddenly ſhifting, carried them out of the bay; where they left the Spaniards in aſtoniſhment at the happy temerity of their audacious victors. This is allowed to have been one of the moſt remarkable actions that ever happened at ſea. "It was ſo miraculous (ſays the earl of Clarendon), that all men who knew the place wondered that any ſober man, with what courage ſoever endowed, would ever have undertaken it; and they could hardly perſuade themſelves to believe what they had done; whilſt the Spaniards comforted themſelves with the belief, that they were devils and not men who had deſtroyed them in ſuch a manner." This was the laſt and greateſt action of the gallant Blake. He was conſumed with a dropſy and ſcurvy; and haſtened home, that he might yield up his laſt breath in his native country, which he had ſo much adorned by his valour. As he came within ſight of land, he expired.—Never man, ſo zealous for a faction, was ſo much reſpected and eſteemed by the oppoſite factions. Diſintereſted, generous, liberal; ambitious only of true glory, dreadful only to his avowed enemies; he forms one of the moſt perfect characters of that age, and the leaſt ſtained with thoſe errors and violences which were then ſo predominant. The Protector ordered him a pompous funeral at the public charge: but the tears of his countrymen were the moſt honourable panegyric on his memory. The Lord Clarendon obſerves, "that he was the firſt man who brought ſhips to contemn caſtles on ſhore, which had ever been thought very formidable, and were diſcovered by him to make a noiſe only, and to fright thoſe who could be rarely hurt by them. He was the firſt that infuſed that degree of courage into ſeamen, by making them ſee by experience what mighty things they could do if they were reſolved; and the firſt that taught them to fight in fire as well as in water.

Blamont || Mont-Blanc.

BLAMONT, a town of France, in the department of Meurthe, ſeated on a little river called *Veſouze*, 12 miles ſouth of Luneville. E. Long. 6. 51. N. Lat. 48. 35.

BLANC. See Blank.

Blank, a town of France, in the department of Indre, ſeated on the river Creuſe, by which it is divided into two parts. The land about it is barren, and full of trees, heath, and lakes. E. Long. 1. 13. N. Lat. 46. 38.

Mont-Blanc, a ſtupendous mountain in Savoy, the higheſt of the Alps, and encompaſſed by thoſe wonderful collections of ſnow and ice called the *Glaciers*. See Alps.

Of theſe glaciers there are five, which extend almoſt to the plain of the vale of Chamouni, and are ſeparated by wild foreſts, corn-fields, and rich meadows; ſo that immenſe tracts of ice are blended with the higheſt cultivation, and perpetually ſucceed to each other in the moſt ſingular and ſtriking viciſſitude. All theſe ſeveral valleys of ice, which lie chiefly in the hollows of the mountains, and are ſome leagues in length, unite together at the foot of Mont-Blanc; the higheſt mountain in Europe, and probably of the ancient world.

The ſummit of this mountain was deemed inacceſſible before Dr Paccard, a phyſician at Chamouni, attempted to reach it in Auguſt 1786, and ſucceeded in the attempt. Soon after, the ſame undertaking was accompliſhed by M. de Sauſſure, who has publiſhed a narrative of the journey. He arrived at Chamouni, ſituated at the foot of the mountain, in the beginning of July 1787; but bad weather prevented him from aſcending until the firſt of Auguſt, when he began his expedition, accompanied by a ſervant and eighteen guides, who carried his philoſophical and other apparatus. His ſon was left at the Priory in Chamouni, and was employed in making meteorological obſervations, with which thoſe made on the top of the mountain might be compared. Although it is ſcarcely ſix miles and three quarters in a ſtraight line from the Priory of Chamouni to the top of Mont-Blanc, it requires nevertheleſs 18 hours to gain the ſummit, owing to the bad roads, the windings, and the great perpendicular height of the mountain. That he might be perfectly at liberty to paſs the night on what part of the mountain he pleaſed, he carried a tent with him; and

Mont-Blanc.

and he and his company ſlept in it the firſt night on that eminence which is firſt met with, and which is on the ſouth of the Priory, and about a mile perpendicularly above the village.

Hitherto the journey was free from danger, or even difficulty; the road being either rocky or covered with graſs; but thence upwards it was either wholly covered with ſnow or conſiſted of the moſt ſlippery ice. But the ſecond day's journey was attended with many difficulties. The ice valley on the ſide of the hill muſt be paſſed, in order to gain the foot of that chain of rocks bordering on the perpetual ſnows which cover Mont-Blanc. The paſſage through this valley is extremely dangerous, ſince it is interſected with numerous wide, deep, and irregular chaſms, which can only be croſſed by means of bridges naturally formed of ſnow, and theſe often very ſlender, extended as it were over an abyſs. One of the guides had almoſt periſhed here the evening before, as he with two others went to reconnoitre the road. They had the precaution to tie themſelves together with a long rope, and he in the middle had the misfortune to have the ſnow-bridge, over the wide and deep chaſm, break under him, ſo that he remained ſuſpended between his two comrades. M. de Sauſſure and his retinue paſſed very near the opening through which this man had fallen, and ſhuddered at the danger in which the poor fellow had been involved. The difficulties they had to encounter in this valley, and the winding road they were obliged to take through it, occaſioned their being three hours in croſſing it, although in a ſtraight line its breadth is not above three quarters of a mile.

After having reached the rocks, they mounted in a ſerpentine direction to a valley filled with ſnow, which runs from north to ſouth to the foot of the higheſt pinnacle. The ſurface of the ſnow in this valley has numerous fiſſures, which penetrate ſo deep, that their bottom is no where to be ſeen, although they are of conſiderable breadth. The ſides of theſe fiſſures, where the ſnow is broken perpendicularly, afford an opportunity of obſerving the ſucceſſive horizontal layers of ſnow which are annually formed.

The guides were deſirous of paſſing the night near one of the rocks on the ſide of this valley; but as the loftieſt of them is at leaſt 1400 yards perpendicularly lower than the ſummit of the mountain, M. de Sauſſure was deſirous of aſcending higher; in conſequence of which it would be neceſſary to encamp on the ſnow: but he found it difficult to convince his companions of the practicability of the plan. They imagined that during the night an inconſiderable cold prevailed in thoſe heights which were eternally covered with ſnow, and they were ſeriouſly afraid of periſhing. By proper encouragements, however, he induced them to proceed; and at four in the afternoon they arrived at the ſecond of the three plains of ſnow which they had to paſs. Here they encamped at the height of 3100 yards above the Priory of Chamouni, and 4250 yards above the level of the ſea, which is about 200 yards higher than the peak of Teneriffe. They did not proceed to the laſt plain, on account of the day having been far advanced; and they were alſo apprehenſive of expoſing themſelves to the avalanches which are frequently tumbling from the ſummit of the mountain. They dug a deep hole in the ſnow, ſufficiently wide to contain the whole company, and covered its top with the tent cloth. Mont-Blanc.

In making this encampment, they began to experience the effects of the rarity of the atmoſphere. Robuſt men, to whom ſeven or eight hours walking or rather climbing were an abſolute nothing, had ſcarcely raiſed five or ſix ſhovels full of ſnow, before they were under the neceſſity of reſting and relieving each other almoſt inceſſantly. One of them who had gone back a ſmall diſtance to fill a caſk with ſome water which he had ſeen in one of the crevices of the ſnow, found himſelf ſo much diſordered in his way, that he returned without the water, and paſſed the night in great pain. M. de Sauſſure, who is ſo much accuſtomed to the air of mountains as to ſay, "That in general I feel myſelf better in ſuch air than in that of the plains," was exhauſted with the fatigue of making his meteorological obſervations. The principal inconvenience which the thickneſs of the air produces, is an exceſſive thirſt. They had no means of procuring water but by melting the ſnow; and the little ſtove which they had carried with them, afforded but a feeble ſupply for twenty men.

This region of the mountain preſents to the view nothing but ſnow of the pureſt and moſt dazzling whiteneſs, forming a very ſingular contraſt with the ſky, which appears remarkably black.

"No living creature (ſays M. de Sauſſure) is to be ſeen in theſe deſolate regions, nor is the leaſt trace of vegetation to be diſcovered. It is the habitation of cold and ſilence! When I reflected that Dr Paccard, and his guide Jacques Balmat, who firſt viſited theſe deſerts, arrived here at the decline of the day, without ſhelter, without aſſiſtance, and wholly ignorant where or how they were to paſs the night, without even the certainty that it was poſſible for men to exiſt in the places they had undertaken to viſit; and yet that they were able to purſue their journey with unremitted intrepidity, I could not but admire their ſtrength and courage. My guides were ſo firmly prepoſſeſſed with the fear of cold, that they ſhut up every aperture of the tent with the utmoſt exactneſs; ſo that I ſuffered very conſiderably from the heat and the vitiated air, which had become highly noxious from the breaths of ſo many people in a ſmall room. I was frequently obliged, in the courſe of the night, to go out of the tent, in order to relieve my breathing. The moon ſhone with the brighteſt ſplendour, in the midſt of a ſky as black as ebony. Jupiter, rayed like the ſun, aroſe from behind the mountain in the eaſt. The light of theſe luminaries was reflected from the white plain or rather baſon in which we were ſituated; and dazzling eclipſed every ſtar except thoſe of the firſt and ſecond magnitude. At length we compoſed ourſelves to ſleep. We were, however, ſoon awakened by the noiſe of an immenſe maſs of ſnow (*avalanche*) which had fallen down from the top of the mountain, and covered part of the ſlope over which we were to climb the next day."

As they were obliged to melt a great quantity of ſnow, and prepare many neceſſaries for their farther progreſs in their journey, it was late the next morning before they took their departure.

"We began our aſcent (continues M. de Sauſſure) to the third and laſt plain, and then turned to the left, in our way to the higheſt rock, which is on the eaſt part

Mont-Blanc.

part of the ſummit. The aſcent is here very ſteep, being about 39 degrees inclined to the horizon, and bounded on each ſide by precipices. The ſurface of the ſnow was ſo hard and ſlippery, that our pioneers were obliged to hew out their footſteps with hatchets. Thus we were two hours in climbing a hill of about 530 yards high. Having arrived at this laſt rock, we turned to the weſtward, and climbed the laſt aſcent, whoſe height is about 300 yards, and its inclination about 28 or 29 degrees. On this peak the atmoſphere is ſo rare, that a man's ſtrength is exhauſted with the leaſt fatigue. When we came near the top, I could not walk fifteen or ſixteen ſteps without ſtopping to take breath; and I frequently perceived myſelf ſo faint, that I was under the neceſſity of ſitting down from time to time; and in proportion as I recovered my breath, I felt my ſtrength renewed. All my guides experienced ſimilar ſenſations, in proportion to their reſpective conſtitutions. We arrived at the ſummit of Mont-Blanc at 11 o'clock in the forenoon.

"I now enjoyed the grand ſpectacle which was under my eyes. A thin vapour, ſuſpended in the inferior regions of the air, deprived me of the diſtinct view of the loweſt and moſt remote objects, ſuch as the plains of France and Lombardy; but I did not ſo much regret this loſs, ſince I ſaw with remarkable clearneſs what I principally wiſhed to ſee, viz. the aſſemblage of thoſe high ridges, with the true form and ſituations of which I had long been deſirous of becoming thoroughly acquainted. I could ſcarcely believe my eyes. I thought myſelf in a dream when I ſaw below my feet ſo many majeſtic peaks, eſpecially the Needles, the Midi-Argentière, and Géant, whoſe baſes had proved ſo difficult and dangerous of acceſs. I obtained a perfect knowledge of their proportion to, and connexion with, each other; of their form and ſtructure; and a ſingle view removed more doubts, and afforded more information, than whole years of ſtudy.

"While I was thus employed, my guides pitched my tent and were fixing the apparatus for the experiments I had propoſed to make on boiling water; but when I came to diſpoſe my inſtruments for that purpoſe, I was obliged, almoſt at every inſtant, to deſiſt from my labours, and turn all my thoughts to the means of reſpiration. When it is conſidered that the mercury in the barometer was no higher than 16 inches and a line (17.145 inches Engliſh), and that this air had conſequently little more than half the denſity of that on the plains, the breathing muſt neceſſarily be increaſed, in order to cauſe, in a given time, the paſſage of a ſufficient quantity of air through the lungs. The frequency of reſpiration increaſed the circulation of the blood, more eſpecially as the arteries on the ſurface of the body had not the preſſure they were uſually accuſtomed to. We were all in a feveriſh ſtate, as will be ſeen in the ſequel.

"While I remained perfectly ſtill, I experienced but little uneaſineſs more than a ſlight oppreſſion about my heart; but, on the ſmalleſt bodily exertion, or when I fixed my attention on any object for ſome moments together, and particularly when I preſſed my cheſt in the act of ſtooping, I was obliged to reſt and pant for two or three minutes. My guides were in a ſimilar condition. We had no appetite; and our proviſions, which were all frozen, were not well calculated to excite it: nor had we any inclination for wine or brandy, which increaſed our indiſpoſition, moſt probably by accelerating the circulation of the blood. Nothing but freſh water relieved us; and much time and trouble were neceſſary to procure this article, as we could have no other than melted ſnow. I remained on the ſummit till half paſt three; and though I did not loſe a ſingle moment, I was not able to make all theſe experiments in four hours and a half, which I have frequently done in leſs than three on the ſea-ſide. However, I made with great exactneſs thoſe which were moſt eſſential.

Mont-Blanc.

"We returned much eaſier than I could have expected; ſince, in deſcending, we did not experience any bad effects from the compreſſion of the thorax; our reſpiration was not impeded, and we were not under the neceſſity of reſting, in order to recover our breath and ſtrength. The road down to the firſt plain was nevertheleſs by no means agreeable, on account of the great declivity; and the ſun, ſhining ſo bright on the tops of the precipices below us, made ſo dazzling an appearance, that it required a good head to avoid growing giddy from the proſpect. We pitched our tent again on the ſnow, though we were more than 400 yards below our laſt night's encampment. I was here convinced that it was the rarity of the air, and not the fatigue of the journey, that had incommoded us on the ſummit of the mountain, otherwiſe we ſhould not have found ourſelves ſo well, and ſo able to attack our ſupper with a good appetite. I could now alſo make my meteorological obſervations without any inconvenience. I am perſuaded that the indiſpoſition in conſequence of the rarity of the atmoſphere is different in different people. For my own part, I felt no inconvenience at the height of 4000 yards, or nearly two miles and a quarter; but I began to be much affected when I was higher in the atmoſphere.

"The next day we found that the ice valley which we had paſſed on our firſt day's journey had undergone a conſiderable change from the heat of the two preceding days, and that it was much more difficult to paſs than it had been in our aſcent. We were obliged to go down a declivity of ſnow of no leſs than 50 degrees of inclination, in order to avoid a chaſm which had happened during our expedition. We at length got down as low as the firſt eminence on the ſide about half after nine, and were perfectly happy to find ourſelves on a foundation which we were ſure would not give way under our feet.

From the narrative, we learn, that the ſummit of the mountain is a ridge nearly horizontal, lying eaſt and weſt: the ſlope at each extremity is inclined from 28 to 30 degrees, the ſouth ſide between 15 and 20, and the north about 45 or 50. This ridge is ſo narrow as ſcarcely to allow two people to walk abroad, eſpecially at the weſt end, where it reſembles the roof of a houſe. It is wholly covered with ſnow; nor is any bare rock to be ſeen within 150 yards of the top. The ſurface of the ſnow is ſcaly, and in ſome places covered with an icy cruſt, under which the ſnow is duſty, and without conſiſtence. The higheſt rocks are all granites; thoſe on the eaſt ſide are mixed with ſteatites; thoſe on the ſouth and the weſt contain a large quantity of ſchoerl, and a little *lapis corneus*. Some of them, eſpecially thoſe on the eaſt, which are about 150 yards below,

Mont-Blanc || Blanch-Ferme.

low the ſummit, ſeem to have been lately ſhivered with lightning.

M. de Sauſſure ſaw no animals on the mountain, except two butterflies, which he ſuppoſes muſt have been driven thither by the wind. Lichens are the only vegetables which are found on the more elevated parts of theſe mountains: the *ſilene acaulis*, which grows in great quantities on the lower parts, diſappears at the height of about two miles above the level of the ſea.

M. de Sauſſure has given us the height of the barometer on the top of Mont-Blanc. Auguſt 3. at noon, 16 inches, 0 lines, and $\frac{144}{160}$ of a line, French meaſure (i. e. 16.181 Engliſh); and Reaumur's thermometer was 2.3 below the freezing point. M. Sennebier, at the ſame time, obſerved at Geneva the barometer 27.2 $\frac{1085}{1000}$ (29.020 inches Engliſh); and the thermometer 22.6 above freezing. From theſe data he makes the height of Mont-Blanc 2218 toiſes, or 14180 Engliſh feet (about $2\frac{1}{4}$ miles), according to M. de Luc's rule; and 2272 toiſes, or 14525 Engliſh feet, according to M. Trembley's. To theſe heights 13 toiſes, or 83 feet, the height of M. Sennebier's room above the lake of Geneva, muſt be added, to give the height of the mountain above the level of the lake 14263 feet, according to M. de Luc, and 14608 feet according to M. Trembley. Sir George Shuckburgh made the height of Mont Blanc, by trigonometrical meaſurement, 14429 feet above the lake, which is almoſt the mean between the other two. The reſult of the obſervations made at Chamouni, contemporary with thoſe on Mont-Blanc, agrees ſtill nearer with Sir George's meaſurement. The general mean reſult makes the ſummit of Mont-Blanc 2450 toiſes, 15973 Engliſh feet, or three miles nearly, above the level of the ſea.

M. de Sauſſure found by his electrometer, that the electricity of the air on the ſummit of the mountain was poſitive. Water boiled at 68.993 degrees of a thermometer, which riſes to 80 with the barometer 27 French inches high. The wind was north and extremely piercing on the ſummit; but, ſouthward of the ridge, the temperature of the air was agreeable. The experiments with lime-water, and with the cauſtic alkali, ſhow that the air was mixed with carbonic acid or fixed air. See ATMOSPHERE.

BLANC-Manger, Fr. *q. d.* white food, is a preparation of diſſolved iſinglaſs, milk, ſugar, cinnamon, &c. boiled into a thick conſiſtence, and garniſhed for the table with blanched almonds. It is cooling and ſtrengthening.

BLANCARDS, a name given to certain linen-cloth, thus called, becauſe the thread uſed to weave them has been half blanched or bleached before it was uſed. They are manufactured in Normandy, particularly in the places which are in the diſtrict or under the juriſdiction of Pont-Audemer, Bernay, and Lifieux.

BLANCH-FERME, or *Blank farm*, a white farm, that is, where the rent was to be paid in ſilver, not in cattle. In ancient times, the crown rents were many times reſerved to be paid in *libris albis*, called *blanch firmes*: in which caſe the buyer was holden *dealbare firmam*, viz. his baſe money or coin, worſe than ſtandard, was melted down in the exchequer, and reduced to the fineneſs of ſtandard ſilver; or inſtead thereof be paid to the king 12d. in the pound by way of addition.

Blanch-Holding || Blanching.

BLANCH-Holding, in *Law*, a tenure by which the vaſſal is only bound to pay an eluſory yearly duty to his ſuperior merely as an acknowledgement of his right. See LAW.

BLANCHARD, JAMES, an excellent painter, was born at Paris, and learnt the rudiments of his profeſſion under Nicholas Bolleri his uncle; but left him at 20 years of age, and travelled into Italy. He ſtaid two years at Rome, and from thence went to Venice, where he was ſo charmed with the works of Titian, Tintoret, and Paul Veroneſe, that he reſolved to follow their manner; and in this he ſucceeded ſo far, that at his return to Paris he ſoon became generally eſteemed for the novelty, beauty, and force of his pencil. He painted two galleries at Paris, one belonging to Perault, the firſt preſident, and the other to Bullion, ſuperintendant of the finances; but his capital piece is a picture of the deſcent of the Holy Ghoſt in the church of Notre Dame. He was ſeized in the flower of his age, with a fever and impoſthume in the lungs, of which he died in 1683. Of all the French painters Blanchard was eſteemed the beſt colouriſt, he having carefully ſtudied this part of painting in the Venetian ſchool.

Carte-BLANCHE. See CARTE.

BLANCHING, the art or manner of making any thing white. See BLEACHING.

BLANCHING of Iron plates, is performed with aqua-fortis and tin.

BLANCHING of Woollen Stuffs, is done with ſoap, or with chalk, or with ſulphur or brimſtone.

BLANCHING of Silk, is performed with ſoap and brimſtone.

BLANCHING of Wax, is by expoſing it to the ſun and dew. See WAX.

BLANCHING, in coinage, the operation performed on the planchets, or pieces of ſilver, to give them the requiſite luſtre and brightneſs. They alſo blanch pieces of plate, when they would have them continue white, or have only ſome parts of them burniſhed.—Blanching, as it is now practiſed, is performed by heating the pieces on a kind of peel with a wood fire, in the manner of a reverbatory; ſo that the flame paſſes over the peel. The pieces being ſufficiently heated and cooled again, are put ſucceſſively to boil in two pans, which are of copper: in theſe they put water, common ſalt, and tartar of Montpelier. When they have been well drained of this water in a copper ſieve, they throw ſand and freſh water over them; and when dry, they are well rubbed with towels.

BLANCHING, among gardeners, an operation whereby certain ſallets, roots, &c. are rendered whiter than they would otherwiſe be.—It is thus: After pruning off the tops and roots of the plants to be blanched, they plant them in trenches about ten inches wide, and as many deep, more or leſs as is judged neceſſary; as they grow up, care is taken to cover them with earth, within four or five inches of their tops: this is repeated from time to time, for five or ſix weeks; in which time they will be fit for uſe, and of a whitiſh colour where covered by the earth.

BLANCHING alſo denotes the operation of covering iron plates with a thin coat or cruſt of tin. See LATTEN.

Blanco || Blanket.

BLANCO, a cape or promontory of Africa, in the Atlantic ocean. W. Long. 18. 30. N. Lat. 20. 0.

BLANCO, a promontory of Peru in South America, in the South ſea. W. Long. 81. 10. N. Lat. 11. 50.

BLANDA, in *Ancient Geography*, a Roman city in the territory of Barcino in Hiſpania Citerior: Now *Blanes*, a ſea port town of Catalonia, ſituated near the river Tordara. E. Long. 3. 40. N. Lat. 41. 30.

BLANDFORD, a town of Dorſetſhire in England. It is pleaſantly ſeated on the river Store near the Downs, but has been ſubject to ſeveral dreadful fires, particularly in 1731, when almoſt the whole town was burnt down; but it has ſince been rebuilt finer than before. It has the title of a marquiſate, and lies in W. Long. 2. 15. N. Lat. 50. 50.

BLANDONONA, in *Ancient Geography*, a ſmall city of Liguria in Italy: Now *Bron*, or *Broni*. See that article.

BLANES. See BLANDA.

BLANK, or BLANC, in a general ſenſe, ſignifies white; and *blancus*, or *blanca*, is more particularly uſed for a kind of white or ſilver money, of baſe alloy, coined by Henry V. in thoſe parts of France then ſubject to England, valued at 8d. ſterling. They were forbidden by his ſucceſſor to be current in this realm. In ſome ancient charters they are called *ſolidi blanci*, *white ſhillings*.

BLANK alſo denotes a ſmall copper coin, formerly current in France, at the rate of five deniers Tournois. They had alſo great blanks, or pieces of three blanks, and others of ſix, in reſpect whereof the ſingle ſort were called little blanks; but of late they are all become only monies of account.

BLANK, or *BLANK-Ticket*, in lotteries, that to which no prize is allotted. The French have a game, under the denomination *blanque*, anſwering to our lottery.

BLANK, in coinage, a plate, or piece of gold or ſilver, cut and ſhaped for a coin, but not yet ſtamped.

BLANK-Bar, in *Law*, is uſed for the ſame with what we call a *common bar*, and is the name of a *plea in bar*, which in an action of treſpaſs is put in to oblige the plaintiff to aſſign the certain place where the treſpaſs was committed.

BLANKS, in judicial proceedings, certain void ſpaces ſometimes left by miſtake. A blank (if ſomething material be omitted) in a declaration, abates the ſame: and ſuch a blank is a good cauſe of demurrer.

BLANK-Verſe, in the modern poetry, that compoſed of a certain number of ſyllables, without the aſſiſtance of rhime. See POETRY, Part iii.

Point-BLANK. See *POINT-Blank*.

BLANKENBERG, a town of Germany, in the circle of Weſtphalia and duchy of Berg. E. Long. 7. 18. N. Lat. 50. 54.

BLANKENBURG, a town of Germany, in the circle of Lower Saxony, and capital of the county of the ſame name, ſubject to the duke of Brunſwic-Wolfembuttle. The caſtle or palace is a modern building, and is the reſidence of the princeſs dowager. E. Long. 11. 20. N. Lat. 51. 52.

BLANKENHEIM, a ſmall territory of Germany with the title of a county, which is part of that of Eyffel, near the archbiſhopric of Cologn and duchy of Juliers.

BLANKET, in *Commerce*, a warm woolly ſort of ſtuff, light and looſe woven, chiefly uſed in bedding. The manufacture of blankets is chiefly confined to Witney in Oxfordſhire, where it is advanced to that height, that no other place comes near it. Some attribute a great part of the excellency of the Witney blankets to the abſterſive nitrous water of the river Windruſh, wherewith they are ſcoured; others rather think they owe it to a peculiar way of looſe ſpinning which the people have thereabouts. Be this as it will the place has engroſſed almoſt the whole trade of the nation for this commodity; inſomuch that the wool fit for it centres here from the furthermoſt parts of the kingdom. Blankets are made of felt-wool, i. e. wool from off ſheep-ſkins, which they divide into ſeveral ſorts. Of the head wool and bay wool they make blankets of twelve, eleven, and ten quarters broad; of the ordinary and middle ſort blankets of eight and ſeven quarters broad; of the beſt tail wool blankets of ſix quarters broad, commonly called *cuts*, ſerving for ſeamens hammocks. See HYKES.

Toſſing in a Blanket || Blanquille.

Toſſing in a BLANKET, a ludicrous kind of puniſhment, of which we find mention in the ancients under the denomination *ſagatio*. Martial deſcribes it geographically enough. *Ibis ab excuſſo, miſſus ad aſtra, ſago*. A late writer repreſents it as one of Otho's imperial delights. But this is turning the tables: that emperor's diverſion, as related by Suetonius, was not to be the ſubject, but the agent, in the affair: it being his practice to ſtroll out in dark nights, and where he met with a helpleſs or drunken man to give him the diſcipline of the blanket.

BLANKOF, JOHN TEUNISZ, a painter of great abilities, was born at Alkmaar in 1628; and received his earlieſt inſtruction from Arent Tierling: but afterwards he was ſucceſſively the diſciple of Peter Scheyenburg and Cæſar Van Everdingen. When he had ſpent ſome years with thoſe maſters, he went to Rome, where, during his continuance in that city, he was ſtudiouſly diligent in copying the works of the beſt maſters, and was admitted into the ſociety of Flemiſh painters called *Bentvogels*, who gave him the name of *Jan Maat* (which in Dutch ſignifies mate or companion), and by that name he is moſt generally known. His ſubjects were landſcapes, with views of rivers or ſea-ſhores, havens or ports, which he executed with a light free pencil; and in the repreſentation of ſtorms and calms (as nature was always his model) he deſcribed thoſe ſubjects with great truth, exactneſs, and neatneſs of handling. The pictures of this maſter which are moſt commended are the Italian ſea-ports, with veſſels lying before them. He poſſeſſed a lively imagination; nor was his hand leſs expeditious than his thoughts; and the connoiſſeurs agreed in opinion, that if he had beſtowed more labour on his pictures than he uſually did, or if he had finiſhed them more highly, he would certainly have deſtroyed a great deal of their ſpirit, force, and effect. His moſt capital performance is a view of the ſea-ſhore, with the waves retiring at ebb tide; which is deſcribed by Houbraken as being wonderfully beautiful and natural. He died in 1670.

BLANQUILLE, in *Commerce*, a ſmall ſilver coin current in the kingdom of Morocco, and all that part of the coaſt of Barbary; it is worth about three halfpence of our money.

Blare || Blaſphemy.

BLARE, in *Commerce*, a ſmall copper coin of Bern, nearly of the ſame value with the ratz.

BLAREGNIES, a town of the Auſtrian Netherlands, in the province of Hainault, ſeated in E. Long. 3. 35. N. Lat. 50. 30. Near this place the Engliſh and their allies under the duke of Marlborough obtained a very bloody victory over the French in 1709. This is moſt commonly called the *battle of Malplaquet*. See MALPLAQUET.

BLASE, biſhop of Sebaſta in Cappadocia, in the ſecond and third centuries, ſuffered death under Dioclesian by decapitation, after being whipped and having his fleſh torn with iron combs. He is a perſon of great note among the vulgar, who in their proceſſions relative to the woollen trade, always carry a repreſentation of him as the inventor or patron of the art of wool combing; though that art muſt have been known long before his time. It is difficult to ſay how the invention came to be attributed to him; but it had probably no better origin than the circumſtance of his being tortured by inſtruments uſed in combing of wool.

BLASIA, LEATHER-CUP. See BOTANY *Index*.

BLASPHEMY (*blaſphemia*, or *blaſphemium*), in middle-age writers, denotes ſimply the blaming or condemning of a perſon or thing. The word is Greek, βλασφημια, from βλαπτω, *lædo*. Among the Greeks to blaſpheme was to uſe words of evil omen, or that portended ſomething ill, which the ancients were careful to avoid, ſubſtituting in lieu of them other words of ſofter and gentler import, ſometimes the very reverſe of the proper ones.

BLASPHEMY is more peculiarly reſtrained to evil or reproachful words ſpoken of the Deity. Auguſtine ſays, *Jam vulgo blaſphemia non accipitur niſi mala verba de Deo dicere.*

According to Lindwood, blaſphemy is an injury offered to God, by denying that which is due and belonging to him; or attributing to him what is not agreeable to his nature. By the Moſaic law, blaſphemy was puniſhed with death; Levit. xxiv. ver. 13—16. As alſo by the civil law; Novel. 77. In Spain, Naples, France, and Italy, the pains of death are not now inflicted. In the empire, either amputation or death is made the puniſhment of this crime.

By the canon law, blaſphemy was puniſhed only by a ſolemn penance; and by cuſtom either by a pecuniary or corporal puniſhment. By the Engliſh laws, blaſphemies of God, as denying his being or providence, and all contumelious reproaches of Jeſus Chriſt, &c. are offences by the common law, and puniſhable by fine, impriſonment, and pillory. And, by the ſtatute law, he that denies one of the perſons in the Trinity, or aſſerts there are more than one God, or denies Chriſtianity to be true, for the firſt offence is rendered incapable of any office; for the ſecond, adjudged incapable of ſuing, being executor or guardian, receiving any gift or legacy, and to be impriſoned for three years.

According to the law of Scotland, the puniſhment of blaſphemy is death. The firſt ſpecies thereof conſiſts in railing at or curſing God; and here the ſingle act conſtitutes the crime. The ſecond conſiſts in denying the exiſtence of the Supreme Being, or any of the perſons of the Trinity; and therein obſtinately perſevering to the laſt. For reiterated denial does not fully conſtitute the crime, becauſe the ſtat. of Char. II. 1661, admits of repentance before conviction, as a complete expiation. Blaſphemy || Blaſting.

This ſtatute of 1661 is ratified by a ſtatute of King William, whereby the calling in queſtion the exiſtence of God, or of any of the perſons of the Trinity, or the authority of Scripture, or the Divine Providence, is made penal: For the firſt offence, impriſonment till ſatisfaction given by public repentance in ſackcloth; for the ſecond, a fine of a year's valued rent of the real eſtate, and twentieth part of the perſonal eſtate; and the trial in both theſe caſes is competent to inferior judges. The trial of the third offence is death, to be tried only by the juſtices.

BLASPHEMY againſt the Holy Ghoſt. Divines are not agreed with reſpect to the nature of the crime thus denominated (Mat. chap. xii. ver. 31.), and the grounds of the extreme guilt aſcribed to it. Dr Tillotſon maintains, that it conſiſted in maliciouſly attributing the miraculous operations which Chriſt performed by the power of the Holy Ghoſt to the devil. Dr Whitby refers it to the diſpenſation of the Holy Ghoſt, which commenced after our Lord's reſurrection and aſcenſion; and thoſe were guilty of the crime who perſiſted in their unbelief and blaſphemed the Holy Ghoſt, repreſenting him as an evil ſpirit. The crime was unpardonable, becauſe it implied a wilful oppoſition to the laſt and moſt powerful evidence which God would vouchſafe to mankind, and precluded the poſſibility of a recovery to faith and repentance.

BLAST, *flatus*, in the military art, a ſudden compreſſion of the air, cauſed by the diſcharge of the bullet out of a great gun. The blaſt ſometimes throws down part of the embraſures of the wall.

BLAST is alſo applied in a more general ſenſe to any forcible ſtream of wind or air, excited by the mouth, bellows, or the air.

BLAST is alſo uſed in agriculture and gardening, for what is otherwiſe called a *blight*.

Blaſts or blaſtings are by ſome ſuppoſed owing to cold; by others to the want of a due ſupply of ſap; by others to aſcending fumes of the earth; by others to ſharp winds and froſts, immediately ſucceeding rains. That ſpecies called *uredines* or *fire-blaſts*, is ſuppoſed by Mr Hales owing to the ſolar rays reflected from or condenſed in the clouds, or even collected by the denſe ſteams in hop-gardens and other places. The effect of them is to wither, ſhrivel, ſcorch, turn black, and as it were burn up the leaves, bloſſoms, and fruits of trees, ſhrubs, herbs, graſs, corn, even for whole tracts of ground.

Phyſicians alſo ſpeak of a kind of blaſts affecting human bodies, and cauſing eryſipelas, palſies, &c.

BLASTS, among miners. See DAMPS.

BLASTED, ſomething ſtruck with a blaſt. Among the Romans, places blaſted with lightning were to be conſecrated to Jupiter, under the name of *bidentalia* and *putealia*. It was alſo a ceremonial of religion to burn blaſted bodies in the fire.

BLASTING, among miners, a term for the tearing up rocks, which they find in their way, by gunpowder. The method of doing which is this: they make a long hole like the hollow of a large gun-barrel in the rock they would ſplit; this they fill with gunpowder; then they firmly ſtop up the mouth of the hole

Blatobulgium || Blaye.

hole with clay, except a touch-hole, at which they leave a match to fire it. A ſmall quantity of powder does great things this way.

BLATOBULGIUM, in *Ancient Geography*, (Antonine); a place of the Brigantines in Britain, having a camp of exploratores or ſcouts near Solway Frith and promontory; now called *Bulneſs*, (Camden).

BLATTA, or Cockroach. See Entomology *Index*.

BLATTARIÆ, (from *Blatta*, a moth or little worm), the title of Scopoli's 12th natural claſs, in his Flora Carniolica. It is taken from the *Blattaria*, which was Tournefort's generic name for the verbaſcum of Linnæus. See Verbascum.

BLAUBEUREN, a town of Germany in the circle of Suabia, and duchy of Wirtemberg. E. Long. 9. 57. N. Lat. 48. 22.

BLAVET, a ſea-port town of Brittany in France, ſituated at the mouth of a river of the ſame name. It is one of the ſtations of the navy of France, and is ſometimes called *Port Lewis*. W. Long. 3. 5. N. Lat. 47. 40.

BLAVIA, or Blavium, in *Ancient Geography*, a town of Aquitain, on the bank of the Garone, below its confluence with the Dordone: Now *Blaye;* which ſee.

BLAYE, an ancient and ſtrong town of France, in the department of Gironde. It is ſituated on the river Gironde, has a harbour much frequented by foreigners, and the ſhips which ſail to Bourdeaux are obliged to leave their guns here. The river is 3800 yards broad at Blaye; for which reaſon a battery was built upon an iſland in 1689, to command the veſſels that ſail up. The city is built on a rock, and has a citadel with four baſtions, which is called the *Upper Town*. The lower town is ſeparated from the upper by a ſmall river; and in the lower town the merchants reſide with their magazines. The neighbourhood produces a great deal of corn, which they ſend abroad when the exportation of it is allowed. W. Long. 1. 23. N. Lat. 45. 6. Blaze || Blea.

BLAZE, a white ſpot in a horſe's face.

BLAZONING, or Blazonry, in *Heraldry*, the decyphering the arms of noble families. The word originally ſignified the blowing or winding of a horn; and was introduced into heraldry as a term denoting the deſcription of things borne in arms, with their proper ſignifications and intendments, from an ancient cuſtom the heralds, who were judges, had of winding a horn at juſts and tournaments, when they explained and recorded the atchievements of knights. See Heraldry.

BLEA, in the anatomy of plants, the inner rind or dry bark. See Plants.

BLEACHING.

1. BLEACHING, or Blanching (*Blanchiment*, Fr.) originally ſignifies the art of whitening any ſubſtance by other means than painting; but it is more particularly applied to a branch of trade or manufacture exerciſed by perſons called *bleachers*, who, by certain proceſſes of a chemical nature, give to woollen, linen, and cotton ſtuffs, &c. the greateſt degree of *whiteneſs* of which they are ſuſceptible.

2. Till lately this art had not occupied any conſiderable ſhare of attention, except to thoſe who were more immediately concerned in the practice of it. Its proceſſes were few, and though exceedingly tedious, were ſimple and eaſily underſtood. The late rapid progreſs of chemical ſcience, has however thrown ſo much light on the theory of the art, and contributed ſo materially to the improvement of its proceſſes, that it is become a moſt pleaſing field of inveſtigation, and demands a much more conſiderable ſpace in a modern encyclopædia than it has hitherto obtained.

3. We propoſe, therefore, to treat of bleaching in the following article more fully, and more in detail than is uſually done, and to bring, as far as poſſible, into one point of view, every thing of importance which has been lately written on the ſubject by Berthollet, De Charmes, Rupp, Kirwan, Higgins, Chaptal, O'Reilly, and other eminent chemiſts.

4. The improvements made by theſe gentlemen have been ſo rapid in their ſucceſſion, and ſo important in their conſequences, as to have rather created a new art, than ameliorated the old. It will hereafter be ſcarcely credible, that in the ſpace of about twenty years, the whole of an ancient ſyſtem of bleaching, which had prevailed from time immemorial, ſhould have been entirely overturned, and replaced by one of the moſt ſcientific accuracy, and expeditious management.

5. The origin of this art, like that of many others which are ſubſervient to the comforts or conveniences of man, is involved in great obſcurity. We find that a deſire for rich and brilliant colours, and for garments of the pureſt white, has prevailed in civilized ſociety from the earlieſt periods of which we have any accounts. This was more particularly the caſe in the eaſtern countries, as appears from the earlieſt writers, both of ſacred and profane hiſtory. It is, however, probable, that the art of dyeing was antecedent to that of bleaching; but the effects of the ſun and air in whitening garments, and in diſcharging the leſs permanent colours imprinted by the dyer, which muſt have been very obſervable in thoſe climates, would ſoon lead an ingenious people to imitate or increaſe the action of the atmoſphere, and turn to advantage as a luxury what in many caſes muſt have been conſidered as an inconvenience. Of the methods employed by the ancients in whitening or ſcouring their various ſtuffs we are almoſt entirely ignorant; we know, however, that the Egyptians were accuſtomed to uſe ſome kinds of clay for theſe purpoſes, and that they availed themſelves of the bleaching powers of the atmoſphere. Pliny informs us that a plant, to which he gives the name *radicula*, was employed for ſcouring wool*; this is probably the ſame with what we call *ſoapwort*. The acrid juice of ſome ſpecies of euphorbia, eſpecially the pep-

* *Plin.* lib. xix. c. 3.

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lus, is ſaid to have been uſed in France for whitening linen.

6. The art of bleaching is very extenſive, and comprehends a variety of objects, whether we conſider it as a diſtinct branch of trade, or as an art called in to the aſſiſtance or completion of ſeveral of our manufactures. It is eſſential to the perfection of the linen, the cotton, the ſilken, the woollen manufacture; it is in many caſes a neceſſary ſtep in preparing ſtuffs for the dyer, and the calico-printer; and to it the paper-maker and the wax-chandler are indebted for the beauty of their productions. To this art belongs the ſcouring of clothes and ſtuffs, the removal of colours, ſpots, and ſtains, the cleaning of books and prints.

7. We ſhall in the following pages deſcribe the various methods employed to anſwer theſe ſeveral purpoſes, and ſhall endeavour to trace the ſteps by which bleaching has arrived at the high degree of perfection which it has lately attained. In detailing the proceſſes of the artiſt, we ſhall, however, avoid as much as poſſible, his technical language, ſo as to render this article not only a uſeful aſſiſtant to the practical bleacher, but an intereſting object to the philoſophic chemiſt. Animal Subſtances.

8. As the methods of bleaching animal and vegetable ſubſtances are different, we may properly divide this article into two parts, in the firſt of which we ſhall deſcribe the proceſſes for bleaching wool and ſilk, and in the ſecond the methods employed in the bleaching of linen, cotton, paper, and other materials furniſhed by vegetables.

PART I. BLEACHING OF ANIMAL SUBSTANCES.

9. THE ſubſtances which are derived from the animal kingdom, and which we more particularly employ as articles of clothing, differ eſſentially from thoſe which are the produce of vegetables. The art of bleaching depends very much on an exact knowledge of thoſe peculiar characters, which form the line of ſeparation between theſe two claſſes of bodies, and it is therefore of importance to him who is deſirous not only to be maſter of the ſeveral proceſſes in this art, but to underſtand the theory of the ſubject, to be acquainted with the nature and properties of each.

10. The animals from whoſe ſpoils we obtain our principal clothing are nouriſhed by vegetables, which as they paſs through their organs loſe their former properties, and acquire others more akin to animal bodies. In particular they are found to contain a new element, *azote*, which is but ſparingly found in the vegetable kingdom, but conſtitutes one of the moſt abundant products of animal bodies. They alſo contain *ſulphur* and *phoſphorus*, as appears from the examination of thoſe peſtilential exhalations which always accompany the decompoſition of animal matters.

11. It is found that animal matters are more eaſily ſeparated into their component principles than vegetable, owing to the weaker degree of their mutual attraction. Hence the action of acids and alkalies is much more violent on the former than on the latter, and conſequently much more caution is requiſite in their employment.

12. In bleaching animal ſubſtances recourſe muſt be had to the united action of the fixed alkalies, ſoap, ammonia or volatile alkali, and ſulphurous acid, the choice, preparation, and uſes of which will be preſently deſcribed. The animal matters with which the bleacher is more immediately concerned are wool and ſilk.

Chap. I. *Of Wool.*

13. Wool, like hair, of which it is a variety, is compoſed of filaments or tubes filled with a ſubſtance of an oily nature. The ſurrounding ſurface of theſe tubes is pierced with an infinite number of ſmall holes which communicate with the internal cavity. By chemical analyſis wool is found to contain carbonat of ammonia, and a conſiderable quantity of oil. It is very little altered by expoſure to the air, and undergoes no change from the action of boiling water. It is of great conſequence that the bleacher ſhould attend to this circumſtance, as will appear immediately.

14. A ſolution of cauſtic alkali, or cauſtic ley, deſtroys it altogether, and forms with it a ſoap, for the diſcovery and application of which we are indebted to Chaptal; it is but little acted on by acids, but the aplication of a violent heat reduces it to a ſtate of fuſion. From all theſe circumſtances it appears that wool is nearly allied to oleaginous ſubſtances.

15. The examination of theſe chemical actions is of conſequence to direct the bleacher in his operations on this ſubſtance; the trifling action which acids exert on wool, and its inalterability in water, even when aſſiſted by heat, ſhews the neceſſity of having recourſe to alkalies or ſoapy matters, while at the ſame time the violent action which theſe exert, will point out the propriety of being cautious in their uſe.

Of Bleaching Wool.

16. The wool as it comes into the hands of the manufacturer uſually contains a large portion of the natural greaſy matter, from which it muſt be purified before it can undergo the proceſs of bleaching. Sometimes the farmer cleans it from moſt of its oil, ſo as to diminiſh its weight by 50 or 60 per cent. in order to enhance the value of the article; but care is taken to leave ſome portion, as the natural fat is found to be the beſt preſervative againſt the attacks of moths and other inſects.

17. The firſt object then is to carry off the whole of the oily matter, which is called the operation of *ſcouring*, and is performed by means of an ammoniacal ley, which is thus prepared. Five parts of river or other ſoft water are to be mixed with one part of ſtale putrified urine, which is found to contain a large quantity of ammonia (A). This

(A) The detergent property of urine has been long known, and it is frequently employed in waſhing to ſave

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This mixture is to be boiled for a ſhort time, and into this, at about the heat of 56 degrees, or ſo that the hand of the workman can be eaſily held in it for a conſiderable time, the wool is to be thrown. Four or five pailsful will generally be ſufficient for 20 pounds of wool. After ſteeping for a ſhort time, the wool is to be ſtirred about in the mixture continually for about a quarter of an hour or 20 minutes, according to the quantity of greaſy matter. It is then to be taken out and drained in to a baſket, ſo that the drainings may drop into the veſſel in which it was ſteeped, that nothing may be loſt. It muſt now be completely rinſed by expoſing it in baſkets to a continued ſtream of clear water, while a workman is perpetually employed in ſtirring it with a pole, till the water paſſes off perfectly clear. The wool is then removed and a freſh quantity put into the baſket, which is to be treated in the ſame manner. The ſteeping and rinſing are to be repeated till the wool has attained as great a degree of whiteneſs as it is capable of receiving from this operation. It is neceſſary, in order to conduct this proceſs to the greateſt advantage, that the workman ſhould attend to the following circumſtances.

18. *1ſt*, A quantity of freſh ley muſt be from time to time added to the bath, as the immerſion of the wool is found to weaken its power; but it is better not entirely to renew the bath, as the greaſe abſtracted from the wool during its immerſion, forms with the ammonia of the urine a kind of ſoap, which much increaſes the cleanſing quality of the bath.

19. *2d*, Increaſing the temperature of the bath will augment its deterging powers, and may ſometimes ſupply the want of an addition of ſtale urine; but both theſe circumſtances require caution, as too great a degree of heat hardens the greaſy matter, and renders it more difficult of ſolution; and again, too much urine makes the wool harſh.

20. *3d*, After being much uſed the bath becomes too foul, and muſt be entirely renewed.

21. The wool which has properly undergone the proceſs of ſcouring ſhould be white, ſoft, elaſtic, and open, whereas before it was hard, ſtiff, and greaſy. By this operation the wool loſes much more of its weight, ſo that 100 pounds of raw wool when completely ſcoured will not yield more than 30 or 40 fit for the manufacture of cloth.

22. After ſcouring, the wool is ſometimes carried to the fulling mill, in which it acquires an additional degree of whiteneſs. The above is chiefly employed for the coarſer wools, and wool that has yet to be carded for the making of broad-cloth, but for the finer kind it is better to employ a bath in which ſoap has been diſſolved. This method is more expenſive, but the expence is compenſated by the ſuperior quality of the wool which is thus treated. This operation is performed by the comber, and is thus conducted. The wool is divided into parcels containing each about ſix pounds and a half. A bath is prepared with two pounds and a half of green or black ſoap diſſolved in a ſufficient quantity of boiling water; and in this bath a parcel of the wool is to be waſhed for a longer or ſhorter time according to its foulneſs. It is then wrung by means of a hook, and hung in the ſunſhine or air to dry. Before it is combed it muſt undergo a ſecond ſcouring, which clears it of all the natural oily matter.

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23. This quantity of wool is not to be waſhed all at once, but in ſucceſſive portions, and freſh hot water is to be added from time to time in order to free the wool more eaſily from the greaſe. For wringing it there is a hook fixed at each end of the waſhing-tub, on which the wool is faſtened and turned round by means of a handle or winch, fixed to one of the hooks. As economy ſhould be conſulted in every manufacture, a method of ſcouring wool without ſoap, would be of conſiderable advantage. Fullers have long been in the habit of employing a ſpecies of clayey earth, called from them *fuller's earth*, which has the property of combining with the greaſy matter and rendering it more ſoluble in water. A new earth has lately been found on an eſtate belonging to Lord Warwick, which by certain proceſſes is made to anſwer the purpoſe of ſoap, and a patent for its preparation has been granted to Mr John Vancouver. It is not diſtinguiſhed by any particular name, and is diſpoſed or ſituated in the ground in different ſtrata or layers. The firſt or uppermoſt layer is of a greeniſh or greyiſh colour; the ſecond layer is of a beautiful lilac or light purple; and the third or undermoſt is generally white; although the white is found intermixed with the purple. The ſtratum on which the earth lies, is indurated red marl, and it is ſuperinduced by a bed of gravel. The thickneſs of the entire ſtratum of this earth is from four inches to one foot, and its general poſition is very even, regular, and level. When firſt taken out of the earth, its colours are very fine particularly the lilac, which, on expoſure to the ſun's rays, or to the influence of froſt, ſoon becomes white. On chemical examination, it appears to contain clay, ſiliceous ſand, and the oxide of iron; but a more ſtudied examination would probably ſhew the exiſtence of other peculiarities, from which the detergent property of this earth might be found to ariſe.

The proceſſes for manufacturing this earth are performed as follows:—After digging it out of the vein, it is dried by means of ſtoves or otherwiſe; then pulveriſed, and ſifted through fine ſieves; a ſize is then prepared from white ſhreds of leather, and the dry ſifted earth is beaten up with the ſize; after which it is formed into convenient parcels or cakes, reſembling thoſe of ſoap, and of ſuch ſizes, figures, and dimenſions, as are beſt adapted to the purpoſes of its intended application. The uſe of the ſize is to keep the parts of the earth together, and to moderate the effect of its abſorbent quality, which is ſo extreme, as to cauſe it to become pulverulent, like quick-lime, when water is added to the dried earth; and, on this account, the patentee does not confine himſelf to the uſe of

ſave ſoap. At ſea, where freſh water cannot be ſpared for the purpoſe of waſhing, the ſailors are accuſtomed to ſcour their foul linen in ſtale urine, which ſo far cleanſes them that a ſubſequent rinſing in ſalt water renders them tolerably pure and ſweet.

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of ſize made of leather, but applies other animal and vegetable mucilage to the ſame purpoſe, giving the preference to ſuch, as by their cheapneſs and adheſive quality are beſt adapted to the purpoſes of the manufacture. The moſt diſtinctive property of this earth is that of cleanſing wool in a manner much ſuperior to ſoap; becauſe it makes it equally white and clean, without robbing it of what manufacturers call its nature, as ſoap does; for, it is well-known, that when wool is waſhed with coarſe ſoap, it undergoes ſome change, either in the poliſh of its ſurface, or in the elaſticity of its fibres, or in ſome other reſpects, which cauſes it to feel leſs full to the hand, ſo that it will not riſe and ſpring up, after the preſſure, in the ſame manner as it did before ſuch waſhing. Whereas, on the contrary, wool, when treated with the waſhing-earth, becomes equally white and clean, at the ſame time that it remains in poſſeſſion of all its original fulneſs and elaſticity, which are of great conſequence and value in the manufacture of this important article of produce*. Before the wool is quite dry it is combed, as this operation is found to ſucceed beſt when it is a little moiſt, it being then eaſier to form it into proper lengths of three or four feet. Conſiderable nicety is requiſite in the conducting of theſe firſt proceſſes, as much of the ſucceſs of the ſucceeding operations depends on their proper management.

* *Month. Mag.* vol. xv. p. 354.

24. After combing, the wool ſometimes undergoes two or three farther waſhings, eſpecially when it is required of a very delicate white.

25. It is known that the wool has been properly ſcoured by its filaments being ſmooth, long, and ſlender, white, and perfectly free from foreign ſubſtances, and not having loſt their natural tenacity. The Dutch wool is generally the pureſt: the Engliſh is next in quality, but is much harſher and fouler. The German wool is ſtill harſher than the Engliſh, and the French is inferior to them all.

26. The loſs ſuſtained by the wools in ſcouring is proportional to their impurity. Thus the French and German loſe about a third of their weight, while the Dutch and Engliſh do not loſe above a fourth.

27. But this ſcouring, whether it be performed with urine, ſoap, or earth, is ſeldom ſufficient to bring the wool to that brilliant whiteneſs which is deſirable for ſome manufactures. This is given it by means of the vapour of ſulphur, or by ſteeping it in ſulphurous acid, which is called by the manufacturers *ſulphuring*.

28. The uſual method of ſulphuring goods is to expoſe them in a very cloſe apartment to the vapour of burning ſulphur. The goods are hung on poles ſo diſpoſed that the vapour can readily paſs between the pieces, and when the chamber is filled, a quantity of ſulphur placed in very flat and broad diſhes, is ſet fire to, and allowed to burn away gradually in the chamber, while every aperture by which the vapour could eſcape is carefully cloſed. The acid vapour generated by the combination of the ſulphur with the oxygen of the air of the chamber, penetrates to every part of the cloth to which it can get acceſs, deſtroys the colouring matter, and thus completes the bleaching. Every thing is allowed to remain quiet till it is ſuppoſed that the effect of the ſulphureous vapour has fully taken place, which requires from 6 to 24 hours.

29. The action of the ſulphureous vapours leaves a roughneſs and harſhneſs on the cloth, which are removed by paſſing it through a bath ſlightly impregnated with ſoap.

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Such was the uſual method of *ſulphuring* woollen cloth; but it was ſoon found to be very imperfect, as the effect of the vapour ſcarcely extends beyond the ſurface, and thus there is often a neceſſity for renewing the operation. O'Reilly has lately propoſed to employ the ſulphurous acid diſſolved in water, and he thus deſcribes the method of preparing and uſing it.

30. "The ſulphurous acid, or that acid which is produced by the imperfect combuſtion of ſulphur, differs from the ſulphuric acid (oil of vitriol) in containing leſs of the acidifying principle, and conſtituting, as we may ſay, the mean between ſulphur and ſulphuric acid.

31. "Sulphurous acid combines very readily with water. In this ſtate of combination it may be employed for the bleaching of wool and ſilk. We may procure it in this ſtate by making the gas paſs through water in an apparatus ſimilar to that which is employed for obtaining the *oxygenated muriatic acid*. The moſt economical mode of preparing this acid is by decompoſing the ſulphuric acid by means of ſome combuſtible ſubſtance which is capable of depriving it of a part of its oxygen. In the nice experiments of the laboratory, where the chemiſt wiſhes to have it in the greateſt purity, it is obtained by means of metallic bodies and eſpecially mercury; but for our purpoſe, where we muſt conſult economy, we ſhall recommend the moſt common materials.

32. Take chopped ſtraw, or ſaw-duſt, and put it into a matraſs; pour over it ſome ſulphuric acid, and apply a moderate heat. Sulphurous acid gas, or ſulphurous vapour, will be diſengaged; which may be combined with water by means of the following apparatus.

33. A matraſs with a long neck is placed in a furnace, and made to communicate with a tubulated bottle in which a little water has been put to abſorb the ſmall quantity of ſulphuric acid which might paſs through the firſt reſervoir without being decompoſed. Care muſt be taken to place a ſmall tube within the bottle, ſo that one of its extremities is immerſed ſome way below the ſurface of the water to prevent abſorption. A tube with a double curvature conducts the gas into the veſſels in which it is to combine ultimately with the water. We propoſe to make a *hollow* cylinder of lead, or white wood, bound with varniſhed iron, of a pretty conſiderable height, and ſurmounted with one of Wolfe's bottles, the bottom of which has been removed, and which muſt be made to fit into a collar in the mouth of the leaden cylinder; and care muſt be taken to make it firm by means of wax, but ſo as to render the joining impervious to fluids. This capital of glaſs will allow us to ſee the the number of bubbles which are diſengaged on the ſurface of the water, and thus to aſcertain the progreſs of the ſaturation, while the weight of this narrow and high column of water, preſſing on the bubbles of ſulphurous acid gas, as it is diſengaged from the end of the tube at the bottom of the cylinder, will facilitate its combination with the water, and will accelerate its diſſolution in that fluid. That nothing may be loſt, we may have a ſeries of two or three of theſe cylinders connected together,

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and they will then compriſe the whole of the apparatus which we are deſcribing. A cock fixed in the bottom of each cylinder will facilitate the diſcharge of the liquor into the tub for immerſion.

34. " The apparatus which we would recommend for the immerſion of the woollen and ſilken goods in the ley of ſulphurous acid perfectly reſembles what will be deſcribed hereafter for the immerſion in oxygenated muriatic acid, and which we have conſtructed after the principles of Rupp. From converſing on this apparatus with Cit. Widmer of Jouy, we have conceived the deſign of the preſent, which is now making at the manufactory of Eſſonne. Let us ſuppoſe an oblong box, divided by a partition in the middle; on each ſide of this partition is a large reel, on which the ſtuffs are to be rolled; at each angle is fixed a roller, over which the ſtuffs paſs before they proceed through the partition to be drawn over a ſimilar number of rollers which conduct them to the ſecond reel. The object of this diſpoſition is to make the ſtuffs paſs through the bleaching liquor, and expoſe to it the greateſt poſſible ſurface.

35. " For the purpoſe of turning this reel, we make uſe of an axis or column of glaſs which paſſes through a collar of leather, and has one of its extremities, which is ſquare, fixed into the reel, while the other is fixed to a winch, which gives it the rotatory motion; and in this way we may entirely avoid employing any metallic ſubſtance within the veſſel. To prevent the eſcape of the gas, the cover of the tub is made with a ledge which fits exactly into the rim of the box, and of which at leaſt an inch ſhould paſs into the deterging liquor.

36. " I propoſe the following method of bleaching woollen ſtuffs: We are firſt to ſcour them by immerſion in a ley ſlightly alkaline, in the proportion of a pound of potaſh to 50 pounds of wool. The bath is heated to the temperature of 30 degrees (B).

37. " The old method with ſtale urine may alſo be employed. Urine is preferred becauſe it holds in ſolution a quantity of ſalt, which is not ſufficient to injure the wool.

38. " When the greaſe is diſſolved, and the wool has been well purified, it is to be waſhed in warm ſoapy water. This part of the proceſs is ſometimes performed in the fulling mill, ſometimes by beaters, and ſometimes by treading in the tub. In every caſe the greaſe muſt be ſeparated by repeated waſhing before the ſulphuring is employed. If we wiſh to obtain a brilliant whiteneſs, it would be proper to make the ſtuffs undergo heat a ſecond, or even a third time, always in water ſlightly impregnated with ſoap, in the proportion of two ounces of this ſubſtance to a pound of wool. It would be better to repeat this operation, turning the ſtuffs about with a ſtick for half an hour, than to endanger injuring the quality of the ſtuffs by employing too ſtrong a ley.

39. " After ſcouring with the greateſt care, the ſtuffs are carried to the tubs for ſteeping in the *liquid ſulphurous acid*, or, as it may be called *the ſulphur water*; the pieces are rolled upon the reels, and by turning the winch, are made to paſs through the acid, till it is obſerved that they are ſufficiently whitened. They are then taken out, and ſuffered to drain on a table covered with a cloth, that the action of the ſulphurous acid on the wood may not injure them; they are afterwards waſhed in river water, and, if neceſſary, Spaniſh white is uſed. This is done by ſteeping the pieces in a tub of clear water, in which about eight pounds of Spaniſh white have been diffuſed. Two ſulphurings are uſually employed to obtain a fine white, but in our proceſs, a ſingle immerſion, with turning for two or three hours, ſhould be ſufficient.

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40. " Before recommending the employment of the liquid ſulphurous acid, I have made a great many experiments on woollen threads and ſtuffs, varying the manipulations, and always with the moſt complete ſucceſs *." * *O'Reilly, Eſſai ſur le Blanchiment.*

41. Beſides the whiting mentioned in the above extract, it is uſual to paſs the ſtuffs through water impregnated with blue, or, what is generally practiſed, after the whiting has been uſed, the ſtuffs are taken out, and to the ſame bath of Spaniſh whiting and water is added a pail of water, in which about an ounce and a half of fine indigo, or of Pruſſian blue, have been diffuſed, the blue being pounded, ſifted, and tied up in a little bag, which is ſtirred round in the water. When the blue water has been added, the bath is well ſtirred, and the piece of cloth is again paſſed through it. It is afterwards laid on a packing cloth, and ſubjected to the fuller's thiſtle, to raiſe the nap, it being wetted from time to time with the liquor of the bath. It is then dried, and well beaten with twigs, to carry off the ſuperfluous whiting.

42. Manufacturers have an idea that bad ſmells, ſuch as foul breath, are capable of producing ſome change on the bath of blue and white, and thus render a repetition of the proceſs neceſſary. It is certain, that without attention the white and blue will not be intimately diffuſed, and that thus a kind of vegetation will be produced on the cloth. When this happens, it muſt be waſhed by plunging it into hot water; and then the bath muſt be repeated.

43. It is chiefly to cloths that are to be of the fineſt quality that all theſe proceſſes are adapted. For ordinary flannels, eſpecially ſuch as are intended to be worn next the ſkin, ſulphuring and ſoap baths are leſs proper; and the ſoap eſpecially diminiſhes the abſorbency, which is ſo deſirable a property in theſe flannels. They are uſually prepared by ſcouring with bran and water, and ſubſequent rinſing in fair water.

Chap. II. *Of the Bleaching of Silk.*

44. Silk is a ſubſtance poſſeſſing ſome degree of tranſparency, and is ſpun by a caterpillar from a matter contained within its body, which has the property of hardening when expoſed to the air. The ſilk-worm is an inhabitant of the ſouthern climates, being originally brought from Aſia, and naturalized in the ſouth of Europe about the period of the decline of the Roman empire.

The

(B) About 100 degrees of Fahrenheit.

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45. The filaments of ſilk, as left by the ſilk-worm, are rolled together into a kind of ball or clew, and in their natural, or what is called the *raw ſtate*, are covered with a yellow varniſh or gum, which obſcures their luſtre, and gives them an unpleaſant roughneſs.

46. Water has no effect on ſilk at the boiling temperature, and no change is produced on it by alcohol; but alkaline leys, when tolerably ſtrong, attack, and are capable of diſſolving it. The yellow varniſh is ſoluble alſo in alkaline leys, and it may even be ſeparated by long continued boiling of the ſilk. When the varniſh is thus carried off, the ſilk is found to have loſt about a fourth of its original weight.

47. Two methods are in practice for bleaching ſilk; the firſt, in which it is ungummed or deprived of the natural varniſh; the ſecond, in which this is retained, in order to give them that ſtiffneſs which is required for gauzes, blonds, &c.

48. In the firſt proceſs, the ſilk is to undergo a ſcouring, ſimilar to what we have deſcribed, as neceſſary for depriving wool of the natural oil. For this purpoſe, a quantity of water is put into a boiler over a fire, and for every hundred pounds of ſilk to be ſcoured, thirty pounds of very fine ſoap are diſſolved. The ſolution is generally boiled, but before the ſilk is put into it, the heat muſt be lowered to about 90 degrees of Fahrenheit, and at this temperature it muſt be kept during the proceſs. The ſilks are to be hung in the liquor upon rods or frames, and left till the gum is ſufficiently deſtroyed, care being taken to alter their poſition now and then, ſo that every part may be expoſed to the action of the bath. When perfectly ungummed, they are flexible and of a dull whiteneſs; in this ſtate they are to be wrung with the pin to clear them of the ſoapy water, then well ſhaken, and put into coarſe linen bags, in parcels of from twenty to thirty pounds each.

49. Theſe bags are now to be ſteeped in a freſh bath, or as the workmen ſpeak, are to be baked. The bath is prepared in a manner and proportion much as before, except that the quantity of ſoap may be ſomewhat diminiſhed, as the heat is to be increaſed; for the ſilk is now to be boiled for two or three hours, taking care to keep the bags from ſticking to the bottom of the boiler, by frequently ſtirring them with a ſtick.

50. For ſilk that is intended to be dyed, the former ſteeping in the lukewarm bath is unneceſſary, and the preſent boiling only is employed, uſing a greater quantity of ſoap in proportion to the fineneſs of the colour. Thus for the ordinary colours, the proportion above laid down, or even leſs will ſuffice, but for the ſaffranum colours, and the poppy and cherry red, even 50 pounds are ſometimes employed to the 100 pounds of ſilk.

51. After boiling, the ſilk is wrung as before, and then waſhed thoroughly in a ſtream of water; they are then examined, and if it appears that they are not ſufficiently or not uniformly ſcoured, they muſt be ſubmitted to a freſh bath.

52. The white ſilk uſually ſold has a bluiſh ſhade. This is given it by a bath impregnated with litmus, or indigo. This is prepared by diſſolving a pound and a half of fine ſoap in about ninety gallons of water, in which a ſmall quanity of litmus or indigo has been diffuſed. The bath is heated to about 90 degrees, and the ſilk is paſſed through it over rods or reels till it have acquired the requiſite ſhade. Being taken out it is wrung and dried.

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53. From theſe proceſſes, the ſilk acquires a tolerably clear white, but the higheſt degree is given to it by the action of the ſulphurous acid, either in the ſtate of vapours, as is uſually practiſed, or by immerſing it in the liquid acid, according to the method of M. O'Reilly.

54. From what has been ſaid above of the action of various ſubſtances on ſilk, it will eaſily be conceived, that during ſcouring it muſt ſuffer conſiderably in its quality. To avoid this, a method has been lately propoſed of carrying off the varniſh by the acid of ſteam under an increaſed preſſure. As this has been more extenſively employed in the bleaching of cottons, we ſhall delay giving a detailed account of the proceſs till a future part of this article. The following is the method propoſed by O'Reilly.

55. "Take a ſolution of cauſtic ſoda, ſo weak that it indicates at moſt but a quarter of a degree of the areometer for ſalts, and fill with it the boiler of the apparatus for ſteam bleaching. Charge the frames with the ſkains of raw ſilk, and place them in the apparatus till it be filled, then cloſe the door and cauſe the ſolution to boil; continue the ebullition for twelve hours; ſlacken the fire and open the door of the apparatus. The heat of the vapour, which is always above 100 degrees (c), will be ſufficient to ungum and ſcour the ſilk. Waſh the ſkains in warm water; wring them with the pin; and place them a ſecond time on the frames of the apparatus to undergo another boiling. Then waſh them in a conſiderable quantity of water, and if you deſire the greateſt degree of whiteneſs, rinſe them in water ſlightly impregnated with ſoap, to give them a little ſoftneſs.

56. "The laſt degree of whiteneſs is obtained by paſſing the ſkains through the ſulphurous acid, uſing the method and apparatus which I have recommended for bleaching wool; and which here ſuperſedes ſulphuring. The incalculable advantage of that method over others, conſiſts principally in the poſſibility of employing the operations in ſucceſſion, without running the riſk of injuring the quality of the ſilk by too ſtrong leys *."

* *O'Reilly Eſſai.*

57. Such are the moſt approved methods of bleaching ſilk when deprived of the yellow gum; but when this is not required, the bleaching is to be performed by ſome ſubſtance which has the property of whitening the ſilk and its varniſh without diſſolving the gum. Of this deſcription is alcohol, and two French authors have propoſed a method of bleaching ſilk by means of this and muriatic acid. It was firſt propoſed by M. Rigaud in 1778, and is thus ſhortly deſcribed by Pajot de Charmes.

58. "The ſilk intended to be bleached, is put into a glaſs veſſel containing a mixture of ſpirit of wine and muriatic

(c) About 250 degrees of Fahrenheit.

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muriatic acid, in the proportion of a pound of the former to half an ounce of the latter, and in quantity, ſufficient to float the ſilk. The veſſel is then cloſed with wet parchment, and expoſed for 12 hours to the ſun, or otherwiſe it may be left 24 hours in the ſhade, at a temperature of between 16° and 20° Reaumur. The ſilk is then taken out and preſſed, and again macerated for the ſame time, and under the ſame circumſtances, in freſh acidulated ſpirit of wine, in another ſimilar veſſel, cloſed as before. The ſilk is then taken out, preſſed and waſhed for four or five minutes in pure ſpirit of wine. In the next place, it is kept for 24 hours in the ſun, or 36 in the ſhade, in a third veſſel, containing pure ſpirit of wine, which is to be renewed at intervals; after which, the ſilk is to be taken out, preſſed or waſhed two or three times in clear water, which is to be changed at each waſhing. Laſtly, the ſilk is to be expoſed to dry upon a frame, ſo contrived as to ſtretch it with conſiderable force, and prevent its curling up as it dries."

59. In 1795 M. Baumé propoſed an improvement of this method with the means of recovering the alcohol, which we ſhall give in the words of Mr Nicholſon in his Journal.

60. "Berthollet, in his *Elemens de l'Art de la Teinture*, publiſhed in the year 1791, after deſcribing the uſual methods of depriving ſilk of its reſinous or gummy matter †, proceeds to remark, that, in the manufacture of blonds and gauzes, the natural elaſticity and ſtiffneſs of this article are required to be preſerved; whence it has become a deſideratum to render the yellow ſilk of Europe white like that of China, without depriving it of its gum. He adds, that M. Baumé has ſolved this intereſting problem, but had kept his proceſs a ſecret; but from the facts he had poſſeſſed the means of obtaining, it appeared liable to accidents, and that the chief difficulty conſiſted in giving an uniform white colour when large quantities were operated upon. He alſo mentions a difficulty in dreſſing the whitened ſilk ſo as to prevent its curling, and obſerves that it ought certainly to be kept conſtantly ſtretched during the drying. It is beſides requiſite that the ſpirit of wine ſhould be recovered after the proceſs, which would elſe be rendered too expenſive. This author does not ſay whether the white Chineſe ſilk is ſubject to the ſame inconvenience of curling when dyed, which, it may be remarked, is a property of no conſequence where the material is to be applied in the manufacture of white goods. The motives which led M. Baumé to communicate his proceſs to the world, originally retained by him as a lucrative ſecret, do not appear. Whether the miſtakes of thoſe who carried it into effect in the large way might have led him to vindicate the reality of his diſcovery by publication; or whether the commercial advantages derived from ſuperiority of quality and cheapneſs in his article over the Chineſe ſilk in the market of France, might in the end have proved of leſs value than the ſcientific reputation to be derived from its diſcloſure; are circumſtances which, will no doubt, have their proper weight with ſuch manufacturers as may be induced gradually to adopt this proceſs.

† Tom. i. p. 146; or p. 141. of Dr Hamilton's tranſlation.

61. "The ſilk of Nankin is perfectly white, ſilvery, brilliant, and poſſeſſes all the elaſticity of raw ſilk. Our author aſſirms, that the value of this article imported into Europe amounts to upwards of twenty millions of livres (about eight hundred and thirty thouſand pounds ſterling), of which France conſumes about four or five millions in gauzes, blonds, ribbonds, &c. This was formerly ſuppoſed to be produced of a white colour from the worm. The late Mr Trudaine, intendant of commerce, procured the eggs of ſilk-worms from China, and cultivated them. The produce conſiſted of yellow cocons, and others of the moſt perfect whiteneſs. The latter afforded ſilk equal in this reſpect to that of Nankin. But M. Baumé affirms, that moſt of the Nankin ſilk is bleached by art, and, as he thinks, by a proceſs ſimilar to his own.

62. "As it is impoſſible to wind off a large quantity of ſilk in the ſhort time previous to that of the inſects eating their way through the maſs, it is uſual in the firſt place, to deprive them of life. This is commonly done by expoſing the cocons, properly wrapped up, for two hours to the heat of about 158 degrees of Fahrenheit in an oven; after which they are kept for a certain time in a maſs to preſerve their heat, and effectually deſtroy ſuch of the inſects as might have eſcaped the power of the oven. The effect of this proceſs is, that the ſilk is hardened, and is more difficult to wind off than before. Hence the product of ſilk is leſs by one ninth part in quantity, and inferior in quality to what might have been obtained by winding off without this previous baking. M. Baumé, not only from theſe views, but likewiſe becauſe the ſilk which has not been baked proves ſuſceptible of a greater luſtre, was induced to deſtroy the chryſalis by ſpirit of wine. For this purpoſe he diſpoſes them in a wooden box in a ſtratum ſix inches deep: upon each ſquare foot half a chopin, or ſomewhat more, of ſpirit of wine is to be ſprinkled with a ſmall watering-pot made for that purpoſe. This quantity anſwers ſufficiently near to our half-pint. The liquid is to be equally diſtributed, but it is not neceſſary that all the cocons ſhould be wetted. They are then to be mixed by hand. In the next place another ſtratum is to be formed over the firſt, nearly of the ſame depth, which is to be ſprinkled and treated as before. By this method of proceeding, the box becomes filled, and muſt then be covered, and left for 24 hours, during which time they become ſpontaneouſly heated to about 100 degrees, and the vapour of the ſpirit of wine exerts itſelf with wonderful activity. Five hundred French pounds (D) of the cocons require 10 French pints, which is nearly the ſame number of Engliſh quarts. After this treatment they muſt be ſpread out to dry, which happens in a ſhort time, and is abſolutely neceſſary previous to winding off.

63. "When the operator propoſes in this manner to extinguiſh various parcels of cocons belonging to different individuals, each parcel may be tied up looſely in a canvas bag, and wetted on the outſide previous to cloſing the box.

64. "The ſpirit of wine to be uſed in this operation, ought to be of the ſtrength of 34 degrees of Baumé's hydrometer at the temperature of 55 degrees. It is of the

(D) The Paris pound is to the Engliſh avoirdupois pound as 756 to 700. Theſe quantities are not reduced, becauſe the operation requires no great preciſion.

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the greateſt importance to uſe that ſpirit only which has been kept in veſſels of glaſs, of tinned copper, or of pure tin. Leaden veſſels are abſoutely to be rejected; wooden veſſels tinge the ſpirit, which gives the ſilk a degree of colour of conſiderable ſolidity, and very inimical to the bleaching proceſs.

65. "With regard to the advantages of this method of extinction, in preference to that of the oven, the author remarks, that the coſt of labour and fuel added to the loſs of ſilk, and the probability of injury from too much or too little heat, conſtitute a ſum of diſadvantage much greater than the coſt of the ſpirit of wine. It is beſides a conſiderable advantage, that the ſpirit of wine renders more diſtinguiſhable ſuch cocons as have periſhed previous to the application of the ſpirit. Theſe afford a much worſe ſilk, and muſt be picked out.

66. "The ſilk is wound off upon a reel, while the cocons are kept immerſed in water almoſt boiling. Upon this part of the proceſs M. Baumé remarks, 1ſt, That the dead cocons muſt be ſeparated. Theſe are known by the brown or black ſpots on their ſurface. 2. That well water, which on account of its clearneſs is almoſt univerſally uſed in the ſilk manufactories, moſtly contains nitre, and is extremely prejudicial to the bleaching proceſs. The preſence of nitrous acid gives a yellow colour, which reſiſts bleaching and even ſcouring; he therefore recommends river water. 3. In ſome countries a ſmall quantity of alum is uſed. Neither this nor any other ſaline ſubſtance is of the leaſt advantage to the colour, beauty, or quality of the ſilk.

67. "At the four places of contact of the ſilk upon the reel, all the threads ſtick together. It is abſolutely neceſſary that this ſhould be remedied. The method conſiſts in ſoaking the ſilk in a ſufficient quantity of warm water, at about 90 degrees, for about two hours; after which the threads are to be ſeparated by opening the hands upon a pin, and lightly rubbing the parts which cohere. When the ſilk is dry, it is to be looſely folded in its original form, and is ready for bleaching.

68. "The ſilk while wet is ſoft, and part of its gummy matter is in ſuch a ſtate, that its threads would readily adhere, if wrung while warm for the purpoſe of clearing it of the water. After ſuch improper treatment there would be no other remedy than to ſoak it again in warm water.

69. "The apparatus for bleaching the ſilk conſiſts of a ſtone-ware veſſel, nearly of a conical form, capable of holding about 12 gallons, having a large opening at the one end, and a ſmaller of about an inch diameter at the other end. Common pottery cannot be uſed in this operation, becauſe it is ſoon rendered unſerviceable by the action of the marine acid, and the ſtone-ware itſelf is not very durable. This veſſel muſt be carefully examined, to aſcertain that it does not leak in the ſlighteſt degree; after which the inſide is to be rubbed with a pumice-ſtone, to clear it of aſperities which might break the threads. A cover of the ſame material is to be fitted on by grinding; and the ſmaller aperture, which in the uſe is the loweſt, is to be cloſed with a good cork, in the middle of which is thruſt a ſmall glaſs tube about a quarter of an inch in diameter; this is likewiſe ſtopped with a cork, excepting at the time when it is required to draw off the liquid contents of the jar. A ſmall perforated falſe bottom is placed within the veſſel, to prevent this tube from being obſtructed.

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70. "This jar, or as many of them as the purpoſes of the manufactory may require, is ſupported by a wooden frame or table, at ſuch a height that a caſk may be conveniently placed beneath to receive what may flow from the glaſs tube in the ſeveral periods of the operation.

71. "Six pounds of yellow raw ſilk are to be diſpoſed in the earthen pot; upon this is to be poured a mixture, previouſly made, of 48 pounds (B) of ſpirit of wine at 30 degrees, with 12 ounces of very pure marine acid, abſolutely exempt from all preſence of nitrous acid, and of the ſtrength of 14 or 15 degrees of Baumé's hydrometer. The pot is then to be covered, and the whole left in digeſtion till the following day, or until the liquor, which at firſt aſſumes a fine green colour, ſhall begin to aſſume that of a duſky brown (*feuille morte*).

72. "The acidulated ſpirit is then to be drawn off. To prevent evaporation, M. Baumé thruſts a cork in the bung-hole of the receiving caſk, in which is a ſliding glaſs tube. The uſe of this tube is completely to ſurround the ſmall tube proceeding from the earthen veſſel. When the whole of the fluid is thus almoſt entirely drawn off, clean ſpirit of wine is poured upon the ſilk, and drawn off repeatedly until it paſſes colourleſs. The ſilk is then ſuffered to drain without ſtirring it. In this ſtate it is ready for a ſecond infuſion.

73. "Forty-eight pounds of ſpirit of wine acidulated with 12 ounces of marine acid is now to be poured on the ſilk, and the whole ſuffered to remain for 24 hours or longer, until the ſilk becomes perfectly white. The time required for this ſecond infuſion is commonly longer than for the firſt: it ſometimes amounts to two, three, or even ſix days, according to circumſtances, particularly the temperature and the nature of the ſilk. Silk which has been in the oven is in general more difficult to bleach.

74. "When the ſilk has thus obtained its utmoſt degree of whiteneſs, the acidulated ſpirit is to be drawn off into a ſeparate veſſel. This fluid is but ſlightly coloured, and may be uſed again in the firſt infuſion of other yellow ſilk, with addition of ſix ounces more of marine acid. The receiving veſſel is to be removed, and another clean veſſel ſubſtituted in its place. The ſilk is then ſprinkled with clean ſpirit, and occaſionally preſſed down with the hand. As ſoon as the ſpirit of wine comes off abſolutely colourleſs, a third infuſion is to be made by pouring upon the ſilk 48 pounds of the pure ſpirit without acid, which is to remain till the following day: it is then to be drawn off, and

(B) The pound is nearly a pint, and is divided into 16 ounces.

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and reſerved for waſhing other ſilk after the firſt infuſion.

75. " After the ſilk has been left to drain, and affords no more ſpirit, it ſtill retains its own weight of that fluid. This is recovered by the very ſimple proceſs of ſprinkling the ſilk with a ſmall quantity of very clear river water at a time. While the water applies itſelf and ſubſides along the ſilk, it drives the ſpirit of wine before it, ſo that the firſt portions which flow from the tube are ſcarcely diminiſhed in ſtrength. The addition of water is to be continued until nothing but mere water comes off below.

76. " In this ſituation the ſilk is found to be well bleached, but ſtill retains a portion of marine acid ſufficient to render it harſh to the touch, and after a time brittle. It muſt be waſhed off with water. The beſt method is to put the ſilk looſely into a coarſe woollen bag, which is to be ſecured cloſely in another cloth like a ſmall bed or pillow, then placed in a baſket and left in a running ſtream for five or ſix hours; but where the convenience of a ſtream is wanting, the earthen pot containing the ſilk is to be covered with a cloth, and water pumped through it for five or ſix hours, or until that which iſſues from the lower aperture gives no red colour to the tincture of tournſol. At this period the lower opening is to be cloſed and the veſſel filled with water, which muſt be changed once or twice in 24 hours.

77. " The time required for waſhing was occaſionally abridged by paſſing ſpirit of wine, or river water impregnated with a ſmall portion of alkali, through the ſilk. The neutral ſalt thus produced is, in fact, leſs adherent to the ſilk than the acid itſelf, but nevertheleſs requires to be waſhed off with a very large quantity of water.

78. " In theſe, as in every other proceſs relating to the ſilk, great care muſt be taken to aſcertain that the water made uſe of contains no nitrous acid, which would infallibly occaſion imperfection of colour, or ſpots in the article. After this treatment the ſilk is ready for drying and luſtering; previous to the deſcription of which, the author makes ſeveral remarks to the following purport:

79. " Though the mineral acids are the moſt powerful and deſtructive of all ſaline ſubſtances, yet they may be applied to ſilk, when diluted with ſpirit of wine in very conſiderable doſes. In trials made to aſcertain the maximum, two ounces of marine acid were added to one pound of ſpirit of wine, without altering the ſilk. Two drachms of marine acid cauſe a very perceptible alteration in one pound of ſilk. I ſuppoſe he means pure acid, or perhaps diluted with water; for the paſſage as it ſtands is obſcure. Numerous experiments have ſhown that the marine acid is preferable to any other. The proportions admit of much latitude, though he prefers the doſe hereinbefore deſcribed.

80. " Spirit of wine which has been mixed with nitrous aicd, cannot be uſed in bleaching, even though afterwards rectified upon the alkali, becauſe it ſtill retains a portion of nitrous gas.

81. " Pure ſpirit of wine without acid extracts a fine yellow colour from ſilk, which does not ſeparate for years, even though expoſed to the ſun's light. Yellow ſilk expoſed to the ſun loſes its colour in a ſhort time. The acidulated ſpirit which has been uſed in the infuſion of ſilk, is changed by expoſure to the ſun, but not in ſuch a manner as to be rendered fit for uſe a ſecond time.

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82. " In order to obtain a beautiful colour, it is eſſential that the ſilk ſhould be immerſed in a large quantity of the fluid, eſpecially at the firſt infuſion. Without this management it would become neceſſary to make three infuſions in the acidulated ſpirit. When the firſt infuſion is well managed, the ſilk will have loſt all its yellow colour, and become conſiderably white, at the ſame time that the liquor will have begun to change colour a little. As long as it continues of a fine green, it is certain that it has not exhauſted its whole action upon the ſilk.

83. " The duration of this firſt infuſion may be longer or ſhorter, without inconvenience, according to the temperature. When the temperature is at 20 degrees of Reaumur, which anſwers to 77 of Fahrenheit, the firſt infuſion is often made in 10 or 12 hours. In ſmall experiments the heat of the atmoſphere may be ſupplied by the water-bath; in which caſe, all the infuſions are eaſily made in the courſe of a day.

84. " When the firſt infuſion is finiſhed and the liquor drawn off, the ſilk appears greeniſh: the ſubſequent waſhings in ſpirit of wine clear it of the liquor it retained. This ſprinkling ſhould be made with the watering-pot, otherwiſe the quantity poured will be greater, and the mangement more waſteful.

85. " The cocons may be bleached in this way, but the inconveniences are too great to render this proceſs deſirable.

86. " Pieces of gauze and entire garments of ſilk have been ſucceſsfully bleached in this way.

87. " The fineſt natural white ſilks are rendered infinitely whiter by this proceſs. Spirit of wine alone has the property of depriving yellow ſilk of its colour, which it brings to the ſtate of the naturally white ſilk. In this ſtate the ſilk is diſpoſed to acquire a greater degree of brightneſs by a ſingle infuſion in the acidulated ſpirit. This proceſs has its advantages over the other, to which it is alſo inferior in certain reſpects; concerning neither of which the author has entered into any detail.

88. " The colouring matter was found to be a reſin perfectly animalized, affording by diſtillation the ſame products as other animal matters, and the concrete volatile alkali.

89. " Silk whitened by ſcouring may be dried freely in the air without affecting its luſtre. This is not the caſe with the ſilk bleached in the gum: if it be left at liberty to dry in the air, it reſembles white flax without any luſtre. The beauty of this ſilk conſiſts in its ſhining brilliancy; to ſecure which, it muſt be dried in a ſtate of tenſion. M. Baumé has contrived a ſimple machine for this purpoſe. It conſiſts of a ſtrong ſquare frame of wood ſtanding upright upon feet: the upper horizontal bar is ſix feet long, and has ſix iron pins driven through it at equal diſtances, ſo as to project on each ſide for the purpoſe of receiving twelve bobbins. The lower horizontal bar is moveable up and down in a mortice by means of a ſcrew at each end: it is furniſhed with ſix holes, adapted to receive as may pins

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to correſpond with thoſe above. The ſkains of ſilk are to be dreſſed and arranged upon wooden pins, as they are taken out of the ſack from waſhing. As ſoon as there are twelve together, they are to be wrung with a ſtaff; after which the ſkains are to be hung one by one upon as many bobbins put upon the upper pins of the ſquare frame. Another bobbin with tails is to be inſerted in the lower loop of the ſkain, and faſtened to the correſponding pin of the lower bar, by means of a ſtrap and hook, which need not be deſcribed to ſuch as are ſlightly acquainted with mechanical objects. When the machine is thus ſupplied with ſkains on both ſides, the lower bar of the frame is to be preſſed down by the ſcrews until the ſilk is moderately ſtretched. When it is dry, the ſcrews are to be equally ſlackened, the ſkains taken off, and folded with a ſlight twiſt, that they may not become entangled.

90. "After this deſcription of the whole of his proceſs, the author proceeds to make certain general remarks on the white China ſilk. He obſerves, that in his proceſs the ſilks acquire the perfect whiteneſs without much handling, and conſequently that there is little cauſe for them to become entangled. Accordingly the loſs in unwinding is found to be no greater than when they are unwound in the yellow ſtate: that is to ſay, from a drachm to a drachm and a half in the pound. This ſaving is of the greateſt importance in the price of the ſilk.

91. "The ſilk of Nankin, which he ſuppoſes to be bleached by ſome proceſs of the ſame nature, is probably handled much more. The loſs is nearly twelve per cent. when it comes to be opened, and not unfrequently even 25 per cent.; a loſs which cannot in any reſpect ariſe from the package. The quality of the Nankin ſilk differs much in the package; the external part being always of the beſt quality, and that which is packed within is of ſuch an inferior quality as ſometimes not to exceed half the value. On examining this ſilk, it not only exhibited unequivocal marks of alkali, but its imperfections were alſo of the ſame kind as thoſe which had occurred to M. Baumé during the progreſſive improvement of his own manipulations. The beſt China ſilk was neither improved nor injured by the proceſs of Baumé; whence he concludes that they are not naturally white, but have undergone a proceſs ſimilar to his.

92. "The reſult of the whole is, that the yellow ſilks of Europe may be bleached to equal or greater perfection than thoſe of Nankin; and that theſe may be even greatly exceeded by winding the naturally white ſilk apart from the other, and bleaching it by itſelf.

93. "To complete the deſcription of M. Baumé's proceſs for bleaching ſilk, nothing more remains, than to ſhew in what manner he recovers the ardent ſpirit, and enſures the purity of the acids made uſe of. Theſe circumſtances are of eſſential importance to the art: for the proceſs would be much too expenſive if the ſpirit were loſt, and it could not be made to ſucceed at all if the acid were impure.

94. "The alcohol which has been uſed in bleaching ſilk, is acid, and loaded with colouring matter. In this ſtate it cannot be again uſed. There are two methods of diſtilling it; which have their reſpective advantages and inconveniences. By the firſt, the acid is loſt; which is ſaturated with potaſh, in order that the diſtillation may be afterwards performed in a copper alembic. The ſecond is performed by diſtilling with glaſs retorts, or an alembic of ſilver. In either of theſe veſſels, which are not acted upon by the marine acid, the diſtillation may be performed, and the greater part of the acid recovered. The inventor moſt generally practiſed the ſaturation of the acid from reaſons of convenience; but recommends the uſe of a ſilver alembic, as being moſt economical upon the whole, in a manufactory.

95. "A ſolution of potaſh is to be poured into the acid ſpirit and ſtirred about to promote the ſaturation. Carbonic acid is diſengaged with ſtrong effervescence from the alkali, and the point of ſaturation is known by the uſual teſt, that the fluid does not redden the tincture of tournſol. The diſtillation is then to be made in the copper alembic, and the alcohol reſerved in proper veſſels, as mentioned at the beginning of this memoir.

96. "If too much alkali ſhould have been added, the liquor remaining in the alembic may be uſed in another ſaturation. The alkali in this proceſs being an expenſive article, M. Baumé endeavoured to ſupply its place by chalk, quick-lime, and lime which had been ſlaked by expoſure to the air. But he found that the action of the ſpirit upon the calcareous earth, or perhaps the abſence of water, prevented the acid from uniting with that ſubſtance. The union does not take place to perfect ſaturation in leſs than five or ſix weeks, even when the alcohol is diluted with upwards of 50 times its bulk of water.

97. "In the ſecond proceſs for diſtilling without alkali, the acid ſpirit is diſtributed into a great number of glaſs retorts, placed in the ſand-bath, on the gallery of a furnace. The firſt product is ſcarcely acid; but what follows is more and more ſo, and muſt be kept in veſſels of glaſs or ſtone ware, which become embarraſſing on account of their number. The fluid which remains in the retorts has the colour of beer ſlightly turbid, and contains the greateſt part of the marine acid. It muſt be poured into one or more retorts, and concentrated by heat gradually applied. The firſt liquor which comes over is ſlightly red, turbid, and ſcarcely acid. This is to be thrown away, and the receivers changed. The ſucceeding product is the colourleſs marine acid, of an aromatic ſmell reſembling the buds of poplar. The reſin of the ſilk remains in the retort decompoſed by the acid. The marine acid thus obtained is weaker than it originally was; which is in fact of little conſequence, as it is pure, and may be ſafely uſed, either by increaſing the doſe proportional to its diminiſhed ſtrength, or by concentrating it, if required, in the uſual way.

98. "If this diſtillation be made in a ſilver alembic, inſtead of retorts of glaſs, and a capital and worm of pure tin be annexed, the alcohol will be obtained ſo ſlightly acid as ſcarcely to redden the tincture of tournſol; but it is ſufficiently acid to receive injury if preſerved in a copper veſſel.

99. "If a cucurbit of ſilver be prepared, of the capacity of three or four quarts, with a glaſs head, the reſidues of the firſt diſtillation may be treated in this veſſel in the ſame manner as has been directed for glaſs retorts. M. Baumé affirms that he has practiſed all theſe

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theſe operations with glaſs retorts and a ſmall ſilver alembic, with the moſt perfect ſucceſs; but that he made uſe of potaſh to ſaturate the marine acid, becauſe he had not a ſilver veſſel of ſufficient capacity. From the danger of diſtilling large quantities of ardent ſpirit in glaſs veſſels, he is of opinion that no motives of economy are ſufficient to juſtify the riſk attending this method. In the uſe of tin, it is neceſſary to be careful that it contains no adulteration of lead, becauſe the vapours of marine acid have ſufficient power to alter this laſt metal very conſiderably.

100. "Upon the firſt intimation of this new proceſs in France, manufactories were immediately eſtabliſhed, to the number of twenty or more, without the concurrence of M. Baumé, by perſons who conſequently were not aware of the apparently minute but very important circumſtances neceſſary to enſure its ſucceſs. In particular, the inventor ſtates that the marine acid of commerce is unfit for this purpoſe.

101. "This acid formerly prepared with the marine ſalt of the ſaltpetre manufacturers; and even when it is made with good ſalt, the decompoſition is effected with a ſmall quantity of vitriolic acid which contains nitrous acid. Marine acid mixed with a ſmall quantity of nitrous acid does not prevent the ſilk from being beautifully whitened: it even accelerates the proceſs conſiderably, and in the moſt ſatisfactory manner. But the alcohol, every time it is uſed and rectified, becomes charged with the acid and gas of nitre, which aſſume the characters of the nitrous anodyne liquor. In this ſtate, neither diſtillations nor repeated rectifications from alkali are ſufficient to ſeparate the nitrous matter from the alcohol. Then it is that the ſucceſs of the operator vaniſhes, with a degree of rapidity equal to the advances which encouraged his hopes at the commencement. The ſame diſappointments befel M. Baumé at the beginning of his labours; to prevent which, he directs the preparation of the vitriolic and marine acids to the following effect.

102. "The vitriolic acid of commerce is obtained by burning ſulphur in chambers of lead, with the addition of ſaltpetre, either crude or of the ſecond cryſtallization, and a ſmall portion of flax. This acid is concentrated and rectified in France, at the place of its fabrication, to 66° of Baumé's hydrometer, or ſpecific gravity in the uſual form 1.848. It contains ſulphur, lead, vitriolated tartar, Glauber's ſalt, alum, ſelenite, and particularly the nitrous and marine acid.

103. "To purify it, 100 pounds of this vitriolic acid is to be mixed in a large baſon of copper with the ſame quantity of river water, and ſtirred with a wooden ſpatula. The mixture inſtantly becomes heated to the boiling-water point, and a great quantity of red vapour is diſengaged, which has the ſmell of aqua-regia, and ariſes from the nitrous and marine acids. When this mixture is made, it is proper to immerſe the baſon to a ſuitable depth in a large veſſel of water, to haſten the cooling. As ſoon as it is ſufficiently cooled it is to be drawn off into bottles, and left to become clear during ſeveral days. Great part of the ſulphur falls down. The author obtained from four to ſix drachms.

104. "A gallery muſt be provided, on which two rows of iron pots of eleven or twelve inches in diameter are to be properly placed for ſeparate ſand baths, as M. Baumé always practiſed in the ſublimation of ſal-ammoniac. By this means the retorts are iſolated, and if one breaks, the acid cannot diffuſe itſelf and break the others in its vicinity. An empty retort is then to be placed in each pot, and covered with ſand. In this way they are much more convenient to arrange, and are attended with no riſk.

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105. "The acid is in the next place to be decanted and conveyed into the retorts by a ſyphon funnel, and the rectification proceeded upon until it becomes perfectly white. Towards the end of the operation a ſmall quantity of ſulphur ſublimes in the neck of the retort. Inſtead of receivers a ſmall glaſs cup is placed beneath the aperture of each retort, in order to facilitate the diſſipation of the nitrous and marine acids.

106. "When the acid in the retorts is ſufficiently cooled, it is poured a ſecond time into the copper baſon, and mixed with 100 pounds of river water, as at firſt, and again concentrated in the retorts till it becomes perfectly clear. Sulphur has been afforded in ſome inſtances by the ſecond rectification. The liquor which diſtills is received in the cups as before, and the acid in the retorts is then ſufficiently pure: that is to ſay, it is purified from all volatile matter. The lead and neutral ſalts ſtill remain combined with the acid, but fortunately they can in no reſpect injure the purity of the marine acid.

107. "This concentrated acid exhibits 68 degrees by the hydrometer, or ſpecific gravity 1.896. It ſtill contains a portion of gas, but ſo ſmall in quantity as not to injure the purity of the marine acid, to which it only gives the property of cryſtallizing when the temperature of the air is near the freezing point.

108. "During the rectification of this acid, what firſt comes over is mere water, and muſt be thrown away; but that which ſucceeds is the aqueous acid. If this be ſet apart, and concentrated, a conſiderable quantity of vitriolic acid is obtained of the greateſt purity. As it has been carried over in diſtillation, it contains no foreign matter.

109. "The author attempted, but in vain, to diſſipate the nitrous acid from the acid of vitriol by ebullition in an open veſſel without concentration. The experiment was made with 50 pounds of common vitriolic acid and 60 of river water. This was kept boiling in the copper baſon for four days, water being added from time to time to ſupply the loſs by evaporation. The copper baſon, by weighing before and after the operation, had loſt by ſolution no more than ten drachms of copper. The acid was blue, but became white as uſual during the rectification in the retorts. From this experiment, as the author obſerves, it is ſeen not only that the nitrous acid cannot be diſſipated by ſimple ebullition without concentration, but that the action of the vitriolic acid upon copper is extremely ſlight.

110. "The marine acid is to be diſengaged from common ſalt by the application of this vitriolic acid in the uſual manner. But as M. Baumé's experience led him to various ſimple manipulations and remarks of importance, and more eſpecially as he conſiders the deſcription of this proceſs as part of the new art of bleaching ſilk, he has annexed it to his memoir.

111. "The vitriolic acid obtained by the foregoing proceſs

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proceſs being too concentrated, muſt be diluted in the copper baſon as before with river water. It is convenient to add 18 ounces of water to each pound of the acid, becauſe the marine acid is not wanted in a ſtate of high concentration. This mixture ought to give 35 or 36 degrees by Baumé's hydrometer; which laſt anſwers to a ſpecific gravity of 1.333. When it is cold it may be preſerved in bottles for uſe.

112. "In the next place, four pounds of marine ſalt dried, becauſe in that ſtate it pours beſt, is to be put into a retort of the capacity of five or ſix French pints, or Engliſh quarts. This may be done by means of a paper funnel, or a long-necked funnel of glaſs, which muſt enter the body of the retort in order that the neck may remain clean. A number of theſe muſt be diſpoſed on a gallery in two oppoſite rows, with the necks properly encloſed and enveloped in ſand as uſual.

113. "A bottle or gauge being provided of ſuch a ſize as by previous experiment is known to hold four pounds of the vitriolic acid before mentioned; this quantity of the acid muſt be meaſured into each of the retorts by means of a curved funnel, the tube of which may paſs into the body, to prevent the acid being ſpilled in the neck. If nevertheleſs a few drops ſhould fall, no inconvenience will follow, as this pure acid is not detrimental to the bleaching proceſs.

114. "The ſupports for the receivers are then to be placed, and the receivers applied, each being pierced with a ſmall hole. The junctures are to be made good with paſted paper, and the diſtillation begun. A gradual heat is to be applied until the fluid boils gently. The marine acid which firſt riſes is volatile and expanſible (F), and requires the ſmall holes of the receiver to be occaſionally opened; but after one fourth part of the time of diſtillation the acid comes over freely, and the vapours ceaſe to be elaſtic.

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115. "The diſtillation laſts two days; but it is practicable to avoid ſitting up the intermediate night. The fire muſt be ſo managed that the contents of the retort may be very liquid in the evening: if it begins to thicken, there is reaſon to apprehend that it may be too hard the next day; in which caſe the heat will dilate the concrete matter before it liquefies, and break the containing veſſel.

116 "Towards the cloſe of the diſtillation the matter ſwells up conſiderably. When this happens, it is proper to empty the receivers, and raiſe the retorts, that more ſand may flow in beneath them. When the matter is dry, and nothing more comes over, the operation is finiſhed.

117. "Each retort affords five pounds of marine acid, of the ſtrength of 14 or 15 degrees; ſpecific gravity 1.114. When the retorts are half cooled, one pound of hot river water is to be poured into each, and the diſtillation being reſumed affords 24 ounces of the ſame marine acid from each retort."

PART II. BLEACHING OF VEGETABLE SUBSTANCES.

118. THE compoſition of vegetable ſubſtances differs materially from that of animal bodies in the proportions of the three principles which are common to both, namely, oxygen, hydrogen, and carbon; and in wanting for the moſt part azote, which in the latter acts ſo conſpicuous a part. The proportion of ſulphur and phoſphorus is alſo exceedingly ſmall in vegetables.

119. As in animals, the ſubſtances derived from vegetable nature are formed by a peculiar proceſs of ſecretion, from the nouriſhment which plants draw from the boſom of the earth, which after being abſorbed by the roots, undergoes, in paſſing through the veſſels of the plant, new modifications and enters into new combinations.

120. By ſpontaneous decompoſition the principles of vegetables, as of other organized matter, are ſeparated and enter into new ſtates. The hydrogen combines with part of the oxygen to form water, while the reſt of this latter element, uniting with the carbon, generates carbonic acid.

121. Theſe changes are the natural effect of expoſure to moiſture, heat, and atmoſpheric air, and upon the effect of theſe agents the chief dependence has been till lately placed in the proceſſes for diſcharging the colour of vegetable ſubſtances. As the gradual improvement of the art of bleaching forms a pleaſing object of contemplation both to the ſcientific manufacturer and the philoſophic chemiſt, we ſhall, after ſaying ſomething of the nature and previous preparation of the ſubſtances employed, endeavour to trace the ſteps which have led to the preſent improved ſtate of bleaching, as it is in the linen and cotton manufactures that this is more peculiarly apparent.

122. The vegetable materials employed for clothing are uſually diſtinguiſhed into two kinds, linen and cotton, the former being derived from hemp and flax, the latter from the down of the cotton plant.

123. Of all the materials employed for clothing, wool ſeems to have been the moſt ancient, and indeed it was a natural and an eaſy ſtep from the ſkins of beaſts, to the uſe of the detached hair. Silk ſeems to have been next in point of antiquity, and in a ſhort time the fibres of hemp and flax were had recourſe to for the ſame purpoſes. It is probable that the fibres of hemp were firſt applied to the ſervice of man as cordage or ſails, or to make tents for ſheltering the inhabitant of the deſert, or the ſoldier in the camp, as their coarſeneſs and ſuperior ſtrength would point them out as

(F) It might be of advantage, even in the large way, to adapt a ſimple pneumatic apparatus to condenſe the marine acid air in water, as is uſual in philoſophical proceſſes.

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as better fitted to theſe uſes, and leſs adapted to the purpoſes of clothing than the finer and more delicate fibres of flax.

124. The uſe of flax appears to have originated in Egypt, and its introduction is attributed to Iſis.

125. Cotton has probably been employed among the Aſiatics for a very long time; in Europe it was the lateſt of all the materials of which clothing is manufactured.

126. On examining the ſtalks of hemp and flax when they are pulled, we ſhall find them compoſed of four diſtinct ſubſtances; a delicate bark, a green juice or ſap, the fibres which are to be employed in the manufacture, matted or twiſted together, and within theſe the wood of the plant. As the fibres are thus enveloped in uſeleſs matter, the firſt object is to ſeparate them, to peel off the bark, waſh away the ſap, and ſtrip the fibres from the wood. The two firſt of theſe are effected by water and fermentation. The plants tied in bundles are placed in water, and proper methods taken to prevent their being carried away, if it be a ſtream, which is frequently the caſe (G). In a ſhort time a fermentation begins to take place, which acts both on the bark, which it looſens, and on the ſap, which it decompoſes. It is neceſſary to be attentive not to let the fermentation proceed too far, as we thereby run the riſk of injuring the texture of the fibres. As ſoon then, as on examining the plants, by rubbing them between the hands, it be found that the wood breaks eaſily, while the plants are ſtill green, they muſt be removed from the water and ſpread out upon the graſs to dry.

In this operation, which is called *watering* the flax or hemp, it is neceſſary to employ *ſoft* water, as it is found that in hard waters the fibres are much more readily injured. To account for this, it muſt be remembered that theſe waters owe their hardneſs to their containing a quantity of an earthy ſalt *; and theſe ſalts are found to promote the proceſs of putrefaction, particularly the ſulphat of lime or gypſum, which is the moſt abundant of theſe ſalts contained in hard waters.

* See *Mineral Waters*, CHEMISTRY *Index*.

127. The proceſs of watering deſtroys the ſap of the plants by effecting its decompoſition. This ſap is found to be compoſed chiefly of water, and what modern chemiſts have called extractive: by fermentation this extractive is ſeparated into carbon, hydrogen, and oxygen. It is probable alſo that the water of the ſap, as well as that in which the plants are ſteeped, is decompoſed: Theſe principles uniting again in different proportions form carbonated hydrogen, which is the cauſe of the offenſive odour, and carbonic acid, which is found to proceed from the plants. The expoſure to the air which they undergo after ſteeping contributes to the ſpeedier eſcape of theſe principles.

After the drying, the plants appear of a grayiſh white colour, which is called by workmen a flaxen grey.

128. One of the greateſt advantages which modern chemiſtry has conferred on the manufacturer is the enabling him to do the ſame work more completely in a ſhorter time than by the uſual proceſſes. Of this the preſent ſtate of bleaching affords innumerable proofs. Even this proceſs of *watering* may be greatly improved and conſiderably haſtened. Several days are required before the fermentation is carried to a ſufficient length, and with every attention, there is a chance of injuring the material. But it is found that this proceſs may be performed by means of a weak alkaline ley without this danger.

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129. The method recommended is, to convey the ſteam of water impregnated with cauſtic ſoda, in the manner which will be deſcribed hereafter for the bleaching of cotton and linen, through the plants of hemp and flax contained in a chamber of twenty or thirty feet ſquare. The expence is trifling, as the ley need not be ſtronger than what was recommended for ungumming and bleaching ſilk.

130. When the watering is completed, the plants are to be kiln-dried. There now remains only the woody part incloſed in the fibres; to ſeparate theſe is the object of the proceſſes of beating and heckling. This is either performed by mallets and a ſort of wooden anvils, and in this way hemp is beaten in houſes of correction, or in mills erected for this purpoſe. In either way the wood is broken ſo as to allow of its being more eaſily detached from the fibres by heckling.

131. This refuſe ſhould not be thrown away, as it may be without much difficulty converted into paper.

132. The fibres are now ready for ſpinning and weaving, operations which it belongs not to this article to deſcribe; we ſhall therefore take up the cloth as it proceeds from the hands of the weaver, when it comes properly under the direction of the bleacher.

133. The pieces of hempen and flaxen cloth, as they come from the loom, are covered with a dry coating of paſte made of flour and water, which is called the *dreſſing*. This paſte is applied to the threads of the weaver, to render the ſtretching of them more eaſy, and its removal is the firſt object in every method of bleaching.

134. For this purpoſe, all that is neceſſary is to ſteep the pieces in water for about forty-eight hours. Some manufacturers boil the pieces in the water, but this is improper, as the paſte is not ſoluble in that fluid, even at the boiling temperature, but muſt undergo a decompoſition by fermentation. To effect this the water ſhould be of a temperature from 60° to 75° Fahrenheit; the fermentation then proceeds gradually, and the cloth ſuſtains no injury. After remaining for a ſufficient time, the pieces are taken out, and well rinſed in running water, either by treading with the feet or paſſing them under a fluted cylinder of wood.

135. By this operation the cloth is not only freed from the paſte, but it acquires a degree of whiteneſs, and becomes of a lighter gray than before it was ſubjected to the water; for by the fermentation the texture

(G) It is very uſual in Scotland to ſteep flax in burns or rivulets, as theſe are commonly found moſt convenient, but as the ſmell of the putrifying plants is intolerably offenſive, and even unhealthy, and as the proceſs is found to deſtroy any fiſh that may inhabit the ſtream, the practice ought to be diſcouraged, and in ſome countries is forbidden by the laws.

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ture of the pieces is loosened, the threads swell, and part of the colouring matter is decomposed.

136. The gray substance, which it is the principal business of the bleacher to remove, is of a resinous nature, and as the theory of the processes which we are presently to describe depends on an intimate knowledge of its properties, we shall be somewhat particular respecting it.

137. Kirwan, to whom chemistry in all its departments is so highly indebted, has submitted this matter to a set of ingenious experiments.

He procured from the bleach grounds a quantity of what the workmen called *dead ley*, which is the alkaline ley in which cloth has been steeped, and is consequently charged in abundance with the colouring matter. He found this liquor to be turbid, of a bluish red colour, having a peculiar taste, and a strong odour. It possessed neither alkaline nor acid properties.

138. To five pints of this liquor he added two ounces of weak muriatic acid, or spirit of salt; no effervescence was produced, but a considerable quantity of greenish matter fell to the bottom, and the liquor above remained of a reddish amber colour.

139. He next day, by means of a syphon, decanted off the supernatant liquor from the green precipitate, upon which he poured two pints of distilled water, stirred them well together, and allowed the matter again to subside: he then decanted off the water, and added a like quantity of fresh. This water still exhibited strong marks of acidity, and was of a reddish colour. He could not believe that after the addition of so much water, this acidity could arise from the muriatic acid which he had employed, as this was scarcely more than sufficient to saturate the alkali, which the liquor had originally held in composition. He concluded therefore that the liquor had contained a peculiar acid, which from its weaker affinity with the alkali had been separated from it by the muriatic acid. He set apart two pints of this for farther experiments.

140. After successive washings of the precipitate, till it no longer appeared to retain any acid, he threw it on a filter: after being dried for some time, it became a tenacious mass, of a greenish colour.

141. A very small portion of it was thrown into 60 times its weight of boiling water, but not a particle appeared to be dissolved. The remainder was dried in a sand-bath, after which it was brittle, of a glossy black without, and internally of a dull green; it weighed about an ounce and a half.

142. From eight pints more of the dead ley, he obtained a larger quantity of this green matter, on which he made the following experiments.

1. A portion of it was digested with rectified alcohol; a reddish tincture was produced, and a considerable part of the matter was dissolved; but on the addition of distilled water, the solution became milky, and a white precipitate gradually subsided. The black mass obtained in the former experiment, gave the same results.

2. These two matters were digested for a long time in linseed oil, and essential oil of turpentine, but were not dissolved in either.

3. The black matter thrown on red-hot coals, burned with a yellow flame, and emitted a black smoke, leaving behind a coaly matter.

4. The green matter exposed to the action of sulphuric, muriatic, and nitric acids, gave a brown tinge to the two former, and a green to the latter. Vegetable Substances.

143. It is pretty evident from these experiments, that the extractive matter of the fibres of flax, which is obtained from them by the action of alkalies, is a resin of a peculiar nature, differing from pure resins in its being insoluble in essential oils, and in this respect having some resemblance to lacs.

144. Kirwan thought it necessary to try the action of alkalies on this matter. Eight grains were digested in a saturated solution of crystallized soda at the temperature of 60° Fahrenheit, which was immediately tinged of a deep brown colour. Two measures of this solution of soda weighing each 265 grains, did not entirely dissolve the matter, but two measures of a solution of potash dissolved the whole.

A measure of caustic soda of the specific gravity 1.053, dissolved nearly the whole, leaving a small quantity of a white substance.

A measure of caustic potash of the specific gravity 1.039 dissolved the whole.

A measure of an alkaline sulphuret or liver of sulphur, of the specific gravity 1.170, also dissolved the whole.

A measure of ammonia dissolved a small portion of it.

145. These experiments were sufficient to satisfy Mr Kirwan, but, for the purposes of the manufacturer, he judged it proper to repeat them with the ordinary saline substances employed in bleaching, and with soap.

He therefore dissolved an ounce of the soda of commerce, and as much Dantzic potash, each in six ounces of distilled water; he added eight grains to an ounce measure of each solution, and allowed them to digest together in a temperature of 180° Fahrenheit for three hours and a half. At the end of this period it was found that more was dissolved in the potash than in the soda, and an ounce of this latter was required to complete the solution, whereas this was effected by the addition of half an ounce of the Dantzic potash liquor; thus shewing the superiority of the potash over soda.

An ounce of white soap was dissolved in eighteen ounces of distilled water; the solution remained turbid, and could be rendered transparent only by bringing it to the boiling heat, an operation which he found extremely difficult; for when the fluid was near boiling, it was thrown out to a distance of more than three feet from the matrass. After completing the solution, he found that three ounces of it were required to dissolve eight grains of the colouring matter.

146. In forming an accurate idea of the comparative effect of these solutions, it must be observed, that an ounce of the soda of commerce contains only 114 grains of pure soda, and consequently, supposing the solution to have been made as above, in six ounces of water, each ounce will contain 19 grains of soda, while an ounce of the solution of Dantzic potash contains fifty grains.

147. He tried the effect of lime on the colouring matter, on which it produced little effect; three ounces of water saturated with lime were employed, which contain at most three grains of that earth.

148. Having been so full on the nature and previous preparation of flax and hemp, it remains only to say something

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ſomething on cotton before we proceed to the bleaching of theſe ſubſtances.

149. Cotton is a filamentous ſubſtance or down, which is found ſurrounding the ſeeds of the cotton plant.

This ſubſtance, as it is firſt obtained from the plant, is covered with a browniſh coloured matter, by which it is rendered dirty and opaque. This matter is of a greaſy nature in which it reſembles the oil contained in wool, as is evident from the ſlowneſs with which raw cotton imbibes water, and the avidity with which it attracts it after having been ſcoured. Scouring, by removing this greaſy matter, alſo renders it clear and tranſparent.

150. There is conſiderable variety in the quality of cottons, ariſing from their different kinds; the climate in which they were produced, and the degree of culture which they received. They are ſometimes of a yellow colour, ſometimes white, but moſt commonly their colour is a dirty yellow.

151. The bleaching of cotton does not call for thoſe preparatory operations which we have deſcribed as neceſſary for hemp and flax. It is firſt to be ſcoured by ſteeping it in a ſlight alkaline ſolution, or what is better, by expoſing it to the vapour bath in the manner which we ſhall ſoon direct. After this operation the cotton is to be placed in baſkets in the ſtream of a river or other running water, ſo as to be well rinſed.

152. After the immerſion of cotton in an alkaline ley, there is always left, however completely it be rinſed, a ſmall quantity of an earthy ſediment. This may be removed by the cautious uſe of acids. We know that cotton bears the action of acids much better than either hemp or flax, and that it may remain expoſed to them for ſome time without injury. Advantage has been taken of ſo fortunate a diſcovery, and it is found, that by keeping the cotton for a ſhort time preſſed down in a very weak ſolution of ſulphuric acid and ſubſequent thorough waſhing, to remove all the acid, this earthy ſediment may be completely removed.

153. The methods which have been employed or recommended for the bleaching of hemp, flax, and cotton, may be reduced to five, viz.

1ſt, By the action of the atmoſpheric air, aſſiſted by alkalies and ſoaps.

2d, By the action of water only.

3d, By the action of the oxygenated muriatic acid, or dephlogiſticated marine acid of Scheele; and this method may be reſolved into four; according as the acid is employed in its ſimple ſtate of combination with water, or in combination with other matters.

a, By the action of oxy-muriatic acid alone.

b, By the action of oxy-muriatic acid combined with potaſh.

c, By the action of oxy-muriatic acid combined with lime or other earths.

d, By the action of oxy-muriatic acid combined with ſulphuret of lime.

4th, By the action of diluted ſulphuric acid.

5th, By the action of ſteam impregnated with cauſtic alkali, or by employing this alternately with the oxymuriats. Of theſe we ſhall treat in the above order.

I. *Of Bleaching by the Action of Atmoſpheric Air.*

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154. This is the method which was commonly adopted till within theſe twenty years, and is ſtill retained in ſome old manufactures. After ſteeping the cloth, as has been related (134.), to remove the weaver's dreſſing, the pieces are dried in the field, and then ſubmitted to the operation of *bucking*.

For this purpoſe a ley is prepared by diſſolving a quantity of potaſhes in ſoft water, and boiling it for about half an hour, when it is allowed to ſettle, and forms what is called the *mother ley*. For bucking, this mother ley is weakened by the addition of 16 or 18 times its bulk of water; and to this is generally added a quantity of ſoap, or for the ſake of economy, a few gallons of ley, which has already been employed for the firſt buckings. This liquor, which has been called the *bucking ley*, is now heated to about 100 degrees, and poured on the pieces ſorted according to their quality. After preſſing the cloth well down in the ley, it is drawn off, heated a little higher, and again poured upon the cloth. This operation is repeated at intervals, allowing the ley to remain longer each ſucceeding time, and moderately increaſing the heat to the bucking temperature, for five or ſix hours. Then the cloth is left ſteeping for three or four hours, when it is taken out, well rinſed, and carried to the field.

155. Here it is ſpread out upon the graſs and ſecured by pins; water is ſprinkled on it ſo as not to allow it to become dry for ſome hours. After it has lain about half a day the watering is leſs frequent, and at night it is left to the full action of the air and dews. On the ſucceeding days it is watered three or four times a-day if the weather be drying, and thus it remains on the field till the air ſeems to have leſs effect in whitening. It is then brought back to the coppers and bucked again with a ley ſomewhat ſtronger than the laſt, rinſed, and again ſpread out on the field. It is thus alternately bucked and watered 10 or 15 times according to the weather, making the bucking ſtronger and ſtronger till about the middle, and then weaker and weaker till the laſt, after which it undergoes the proceſs of ſcouring or ſteeping in ſome acid liquor.

156. The acid which has been uſually employed in the proceſs of ſouring is generated by the fermentation of bran and water; or where the bleachfield was in the neighbourhood of a dairy, ſour whey was uſed for this purpoſe. It has been found that a very weak ſolution of ſulphuric acid is more convenient and not more injurious than theſe, and this is now generally employed. The cloths are ſteeped in the ſouring for five or ſix days, if it be formed of milk or bran, or a leſs time where the ſulphuric acid is uſed, and they are then given to the waſhers to be rubbed with ſoap, which is more particularly neceſſary to the ſelvages, as theſe reſiſt the action of the air and alkalies longer than the reſt of the cloth.

157. After being well ſoaped, the cloth is again bucked in a ſtrong ley, rinſed, and again watered and expoſed to the air, and all theſe proceſſes are repeated in ſucceſſion till it has acquired the requiſite degree of whiteneſs. It muſt be obſerved that the ſtrength of the acid liquors is diminiſhed at each ſucceeding immerſion.

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158. The theory of theſe operations was, till lately, very little underſtood, but it admits of an eaſy explanation by the principles of modern chemiſtry. It has been proved, as will be ſhewn in chemiſtry, that the air of the atmoſphere conſiſts principally of two airs or gaſſes, oxygen gas or vital air, and azotic gas, in the proportion of about .23 of the former to .77 of the latter. The only active principle in moſt of the operations of art and nature appears to be the oxygen, and this uniting with various inflammable bodies produces acids. Now the colouring matter of cloth is a compound inflammable matter or reſin, compoſed chiefly of carbon (the baſe of charcoal), and hydrogen (the baſe of hydrogenous gas or inflammable air). As has been ſhewn, this is partly ſoluble in alkalies; hence the uſe of the alkaline leys in bucking is to diſſolve as much as poſſible of the colouring matter; but, as the action of the alkali extends only to the ſurface of the cloth, it is ſoon over. The ſubſequent expoſure to the air promotes the union of the carbon and hydrogen with the oxygen of the atmoſphere, producing carbonic acid gas, or fixed air, and water.

When it was the faſhion to denominate every combination of oxygen with an inflammable ſubſtance, combuſtion, this was conſidered as a ſpecies of burning*.

* Vide *Higgin's Eſſay on Bleaching*, p. 53.

159. The great objection to this method of bleaching is its tedioufneſs, two or three months being requiſite to give the cloth the neceſſary whiteneſs. The ſimplicity of it, and the little apparatus it requires, recommend it however on ſome occaſions, and accordingly it is employed by thoſe country people who make their own cloth, particularly in Scotland.

The bucking of coarſe cloths is expedited by boiling them in the ley, but this is ſeldom required for the finer kinds.

II. *Bleaching by Water only.*

160. We have obſerved (135.), that during the proceſs of ſteeping, the cloth acquires ſome degree of whiteneſs; and it was long ago remarked, that the pulp from which paper is formed, while acted on by the ſtampers, was rendered whiter than before; it is found too, when the ſtalks of hemp and flax remain too long in the water in which they are ſteeped, they become conſiderably whiter, while, however, their texture is much injured. A manufacturer of Amiens, M. Braſſe, conceived that by cautious management, he might turn theſe facts to account, and bleach by means of water alone, which would be certainly one of the moſt economical methods. He allowed the hemp (for to this his experiments ſeem to have been confined) to remain ſteeping till the bark was pretty much deſtroyed by the fermentation. He then drew it through the teeth of a heckle or comb, which eaſily tore away the half putrid bark, permitting the fibres to paſs uninjured between the teeth. During this proceſs the hemp was perpetually immerſed in water, by which means the green bark was much more eaſily ſeparated, and the fibres acquired a much greater degree of brilliancy. Indeed, the whiteneſs produced in this way is truly ſurpriſing, and it is much to be regretted, that this cannot be obtained without injuring the quality of the cloth, which is prepared from the hemp thus treated. By this operation, however, the hemp does not acquire ſo pure a white as to render unneceſſary the other proceſſes, but by it theſe would be greatly ſhortened. Vegetable Subſtances.

161. As it is a matter of the greateſt conſequence to the bleacher, to be perfectly acquainted with the nature of the ſubſtances which he employs, as well as the moſt economical and convenient methods of procuring or purifying them, we ſhall take an opportunity in the courſe of this article, of treating theſe ſubjects pretty fully. There is no material which has been more extenſively employed in bleaching than potaſh or potaſhes.

162. If a pile of wood, or a heap of land-plants tolerably dry, be kindled and burned in the open air till the whole is conſumed, there remains a conſiderable quantity of aſhes, which on being boiled in water, impart to this fluid a ſtrong ſaline taſte, and give it the property of tinging ſyrup of violets, or any blue vegetable infuſion of a green colour. It was long ago known, that this liquor thus impregnated, poſſeſſed the valuable property of facilitating the removal of dirt and greaſe from cloth or linen, and with theſe views it has been employed from time immemorial; and is ſtill uſed for this purpoſe by the country people. At length it was diſcovered, that by driving off the water by evaporation, the uſeful part of the liquor might be obtained in the form of a whitiſh ſolid ſubſtance, which being thus rendered capable of being carried to any diſtance, or kept in a dry place to any length of time, was much more convenient than the liquor itſelf. It is ſaid that the Germans were the firſt who procured this ſalt in the ſolid ſtate from the aſhes of wood, and as it was prepared by boiling in iron pots, it received the name of *potaſh* or *potaſhes*.

163. Potaſhes have long been a conſiderable and lucrative article of commerce, and a great quantity is annually imported into the Britiſh empire, for the purpoſes of ſeveral manufactures, but particularly for the proceſs of bleaching. The greateſt quantity is brought from Ruſſia and America, and of theſe the American is conſidered as the beſt. Good potaſhes ſhould be very ſoluble in water, and ſhould leave a ſmall quantity of ſediment, and they ſhould have the property of eaſily *deliqueſcing* or becoming moiſt when freely expoſed to the air. But as the ſale of potaſhes is extremely extenſive and beneficial, it has been found *convenient* to the vender to increaſe their bulk by the addition of ſome other ſubſtance which he can procure at a cheaper rate; it is therefore of much importance that the manufacturer ſhould be able to detect this impoſition, which he will not find a difficult matter.

164. The aſhes of moſt plants, beſides the alkaline ſalt, which is more properly called *potaſs*, and of which we ſhall ſpeak preſently, contain a compound ſalt, formed of this potaſs, united to ſulphuric acid, called ſulphat of potaſs. This ſalt is an injurious addition to the potaſs, as it poſſeſſes no detergent properties, and is very little ſoluble in water, one part requiring 16 of water at an ordinary temperature to diſſolve it. This ſalt is ſometimes added to the potaſs by the merchant or the manufacturer to increaſe its bulk, and as it is a very cheap article in compariſon with potaſs, the adulteration turns out very profitable.

"During a mineralogical excurſion through England," ſays Mr Higgins, "in the ſummer and autumn of the year

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year 1785, the different manufactures which fell in my way, were not paſſed over. Upon enquiring of the diſtillers of aquafortis (nitrous acid) how they diſpoſed of the large reſiduum left in the ſtill, which is ſulphat of potaſh, and which is of little or no uſe in the arts, they informed me it was bought up by the Iriſh merchants.

" Sulphat of potaſh, when ground down, cannot readily be diſtinguiſhed as to its external appearance, from pearl-aſh, and being ſo much cheaper than the latter, is well calculated for the above fraudulent purpoſe.

" By no means do I intimate that this is a common practice, as from experience I know the contrary.

" However, to paſs it over in ſilence would be unpardonable, when it is conſidered that the bleacher is at the expence of an article of no uſe whatever in bleaching, and that, by the adulteration, the proportion beſt known by experience to anſwer his purpoſe, is varied; by which means his proceſs, although not altogether fruſtrated, muſt be materially retarded *."

* *Higgins on Bleaching*. p. 14. 15.

165. The difficult ſolubility of ſulphat of potaſs renders it eaſy to ſeparate it from the pure alkaline ſalt. Higgins gives the following method.

" Three pounds of pearl-aſh, and two quarts (a Scotch pint) of water, ſhould boil together for a few minutes, then be removed from the fire and ſuffered to ſtand for twenty four hours, when the clear liquor is to be decanted off. Half a pint more of cold water is to be poured upon the dregs, and this again drawn off when clear. The inſoluble ſalt is afterwards to be well dried and weighed, which being a foreign ſalt, will give pretty nearly the quantity of impurities in the potaſh.

" I would recommend the above mode of analyſis to the bleachers before they purchaſe or uſe this pot-aſh†."

† *Ib.* p. 16.

166. Though the potaſh in the ſtate in which it is ſold anſwers ſufficiently well for many purpoſes, it is not, however, pure potaſs, but is a compound ſalt formed of this united to carbonic acid, or fixed air, and it is called by modern chemiſts *carbonat of potaſs*. It is neceſſary for ſome proceſſes to have it in the pure and cauſtic ſtate, in which it acts much more powerfully. The carbonic acid is carried off by means of lime, for which it has a greater affinity than for potaſs. For this purpoſe a quantity of quick-lime freſh burnt is to be ſlaked with ſoft water in a wooden or iron pot, and afterwards the potaſs is to be added diſſolved in water, after being purified in the manner above directed. They muſt ſtand together well covered from the air for ſome hours, frequently ſhaking the veſſel, and then the fluid may be drawn off clear for uſe. This is commonly called ſoap-leys, as it is uſed in the manufacture of ſoft ſoap; it is called *cauſtic alkali*, from the violent action which it exerts on animal and vegetable matters, which it corrodes or burns very ſpeedily, whereas the action of carbonat of potaſs is much leſs violent, and this is therefore diſtinguiſhed by the name of *mild alkali*. The uſe of the cauſtic ley requires great caution, but when ſufficiently directed it is perfectly ſafe.

167. It is proper to remark here, for the ſake of manufacturers who are not ſcientific chemiſts, that the lime is of no farther uſe here than taking the carbonic acid from the potaſs, by uniting with which it is converted into chalk or carbonat of lime. The effect which the lime has in rendering the alkali cauſtic, was long known to manufacturers, and they were led to ſuppoſe that it entered as an ingredient into the ſoap-ley, and was itſelf uſeful as a detergent ſubſtance. This capital error led ſome into the employment of quick-lime in bleaching without any addition, by which means the texture of the cloth was greatly injured.

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168. As potaſh is the alkali which has been moſt employed in bleaching, we have mentioned it firſt; there is however another of ſtill greater conſequence in moſt manufactures, and which deſerves our particular attention, from its being employed in the method of bleaching by ſteam, to be deſcribed hereafter. This is called *ſoda* or *mineral alkali*.

When ſea-weed or wrack, and ſeveral plants which grow on the ſea-coaſts, particularly ſeveral ſpecies of ſalſola and ſalicornia are burned, the aſhes form an impure alkaline maſs of a different nature from that produced by the burning of land plants. What is obtained on our coaſts from the ſea-weed is called *kelp*, and that which is brought from the continent, eſpecially from Spain is called *barilla*, or *barilha*. The latter is the purer of the two, and is generally employed in the manufacture of ſoap. When theſe maſſes are reduced to powder, boiled in water, and the liquor filtered, ſufficiently evaporated and ſet by to cool, a quantity of large beautiful cryſtals are obtained, which are *carbonat of ſoda*, or *ſalt of ſoda*.

169. The ſoda, as contained in *barilla*, is in a much more cauſtic ſtate, or leſs of it is combined with carbonic acid, than potaſh in the raw ſtate; neither of theſe alkalies will cryſtallize in the cauſtic ſtate, but by ſtanding for ſome time freely expoſed to the atmoſphere, they imbibe from it carbonic acid gas, and are then capable of cryſtallization. It is therefore neceſſary to allow the ſolution obtained from barilla or kelp to ſtand thus expoſed for about a-week. It muſt then be evaporated to a proper degree, determined by experience or by the aerometer for ſalts, and ſet by to cryſtallize. To make ſure of obtaining cryſtals, which it is not always eaſy to procure, it would be better to evaporate to dryneſs, then diſſolve the dry maſs in the leaſt poſſible quantity of boiling water, and, on cooling, cryſtals will be formed.

170. Soda, as exiſting in barilla and kelp, is ſometimes contaminated by the mixture of muriat of ſoda, or common ſalt, from which it may be freed by careful evaporation. Carbonat of ſoda is leſs ſoluble in cold than in hot water, while the ſolubility of muriat of ſoda is much the ſame in both. After obtaining the firſt crop of cryſtals therefore, which will be pure carbonat of ſoda, the remainder of the ſolution muſt be gently evaporated to about one half, when part of the muriat will ſeparate and remain at the bottom of the veſſel; the hot liquor is now to be poured off from it and ſet by to cool; when a freſh crop of cryſtals will be obtained, and thus the remainder is to be ſucceſſively treated till all the ſoda is procured, and all the ſalt ſeparated.

171. For moſt purpoſes of the manufacturer, ſoda is required in its cauſtic ſtate, and for this purpoſe, the carbonic acid is removed by means of quick-lime. But as barilla contains moſt of it in a ſtate ſufficiently cauſtic for the ordinary purpoſes of the bleacher, he is ſeldom at the pains of purifying it. The uſual way is to tie up a quantity of powdered barilla in a thick canvas bag, which

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is suspended in the copper in which the cloth is boiled. A sufficient quantity of the soda is thus dissolved in the water and imbibed by the cloth, while the insoluble dregs remain behind in the canvas bag. For the finer cloths, however, and for the purposes of bleaching with vapour impregnated with caustic soda, it would be much better to obtain the soda in its purest form.

172. Soap is an article of the utmost importance to the bleacher, and which we are naturally led to consider after speaking of potash and soda.

These alkalies readily combine with vegetable oils and animal fat, and on this property is founded the manufacture of the detersive substances denominated *soaps*. There is a difference sufficiently marked between the soap produced by the union of fatty matters with soda, and that formed from their union with potash. The former combination produces a hard, the latter a soft soap. The invention of this valuable substance is attributed by Pliny to the Gauls. The original composition of soap seems to have been much the same in all ages, but the first attempts to make it appear to have been extremely rude. The ancients formed their soap of goats fat mixed with the ashes of beech. Various improvements have been successively and gradually introduced into the manufacture in proportion as accident, the parent of the most important discoveries, pointed out their necessity.

173. In France two kinds of soap are manufactured; hard, formed of soda, combined with olive-oil, and soft, composed of potash and vegetable oils, of inferior quality.

In Hungary and some parts of Germany, soap is made of tallow and barilla. A hard soap is prepared in Russia of bad salt butter, but it is held in little estimation, as the rancidity of the butter, and the quantity of cheesy matter which it contains, contribute to render it of a very inferior quality. We are informed by Weiglib that they also form a very hard soap of yellow and white bees wax, which has a very agreeable smell of almonds.

174. In Britain, where vegetable oils are by no means plentiful, and are consequently expensive, they manufacture this soap entirely with animal fat, employing either tallow, fish oil, kitchen grease, or stale butter. There are four kinds of soap manufactured here. 1. A hard white soap formed of soda of Alicant, and of Varech, combined with tallow. 2. A marbled soap, made of soda, tallow, and kitchen grease: the marbling is produced, not by a metallic oxyd, as is the case in France, but by mixing a little ley towards the end of the boiling with the whole matter, drawing off the surplus to prevent the marbled part from setting, and then quickly conveying the soap into the frames to cool suddenly: this is at least the way in which the red marbled soap is made with us, but the motled appearance in the blue marbled wash balls is said to be occasioned by Indigo *. 3. A hard yellow soap composed of soda, tallow, and rosin, which last seems to be added to make the soap cheaper, as it certainly does not increase its detersive property; and indeed it is said that the use of rosin is very injurious both to the arms and hands of the washers who employ this soap, which it irritates exceedingly, and to the linen washed with it, to which it gives a yellow colour. 4. A soft soap, formed of whale or other fish oil combined with potash.

* *Monthly Mag.* for July 1803.

175. Attempts were long made to discover substances, which might supply the place of these fatty matters, in the manufacture of soap. It was reserved for Chaptal to point out the road to this valuable end, by introducing his soap formed of wool, and thus converting scraps of cloth and pieces of old woollen garments, into an excellent soap. He has been followed in Britain by Sir John Dalrymple, who conceived, that by a process similar to Chaptal's, he might form a soap of the muscular parts of the fat fish. Some successful experiments completely proved the justice of the idea (H).

III. *Of Bleaching by the Oxygenated Muriatic Acid.*

176. The *muriatic acid* (See Chemistry), or *spirit of salt*, is not proved to contain oxygen, to which most other acids appear to owe their acidity. It is, however, capable of combining with this principle, by the addition of which it acquires new and very extraordinary properties. It will take oxygen from most of the metallic oxyds or calces, as red lead, or what is more commonly employed, the black oxyd of manganese. If the muriatic acid be digested for some time, over either of these oxyds, it acquires a most penetrating and suffocating odour, and instead of reddening a blue vegetable infusion, it banishes the colour altogether. It is this latter property of destroying colours, which renders the oxygenated muriatic acid of such importance in bleaching.

For the discovery of this acid, we are indebted to the immortal Scheele of Sweden, who was also acquainted with its property of discharging vegetable colours. The true application of this property, however, to the purposes of bleaching we owe to M. Berthollet, of whose paper in the annals of chemistry, *Annales de Chimie*, we shall present a brief abstract, as this was the foundation of all those improvements which have been lately made in the art, and of which we are presently to speak.

177. The oxygenated muriatic acid is obtained in the form of an air or gas, and was procured by Scheele in the following manner. He put a quantity of black oxyd of manganese reduced to powder, into a glass retort, and poured on it some muriatic acid. To the retort he fixed a receiver, capable of holding twelve ounces; but containing only two drachms of water. On placing the retort in a sand bath, so that any acid which came over unchanged might fall back, and applying heat, the receiver was soon filled with a yellow coloured gas. Having filled one receiver, he applied others successively, till no more gas was extricated, or till he had obtained sufficient for his experiments.

178. The experiments made by Scheele to ascertain the nature and property of this acid were few and simple; he suspended several substances in the necks of the receivers, and observed the following facts.

1. The

(H) For a full account of the manufacture of this soap, Vid. *Annales des Art et Manufactures*, par O'Reilly.

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1. The corks which closed the mouths of the vessels which contained the gas, were rendered yellow, as if they had been corroded by nitric acid (aquafortis). 2. Paper tinged blue, with infusion of litmus or turnsole, was rendered nearly white. 3. The red, blue, and yellow parts of flowers, as well as the green leaves of vegetables, were by the action of the gas rendered pale and colourless. 4. When these changes were produced by the action of water, by which this gas had been absorbed, the water was changed into very weak common muriatic acid. 5. Neither acids nor alkalies were capable of restoring the original colours thus changed.

179. Berthollet repeated and confirmed these experiments of Scheele's, and explained the theory of the changes produced by the action of this new substance. "I have shown," says he, "that one portion of the common muriatic acid employed in the preparation dissolves the oxyd of manganese, and displaces a part of the oxygen, or basis of vital air, which was, in that substance, combined with the metal in larger proportion than is necessary for enabling it to be dissolved in acids. This superabundant and now disengaged oxygen being in a non-elastic form, or, as Priestley calls it, *in a nascent state*, and being thereby greatly disposed to enter into new combination, unites itself to the other portion of the muriatic acid, and, in consequence of this union, the oxygenated muriatic acid gas is produced."

Having examined and explained the experiments of Scheele, Berthollet goes on to make others of his own.

180. His first object was to examine the degree of solubility of the gas in water, which he suspected to be greater than Scheele had supposed.

181 "He soon perceived, if a body with a recurved tube be filled with this water, impregnated with the dephlogisticated or oxygenated muriatic acid, and the outer extremity of the tube be immersed under a receiver filled with water; if, in this situation, the fluid be exposed to the light of the sun, bubbles are soon disengaged, which pass into the receiver, and are found to consist of pure or vital air. When the bubbles have ceased to be disengaged, the liquor is found to have lost its characteristic smell, colour, and all its distinctive properties; and is found to consist of mere water, containing a proportion of common muriatic aicd. This simple experiment, M. Berthollet observes, ought to be sufficient to afford a conviction, that the oxygenated muriatic acid is really nothing but a combination of the muriatic acid with basis of vital air, or oyxgen, which is found so abundantly in the black oxyd or calx of manganese, that nothing more is necessary than to urge this oxyd by a strong heat, in order to obtain a large quantity. Manganese, thus treated, is no longer proper to form the oxygenated muriatic acid; because it is deprived of that portion of oxygen which is required to combine with part of the muriatic acid.

182. "He remarks, that light possesses the property of disengaging the oxygen which was combined with the muriatic acid, by restoring that elasticity of which it was partly deprived; a restoration not to be effected by mere heat: he concludes therefore that the light combines with the oxygen, and that the elastic state of vital air is owing to this combination: which air, by losing a second time its elasticity in the process of combustion, that is to say, by a rapid combination with some other body, again suffers the principle of light to escape, at the same time that much heat is disengaged; the relation of which last substance with light is still an object for future discovery. Vegetable Substances.

183. "If vegetable colours be plunged in the oxygenated muriatic acid, they disappear more or less speedily, and more or less perfectly. When the substance under examination possesses a mixture of different colouring parts, some disappear more readily, and leave only those which more effectually resist the power of this agent, but have nevertheless suffered a considerable alteration. The yellow colouring matters usually resist the most strongly, but at length they all disappear; and when the oxygenated muriatic acid has exerted its whole action, it is found to be reduced to the state of ordinary muriatic acid. Hence it follows, that the colouring matters have deprived it of the oxygen, or vital air; and have, by this combination, acquired new properties, at the same time that they have lost that of producing colours. This ingenious chemist declines entering, in his present memoir, into the properties of these oxygenated substances; and proceeds to observe, that the oxygenated muriatic acid owes its property of destroying colours to the oxygen, which not only is combined abundantly with it, but likewise adheres with very little force; and readily passes into a state of combination with such substances as have a certain degree of affinity with it. The habitudes of such a variety of colouring matters as exist in nature, with the oxygen, with light, with alkalies, and with other chemical agents, cannot but form a highly interesting, and almost entirely unexplored, part of natural philosophy.

184. "After having observed the action which the oxygenated muriatic acid exercises in general upon colouring matter, he concluded that it might produce the same effect upon those substances which colour thread and linen, and which the art of bleaching proposes to destroy. Without confining himself to describe the process as now practised, he enters into a concise detail of the imperfect essays he made at first; a detail which will be by no means without its utility to such as are desirous of carrying the process into execution.

185. "He at first used a very concentrated liquor, which he renewed when exhausted, until the thread or cloth appeared sufficiently white: but, in this way, he soon perceived that their texture was considerably weakened, and that they were even entirely deprived of their solidity. He therefore slightly diluted the liquor, and succeeded in bleaching his cloth, without altering it; but it soon became yellow by keeping, and more especially when it was heated, or subjected to the action of an alkaline lixivium. He directed his reflections, therefore, to the circumstances of the usual process of bleaching, which he endeavoured to imitate; because he had adopted the opinion, that the oxygenated muriatic acid ought to act in the same manner as the exposure of cloth upon bleach-grounds; which exposure alone is not sufficient for the purpose, but appears merely to dispose the colouring matter to solution in the alkali of lixiviums. He examined the dew which is precipitated from the atmosphere, and likewise

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wiſe that which is afforded by the nocturnal tranſpiration of plants; and obſerved that both the one and the other were ſaturated with oxygen to ſuch a degree, as to deſtroy the colour of paper weakly tinged with tournſole; and he remarks that the ancient prejudices reſpecting May dew, which is the ſeaſon wherein the tranſpiration of plants is abundant, might probably depend on ſome obſervation of this nature.

186. "He therefore employed, alternately, the lixiviums, and the action of the oxygenated muriatic acid; by which means he obtained a permanent white. And as it is the practice, in the ordinary way of bleaching, to paſs the cloth through ſour milk, or vitriolic acid diluted with a large quantity of water, he made the trial likewiſe of paſſing his cloths through a very diluted ſolution of vitriolic acid, and obſerved that the white was much brighter.

187. "As ſoon as he had made uſe of the intermediate lixiviums, he found that it was not neceſſary to uſe a concentrated liquor, or to leave the cloth long in the fluid at each immerſion. By this obſervation he avoided two inconveniences, which might have rendered the proceſs impracticable in the large way: the firſt is, the ſuffocating ſmell of the fluid, which would be very incommodious, and even highly dangerous to be reſpired for a long time, and which has diſcouraged ſeveral operators from purſuing their attempts in this way: the ſecond is, the danger of weakening the cloth. At this period of his experiments he likewiſe gave up the idea of mixing alkali with the oxygenated muriatic acid, as he had before done in moſt of his experiments*.

* *Journal de Phyſique, 1785.*

188. "This was the ſtate of the experiments of this excellent chemiſt, when he repeated them in the preſence of the celebrated Mr Watt. A ſingle glance, he obſerves, is ſufficient to a philoſopher whoſe abilities had been ſo long exerciſed upon the arts. Mr Watt ſoon afterwards wrote to him from England, that in his firſt operation he had bleached 500 pieces of cloth on the premiſes of Mr Grigor, who has large bleach-grounds at Glaſgow, and continues to uſe this new proceſs.

189. "In the mean time M. Bonjour, who had aſſiſted M. Berthollet in his experiments, and who to a large ſhare of ſagacity has added a very extenſive knowledge in chemiſtry, entered into an agreement with Mr Conſtant of Valenciennes to form an eſtabliſhment in that town. This project was oppoſed by the prejudices and intereſt of the bleachers, who were apprehenſive of the competition of a new method. Mr Conſtant could not even procure a piece of ground in the town of Valenciennes: but the Count de Belainge favoured this enterpriſe, and gave up a piece of ground which poſſeſſed every advantage; but, being at a certain diſtance from Valenciennes, would have the diſadvantage of diſtance, if any manufactory ſhould be eſtabliſhed at Valenciennes itſelf. M. Bonjour had given up the well-grounded hopes which his knowledge and talents gave him reaſon to expect at Paris; and had in return found, in the enterpriſe to which he had devoted his attention, nothing but thoſe diſguſting circumſtances which uſually accompany new proceſſes in the arts. He addreſſed himſelf to the Bureau de Commerce, not to reward his ſervices, but to requeſt that he might be defended from the diſadvantages and obſtacles which prejudice and an oppoſition of intereſt had created in Valenciennes, by granting to him a certain ſpace of two leagues round Valenciennes and Cambray, in which he alone might, during a certain number of years, exerciſe this new art; without conſtraining in any reſpect thoſe who might chooſe to adhere to the ancient proceſſes, or attempt new proceſſes, in which no uſe ſhould be made of the oxygenated muriatic acid. He offered to inſtruct in his manufactory, in all the details of his proceſs, all ſuch as might be deſirous of uſing it, and might obtain the ſanction of the miniſtry. It is probable that, if his requeſt had been granted, the eſtabliſhment at Valenciennes might have produced a greater degree of confidence in thoſe who had undertaken to make the neceſſary advances. It is probable, continues M. Berthollet, that they might have ſhortened their trials, inſtead of eſtabliſhing the proceſs at Courtray, as they have done; many artiſts might probably have been formed under the direction of M. Bonjour; and a great number of eſtabliſhments might have been formed in the French provinces, by avoiding thoſe fruitleſs trials which tend to throw diſcredit upon an uſeful art.

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190. "As ſoon as M. Berthollet had reaſon to hope that the proceſs might be executed in the large way, he endeavoured to diminiſh the price of the liquor, by decompoſing the marine ſalt in the very operation which ſerved to form it. His firſt trials were unſucceſsful; but Mr Welter, a young ingenious chemiſt to whom M. Berthollet had entruſted the management of the proceſs, obſerved that it might be of advantage to dilute the vitriolic acid; and the operation then ſucceeded in the moſt ſatisfactory manner. He immediately wrote to M. Bonjour and Mr Watt, the latter of whom informed him that he had made this change from the firſt; and the operation was long afterwards deſcribed by M. Chaptal, in a memoir forwarded by him to the Academy of Sciences. Mr Watt had likewiſe made uſe of a certain caſk or butt, of a conſtruction which M. Berthollet was not acquainted with; but, before this apparatus was mentioned, Mr Welter had conſtructed one, which is not only very proper to prepare the oxygenated muriatic acid, but very well calculated for ſeveral other chemical operations.

191. "The intention of this apparatus is to multiply the ſurfaces of contact between the gas and the water, as it is evident that the combination can take place only at their ſurfaces. That part of the gas which did not enter into combination in the lower ſpace, where it is firſt conveyed, paſſes into a ſecond cavity or ſpace which is above the tube intended to give it vent. The veſſel which is intermediate between the pneumatic caſk and the diſtillatory matraſs, is deſigned to retain that part of the muriatic acid which is not oxygenated: a ſmall quantity of water is put into this veſſel, a glaſs tube being plunged therein, the height of which exceeds that of the column of water the gas muſt overcome in the caſk. The gas which paſſes out of the matraſs compreſſes the water in the intermediate veſſel with a force equal to that oppoſed to its diſengagement; ſo that the water riſes in the tube of ſafety, and forms a column equal to the weight of the water

which

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which preſſes on the tube through which the gas enters the caſk. But if, during the operation, a ſudden cooling or rapid abſorption of gas ſhould take place, the water deſcends again in the tube, the air of the atmoſphere enters, and prevents a vacuum from being formed within, which would have been attended with a reſorption of the liquor, and conſequently break the diſtilling veſſel by the ſudden cooling.

192. "If the oxyd or calx of manganeſe be of a good kind, in ſmall cryſtals, and contain very little foreign matter, the proportions which M. Berthollet found beſt calculated for diſtillation, are the following:

193. Six ounces of pulverized calx of manganeſe, one pound of pulverized ſea ſalt, twelve ounces of concentrated vitriolic acid, and from eight to twelve ounces of water. If the calx of manganeſe contain foreign earth or metallic ſubſtances, the quantity muſt be augmented in proportion to its impurity. It will be known, after the operation, whether a ſufficient quantity has been employed; becauſe a ſmall quantity ought to remain undecompoſed, and of its original black colour: from this obſervation, the quantity proper to be uſed in the following operations may be aſcertained.

194. "When the calx of manganeſe is found to contain calcareous ſpar, as may be known by its effervescing upon the contact of a ſmall quantity of vitriolic acid, it is proper to waſh it before the operation with diluted vitriolic acid, to ſeparate the calcareous part, which might be troubleſome on account of the effervescence it produces: the calx muſt be dried after this waſhing.

195. "M. Berthollet is of opinion, from his trials, that when the calx of manganeſe contains much phlogiſticated air, it is ſcarcely proper to form the oxygenated muriatic acid: M. Fourcroy however aſſerts, that the phlogiſticated air eſcapes in diſtillation from manganeſe by a degree of heat leſs than ignition, but that ignition is neceſſary to deprive it of its vital air. It might perhaps be found advantageous to make uſe of this information to purify ſuch manganeſe as contains phlogiſticated air, by diſtilling off this laſt aerial ſubſtance by a moderate heat before it is applied to the purpoſe of oxygenating the marine acid.

196. "A greater or leſs quantity of water muſt be added, not only according to the degree of the concentration of the ſulphuric acid, but likewiſe according to the quantity of matter ſubjected to diſtillation. If this quantity be conſiderable, the acid muſt be more diluted than if it be ſmall. It might be more advantageous to make uſe of an acid which had not been concentrated; becauſe the operation of concentrating it adds to its price, and it is obliged to be again diluted with water. But M. Berthollet obſerves, that this ſaving can only take place when the manufactory of the vitriolic acid is near at hand; for in thoſe ſituations where this acid is to be brought from a conſiderable diſtance, the expence of carriage of a greater quantity of fluid might exceed that of concentrating it.

197. "When the materials are prepared, the calx of manganeſe muſt be carefully mixed with the ſea-ſalt, and the mixture introduced into the diſtillatory veſſel, placed on a ſand bath: the vitriolic acid muſt then be diluted, and ſuffered to cool; after which it is to be poured on the mixture, and the tube of communication between the matraſs and the intermediate veſſel quickly fitted in. A particular attention to the lutings is required in this operation. M. Chaptal takes notice, that when the vapour is perceived to eſcape by the ſmell, it is ſometimes difficult to aſcertain the imperfect place; but that if a feather dipped in volatile alkali be paſſed on ſuch occaſions over the lutes, it will ſhew the faulty place, by the white cloud of ammoniac formed in conſequence of the combination of marine acid with the volatile alkali.

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198. "The ſize of the veſſels ought to be ſuch, that the matraſs ſhould be about one-third empty; and that, for the quantity here laid down, the caſks ſhould contain one hundred pints of water, with an empty ſpace of the bulk of about ten pints; becauſe, when the gas comes to occupy the cavities deſigned to receive it, the water will require a ſpace into which it may aſcend.

199. "Before the operation is begun, the pneumatic caſk muſt be filled. The mixture being made, the gas, which ſoon begins to be diſengaged, firſt drives the atmoſpheric air out of the apparatus. As ſoon as it is apprehended that the atmoſpheric air has paſſed into the cavities, it is emptied out by means of a recurved tube, ſucceſſively introduced beneath each; and in order to drive the water out which has entered into the tube, M. Berthollet recommends blowing ſtrongly into it. The operation is ſuffered to go on without the application of heat, until it is perceived that the bubbles are more ſlowly emitted: at this period, a ſlight degree of heat is applied. It muſt not be ſtrongly urged at the beginning; but by a gradual increaſe it is at laſt to be carried to ebullition, towards the end of the operation. It may be known when the operation is near its termination, by the tube of communication and intermediate veſſel becoming hot.

200. "When the gas is no longer diſengaged but in ſmall quantities, the fire is to be put out, and a ſufficient time muſt be ſuffered to clapſe until the matraſs is nearly cold. The tube of communication may then be removed, and hot water poured in to keep the matter in ſolution, that it may be more eaſily taken out: this reſidue is to be poured into a large veſſel, intended to preſerve it for a uſe to be preſently mentioned. The operation laſts longer in proportion to the quantity of matter. With the before-mentioned quantity, it ought to laſt five or ſix hours. It is proper not to be too much in haſte, becauſe a larger quantity of gas is by that means obtained. One ſingle perſon may inſpect and manage ſeveral of theſe apparatus, and the quantities may be much larger.

201. "The intermediate veſſel gradually becomes filled with a fluid, which conſiſts of pure but weak muriatic acid: ſeveral operations may however be made without taking it out; but when it is apprehended that there is not a ſufficient ſpace left empty, this acid is taken out by means of a ſyphon: and, when its quantity is conſiderable enough, it may be ſubſtituted inſtead of the mixture of ſulphuric acid and muriat of ſoda, in a ſimilar operation, if it be not wanted for another uſe. In order that the quantity of common muriatic acid which paſſes out of the matraſs, may be inconſiderable, it is expedient that the firſt tube ſhould make a right angle, or even a more obtuſe angle, with the body of the matraſs. During the operation, it is neceſſary to

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ſtir the water, from time to time, by means of the agitator, in the apparatus, to favour the abſorption of the gas by the water. When this is completed, the liquor is ſufficiently ſtrong to be uſed in bleaching. A ſmaller proportion of water may be put into the caſk, and the fluid may afterwards be properly diluted.

202. "In this ſtate of concentration, though the liquor retains a conſiderably ſtrong ſmell, yet it cannot prove noxious, or even very inconvenient, to thoſe who uſe it. It is nevertheleſs proper to conduct it into the veſſels in which the cloths are arranged by wooden channels, fitted to the opening at the lower part of the caſk. It is proper to draw off the liquor from the caſk as ſoon as it is prepared, becauſe it acts upon the wood, and not only becomes by that means weaker, but likewiſe haſtens the deſtruction of the caſk: but when it is conveyed into a veſſel in which cloths are properly placed, theſe ſpeedily weaken it to ſuch a degree that it does not perceptibly act upon the wood.

203. "The cloths are to be prepared by leaving them 24 hours in water, or ſtill better in the old lixivium, to extract the dreſſing; after which they muſt be once or twice well waſhed in alkaline lixiviums, becauſe all that part which can be extracted by the lixiviums would have neutralized a portion of the liquor, which requires to be carefully uſed. After this the cloth muſt be carefully waſhed, and diſpoſed upon ſticks in ſuch a manner that it may be impregnated with the liquor poured on it, without any part being compreſſed. The framing of the ſticks, as well as the caſk and veſſel intended to contain the cloths, ought to be conſtructed without iron; becauſe this metal becomes calcined by the oxygenated muriatic acid, and would produce iron moulds, not to be taken out but by means of ſalt of ſorrel.

204. "The firſt immerſion muſt be longer than the following ones; it may laſt three hours: after which, the cloth is to be taken out, lixiviated anew, and then put into a ſhallow veſſel, in order that new liquor may be poured on it. It is ſufficient that this immerſion, and the following, ſhould continue for the ſpace of half an hour. The cloth is taken out, and cleared of the liquor by preſſure; then lixiviated, and ſubjected to new immerſions. The ſame liquor may be uſed until it is exhauſted; and when it is found to be much weakened, a proportion of the liquor which has not been uſed may be added.

205. "When the cloth appears white, excepting at the ſelvages, and a few threads darker than the reſt, it muſt be impregnated with black ſoap, and ſtrongly rubbed; after which it is to be lixiviated for the laſt time, and immerſed once more in the liquor.

206. "The number of lixiviations and immerſions which are neceſſary, cannot be determined, becauſe it varies according to the nature of the cloth: the limits of this number, however, are between four and eight, for linen and hempen cloths. M. Berthollet expreſſes his inability to point out the beſt method of making the alkaline lixiviums; this uſeful art being ſtill a matter of mere practice, and variouſly performed in different places. It appeared advantageous to him to render the alkali cauſtic, by mixing one-third of lime; but in this caſe care muſt be taken that the lixivium be ſtrained through a cloth, in order that the calcareous earth may not mix itſelf with the linen, as its particles might corrode or wear it by their hardneſs. By this management the lixivium being rendered more active, does not require ſo large a quantity of alkali; and nevertheleſs, if the quantity of alkali be not too conſiderable, it produces no damage to the cloth, notwithſtanding the contrary prejudice, which is very general. He has likewiſe remarked that it was of no advantage, and even prejudicial, that the lixiviations ſhould be of long duration; but it is neceſſary that the fluid be very hot, and of conſiderable ſtrength, otherwiſe the cloths bleached by the aerated marine acid would become coloured and ruddy when ſubmitted to new lixiviations. This accident took place in the trials already mentioned. Cottons are much more eaſily and ſpeedily bleached than linens: two lixiviums, or at moſt three, with the ſame number of immerſions in the liquid, are ſufficient; and as they are ſo much the more readily bleached, it is advantageous, when linen, hemp, and cotton are to be bleached, to reſerve the liquors for the latter, which have been already weakened by exerting their action on the former. Such liquors as are ſo exhauſted as ſcarcely to act upon hemp or linen, will do very well for cotton.

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207. "After the laſt immerſion in the liquor, the cloth muſt be plunged in ſour milk, or water acidulated with vitriolic acid. The true proportion is not well aſcertained; but our author thinks, from his experiments, that one part of the acid by weight, with fifty parts of water, may be employed ſucceſsfully, and without danger. The cloths are to be kept about half an hour in this fluid, warmed; after which, they muſt be ſtrongly preſſed, or wrung, and immediately plunged in common water: for, if they were ſuffered to dry by evaporation, the vitriolic acid, becoming concentrated, would attack them. When the cloths are well waſhed, nothing more is neceſſary than to dry and prepare them in the uſual manner.

208. "It is an obvious precaution, that this acid water be not too ſtrong, as it would of courſe injure the texture of the ſtuffs.

209. "Fig. 5. Pl. XCI. exhibits the apparatus for preparing the liquid intended to be uſed in this new method of bleaching. ABC is a furnace; C is the matraſs, or diſtillatory veſſel; GHI the tube of communication with K, the intermediate veſſel; L the tube of ſafety; M a tube communicating with the tub N, the ſection of which tub is exhibited in fig. 6. while the lower orifice of this tube is ſeen at y. In the tub N are fixed three inverted veſſels, open beneath, as repreſented in fig. 7. and intended to contain the aeriform marine acid. PPP are agitators for the purpoſe of ſtirring the water by the rotation of the upright poſt OQ. The effect of this apparatus may be eaſily underſtood, by conſidering that the aeriform dephlogiſticated marine acid, iſſuing from the tube y, paſſes into the veſſel X, until it has excluded the water it may contain: after which the ſurplus iſſues through the tube Z, and runs into the ſecond veſſel: which, becoming alſo filled, affords its ſurplus to the third, or uppermoſt veſſel. Hence it follows, that three ſurfaces of the water are expoſed to an atmoſphere of dephlogiſticated marine acid; and theſe ſurfaces muſt of courſe be changed by the rotation of the agitators. In this manner the water becomes impregnated, and may be drawn off at P. It is of conſequence to aſcertain its relative

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relative ſtrength, in order that the experiments may at all times be equally ſucceſsful. M. de Croiſille makes uſe of a ſolution of indigo in the vitriolic acid; for which purpoſe he takes one part of finely-pulverized indigo, with eight parts of concentrated vitriolic acid. This mixture is kept in a matraſs for ſeveral hours on the water bath; and, when the ſolution is complete, it is diluted with a thouſand parts of water. In order to aſcertain the force of the oxygenated muriatic acid, one meaſure of this ſolution is put into a graduated tube of glaſs, and the liquor or impregnated water is added, until the colour of the indigo is completely deſtroyed. In this way it is aſcertained, by means of the graduations, how many meaſures of any liquor, whoſe goodneſs has been aſcertained by direct experiments upon linen or cotton, are neceſſary to deſtroy the colour of one meaſure of the ſolution of indigo; and this number will ſerve to aſcertain the reſpective force of all the liquors which are required to be compared together. Mr Watt makes uſe of a ſolution of cochineal for the ſame purpoſe.

210. "In the ſixth volume of the Annals of Chemiſtry, M. Berthollet has publiſhed ſome additions to the foregoing Memoir, which, on account of its extenſive utility, I have ſcarcely at all ſhortened. They are the following:—Mr Welter finds that it is advantageous to terminate the proceſs, by expoſing the thread or cloth for three or four days in the field; during which they muſt be occaſionally watered, and afterwards waſhed with pure water. He conſiders this expoſition as indiſpenſable. But M. Berthollet obſerves, that other perſons have bleached to the perfect ſatisfaction of artiſts without it; though he admits that it may happen, in the large way, that certain pieces may not turn out perfectly white after the laſt operation, in conſequence of ſome of their parts having ſuffered caſual preſſure; and he thinks that, although a continuance of the operation would remove theſe imperfections, it might, in ſuch caſes, prove more advantageous to remove them by expoſure on the graſs; very little loſs of time, and no conſiderable extent of premiſes, being required for this purpoſe.

211. "M. de Croiſille has excluded the uſe of wood in every part of his apparatus; and has applied the proceſs not only to bleaching, but to the diſcharging of colours in dyed cottons or linens.

212. "M. Berthollet further obſerves, that the precaution of plunging the cottons in pure water, after they have been taken out of the acidulated water, is not ſufficient; but it is neceſſary to plunge them into a weak cauſtic lixivium, moderately heated, and keep them there for a ſhort time.

213. "When the liquor is ſuffered to run immediately into troughs, care muſt be taken to mix it well with the agitator; becauſe otherwiſe the moſt ſaturated liquor, which occupies the lower part of the veſſel, running firſt, would exert too ſtrong an action; or if half or three quarters of the liquor be drawn off, and mixed with the proper quantity of water, according to the precautions before eſtabliſhed, the reſt of the fluid may be uſed together with the water for the ſucceeding operation: laſtly, he obſerves that this proceſs, ſimple as it is, can ſcarcely be carried into execution, without, in the firſt inſtances, being directed by a perſon to whom the operations of chemiſtry are familiar.

He obſerves that a diminution, or even an equality of the expences, relative to the ordinary proceſs, is not to be hoped for, excepting for the bleaching of fine cloths, unleſs the operator poſſeſſes a good proceſs to extract the ſoda from the reſidue of the diſtillation; and without this condition the bleaching of coarſer cloths ought not to be undertaken, excepting in thoſe caſes wherein the advantages ariſing from the ſpeed of the operation, the facility of performing it in all places and at all times, and the diminution of the ſtock or capital, are ſufficient to compenſate for the exceſs of the price. Theſe obſervations are perhaps applicable to linens, and not cottons. It is not poſſible, he continues to obſerve, to lay down principles applicable to every particular caſe; but he adviſes thoſe who may undertake this object, to begin by trials, and by means of thoſe trials to form calculations, without any allowance on the favourable ſide. On the other hand, he adviſes the operator not to ſuffer himſelf to be impoſed on by thoſe loſſes which ariſe for want of being familiarized with the operations; as there is no great expence incurred by making trials for a time, by which this advantage is derived, that the operator renders himſelf more expert for carrying more extenſive proceſſes into effect *."

* *Nicholſ. Chem. Dict.*

214. Such is the method of procedure recommended by M. Berthollet, which was ſoon found liable to many inconveniencies, and various amendments and alterations have been ſuggeſted, the principal of which we ſhall relate. Pajot de Charmes was one of the firſt improvers of the new method. He ſtates the following objections to Berthollet's proceſs.

1. He thinks the furnaces recommended by Berthollet not well adapted to the purpoſe, as they are difficult to procure and expenſive, as they will only contain each one matraſs; as they are not calculated to ſhew the progreſs of the proceſs, are too ſpeedily heated, and conſequently endanger the lutes: and laſtly, as they will not always guard againſt abſorption, notwithſtanding the tube of ſafety in the intermediate veſſel. The furnace which he would have employed in place of theſe is thus conſtructed:

215. The furnace is ſupported upon a frame-work of wood, between which and the hearth tiles are diſpoſed in a bed of clay. The furnace itſelf is built of brick, which he recommends to be lined with plaſter of Paris. It ought always to be double, and is divided by a partition in the middle. In the upper part at the front are two cavities intended to admit the veſſels uſed in the diſtilling; they may be either round or ſquare; and, as the latter is moſt convenient to the builder, they ſhould perhaps be always ſquare, provided with a ledge, and rounded at bottom. The combuſtible matter, which may be charcoal, is burned in a ſort of chaffer, or in a portable grate, which is introduced by an opening in the ſide of the furnace; and this opening may be cloſed during the proceſs by a door of plate-iron ſo as to prevent the too free acceſs of air. From behind the diſtilling veſſels and charcoal grate proceeds a funnel through which the vapour and heat of the fuel is conveyed into a cavity with raiſed edges, over which is placed an oblong veſſel of ſheet iron, intended to be kept filled with muriat of ſoda, which may dry during the proceſs. At each extremity of this cavity is a hole which may be opened or cloſed as required, ſo as to

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admit a greater or leſs quantity of air. Below the drying place, in the ſides of the empty ſpace at the back of the furnace, are places where boxes of ſheet iron, containing the requiſite proportion of manganeſe and ſalt, ready mixed, are kept for the purpoſe of keeping the materials dry.

In each of the ſquare ſpaces is placed a capſule, which may be made either to contain ſand or water, in which the diſtilling veſſels are to be inſerted. Theſe capſules reſt with their rims upon the edges of the cavities, and are ſupported below by a ſmall bar. The furnaces, according to the directions of De Charmes, are made ſo as to be portable, an advantage which may perhaps, in moſt manufactories, be diſpenſed with.

216. 2. De Charmes next objects to the curved tube as being liable to be broken; and thus expoſe the workmen to the noxious gas, of which the accident will alſo cauſe a conſiderable loſs. Berthollet's method of applying the tube is alſo objectionable from the deſtructible nature of the cork ſtoppers, and the difficulty of preſerving the ſtability of the latter.

He propoſes, inſtead of the matraſs, tube, and intermediate veſſel, to ſubſtitute tubulated retorts, furniſhed with curved necks of glaſs or lead; the beak of which is fitted by luting to a leaden ſupport in the form of a funnel; and to that is adapted the end of a leaden tube which paſſes into the pneumatic tub, and has its lower extremity bent to a right angle, ſerving inſtead of the glaſs tube uſed by Berthollet.

217. 3. Berthollet's pneumatic tub was not provided with a cover cloſe enough to prevent the eſcape of the gas; and his inverted veſſels appear to De Charmes to be improper from the difficulty there is of conſtructing their ſides and borders ſo as to concentrate the gas in the beſt and moſt complete manner.

His pneumatic tub is conical and divided into three parts by two falſe bottoms, which are made to reſt on hoops or ſliders within the tub, and kept firm by means of pins.

218. The diſtilling veſſels employed by De Charmes are not high enough to prevent a portion of the ſulphuric acid from paſſing over without combination; and they are beſides too dear for ordinary uſe. In Ireland they employ leaden alembics of a ſufficient height, and capable of containing 40 gallons of liquor, which is a capacity amply ſufficient for allowing the ſwelling of the materials. Theſe alembics are conical, have a broad bottom, which is ſupported in a veſſel of water to regulate the heat, the neck is ſo long as to allow any ſulphuric acid, which may riſe, to fall back again, and the cover of it is perforated in two places; one of the perforations ſerving for the paſſage of a rod of iron with prongs entering within the alembic, but ſo covered with lead as to prevent the action of the ſulphuric acid, and the handle paſſes through a leathern collar to prevent the eſcape of gas, the whole being intended for ſtiring the materials; the other hole intended to admit a leaden funnel curved like an S to prevent the reaction of the gas on the diluted ſulphuric acid which is to be introduced through it.

219. It is of the greateſt importance to prevent the eſcape of the gas, as well to prevent danger to the workmen, as loſs to the manufacturer. "C. Widmer, at Jouy, has arranged his apparatus in ſuch a manner as to loſe the leaſt gas poſſible during the condenſation: he receives the gas under a capſule inverted at the bottom of the apparatus; above theſe are two *tours de goutiere* alſo inverted, then another capſule above theſe; then two more *tours de goutiere*, and then another capſule, which terminates the apparatus. The diſpoſition of his tub is ſuch, that he places around in his laboratory ſeveral diſtilling apparatuſes, which are going at the ſame time.

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"Apparatuſes conſtructed on ſimilar principles are alſo in uſe at Glaſgow and Mancheſter. Bourboulon-de-Bonneuil has likewiſe invented an apparatus, conſiſting of ſeveral matraſſes, ranged as in an aquafortis manufactory, the tubes of which are conveyed into a chamber containing concentrating tubs. His apparatus for the bleaching of paper is very ingenious, and deſerves to be deſcribed. In the laſt place, others have arranged five or ſix large caſks, like Wolfe's apparatus, in ſuch a manner as to make each caſk perform the functions of a tubulated flaſk*."

* *Philoſoph. Mag.* vol. 10. p. 258.

220. Before we proceed to deſcribe the moſt approved method of immerſing the cloths in the oxygenated liquor, it will be proper to treat particularly of the materials employed in preparing this liquor, the mode of preparing them for the proceſs, and the method of adjuſting the apparatus and conducting the diſtillation

221. The ſelection and preparation of the materials is of the greateſt importance, as on them will depend in a very great meaſure the ſucceſs of the operation.

The materials are either the muriatic acid and black oxyd of manganeſe, or this latter and ſulphuric acid and muriat of ſoda, which are uſually employed as being cheaper. There are, however, advantages in uſing the muriatic acid ready prepared, where the bleachfield is in the neighbourhood of ſuch a manufactory, as the danger of breaking the veſſels (where glaſs is employed) from the incruſtation of the reſiduary ſalt is much leſs in this caſe.

222. The cryſtallized ore of manganeſe is to be preferred, ſuch as appears to be compoſed of ſplendid needles ſlightly adhering to each other; this variety is generally purer, and much more eaſily reduced to powder, and a ſmaller quantity of it is ſufficient. It muſt be reduced to a very fine powder, a ſhort time before it is wanted, as if kept long in the ſtate of powder, it is ſaid to be injured.

223. The gray muriat of ſoda is employed in France as being cheaper than the white, but probably the preſent regulations of the ſalt duties in this country are ſuch as preclude the manufacturer from employing it in this ſtate †. The ſalt is to be dried on an iron plate in that part of the furnace deſcribed in 205, and then rubbed to a fine powder, and paſſed through a ſieve; this is neceſſary, to mix it more intimately with the manganeſe, and to enable the ſulphuric acid to act more uniformly and completely on it.

† *Nicholſon's De Charmes.*

224. In order to be more certain as to the proportion of the ingredients, the ſulphuric acid ſhould be procured in its concentrated ſtate, and acid of the ſame ſpecific gravity ſhould always be employed. Before uſing, it is to be lowered with its weight of water, and it is proper to obſerve, that in making the mixture, the water ſhould not be added to the acid, but the acid be poured in a gentle ſtream into the water, pouring it down the ſides of the glaſs veſſel in which the mixture

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ture is made, adding the acid by portions at intervals, and turning the head aſide to avoid any drops which may fly up from the effervescence produced, which, however, is much leſs in this way than when the mixture is made in any other way. As a heat greater than that of boiling water is generated, it is better that the veſſels have the form of jugs with ſpouts and handles, that the mixture may be more eaſily poured into the diſtilling veſſels.

225. The proportions in which the ingredients are employed, are variouſly adjuſted by different manufacturers. De Charmes recommends the following:

Oxyd of manganeſe cryſtallized, twenty ounces.
Muriat of ſoda, four pounds.
Sulphuric acid (at 60° of Maſſy's aerometer), 44 ozs.
Water, three pounds and a quarter *.

* *De Charmes.*

Mr Rupp of Mancheſter recommends the following, as affording him the ſtrongeſt liquor.

Manganeſe, three parts.
Muriat of ſoda, eight parts.
Sulphuric acid, ſix parts.
Water, twelve parts †.

† *Mancheſt. Mem.* vol. v. p. 1.

Mr Higgins uſes the proportions as under:

Manganeſe, ſixty pounds.
Muriat of ſoda, ſixty pounds.
Sulphuric acid, fifty pounds.
Water, about thirty pounds ‡.

‡ *Higgin's Eſſay.*

In Germany, and in France at preſent, the proportions are nearly as follows:

Manganeſe, twenty parts.
Muriat, ſixty four parts.
Acid, forty four parts.
Water, fifty four parts §.

§ *O'Reilly Eſſai.*

226. It would conduce much to the economy of this method of bleaching, if the manufactory of ſulphuric acid could be carried on under the ſame roof with the bleaching proceſs, or if ſome method could be deviſed to prepare this acid, without employing the nitrat of potaſs (ſaltpetre). The latter has been attempted by De Charmes, and as his experiment may afford a hint to manufacturers, we ſhall copy it.

"The preſent is certainly the place to ſpeak of the attempt I have made, to procure the ſulphuric acid without the intermedium of nitre, and to deſcribe the apparatus I made uſe of for that purpoſe. It conſiſted of a pitcher or pot of ſtone-ware, perforated at the bottom, the neck of which communicated with two ſmall two-necked glaſs bodies connected together, and each half filled with water. Under each of theſe glaſs veſſels was lighted charcoal, to keep the water in a ſtate of evaporation, and under the earthen pot there was likewiſe fire to heat and enflame the ſulphur, which was put into the pot through the opening oppoſite the neck. This opening, which draws in the external air for the combuſtion of the ſulphur, was cloſed with a ſtopper, perforated like the nozel of a garden-pot.

"The ſulphur, thus enflamed, ſoon filled the vacant part of the glaſs veſſels with its whitiſh cloudy vapour. This vapour, meeting that of the water, combined with it, and fell in acidulous drops on the lower water, over which the vapour of the ſulphur circulating for a time, does alſo probably combine with it to a certain point. Another proof that this condenſed water did combine with the vapour of the ſulphur is, that the ſame vapour, received in drops beyond the ſecond glaſs veſſel by means of a recurved adopter, came out in the acid ſtate, reddening the tincture of turnſol, and effervescing with alkalies when concentrated. I have twice repeated this experiment with ſucceſs, and with ſcarcely any inconvenience.

"I likewiſe attempted to burn ſulphur and heat water, in two ſeparate veſſels communicating with a third. The two vapours combining together in the receiving veſſel, likewiſe produced by their condenſation a fluid, which afforded the ſame indications of acidity as that of the former experiment.

"When ſulphur was burned in an earthen veſſel, and its vapour communicated into an earthen jar, in which water almoſt boiling was poured, the reſults were the ſame.

"It is probable that if theſe experiments were repeated more at large, with a ſuitable apparatus, a longer ſeries of glaſs veſſels, and proper furnaces, the ſucceſs would be more complete. I intend at ſome future time to reſume this proceſs, and ſhall haſten to communicate my ſucceſs to the public, if ſucceſs ſhould attend my endeavours (1) *.

* *Nicholſ. De Charmes.*

227. The diſpoſal of the apparatus for the diſtillation will next demand our attention; and as much of the ſucceſs of this operation will depend on the goodneſs of the lute, it is proper to make a few remarks on this ſubject. The following is recommended by De Charmes (or rather M. Baume) as a fat lute. Take any quantity of good gray or blue clay, or, what anſwers extremely well, fuller's earth. Let it be dried in thin cakes in an oven after the bread is baked, then pounded or ſifted; a certain quantity of this clay is to be mixed with a ſufficient quantity of boiled linſeed-oil, in an iron or bell metal mortar, in which they muſt be well beaten together for a long time, ſo as to form a tenacious ſtiff paſte of a uniform conſiſtence, and perfectly free from lumps. A conſiderable quantity of lute is uſually made at once, and ſo far from loſing any of its tenacity by being kept, it is aſſerted that lute which has been made a twelvemonth, provided that it has been preſerved in a cool damp place, as a cellar, and in a covered veſſel, is more pliant and better than when firſt made. If too dry and hard, it may be eaſily rendered of a due conſiſtence by being warmed and worked with the fingers, or beaten in a warm mortar.

The lute which has been uſed in one diſtillation muſt not be thrown away, as, with proper management, it may ſerve again, and is even better than before. It muſt be carefully freed from the burnt and hard parts, however, as theſe would render it crumbly.

228. "When the quantity to be mixed, or kneaded

(1) Chaptal made a great number of experiments in the large way, for the purpoſe of diſcovering the means of acidifying ſulphur, without the expence of nitre, but upon the whole they were unſucceſsful.

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up again, is very ſmall, the trouble of beating it in the mortar may be avoided, becauſe the operation is performed very well, by kneading the matter with the hands. For this purpoſe, a portion of the lute already kneaded in the mortar, and ſoaked with oil, may be taken and rolled in the veſſel containing the pounded and ſifted earth; the portion of earth which adheres may then be worked in; and, by a repetition of this manipulation, the maſs will ſpeedily become enlarged, and muſt be ſtrongly compreſſed, rolled out, and doubled again, until it is found that it poſſeſſes the requiſite ſoftneſs and tenacity, and does not crack when doubled.

" If it ſhould happen that the lute ſhould become too ſoft by exceſs of oil, and clay is not at hand to correct this fault, the maſs will ſoon acquire firmneſs by expoſing it to the open air upon parchment, or upon a plate. It muſt not be laid upon paper, becauſe it is very difficult to ſeparate this material entirely; and if any particles ſhould remain, there would be reaſon to fear that, when incorporated in the mixture, they would either prevent the perfect adheſion of the lute, or would allow the paſſage through that kind of void, or pore, which the fragments of paper would form. It is, moreover, to be remarked, that this lute cannot be too ſmooth and uniform. It ought not to afford any perception of inequality when it is handled, or kneaded, nor indicate the preſence of foreign ſubſtances, ſuch as ſand, ſtraw, earthy particles, &c. which are capable of preventing the intimate connexion of its parts.

" I ſtrongly inſiſt on the perfection of this lute, becauſe it is the ſoul of diſtillation.

229. " Boiled linſeed oil is thus made: two pounds of common linſeed-oil being put into a ſaucepan, or proper veſſel, of copper, iron, or pottery, add three ounces of red litharge, finely powdered and ſifted; after ſtirring the whole well together, place the veſſel on the fire, heating it gradually, until the litharge is completely diſſolved. It is neceſſary to ſtir the mixture very frequently with a wooden ſpatula, until the whole ſolution, which at firſt acquires a brick-duſt colour, is completed: it is then to be removed from the fire, and, when cold, transferred into a ſtone or earthen veſſel, and kept well corked. This is the boiled linſeed-oil above directed to be uſed in making the fat lute.

" When this oil, which is blackiſh after boiling, is well made, it congeals in the veſſel as ſoon as it is cold. When it is required to be poured out, it may be rendered fluid by bringing it near the fire. To ſave the trouble of heating it, it may be poured, as ſoon as made, into a plate or ſhallow veſſel, or left in the veſſel uſed for boiling it. It is ſeldom neceſſary to heat it for the mere purpoſe of mixture; the quantities required for this purpoſe may be taken up with the fingers, or in any other manner.

" It is proper to obſerve, that the veſſel in which the oil is boiled muſt be ſufficiently high, to afford a ſpace for the ſwelling of the fluid; for, as ſoon as the heat begins to act, it will riſe and overflow the veſſel, if particular attention be not paid to it. As ſoon as this proceſs begins, the veſſel muſt inſtantly be taken off the fire, and the mixture ſtrongly agitated by plunging the ſpatula in it, at the ſame time blowing ſtrongly at its ſurface with the mouth; by which means the ebullition will be checked. After this event has happened two or three times, it may with certainty be concluded, that the oil will be ſufficiently conſiſtent to form a good fat lute. By cooling, it immediately congeals, as has been remarked, to the conſiſtence of plaſter, of a black colour, inclining to brown.

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230. " The lute made of linſeed oil cake is thus made:

" The cake is firſt to be broken and pounded in an iron or bell-metal mortar, and afterwards ſifted through a ſilken ſieve; ſtarch is then to be boiled up, to the conſiſtence of ſize or glue; a ſmall piece of this, being powdered with the flour of the oil-cake, is to be worked in a plate, or with the hands; more of the flour may then be added, and the kneading continued until the maſs is abſolutely without any lump, or inequality, and its conſiſtence has become nearly the ſame as that of the fat lute; after which it is to be kept in a plate, or covered wooden bowl, in the cellar, for uſe. The ſame care muſt be taken with this, as with the fat lute, not to wrap it in paper, but in parchment, if thought neceſſary.

" This lute dries and hardens much on its outer ſurface, which remains uninjured at the place where it is applied; but it is decompoſed more ſpeedily than the fat lute, on account of its peculiar property to become hard and ſhrink with a ſtrong heat. In this ſtate, in conſequence of the action of acids, it aſſumes a yellow colour, and is then good for nothing: it muſt be renewed.

" A very good lute is likewiſe made with equal parts of the flour of almonds, of linſeed, and of ſtarch, kneaded together. It muſt be underſtood, that the latter is to be boiled to the conſiſtence of ſtarch.

" To theſe different lutes we may add that which is compoſed of lime and white of egg, which has the property of acquiring a conſiderable degree of hardneſs.

" Among all theſe lutes, that to which I have conſtantly given the preference, and is always kept in ſight in the preſent work, is the fat lute. The lute of white of egg and lime, retained by a cloth and a bandage, may be advantageouſly uſed as a covering to the fat lute.

" The fat lutes adhere very much to the hands, during the kneading, or working; but it is not difficult to waſh off the remains after the operation: nothing more is neceſſary, than to uſe warm water and ſoap, or ſoap leys, after having previouſly wiped off the greater part with blotting paper *."

* *Nicholſ. De Charmes.*

231. As the directions given by De Charmes for diſpoſing the apparatus will, with a few modifications, apply to every caſe, it will be proper to give them without abridgment.

" Our diſtillation may be performed either in a retort, or a tubulated body or bottle. There can be no difficulty in properly placing theſe veſſels. The junction of the neck or tube, communicating with the pneumatic veſſel, is the only object which requires particular care. The manner of joining theſe two parts, by means of lute alone, will be explained below.

" As the uſe of the retort requires more attention with regard to its form, and the application of the additional part, the following details will be of uſe to prevent accidents.

232. " When the retorts are new, and have not be

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fore been luted to any additional part, it is adviſable either to rub a ſmall quantity of warmed wax on the parts where the lute is to be applied, that is to ſay, the neck of the retort, as well as the correſpondent part of the additional piece, or to ſuffer a ſmall quantity of ſtarch or paſte to dry upon thoſe parts; without this precaution the lute could not be eaſily applied; it would ſlide and roll upon the glaſs inſtead of adhering.

" Care muſt afterwards be taken to fix round the neck of the retort a maſs of lute, ſomewhat greater than is ſuppoſed to be neceſſary to fill the additional part to the place where it is to be fixed, in order that by the forcing of that piece upon the neck of the retort, the lute may extend and apply itſelf more intimately. The ſame attention muſt alſo be paid to the maſs of lute, which is required to ſecure the beak of the additional piece in its connexion with the pneumatic apparatus. Theſe obſervations are of more importance, in order that the two pieces may, by this compreſſion, be made to operate as if they formed one entire veſſel.

" To apply theſe lutes with eaſe and convenience, the retort is to be held in one hand, in ſuch a manner as that its belly or lower part may not touch or reſt upon any thing whatever, becauſe the ſlighteſt blow upon this very thin part will break it.

" Before the lutes are applied, care muſt be taken to introduce the neck of the retort into the additional piece, and mark with lute or wax upon the additional piece the place where the extremity of the retort touches it internally; and in like manner, on the retort itſelf, the place where the extremity of the additional piece touches its neck. By means of theſe marks it is eaſy to eſtimate the thickneſs of the maſſes of lute, by placing the two veſſels near each other in the reſpective poſitions they ought to have when fixed. Laſtly, they are united together by ſliding the recurved additional piece upon the neck of the retort, which is to be held firmly by its neck, reſting the hand on the ſurrounding part, if the retort is ſmall; or holding it by the recurved part, if it be large, or the additional piece ſhould be too long and heavy. The greateſt attention muſt be paid not to turn the parts round, during this operation, more than is abſolutely neceſſary to bring them together; and if this can be done without any turning at at all, it will be ſtill better, as the lute will hold more effectually. The neck of the retort muſt be entered into the additional piece as far as it is capable of compreſſing the lute, or nearly to the marks made upon the pieces before they were put together. In this ſituation the lute, which forms a maſs round the edge of the additional piece, muſt be raiſed ſo as to cover both ſurfaces, after having firſt preſſed it as firmly as poſſible into the joint; ſmoothing it upon the two pieces, ſo as to prevent the ſmalleſt opening or crack. It is adviſable after all to ſpread a thin coating of the boiled linſeed-oil over the lute, which not only renders it ſmoother and more perfect, but by the denſity it acquires from evaporation it forms a kind of varniſh or pellicle, which ſupports the lute, and prevents the fiſſures which might be formed during the actual operation. Whenever in the courſe of the work the lute ſhould appear too dry, it muſt be ſupplied with a thin coating of oil.

" While the lute is thus ſpread and applied on the external part of the additional piece and the neck of the retort, the compound apparatus is to be held by the additional piece only, and the retort left to be ſupported untouched in the air, by its inſertion at the neck only.

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" Inſtead of luting the additional piece to the retort, ſimply at the extremity of the neck of this laſt, and at the place where the wider part of that piece touches the retort, we might apply the lute upon the whole ſurface comprehended between thoſe parts. But I have found that it is ſufficient if theſe two parts be made ſecure. A retort luted in this manner forms one ſingle and entire body with its additional neck; and with very little care and attention, the lute will ſeldom or ever have occaſion to be renewed before one or two months ſervice.

233. " The tube on which the recurved additional piece reſts during the diſtillation, and through which the gas is introduced into the pneumatic tube, is, as I have remarked, entirely of lead. If it be not caſt, it ought to be carefully joined with ſtrong ſolder; and, for fear this laſt ſhould fail, it will be prudent to cover it with a coating of yellow wax, pitch, or melted pitch.

" That part of the tube (if ſoldered as before mentioned) which paſſes under the lower falſe bottom, ought to be carefully bended with a round corner, before it is coated with the wax or pitch; and in the bending it is ſafer to cauſe the ſoldered part to lie within the angle. It is likewiſe proper to ſtop the mouth of the tube with paper, or a cork, during the time of waxing or tarring, in order to prevent any introduction of thoſe ſubſtances into its cavity, taking care to withdraw this temporary ſtopper before the apparatus is applied to actual uſe. It is not abſolutely neceſſary to coat any other part of the tube, but that which is to be placed within the pneumatic apparatus, becauſe it is eaſy to ſtop any other part, out of which the gas might iſſue, with ſoft wax or lute.

" The extremity of this tube, in which the recurved neck of the additional piece is to be inſerted, muſt have the form of a ſmall funnel, not only for the purpoſe of affording the moſt convenient ſupport, and the more ready adaption to the various ſizes of thoſe necks, but alſo becauſe it more readily ſupports the only kind of lute which in this work we ſuppoſe to be uſed. This lute is never deranged, if care be taken to preſs it againſt the internal ſurfaces of this ſmall funnel, and of the glaſs or lead of the additional piece, ſo as to unite them as much as poſſible, it being always underſtood that the lute is good, and poſſeſſes the properties before deſcribed in treating of that ſubſtance.

234. " I have remarked that the uſe of the retort with its additional neck might be diſpenſed with, by ſimply uſing a body or bottle with a neck (even a wine bottle may be uſed in caſe of neceſſity, provided its bottom be either very thin, or very gradually heated). In the orifice of the neck of theſe veſſels, is to be adapted a tube of lead, properly bended, and of a due ſize. This method is in fact very advantageous and economical; but care muſt be taken to join the tube, if it be of ſheet-lead, particularly in the parts below the bottle which are liable to become heated, a ſhort time before the end of the diſtillation; to join it, I ſay, without ſolder, by fuſing the two edges together. For in proceſs of time the ſolder, though ever ſo ſtrong, yet

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yet becauſe it contains tin, is liable to exceſſive corroſion by the oxygenated muriatic acid, which, notwithſtanding its heat, is not found to attack lead in any perceptible degree.

" But it may, perhaps, be more convenient to caſt ſuch a tube at one heat, as well as the additional piece in the apparatus, with the retort; unleſs, indeed, it ſhould be practicable to have it made of ſtone-ware or porcelain, the latter of which is the leaſt permeable to the gas. Or we might, with more advantage, make uſe of a thick tube of common glaſs, which might be eaſily bended in a charcoal fire, and might be adapted to the tubulated bottle, as well as the leaden tube. But the danger of its breaking, and the difficulty of procuring others in caſe of need, together with the expence, have led me to reject this, as well as the tubes of pottery or porcelain.

" In order that the tube adapted to the neck of the bottle may accurately fit, and prevent all eſcape of the oxygenated muriatic acid, it is defended by lute in ſuch a manner, that it ſhall not be thruſt into the neck of the bottle, without extruding a portion of that ſubſtance; and a border of luting muſt then be applied round the place of junction, which will effectually prevent the eſcape of any vapour which might iſſue through the firſt luting. Laſtly, the whole ſurface of this external luting is to be ſmeared with boiled linſeed oil; after which the diſtillatory apparatus may be conſidered as perfectly ſecure.

" If a tube of glaſs be uſed, it may be ſo adapted by grinding with emery as to fit the neck of the glaſs body, and require no luting. The ſame might be done with a tube of porcelain, if the material were ſufficiently fine.

235. " With regard to the other neck which I have recommended, as well in the bottle as in the retort, it ſerves not only to introduce the materials when the leaden tube is previouſly luted in, but likewiſe to admit the external air, if by chance an abſorption ſhould be perceived to take place; that is to ſay, if the water, by diminution of the heat, which leaves a kind of vacuum, ſhould riſe from the pneumatic apparatus into the body: though even in this caſe there would be no reaſon to fear its breaking, notwithſtanding its being conſiderably heated, as at the end of the operation. I have expreſsly made the trial ſeveral times, and always without any accident. The fluid becomes gradually heated in its paſſage along the ſides of the tube or neck of the diſtilling apparatus, before it enters and mixes with the matter in the body itſelf; and again, if the tubulated bottle and tube be made uſe of, the water riſing through the latter and falling in the middle of that contained in the veſſel, cannot directly touch the ſides before it becomes mixed. But, at all events, if the ſmalleſt abſorption be feared, it will be ſufficient to raiſe the ſtopper, and return it to its place the inſtant after the introduction of the atmoſpheric air. Inſtead of a glaſs ſtopper, a cork may be uſed, which muſt be carefully luted round the neck, if there be any reaſon to think that the vapour ſhould find its way through, in conſequence of the neck being not perfectly round.

236. " With regard to the pneumatic veſſel, the following is the method of placing and fixing the falſe bottoms:

" A common wooden hoop is plained flat on the ſide which is to bear the falſe bottom, and fixed within the caſk with pegs which do not paſs quite through the ſtaves. The falſe bottom, ſecured together by two dove-tails, is placed upon this hoop, and fixed there by ſimilar pegs, which penetrate part of the bottom itſelf, and by that means prevent it from either riſing or turning. The cavities between the falſe bottom and the ſides are then to be cloſed round with caulker's ſtuff (*braſſec*,) or melted pitch. It muſt be remembered, that the vertical axis with its croſs-arms is to be placed beneath each falſe bottom. The arms are fixed in a mortice by means of two pins, which prevent them from vibrating or getting looſe. The leaden pipe in in which the extremity of the additional neck is to be inſerted, is not to be put into its place till the firſt falſe bottom is immovably fixed. A notch is ſuppoſed to have been cut in this bottom to admit the tube; and when it is duly placed, the vacant ſpace is to be made good, firſt with tow and then with melted pitch.

" Inſtead of the wooden hoop, which affords a ſolid ſupport for the falſe bottom, it may anſwer the purpoſe very well, if cleats or blocks of wood, three inches thick, be pinned on, at different parts of the circumference; or, which is ſtill better, if the trouble be taken to fit the falſe bottom ſo well, that it may bear ſimply upon the inclination of the ſtaves, which naturally oppoſe its deſcent. This method would certainly be the quickeſt, and is not very difficult to be done.

" When the falſe bottom is thus fixed, it muſt be retained in its place by pins placed at certain diſtances, and afterwards made tight by caulking.

" In order that the tube may not be expoſed to vary in its poſition, a mark muſt be made on the edge of the funnel which terminates one of its extremities, by which it is eaſy to aſcertain the poſition of the bended part below, and place the ſame in the moſt favourable ſituation. It will be convenient to fix the pipe in this proper ſituation, by means of two pegs, which muſt be drawn out previous to the laſt fixing of the falſe bottoms.

237. " When the firſt or loweſt falſe bottom is ſecured in its place, the ſecond arm of the agitator is to be faſtened to the axis, and the other falſe bottom is to be placed and made faſt in the ſame manner as the firſt.

" It is particularly neceſſary to place theſe two partitions in ſuch a manner, as that the holes of communication may not be in the ſame vertical line, but as far as poſſible from each other; that is to ſay, diametrically oppoſite. This diſpoſition is neceſſary in order that the gas may have time to concentrate in one part, before it eſcapes to the other. For the ſame reaſon, it is proper to direct the lower opening of the leaden tube to that extremity of the diameter which is oppoſite the pipe of communication from the firſt to the ſecond bottom, in caſe one diſtilling veſſel only is uſed. If two or more communicate with each pneumatic apparatus, the openings of the tubes muſt be reſpectively diſpoſed at equal diſtances, as far as poſſible from each other, and from the opening in the falſe bottom next above them.

" If inſtead of falſe bottoms the preference ſhould

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be given to inverted tubs (*cuvettes*), the following method may be used to make the rims or sides, and to fix them immovably.

"The rim may be made in two ways; either by short staves, fixed with wooden hoops as usual, scarfed or hooked together at their two extremities, or else, by simply fixing a broad wooden rim, like that of a sieve, round the bottom of this inverted vessel, by means of small wooden pins with heads.

"Both these methods are good. The second has the advantage of taking less room and being cheaper. If this method be used, the points of the pins must be made a little thicker than the stem, in order that they may be less disposed to draw out of the holes bored in the bottom. With regard to the joining of the two ends of this kind of broad hoop, it may be effected very firmly by sewing them together with a flat strip of osier, as is done in the better sort of chip boxes, or it may be very well managed by means of two pins with heads, which may be driven through the overlapping part, and secured at the other side by driving a small wedge into the tail of each pin. With regard to the empty spaces or openings which may be between the rim and its bottom, they must be stopped with glaziers putty (*mastic du vitrier*), which may be smoothed with oil. This putty is of excellent service when the muriatic acid is used without potass; but it is soon destroyed if potass be put into the pneumatic vessel. In this case the internal part of the places of junction must be pitched or caulked, as has been already shewn.

"The method of making these inverted vessels with staves and hoops, has the advantage of being close, and not requiring any particular caulking.

238. "Lastly, Instead of these inverted vessels, the operation may be performed merely by flat boards without rims, provided, however, that the upper board be some inches broader on every side than the lower, in order that the bubbles of gas may be forced in their ascent to strike each board in succession, and remain for a short time in contact with it. The essential circumstance in this arrangement will be to keep the upper part of the vessel well closed, which is to be defended at the hole which admits the axis of the agitator by a central tube to retain the gas; and the partial escape which might take place between that axis and the covering, must be more effectually prevented by a cloth soaked in alkaline leys. This method, besides its convenience, requires less care in fixing, but it renders it necessary to work the agitator more frequently, in order to hasten the absorption of the gas in the water. I have determined to relate all the methods which I have successfully practised, in order that those who may undertake any work of this nature, may determine for themselves, not only with regard to general motives of preference, but likewise the facility with which their own situation or circumstances may enable them to carry the same into execution.

239. "The next object is to fix these inverted vessels in the pneumatic apparatus. This is a very simple operation, and consists merely in fixing pieces of wood or brackets, three inches in length, under each of the two bars which connect the pieces of the bottoms of the inverted vessels together. The bracket pieces are fastened to the side of the vessel with oak pegs, and the cross-bars which rest upon them are secured by pins of the same material driven above them and on each side, in such a manner that the central perforation is in its true place, and the whole is incapable of being removed or disturbed.

"In this operation, as I have already recommended with regard to the false bottoms, it is advisable to place the revolving axis in its proper situation, in order to ascertain that it is not likely to be impeded in its action. It is best, indeed, to avoid fixing either the two inverted vessels or the two false bottoms, if these be used, until the clear movement of the agitator has been ascertained; without which precaution, there might probably be occasion to displace them, either in whole, or in part, to remove the impediments which might prevent the free motion of the parts.

"From the description I have here given, it may be seen that my pneumatic vessels have only two false bottoms or inverted vessels. I think it advisable not to use more, because I have remarked that three of these vessels requiring a greater depth, the distillation became much more laborious, particularly when I made use of the intermediate apparatus. 1. The lutes did not so well resist the pressure of the vapour. 2. It was not disengaged with the same speed, and consequently the operation was more tedious. It is better, therefore, to use shallower vessels, and enlarge their dimensions in the diametral direction, as I have constantly found. The proportions which have appeared to me to be advantageous for a small common workshop, are $1\frac{1}{2}$ foot in height, 32 inches in diameter below, and 36 inches diameter above, all inside measure.

240. "With regard to the kind of wood for constructing the vessels, it has appeared to me to be almost a matter of indifference, I used fir, oak, and chestnut, without observing that either the one or the other were productive of any inconvenience to the quality or clearness of the liquor, unless that, at the first or second distillation, the degree of force was a little altered, by soaking into the wood. That kind of wood may, therefore, be used which can the most readily be procured. I must, however, observe, that the large casks in which oil is brought from Languedoc, which are mostly made of chestnut-tree, are very convenient when cut in two to form the pneumatic vessels. They have even an advantage over the oak and fir casks, because they are closer in the joints, better hooped with iron and wooden hoops, and impregnated with the oil, in consequence of which they are not subject to become dry, how long soever they may be out of use, provided they are kept in a close place; whereas the tubs of fir wood require to be almost constantly filled with water. Oak does not contract so soon as fir.

"It must also be observed that the white deal must not be used, because it transmits water like a sponge. The yellow deal is to be preferred, because it undergoes less alteration from the fluid, no doubt on account of the resin it contains. But if the use of the white deal, or any other spongy wood cannot be avoided, it will be proper to paint the vessel within and without with one or two good coatings of white lead. I have had the great satisfaction to observe, that this treatment not only prevents the water from passing through, but likewise that the oxygenated muriatic

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acid does not attack this colour, or if it does attack it, a long courſe of time muſt be required for that purpoſe. Melted pitch or tar likewiſe afford a good defence for ſuch wooden materials as have this defect. A mixture of yellow wax and reſin is likewiſe of excellent ſervice as a coating for the whole internal ſurface of the pneumatic veſſel, including the inverted veſſels and the agitator.

241. " Beſides the falſe bottoms, or inverted veſſels we have deſcribed, each apparatus muſt likewiſe have its cover chamfered, to fit the circumference, with apertures to admit the tubes and the central axis; together with two others, namely, one of conſiderable ſize, to receive a funnel through which water is poured as occaſion requires, and the other ſmaller, to be opened on ſuch occaſions, in order that the air may eſcape. The cover being nailed, or rather faſtened with wooden pins, in its place, is afterwards ſecured by glueing ſlips of paper over the line where it is applied to the veſſel.

" Inſtead of the wooden pneumatic veſſel, it might be more advantageous to uſe ſimilar veſſels of grit-ſtone *(grès)*, rolled or caſt-lead, or cement of loriot (K). Manufacturers muſt form an eſtimate of the advantages to be derived from the expences they incur. If leaden veſſels be uſed, it will be proper to defend the ſoldered places with one or more coats of white lead, or putty, or reſin, or pitch mixed with bees-wax. I have tried theſe preſervatives againſt the deſtruction of the ſolder, and found them anſwer very well.

242. " As it is uſeful to poſſeſs a knowledge of the height and quantity of water contained in the tub, there is a tube of glaſs fixed againſt its outer ſide, the lower end of which is bended and enters the veſſel about five or ſix inches from its bottom. This part, into which the tube is ſtuck by firm preſſure, is to be previouſly defended by lute, which is afterwards trimmed and laid ſmooth upon the ſides of the tube and the veſſel.

" Laſtly, As it is eſſentially neceſſary to aſcertain, from time to time, the ſtrength of the liquor, and to draw it off upon occaſion, I have uſefully availed myſelf of a braſs cock, covered with ſeveral coatings of white lead for this purpoſe. By means of this cock, it is eaſy to draw off any ſmall quantity of the fluid at pleaſure. It has likewiſe the advantage of readily filling the narrow-mouthed ſtone-ware, or glaſs veſſels, in which the liquor may be kept when there may be any to ſpare, or in caſe it is thought fit to preſerve a quantity always in readineſs.

" When it is required to draw off the acidulated water with ſpeed and in abundance, it is convenient to uſe one or more wooden tubes or ſpigots, which may be opened ſeparately, or all at once, into appropriate veſſels. But it is moſt convenient that they ſhould have ſtoppers of cork only, becauſe thoſe of wood, though covered with tow, are very apt to burſt the wooden tubes by their ſwelling; beſides which they very ſeldom fit with accuracy, unleſs turned with extraordinary care.

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243. " With regard to the intermediate veſſels mentioned in the *Annales de Chimie*, in caſe the operator is determined to uſe them, it is proper to avoid uſing ſtoppers of cork to cloſe the orifices, and ſupport the tubes at the ſame time. For this ſubſtance being very ſpeedily acted upon by the corroſive gas, expoſes the lutes and cloſures to frequent derangement, as well as the tubes which paſs through them. At the beginning of my operations, I ſupplied the place of theſe ſtoppers as follows, when the necks were of a larger diameter than the tubes. I made ſtoppers of glaſs, with flanches on the ſides. Theſe were ground with emery upon the necks themſelves, and they were perforated quite through with a hole, no larger than was proper to admit the paſſage of a glaſs or leaden tube. This tube was coated with lute of ſufficient thickneſs, that it could not paſs through the hole without forming a protuberant piece, which I preſſed and ſmoothed againſt the tube as well as the orifice. Or if the ſtoppers of cork ſhould, nevertheleſs, from convenience be choſen, the necks may be covered with lute, and the ſtoppers forced in. In caſe the interval be ſmall, the parts may be heated a little, covered with virgin-wax, and then forced into the neck, and the ſmall vacuities which may remain may be filled up with the ſame wax, melted and poured out of a ſpoon. Inſtead of lute, yellow wax may alſo be uſed to fix the tube of ſafety; and the ſame operation may be performed with regard to the glaſs or leaden tube, which communicates from the tub to the intermediate veſſel. Stoppers and tubes luted in this manner, are, in ſome meaſure, fixed for ever; for when the wax is once hardened, they are in no further danger.

244. " If the operator be ſo ſituated, that he can order the intermediate veſſels of whatever form he chooſes, it will be adviſable to have the orifices of no greater diameter than juſt to ſuffer the tubes to paſs through. No other defence will then be neceſſary, than that they ſhould be covered with lute at the time of placing them, which will render them ſufficiently firm. The rim, or border of theſe orifices, ought likewiſe to be large enough to ſupport the maſs of lute which it is proper to apply round the tube *." * *Nicholſ. De Charmes.*

245. Having adjuſted the ſeveral parts of the apparatus, we proceed to prepare for the diſtillation, by filling the pneumatic tub with water, or ſuch fluid as it is intended ſhall be impregnated with the gas, and introducing the materials into the diſtilling veſſels.

The cover of the tub is firſt to be properly ſecured by pegs and ſlips of paper, paſted over the joinings. The tub is then (if not done before) to be filled to within

(K) The author does not appear to ſpeak from experience in this place. It is not probable that any manufacturer would be tempted to incur the expence of ſtone veſſels; but it is nevertheleſs proper to remark, that every ſtone which could with facility be wrought, contains lime or clay, or both; the former of which would no doubt be ſpeedily corroded by the liquor, on which it would alſo have a pernicious effect. It is not likely that clay would be more durable. So that on the whole there is no temptation to uſe, and many reaſons to reject, the earths.

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within an inch and a half of the top, with ſoft water. Care muſt be taken to leave open the orifice, by which the air may be allowed to eſcape on pouring in the water, as were this cloſe, the water would inſinuate itſelf under the paper, and deſtroy the luting.

The diſtilling veſſels are now to be placed in the capſules, or the veſſels of water, and firmly ſecured. De Charmes directs the mixture of manganeſe and muriat of ſoda to be introduced at this time, but perhaps it would be better to have this ready done before fixing the veſſels, and then nothing remains, but to add the ſulphuric acid, which is beſt done by means of the crooked funnel. This being done, the ſtoppers are to be well ſecured, and the various jointures cloſed up with lute, where this has not been done before.

246. All theſe ſteps (except the addition of the acid) ſhould be executed the evening before the diſtillation, and the next morning, the acid juſt diluted may be added, if the leaden alembics are uſed, but if glaſs retorts or bottles be employed, it is ſafer to allow the acid to cool before it is poured in.

" If the acid has been poured in warm, and the muriat is very dry, and well mixed, the ſulphuric acid not more diluted than has been preſcribed, and the manganeſe of a good quality, bubbles of air will be heard to paſs into the wooden veſſel, through the leaden tube, at the end of two or three minutes. If the above requiſites be wanting, the eſcape will not take place till ſomewhat more than a quarter of an hour. In either caſe it is neceſſary, a few inſtants after the pouring of the acid, to place a chafing diſh with lighted charcoal beneath the veſſel which holds the retort.

247. " About half an hour after the pouring of the acid, a conſiderable effervеſcence takes place, which ſometimes ſwells the materials as high as the neck of the retort, if this laſt be too ſmall for its charge. The bubbles of the froth are large, and covered with a kind of pellicle, formed by a portion of the mixture carried up during the agitation. This intumeſcence laſts about two hours, during which time the bubbles of oxygenated muriatic acid gas are moſt abundantly diſengaged in the water, They even ſucceed with ſuch rapidity, that the intervals are not diſtinguiſhable, and an inceſſant noiſe is heard in the pneumatic veſſel, which very often laſts three or four hours, according to the management of the fire, and the goodneſs and accurate mixture of the materials. The agitation produced by this rapid eſcape is commonly ſuch, that it is ſcarcely neceſſary to move the agitator.

" The fire is not to be renewed till the expiration of two hours, even though it may have gone out in the mean time. After this, it is not to be renewed till the end of an hour and a half, and after that period, at the end of an hour, and ſo forth, without any perceptible increaſe of its intenſity. It will be ſufficient after theſe periods to keep up the fire, excepting that during the laſt two hours the fire muſt be maintained without ſuffering the charcoal to be almoſt burned away, as in the former caſes, before it is renewed. The chafing diſh muſt be raiſed upon bricks, to bring it nearer the retort, during the laſt hour. I muſt obſerve, with regard to this chafing diſh, that the grate muſt not be too open, leſt the charcoal ſhould be too rapidly conſumed. After the intumeſcence of the mixture has ceaſed, the rapid eſcape of bubbles does not diminiſh for a long time, in conſequence of an effervеſcence which conſtantly proceeds. It is true that this continually diminiſhes, and towards the end of the diſtillation the bubbles which paſs into the tube appear only at intervals, notwithſtanding the matter in the retort may, by the gradual augmentation of the heat, be brought into the ſtate of ebullition. This heat is ſuch, that eight or nine hours after the commencement of the operation, the hand can ſcarcely be endured near the aperture, or the neck of the retort, or other diſtillatory veſſel, though between the fourth and ſixth hours the ſame parts are ſcarcely warm. The diſtillation of one or more retorts or bodies into a ſingle veſſel, according to the doſes before mentioned, takes uſually eleven or twelve hours, and even leſs; the time for ſtopping the diſtillation is known from the eſcape of the bubbles being very ſlow, and the noiſe leſs perceptible. This ſlight noiſe is even a mark to form a judgment of the concentration of the gas, and the degree of ſaturation of the water. In order to hear the bubbles, it is often neceſſary to apply the ear againſt the tub. Moreover, the adopter of the retort begins to be heated, and the lute upon its neck becomes a little ſoftened. Another indication that the proceſs is near its termination is had from the long vibrations of the water in the indicatory tube, placed on the outſide of the tub, and likewiſe in the tube of ſafety, when an intermediate veſſel is uſed.

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248. " If a proper regard be not paid to the ſigns here enumerated, and the diſtillation be not ſtopped, there will not only be a loſs of time and fuel, and a diſtillation of mere water; but the ſteam when an intermediate veſſel is uſed, will drive the water through the tube of ſafety, and itſelf immediately follow, if not inſtantly remedied by diminiſhing or removing the fire, and cooling the neck of the retort and its adopter with a wet cloth, or, which is better, by drawing the ſtopper of the retort for an inſtant.

" As ſoon as the diſtillation is ſtopped, the impregnated fluid of the pneumatic veſſel is to be drawn off into tubs, or other veſſels, proper to receive the goods which are previouſly diſpoſed therein. If it be not convenient to uſe it immediately, the liquor may be left in the tub without fear of any perceptible diminution of its virtue, provided the cover and its joinings be well cloſed with lute and ſtripes of paper paſted on, and likewiſe that the ſpace between the axis of the agitator and the cover be ſimilarly ſecured. It may likewiſe be drawn off in ſtoneware bottles well cloſed with corks, covered with lute at the place of their contact. In this manner the liquid may be preſerved till wanted. I have kept it for ſeveral months without its goodneſs having been impaired.

249. " I muſt obſerve in this place, that if it be wiſhed that the liquor at the upper part of the veſſel ſhould be equal in ſtrength to that of the lower, without retarding the diſtillation (which may be uſeleſsly prolonged for upwards of twenty-four hours, by an effect of the concentration of the gas in the bottom of the veſſel, and the reſiſtance it then oppoſes to its introduction, which ſingularly contributes to increaſe the heat of the retort); I have found no better method, than that of drawing off the liquor, either into earthen pitchers or veſſels filled with merchandiſe ready for immerſion. I have done this after a limited

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time, and repeated proofs of the good quality of the fluid. At the end of eight hours diſtillation, I drew off one-fourth of the contents of the veſſel; a ſecond fourth two hours afterwards; a third fourth after ten hours and a half, or eleven hours; and the reſt after twelve hours diſtillation, which formed the concluſion.

"When the liquor is entirely drawn off from the veſſel, it muſt again be immediately filled with water, or at leaſt to the height of five or ſix inches above the return of the leaden tube, otherwiſe the gas, which continues to eſcape from the diſtilling veſſel and then affords no reſiſtance, might attack the pneumatic veſſel itſelf.

250. "The fire muſt be taken from beneath the retort as ſoon as the diſtillation is finiſhed, not only to prevent the effect of the gaſeous vapours, which ſtill continue ſlowly to eſcape, from acting on the ſides of the tub, but likewiſe to diſpoſe the retorts or bodies to receive a quantity of warm water, which is to be poured in up to the neck. There is no reaſon to fear an exceſs of quantity, and the hotter the veſſels are the better. It is eſſential, however, that it be not poured in cold, for fear of breaking the glaſs. The adopter is then to be unluted from the neck of the leaden tube, if the operator chooſes; and in order that no vapour may eſcape into the workſhop, a bit of lute or a cork may be applied to the beak of the adopter. The ſand bath eaſily permits the retort to be raiſed and returned again to its place, as well as the application of the lute or ſtopper to the neck of the adopter, this laſt being raiſed with one hand while the cork is put in with the other.

"Nevertheleſs, as the lutes which connect the adopter with the retort are ſomewhat ſoftened towards the end of the operation, it would be more prudent to leave every thing in its place, for fear of deranging thoſe lutes. This danger is greater when the adopter is of lead, becauſe the great length of this additional piece tends to force the luting ſtill more on that account. If it be required to proceed immediately to a new diſtillation, the retort or bottle with its capſule or pan muſt be immediately taken from the furnace, and another ſubſtituted in its place ready prepared during the former diſtillation. This neceſſarily requires a double ſet of veſſels.

251. "When the diſtilling veſſel is cold, or nearly ſo, the whole of its contents muſt be ſhaken, by holding this veſſel by the neck with one hand, and applying the other to its bottom. The ſtopper muſt then be taken out, and the veſſel ſpeedily inverted, ſhaking the reſidue to facilitate its eſcape. In this laſt ſituation the retort is to be held by its neck with one hand, and its ſide gently reſting againſt the other. The veſſels into which the water and reſidual matter of the retorts are poured, ſhould rather be of ſtoneware, pottery, or lead, than of wood, unleſs theſe laſt be oil veſſels, which are leſs ſubject to dry in the part above the fluid. If this circumſtance be not attended to, there will be danger of loſing great part of the contents.

"It is moſt convenient to diſengage the retorts or bodies while they are ſtill warm, which continues to be the caſe the next morning after diſtillation, in conſequence of the heat of the ſand bath. If they be left to cool entirely, the ſulphate of ſoda will cryſtallize, and it will be neceſſary to diſſolve in hot water ſuch larger portions as cannot paſs through the neck. But this inconvenience is not likely to happen, unleſs the quantity of water laſt added be too ſmall, and the reſidues have been left undiſturbed for ſeveral days. The ſame obſervation is applicable to that kind of incruſtation which is formed by the muriat, if not properly pulveriſed, dried, or mixed; this cannot be ſeparated from the bottom of the retort, but by means of hot water poured at different ſucceſſive times. It is likewiſe eſſential to leave no cruſt or depoſition of muriat, or other matter, in the veſſels which are emptied, unleſs the ſame be moveable, in which caſe the riſk is leſs. But if the urgency of buſineſs ſhould then require that the ſame veſſels be uſed without entirely clearing them, it will be neceſſary to range this reſidual matter on one ſide, where it will be leſs expoſed to the heat, and will afford a greater degree of facility for the nitric acid to act upon it.

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"In order that the vapour which exhales from the diſtilling veſſels may not prove inconvenient, it is neceſſary to pour in a ſmall quantity of alkaline lixivium in the firſt place, which inſtantly deſtroys the ſmell. This may be done immediately after the end of the diſtillation, and the weak alkaline ſolution may ſupply the place of the water uſed for diluting the reſidues. At the inſtant of pouring this lixivial water, a ſtrong effervescence takes place; for which reaſon it is proper to pour it in by ſeveral ſucceſſive portions, waiting a little between each time *." * *Nicholſ.*

252. The oxygenated liquor prepared in this way is very effectual in bleaching the ſtuffs which are immerſed in it, but it at the ſame time poſſeſſes an odour ſo ſuffocating as to render its uſe unpleaſant and even injurious to the workmen employed in the proceſs, ſhould any of it eſcape. "I have witneſſed, (ſays O'Reilly) in an extenſive manufactory near Paris, the cruel ſufferings experienced by the wretched workmen, from theſe ſuffocating vapours; I have ſeen them rolling on the ground in the exceſs of agony. Frequently even ſevere diſorders are the conſequence of the firſt effects produced by the oxygenated liquor†." De Charmes gives a long account of the ſufferings which he underwent in his courſe of experiments with this acid. It produces ſymptoms completely reſembling thoſe of a violent cold, but which go off in a day or two after having deſiſted from the uſe of the liquor. † *De Charmes.* † *O'Reilly Eſſai.*

This inconvenience may be avoided in two ways;

1*ſt*, By rendering the veſſels for immerſion ſo tight as to prevent the poſſibility of the eſcape of the gas,

2*dly*, By diſſolving in the water ſome ſubſtance which has the property of ſo far neutralizing the acid as to connect its odour without deſtroying its bleaching quality to any conſiderable degree.

253. Mr Rupp of Mancheſter contrived a tub for immerſion, which is admirably adapted to anſwer the firſt purpoſe. Its conſtruction is ſimple, and not expenſive.

"It would, therefore, be deſirable to have an apparatus for the uſe of the pure oxygenated muriatic acid ſimply diſſolved in water, which is at once the cheapeſt and beſt vehicle for it. This apparatus muſt be ſimple in its conſtruction, and obtainable at a moderate expence; it muſt confine the liquor in ſuch a manner as to prevent the eſcape of the oxygenated muriatic acid gas, which is not only a loſs of power, but alſo an inconve-

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nience to the workmen and dangerous to their health; and it muſt, at the ſame time, be ſo contrived, that every part of the ſtuff which is confined in it, ſhall certainly and neceſſarily be expoſed to the action of the liquor in regular ſucceſſion. Having invented an apparatus capable of fulfilling all theſe conditions, I have the pleaſure of ſubmitting a deſcription of it to the ſociety, by means of the annexed drawing.

Plate XCI. "Fig. 4. is a ſection of the apparatus. It conſiſts of an oblong deal ciſtern, ABCD, made water-tight. A rib, EE, of aſh or beach wood, is firmly fixed to the middle of the bottom CD, being mortiſed into the ends of the ciſtern. This rib is provided with holes, at FF, in which two perpendicular axes are to turn. The lid, AB, has a rim, GG, which ſinks and fits into the ciſtern. Two tubes, HH, are fixed into the lid, their centres being perpendicularly over the centres of the ſockets, FF, when the lid is upon the ciſtern. At I, is a tube by which the liquor is introduced into the apparatus. As it is neceſſary that the ſpace within the rim, GG, be air-tight, its joints to the lid, and the joints of the tubes, muſt be very cloſe; and, if neceſſary, ſecured with pitch. Two perpendicular axes, KL, made of aſh or beechwood, paſs through the tubes, HH, and reſt in the ſockets, FF. A piece of ſtrong canvas, M, is ſewed very tight round the axis K, one end of it projecting from the axis. The other axis is provided with a ſimilar piece of canvas. N, are pieces of cloth rolled upon the axis L. Two plain pullies, OO, are fixed to the axes, in order to prevent the cloth from ſlipping down. The ſhafts are turned by a moveable handle, P. Q, a moveable pully, round which paſſes the cord, R. This cord, which is faſtened on the oppoſite ſide of the lid (ſee fig. iv.), and paſſes over the ſmall pulley S, produces friction by means of the weight T. By the ſpigot and fauſſet V, the liquor is let off, when exhauſted.

"Fig. iv. A plan of the apparatus, with the lid taken off.

"The dimenſions of this apparatus are calculated for the purpoſe of bleaching twelve or fifteen pieces of $\frac{4}{4}$ calicoes, or any other ſtuffs of equal breadth and ſubſtance. When the goods are ready for bleaching, the axis, L, is placed on a frame in the horizontal poſition, and one of the pieces, N, being faſtened to the canvas, M, by means of wooden ſkewers, in the manner repreſented in fig. 4. it is rolled upon the axis by turning it with the handle, P. This operation muſt be performed by two perſons; the one turning the axis and the other directing the piece, which muſt be rolled on very tight and very even. When the firſt piece is on the axis, the next piece is faſtened to the end of it by ſkewers, and wound on in the ſame manner as the firſt. The ſame method is purſued till all the pieces are wound upon the axis. The end of the laſt piece is then faſtened to the canvas of the axis K. Both axes are afterwards placed into the ciſtern, with their ends in the ſockets FF, and the lid is put on the ciſtern by paſſing the axes through the tubes HH. The handle P is put upon the empty axis, and the pulley Q upon the axis on which the cloth is rolled, and the cord R, with the weight T, is put round it and over the pulley S. The uſe of the friction, produced by this weight, is to make the cloth wind tight upon the other axis. But as the effect of the weight will increaſe as one cylinder increaſes and the other leſſens, I recommend that three or four weights be ſuſpended on the cord, which may be taken off gradually, as the perſon who works the machine may find it convenient. As the weights hang in open hooks, which are faſtened to the cord, it will be little or no trouble to put them on and to remove them.

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"Things being thus diſpoſed, the bleaching liquor is to be transferred from the veſſels in which it has been prepared into the apparatus, by a moveable tube paſſing through the tube I, and deſcending to the bottom of the ciſtern. This tube being connected with the veſſels, by means of leaden or wood pipes provided with cocks, hardly any vapours will eſcape in the transfer. When the apparatus is filled up to the line *a*, the moveable tube is to be withdrawn, and the tube I cloſed. As the liquor riſes above the edge of the rim G, and above the tubes HH, it it evident that no evaporation can take place, except where the rim does not apply cloſely to the ſides of the box: which will, however, form a very trifling ſurface, if the carpenter's work be decently done. The cloth is now to be wound from the axis L upon the axis K, by turning this; and when this is accompliſhed, the handle P and pulley Q are to be changed, and the cloth is to be wound back upon the axis L. This operation is, of courſe, to be repeated as often as neceſſary. It is plain, that, by this proceſs of winding the cloth from one axis upon the other, every part of it is expoſed, in the moſt complete manner, to the action of the liquor in which it is immerſed. It will be neceſſary to turn, at firſt, very briſkly, not only becauſe the liquor is then the ſtrongeſt, but alſo becauſe it requires a number of revolutions, when the axis is bare, to move a certain length of cloth in a given time, though this may be performed by a ſingle revolution when the axis is filled. Experience muſt teach how long the goods are to be worked; nor can any rule be given reſpecting the quantity and ſtrength of the liquor, in order to bleach a certain number of pieces. An intelligent workman will ſoon attain a ſufficient knowledge of theſe points. It is hardly neceſſary to obſerve, that, if the liquor ſhould retain any ſtrength after a ſet of pieces are bleached with it, it may again be employed for another ſet.

"With a few alterations, this apparatus might be made applicable to the bleaching of yarn. If, for inſtance, the pulley O were removed from the end of the axis K, and fixed immediately under the tube H; if it were perforated in all directions, and tapes or ſtrings paſſed through the holes, ſkains of yarn might be tied to theſe tapes underneath the pulley, ſo as to hang down towards the bottom of the box. The apparatus being afterwards filled with bleaching liquor and the axis turned, the motion would cauſe every thread to be acted upon by the liquor. Several axes might thus be turned in the ſame box, and being connected with each other by pullies, they might all be worked by one perſon at the ſame time; and as all would turn the ſame way and with the ſame ſpeed, the ſkains could not poſſibly entangle each other *." * *Mancheſt. Mem.* vol. v. p. 1.

254. As far as reſpects the confinement of the gas, this apparatus of Mr Rupp is extremely well contri-

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ved, but in his method of rolling up the ſtuffs, there is an inconvenience which M. O'Reilly has corrected. The inconvenience ariſes from the axis being vertical, as when ſeveral pieces are rolled upon the ſame axis, ſome parts of them are liable to ſway down, and thus render the action of the bleaching liquor unequal. He propoſes to remedy this inconvenience by making the axis horizontal, and to make the paſſage of the ſtuff through the liquor more complete, he places a roller at each end of the veſſel, above and below, and three others in the middle, as will be explained when we deſcribe the apparatus.

255. Soon after the appearance of Berthollet's paper in the *Annales de Chimie*, it was propoſed to employ the oxygenated muriatic acid, in the ſtate of gas applied immediately to the cloths previouſly moiſtened, and we believe that it has been ſo employed by ſome bleachers. We are, however, diſpoſed to conſider the method as highly injurious to cloth ſo bleached, although the danger to the workmen might be avoided, by the uſe of the immerſing veſſel above deſcribed.

256. In employing the ſimple oxygenated liquor, it is of conſequence to poſſeſs ſome criterion, by which we may aſcertain its comparative ſtrength. The method contrived by M. Deſcroizilles has been deſcribed in paragraph 209. Mr Rupp has improved on this, by employing the acetite of indigo, prepared by pouring acetite of lead (ſugar of lead) into a ſolution of indigo, in ſulphuric acid as long as any precipitate appeared.

257. The ſecond means of avoiding the unpleaſant effects of the ſuffocating gas, we have ſaid, conſiſt in diſſolving in the water through which the gas is paſſed, ſome ſubſtance which is capable of mixing with, and correcting it.

Two ſubſtances may be employed with this view, potaſs and lime.

258. When potaſs is employed, a quarter of a pound of the common potaſs purified as directed in 165. is to be uſed for every pound of muriat of ſoda introduced into the diſtilling apparatus. This is to be diſſolved in the water with which the pneumatic tub is filled. It is moſt convenient to diſſolve the potaſs in a ſmall quantity of water, and add the ſolution to the water in the tub, but care muſt be taken to ſtir them well together with the agitator, that the potaſs may be equally combined with the water.

But, although this weak ſolution of potaſs certainly renders the bleaching proceſs much leſs inconvenient to the workmen employed, it is yet much more expenſive than the ſimple oxygenated liquor, and more of it is neceſſary to perform the ſame work than is required of this latter. Mr Rupp has completely proved this by a ſet of ingenious experiments which he made, comparing the quantity of colouring matter in the acetite of indigo, and in an infuſion of cochineal deſtroyed by the ſame quantity of the two liquors. His experiments are highly intereſting, and are thus related by himſelf. Vegetable Subſtances.

"*Experiment* I.—To half an ounce of oxygenated muriatic acid, I added a ſolution of indigo in acetous acid (L), drop by drop, till the oxygenated acid ceaſed to deſtroy any more colour. It deſtroyed the colour of 160 grains of the acetite of indigo.

"*Experiment* II.—A repetition of Experiment I. The colour of 165 grains of acetite of indigo was deſtroyed in this experiment.

"*Experiment* III.—A repetition of Experiments I. and II. The colour of 160 grains of the acetite was deſtroyed.

"*Experiment* IV.—To half an ounce of the oxygenated muriatic acid, were added eight drops of pure potaſs in a liquid ſtate. This quantity of alkali was about ſufficient to deprive the acid of its noxious odour. This mixture deſtroyed the colour of 150 grains of the acetite of indigo.

"*Experiment* V.—A repetition of Experiment IV. The colour of 145 grains of the acetite was deſtroyed.

"*Experiment* VI.—To half an ounce of the oxygenated muriatic acid, ten drops of the ſame alkali were added. It deſtroyed the colour of 125 grains of the acetite of indigo.

"*Experiment* VII.—A mixture of half an ounce of the oxygenated acid, and 15 drops of the alkali, deſtroyed the colour of 120 grains of the acetite of indigo.

"Though I had taken the precaution of avoiding the ſulphuric acid, for the reaſon ſtated in the foregoing note, I was not quite ſatisfied with theſe experiments, on account of errors which might have taken place through a double affinity. I therefore made the following experiments, in which I employed a decoction of cochineal in water, inſtead of the acetite of indigo.

"*Experiment* VIII.—To half an ounce of the oxygenated muriatic acid, a decoction of cochineal was added till the acid ceaſed to act on its colour. It deſtroyed the colour of 390 grains of the decoction.

"*Experiment* IX.—A repetition of Experiment VIII. The colour of 385 grains of the decoction was deſtroyed in this experiment.

"*Experiment* X.—To half an ounce of the acid, ſix drops of the liquid alkali were added. This mixture deſtroyed the colour of 315 grains of the decoction.

"*Experiment* XI.—Eight drops of the alkali were mixed with half an ounce of the acid. This mixture deſtroyed the colour of 305 grains of the decoction.

"In order to ſhew the uſefulneſs of this apparatus ſtill more clearly, I requeſt the ſociety to attend to the following ſtatement of the expence of a given quantity of bleaching liquor, with and without alkali, but of equal ſtrength.

With

(L) It has been uſual to eſtimate the ſtrength of the oxygenated muriatic acid by a ſolution of indigo in ſulphuric acid. This method was inadmiſſible in theſe experiments on the comparative ſtrength of the bleaching liquor, with and without alkali; becauſe the ſulphuric acid would have decompoſed the muriat of potaſh, and thereby produced errors. I therefore added to a ſolution of indigo in ſulphuric acid, after it had been diluted with water, acetite of lead, till the ſulphuric acid was precipitated with the lead. The indigo remained diſſolved in the acetous acid.

With Alkali (M).

	L.	s.	d.
80 lb. of salt, at 1½d. per lb. -	0	10	0
60 lb. of oil of vitriol, at 6½d. per lb.	1	12	6
30 lb. of manganese, -	0	2	6
20 lb. of pearlashes, at 6d. per lb. -	0	10	0
	L. 2	15	0
But it appears by the foregoing experiments, that the liquor loses strength by an addition of alkali. The value of this loss, which on an average amounts to 15 per cent. must be added to the expence, - -	0	8	3
	L. 3	3	3

Without Alkali.

	L.	s.	d.
80 lb. of salt, - -	0	10	0
60 lb. of oil of vitriol, -	1	12	6
30 lb. of manganese, - -	0	2	6
	L. 2	5	0

"It appears from this calculation, that a certain quantity of the liquor, for the use of my apparatus, costs only 2l. 5s. but that the same quantity of the alkaline liquor costs 3l. 3s. 3d. which is 40 per cent. more than the other. The aggregate of so considerable a saving must form a large sum in the extensive manufactures of this country *."

* *Manchest. Mem.* vol. v.

259. Indeed, that the addition of potash should diminish the bleaching power of the oxygenated muriatic acid might easily be inferred, from knowing that the oxygenated muriat of potash, or rather the hyperoxygenated muriat of potash does not in any degree possess the power of destroying vegetable colours, and consequently, the more completely the acid is saturated with the potash, the more completely is its bleaching power destroyed.

260. The method of employing lime in correcting the oxygenated acid was first used in Ireland, and some years ago, there were not less than thirty apparatus for preparing this mixture established in the northern parts of that kingdom †. It has been also employed at Glasgow, and a patent, which is now set aside, was obtained by a manufacturer there for preparing the liquor, and a solid oxymuriat of lime, which might be employed at all times, and conveyed to any distance.

† *Higgin's Essay.*

The pneumatic tub should be of such a capacity as to hold 800 gallons of water, and to this is to be added eight pounds of slaked and well sifted lime, which is to be well mixed with the water by means of the agitator, both at the time of making the mixture and during the distillation.

Between the tub and the distilling vessel is placed a leaden receiver capable of holding eight gallons, which is to be two-thirds filled with water, intended to retain any common muriatic acid which may come over. For this purpose a leaden tube, three inches diameter in the bore, proceeds from the alembic, and passes nearly to the bottom of the receiver, and another tube of the same diameter passes from the upper part of this latter to the pneumatic tub. It is known that the limed water in the tub is saturated with acid, when on drawing off a portion of the liquor and adding lime to it, the lime sinks to the bottom. The liquor is then to be drawn off and mixed with thrice its bulk of water, when it is fit for bleaching.

The oxymuriat of lime is found to be superior to the oxymuriat of potash in bleaching, and it is certainly far less expensive. Barytes (ponderous earth) and strontites might probably be used with still greater advantage, from their greater solubility in water, and could be procured at a cheaper rate.

261. Previous to immersing the stuffs in any of this oxygenated liquor they are to be steeped and fulled in the same way as in the old method, to deprive them of the weavers dressing, and the saliva of the spinners. For this purpose it is proper to employ a weak alkaline ley.

In Britain and Ireland machinery is commonly employed in the fulling process, but it is generally so constructed as to wear the cloth. O'Reilly has proposed the following machine for this purpose.

He constructs a circular platform, which revolves about a moveable axis, and is supported at the extremities of the spokes by rollers of cast iron, the circumference of the platform is indented to receive a paul or catch, which makes it recede one notch at each stroke produced by the motion of the mill-tree. To the axis of the mill-tree are fixed spokes which raise several wooden beaters, which falling on the platform loaded with cloth or thread, rinse them more completely than can be effected in any other way, water being constantly supplied from gutters which are filled by buckets attached to a water wheel.

Cotton, thread, and stuffs, more particularly require this preparation, as without it the ley cannot penetrate the substance of the cotton, because of the resinous matter with which it is impregnated.

In some manufactories a bath of soap is employed, but this is unnecessary, as all that is requisite is to form a combination of the oily matter of the cotton with an alkali in order to render it soluble in water; and afterwards to submit the colouring matter to the action which another part of the alkali may exert on it. The preparations which the stuffs must undergo previous to their immersion in the oxygenated liquors consist therefore in steeping in an alkaline ley, rinsing in water, and subsequent pressing and wringing.

262. In disposing the apparatus for the immersions, regard must be had to the objects on which we are to work. Skains of thread are to be suspended in the tub which is intended to receive them; and the stuffs are to be rolled round the rollers of the immersing tub which we have described. The method of doing this is as follows: A piece of cloth is to be fastened to one of

(M) I make no mention of the expence attending the preparation of the liquor, it being the same in both cases.

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of the horizontal axes which correſpond to thoſe of Mr Rupp, and is to be rolled round by means of the handle till the whole is upon the axis; to this is faſtened a ſecond piece, which is rolled on in the ſame manner, and thus as many pieces as required are rolled upon the axis. The end of the laſt piece is then made to paſs over the roller *h* at the upper part of the extremity of the tub next to *g*; is carried down below the roller *h* at the lower part of the ſame extremity; is carried along the bottom of the tub under the next roller up to the roller at the upper part of the partition, paſſes over this to the roller at the bottom of the tub on the other ſide of the partition, ſo on below the lower roller at the other end of the tub, over the upper roller of the ſame end from which it paſſes to the other horizontal axis, and is there ſecured.

Plate XCI. fig. 3.

When the pieces are thus faſtened, the immerſing tub is filled with the liquor intended to be uſed from the pneumatic tub, and this, if it be the oxymuriat of lime may be done by a funnel, but if it be the ſimple oxygenated liquor it is beſt done by a ſtop-cock paſſing from the pneumatic tub into the immerſing veſſel: when this is filled, the handle of the axis to which the laſt end of the cloth is faſtened is turned till the whole of the cloth is unrolled from the firſt axis round the ſecond, and then again the handle of the firſt is turned to reverſe the ſituation of the cloth. Thus the cloth is made to paſs to and fro through the liquor till the ſtrength of this is exhauſted.

263. This is diſcovered by drawing off a little of it and adding to it a portion of the acetite of indigo; if the colour of this is not diminiſhed, the liquor has loſt its bleaching power, and the cloth may be removed, and the water, if the ſimple oxygenated liquor was employed, may be uſed for a new impregnation.

264. After the ſtuffs or thread have been removed, they muſt be well rinſed and again ſubjected to an alkaline ley. The lixiviations and immerſions are repeated as often as is requiſite till the bleaching is completed.

The number of lixiviations and immerſions differs according to the articles. Cotton cloth requires only two operations of each; cotton-thread three; fine flax will require four; and articles of hemp five or ſix alterations.

265. "As it is of eſſential conſequence to be aware of certain events, or facts, by which the progreſs of the bleaching may be aſcertained, I ſhall here point out the gradations of colour, which the pieces aſſume after each immerſion in the oxygenated muriatic acid without ſmell, made according to the proportions here deſcribed. The firſt immerſion gives the thread, or piece-goods, a reddiſh colour, ſlightly inclining to yellow; the ſecond, a colour inclining to ruddy yellow; the third, a whitiſh yellow; the fourth, a white, ſlightly inclining to a ruddy tinge; and by the fifth and ſixth, the white becomes clearer and clearer. Theſe are very nearly the ſhades which are aſſumed by coarſe goods, for the fine goods frequently paſs to the ſecond or third gradation by one ſingle immerſion.

"When the liquor is ſtrongly concentrated in potaſs, ſuch as that which is denoted in the annals of chemiſtry by the name of *javelle*, the goods immediately, and without previous lixiviation, aſſume the third colour; but I have obſerved, that it is difficult to bleach them further without uſing the ſulphuric acid, to remove the lees with which they are loaded. It muſt, moreover, be remarked, that in order to obtain this tone of colour, it is ſufficient that the lixivium be diluted with water, ſo as to mark two or three degrees only on the aerometer inſtead of eighteen or twenty, which it may mark after it is prepared by diſtillation.

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"There are ſome who do not approve the colour which the thread acquires after the firſt immerſion, but it may immediately be reduced by ſteeping the goods in cold or hot lees. The latter produces its effect more ſpeedily; and after ſubſequent rinſing and drying, the goods retain a gray white colour, more or leſs deep according to the ſhade it has received. Many venders prefer this gray, or reduced colour, on account of its preferable ſale in certain markets.

"With regard to the bright and perfect white, there are very few perſons in the provinces who care for it, or appear to give it an excluſive preference. Two reaſons may be given for this: firſt, becauſe a prejudice is unfortunately eſtabliſhed againſt the ſpeed with which the new invented method of bleaching operates: and ſecondly, the conſumer is conſtantly perſuaded, whether the bleaching may have been performed in this mannner, or in the field, that when the goods have attained an extreme degree of whiteneſs, they cannot be as durable as ſuch as are leſs white. It is thought to be rotten, or burnt, and this opinion leads to a preference in favour of ſuch linens, and even cottons, which preſerve after bleaching a ſolid ſhade of gray, or dulneſs in the white.

"From a prejudice of the ſame kind it is, that, in many countries, the women, particularly the peaſants, prefer their linen, whether for clothing or houſehold uſe, ſimply cleared without bleaching. The orders of proprietors, or purchaſers, muſt therefore be attended to, and the number of immerſions and lixiviations regulated accordingly.

"It may be conſidered as a rule, that when the goods no longer communicate a perceptible colour to new lees, they are entirely finiſhed, and conſequently, that every ſubſequent lixiviation, or immerſion, will be attended with abſolute loſs, unleſs the immerſion is neceſſary to clear off the laſt lees, on the ſuppoſition that ſimple rinſing in a large quantity of water may not be ſufficient.

"I muſt, nevertheleſs, remark, that thread bleached by the oxygenated muriatic acid, may be uſed by the ſempſtreſs with much more ſpeed and briſkneſs than thread of the ſame quality bleached in the field; it is leſs brittle, and, on that account, is better for the weft, as well as the warp. It likewiſe may be ſtruck much more effectually home to its place in weaving, and does not afterwards move. I received this valuable obſervation from impartial and unprejudiced manufacturers, for whom I bleached thread according to this method for making handkerchiefs *." * *Nicholſ. De Charmis.*

266. The theory of theſe operations is ſimply this. The oxygenated liquor ſupplies to the cloth the place of the oxygen of the atmoſpheric air, and this in greater abundance, and in a ſtate which renders its action on the cloth more expeditious and more complete. By the union of the oxygen with the carbon of the colouring matter of the cloth, carbonic acid is formed, to produce and carry off which is the object of the ſeveral proceſſes which we have deſcribed. It is carried

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ried off by the subsequent lixiviations in which the alkali answers two purposes; part of it combining with the carbonic acid forms carbonat of potas, while another portion acts on the remaining colouring matter, and dissolving part of it prepares it for another immersion in the oxygenated liquors.

267. The expence of potas soon suggested to scientific bleachers the importance of endeavouring to discover a substitute for it which might render their processes more economical. Kirwan with his usual ingenuity, discovered, that saline sulphurets would answer the purpose, and Mr Higgins has lately much improved on this discovery by bringing into use the sulphuret of lime, which he has fully proved may be employed as a substitute for potas with the greatest advantage. His account of his views, and of the method of preparing and using this substance are too interesting not to find a place in this article.

268. "Since I had the honour of being appointed chemist to the Linen Board, which is now more than three years, I have allotted a considerable portion of my time and attention to the investigation of the principles of that science, applicable to the art in which I am thus more particularly interested. It appeared, that until potas could be dispensed with, we must for ever remain in the power of foreign nations as to our staple commodity: observing also, that all the late improvements in bleaching were exclusively confined to the one object; that of imparting oxygen to the cloth, in a safe and expeditious manner, but that there had been no effort made to supersede the necessity of potas, by far the most expensive and uncertain article employed by the bleacher, and for which he is entirely dependent upon foreign markets; I directed my attention chiefly to discover a substitute for potas; which, provided it should be of Irish production, though it might be equally expensive, I conceived would be of the utmost national importance. Impressed with these ideas, I undertook a series of experiments with that view.

269. "To enumerate the many disappointments and failures I experienced during my investigation, would be endless, and an unnecessary intrusion upon my reader. Knowing, from an important observation of Mr Kirwan, that saline hepars, or the combination of an alkali with sulphur, might, from its detergent properties be advantageously employed in bleaching, as a substitute for mere alkali, by an obvious analogy I was led to expect a similar effect from calcareous hepar, or, more properly speaking, sulphuret of lime, being a combination of lime and sulphur.

270. "In these expectations I was not disappointed, but at that time (about three years since) I contented myself (rather through necessity, for large cities are very unfavourable to experiments on bleaching by exposure to the atmosphere), with pointing it out to some of the principal bleachers from the north then in the town, earnestly recommending it to them to give it a fair trial with and without potas. Since that time, alkaline salts having become progressively dearer, and in consequence of a late proposal of substituting lime for potas, in condensing the oxymuriated gas, I was instigated to resume the subject, and make further and more varied trials. The result of which has been, that the use of the sulphuret of lime may be most advantageously combined with that of the oxymuriated lime, and that thus cloth may be perfectly whitened without the use of a particle of alkali. This then alone would seem to give it a decided preference over the methods at present in use, while at the same time it possesses peculiar advantages, and is exempt from the principal objections to which other substitutes are liable; for 1st, quicklime and sulphur, the materials of which the calcareous hepar consists, are both articles of trivial expence, especially as the latter enters but sparingly into the composition; 2dly, their combination is effected in the easiest and most expeditious manner possible, and perfectly level with the capacity of the meanest workman; 3dly, as the manner of its application is, by steeping the cloth in it cold, the saving of fuel is a matter of great magnitude; and lastly, there is no danger to be apprehended in the use of it, from the unskilfulness or negligence of the workman, as it appears to be incapable of injuring the texture of the cloth.

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271. "The sulphuret of lime is prepared in the manner following: Sulphur, or brimstone in fine powder, four pounds, lime well slaked and sifted 20 pounds, water 16 gallons; these are all to be well mixed and boiled for about half an hour in an iron vessel, stirring them briskly from time to time. Soon after the agitation of boiling is over, the solution of the sulphuret of lime clears, and may be drawn off free from the insoluble matter, which is considerable, and which rests upon the bottom of the boiler (N). The liquor in this state, is pretty nearly of the colour of small beer, but not quite so transparent.

"Sixteen gallons of fresh water are afterwards to be poured upon the insoluble dregs in the boiler, in order to separate the whole of the sulphuret from them. When this clears (being previously well agitated) it is also to be drawn off and mixed with the first liquor; to these again, 33 gallons more of water may be added, which will reduce the liquor to a proper standard for steeping the cloth.

"Here we have, (an allowance being made for evaporation, and for the quantity retained in the dregs) 60 gallons of liquor from four pounds of brimstone.

272. "Although sulphur by itself is not in any sensible degree soluble in water, and lime but very sparingly so, water dissolving but above $\frac{1}{700}$th part of its weight of lime; yet the sulphuret of lime is highly soluble (O).

273.

(N) Although lime is one of the constituent principles of the sulphuret, yet being so intimately united to the sulphur, it has no longer the property of lime; upon the same principle that sulphuric acid in sulphat of potas, has not the property of that acid.

(O) When the above proportion of lime and sulphur is boiled with only 12 gallons of water, the sulphuret partly crystallizes upon cooling, and when once crystallized, it is not easy of solution.

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273. " When the linen is freed from the weavers dreſſing, in the manner already deſcribed, it is to be ſteeped in the ſolution of ſulphuret of lime (prepared as above) for about twelve or eighteen hours, then taken out and very well waſhed; when dry, it is to be ſteeped in the oxymuriat of lime for twelve or fourteen hours, and then waſhed and died. This proceſs is to be repeated ſix times, that is, ſix alternate immerſions in each liquor, which I found ſufficient to whiten the linen.

" When I ſubmitted the linen to ſix boilings in potaſs, and to ſix immerſions in the oxygenated liquor, it was not better bleached than the above.

" The three firſt boilings in potaſs, it is true, produced a ſomewhat better effect than as many ſteeps in the ſulphuret; but towards the concluſion, that is, when the linen was bleached, the ſmalleſt difference was not obſervable as to colour. The linen bleached with the potaſs was thinner, or more impoveriſhed than that treated with ſulphuret, and the latter ſtood the teſt of boiling with ſoap much better than the former, although it did acquire a ſlight yellowiſh tinge, which I ſhould ſuppoſe a week's, or at moſt, a fortnight's graſs, as they term it, would remove.

274. " I contraſted the effects of hot and cold ſulphuret in various temperatures, and although the difference appeared in favour of the hot liquor, yet it was ſo trifling as not to deſerve conſideration, or the expenditure of the ſmalleſt quantity of fuel.

275. " When I ſteeped the linen in the ſulphuret firſt, and afterwards boiled it in potaſs, and then immerſed it once in the oxygenated liquor, a better effect was produced than from two previous boilings in potaſs, or from two ſteeps in the ſulphuret; ſo that the two ſubſtances ſeem to co-operate with each other.

" Indeed, from what I have ſeen, two ſucceſſive ſteeps in freſh ſulphuret, previous to the immerſion in the oxygenated liquor, ſeemed to afford very little better effect than a ſingle one, which is not the caſe with reſpect to potaſs.

276. " It was obſervable, that the cloth was invariably thicker or more ſwelled coming out of the ſulphuret, than after being boiled in potaſs, and remained ſo when even waſhed and dried.

" It appears to me, that the ſulphuret opens the fibres of the linen more ſpeedily and better than the latter, by ſoftening and ſwelling, rather than by diſſolving, the reſinous or colouring matter. This accounts for the better effect of potaſs upon the linen when previouſly ſteeped in the ſulphuret, than when uſed by itſelf.

277. " Probably thoſe bleachers who do not at preſent find it convenient to uſe the oxygenated liquor, but continue to bleach by expoſure to air, may derive ſome advantage from this, by uſing the ſulphuret and potaſs conjointly or alternately.

" Mr John Duffy, of Ball's-bridge, (who from his knowledge of chemiſtry is very well acquainted with the principles of bleaching) was kind enough to repeat the above experiments, and his report to me correſponded with my own obſervations.

278. " It is almoſt impoſſible to aſcertain to the full extent, more eſpecially by ſmall experiments in an elaboratory, the many advantages any ſubſtance not hitherto uſed in bleaching, will afford by varying the mode of application. Vegetable Subſtances.

" The experimenter does a great deal by diſcovering the efficacy, proving the practicability, and aſcertaining the ſafeſt and moſt economical method of directly uſing it, and alſo the beſt proportion of it. Before he can arrive at any one of theſe, many a round of changes are neceſſary; indeed a greater number than any man who is not uſed to experiments can be aware of. But I ſhould hope, that the bleacher need not heſitate to uſe it in the ſtate in which I preſent it to him, more eſpecially as he runs no riſk of injuring the cloth with it. If he can make more of it hereafter, I ſhall feel happy upon the occaſion; no diſcovery was ever brought to perfection at once.

" How gradually, and yet how progreſſively the ſteam engine, from its firſt invention by the marquis of Worceſter, was brought to its preſent degree of perfection! undoubtedly, it was juſt ſo with reſpect to alkalies, the ſubſtances now uſed by the bleachers, it muſt have taken a conſiderable time after their firſt application in bleaching, before they could be made the moſt of.

279. " I will now conclude by pointing out the advantage likely to accrue from the uſe of the ſulphuret, to the nation, and alſo the ſaving to the individual.

280. " Hence it ſeems, that the quantity of foreign alkalies imported into the kingdom every year, amounts to 265,968 pounds; and that the quantity uſed in bleaching alone, amounts to about 215,307 pounds annually.

" The average price of brimſtone for the laſt three years, is about 25l. a-ton, which is at the rate nearly of 2¼d. a-pound; four pounds of brimſtone, and twenty pounds of lime, as already obſerved, will produce 60 gallons of liquor. In this country twenty pounds of lime may be valued at about 4d. ſo that the bleacher may have the 60 gallons at the expence of 1s. 1d.

281. " By what I could learn from different bleachers, the common allowance of alkali for 60 gallons of water is ſix pounds of barilla or four pounds of potaſs at the very leaſt, and moſt bleachers uſe more than this. The price of four pounds of potaſs at the rate of 65l. a-ton, is about 2s. 4d. which is 2d. more than double the price of the ſulphuret; but as the brimſtone muſt be ground, an allowance ſhould be made for it; and being eaſy of pulverization, a farthing per pound is an ample conſideration for the expence attending it.

282. " The ſaving of fuel only remains now to be taken into conſideration; and as this cannot be calculated with any degree of accuracy, I ſhall content myſelf by particularizing facts. In the firſt place, but 16 gallons of liquid are to be boiled in preparing 60 gallons of the ſulphuret, while the whole 60 gallons muſt be boiled when the alkali is uſed; hence it might appear that two-thirds of the fuel are ſaved in the quantity of liquor, but it is not quite ſo much, ſuppoſe we eſtimate it at one half, which is rather under-rating it. Let us add to this the time neceſſary to boil the different liquors; the ſulphuret requires but about half an hour, and the alkaline lixivium at the very leaſt ſeven hours to boil the linen in it, which is in the proportion of one to fourteen.

283. " The ſaving altogether to the bleacher from this

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this ſtatement, is obviouſly very conſiderable; and as the Wicklow copper mines are ſufficient to ſupply the whole kingdom, or indeed two ſuch kingdoms with abundance of ſulphur, let the conſumption be ever ſo great, the entire of the alkali, or 215,307 pounds muſt be annually ſaved to the nation.

"But ſuppoſe two-thirds only of the quantity of alkali generally conſumed in bleaching were diſpenſed with by the uſe of the ſulphuret (which is a ſuppoſition not warranted by my experiments) ſtill the ſaving to the nation and to the individual, muſt evidently be great indeed *."

* *Higgin's Eſſay.*

284. The goods which have been bleached in the methods above deſcribed, require to undergo what are called dreſſings to give them a clear and bright white. This is particularly neceſſary for the finer piece goods, ſewing thread, ſtockings, gloves, and all cotton articles.

After the laſt immerſion, the goods are to be preſſed or wrung, and then immerſed in a bath of water, holding in ſolution about a hundredth part of its weight of ſulphuric acid. The acidulous bath may be employed cold, but it is better to heat it ſo moderately, that the hand may be born in it. The beſt way to make the mixture of ſulphuric acid and water, is to invert the bottle containing the acid in the water, when the acid by its greater ſpecific gravity quits the bottle, and by agitation for a conſiderable time combines with the water.

It is uſual to leave the goods for ſome days in the bath, but it is ſafer to allow them to remain only a few hours, and to renew the bath till they are ſufficiently white. Too many articles muſt not be crowded together, nor two much preſſed, that the acid may exert its action equably.

After removing the goods from the acid bath, they muſt be wrung, and waſhed repeatedly in fair water till they no longer retain any marks of acidity.

285. It is cuſtomary to give to linen cloth a bluiſh ſhade; this is produced by diſperſing through the water in which it was laſt rinſed, a little indigo or Pruſſian blue, or it may be given by a ſolution of white or motled ſoap in which the cloth is waſhed, while it ſtill retains a little acid.

286. As accidents are apt to occur during theſe proceſſes, it is proper to inform the artiſt how theſe may be remedied.

287. "*Accidents in the diſtillation.*—The principal accident which is capable of interrupting the diſtillation, is when the lutes of the adopter ſuffer the gas to eſcape. The moſt ſpeedy remedy, in this caſe, to prevent the exhalation of the acid, which cannot be retained but with difficulty, ſeldom for any length of time, and then very imperfectly, in conſequence of its great expanſion; the ſhorteſt method, I ſay, at leaſt if the diſtillation be not near its concluſion, is to remove the fire immediately from beneath the capſule of the retort, and to ſuffer this laſt to cool for a certain time, by raiſing it a little in its ſand-bath. If it be not poſſible to take it out of the furnace, together with its capſule, on account of the heat, or its ſticking too faſt, the adopter muſt be unluted from the funnel of the leaden tube, and the aperture of this tube cloſed with a cork, or lute, to prevent the gas of the pneumatic veſſel from evaporating; after which the retort muſt be raiſed, and placed gently upon a bag of ſtraw, or on coarſe cloths folded together; and then holding the retort by its neck, near the flexure, the adopter muſt be entirely unluted, by twiſting it round and drawing it off. The orifice of the neck of the retort is then to be cloſed with a cork ſtopper, but not ſo cloſely but that a very ſmall portion of gas may be ſuffered to eſcape, for fear of an exploſion. The ſtopper of the neck may, for greater ſafety, be ſlightly raiſed. This precaution is neceſſary, on account of the great expanſion of the muriatic acid gas. The old lute muſt then be taken off, as well from the adopter as the retort, and the places to which they were applied muſt be well cleaned, in order to receive freſh lute, after having carefully wiped off the moiſture with a cloth or a ſponge. If the lute which comes off be ſtill good, it may be kneaded again, adding, if required, a ſmall quantity of boiled oil, or it may be mixed with new lute, if it be burned or decompoſed. This decompoſition in the fat lute may be known by the white or reddiſh colour which it acquires, and the facility with which it breaks, on account of its having loſt the gluten which afforded it that toughneſs and tenacity, on which its goodneſs chiefly depends.

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288. "With regard to the lute of linſeed cake, it muſt, in almoſt every caſe, be totally renewed, particularly when internally applied, becauſe the heat hardens it too much to admit of its being kneaded again, with any moderate degree of facility; the decompoſition of this lute is known by the yellow colour it acquires, and the contraction it undergoes from the effect of the heat. The lutes be kneaded to a proper conſiſtence, and duly placed according to the directions laid down in (232.) the adopter is to be fixed, previouſly removing the ſtopper from the mouth of the retort, and placing another in that of the ſmall end of the adopter, to prevent any inconvenience from the vapour which might iſſue out during the time of fixing it. This vapour is likewiſe condenſed within the adopter, in conſequence of its coldneſs. The retort is then to be placed, as before, on the furnace, the adopter uncorked, and its beak luted into the tube of lead; after which, the fire is to be replaced beneath the capſule, and diſtillation very ſpeedily recommences, and proceeds as uſual. The operation is a work of ſome delicacy; it requires to be performed with ſpeed, and great care muſt be taken while placing the lutes and the adopter in their proper ſituations, to ſtand always in ſuch a poſition, that the current of the external air may drive the vapour from the operator himſelf.

289. "If the accident here deſcribed ſhould take place towards the end of the diſtillation, as it may ſometimes happen, in conſequence of the ſtrong heat which, at that time, may ſoften the lutes, it will be ſufficient if the fire be taken from beneath the capſule. The diſtillation ſoon ceaſes when this is done, particularly if care be taken to condenſe the gas, by the prudent application of wet cloths on the neck of the retort, as well as the adopter.

290. "This inconvenience would not take place, if the workmen in thoſe glaſs-houſes which are principally employed in the fabrication of chemical veſſels could make retorts with necks recurved in the form of the adopter. Theſe kind of veſſels may be aſſiduouſly ſupplied by making uſe of a tube of lead, ſo formed as

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to ſerve inſtead of the adopter, as I have already obſerved, with regard to the tubulated bottles or bodies (p). If, by accident, the lute which is adapted ſhould fail, or ſuffer the gas to paſs through, it may eaſily be ſtopped, by applying a new lute to the place of junction. Inſtead of the leaden tube, we may ſubſtitute, with ſtill greater convenience (the danger of breaking excepted), a tube of glaſs, of which the end neareſt the bottle, or tubulated body, ſhould be ground with emery. By theſe means there would be no application of lute, and conſequently no danger to be feared with regard to the filtration of the gas, the eſcape of which is eaſily perceived by the ſmell which diffuſes itſelf through the workſhop, and is more particularly perceived when the noſe is applied near the veſſels, or the lute. But as this laſt method of diſcovering the place where the lute has failed may be attended with the moſt ſerious conſequences, if the greateſt precaution be not uſed, it is more prudent to apply an open bottle of ammoniac near the ſuſpected place; at the inſtant that it is preſented, a white fume is formed, which immediately points out the defective ſpot. The bottle muſt be preſented above the current of air, which takes place near the lute, or in the workſhop. If this precaution be not attended to, the operator might be induced to remove a good lute, inſtead of one which was really defective.

291. "On the other hand, if in the courſe of the diſtillation, and for want of keeping up the heat, the fluid in the pneumatic veſſel ſhould be abſorbed and riſe into the diſtilling apparatus, it is neceſſary the inſtant it is perceived to withdraw for a moment the ſtopper out the neck of the retort, where, as I have already had occaſion to obſerve, the abſorption inſtantly ceaſes. Nevertheleſs, if, for want of being obſerved in time, the water ſhould riſe ſo far as partly to fill the retort, or body (for it never entirely fills it), the diſtillation will be ſtopped, from the coldneſs of the water, and its too great quantity. The ſhorteſt remedy is to draw out the exceſs of water, which is thus introduced into the diſtilling veſſel, by the aſſiſtance of a glaſs pump, or ſyphon, and afterwards to heat the ſame veſſel, firſt returning the water into the pneumatic veſſel, if thought expedient: but if the diſtillation be properly attended to, this accident can never happen.

292. "*Accidents in the lixiviations and immerſions.* I place the accidents ariſing from theſe two operations in the ſame claſs, becauſe they can ſcarcely take place, but by the joint operation of both.

"Any article which is badly cleared of the lixivium, and afterwards immerſed in the oxygenated muriatic acid, becomes almoſt immediately of a nankeen colour, particularly in the folds, either in ſpots where certain parts have not been ſufficiently rinſed, or elſe the colour is general, if the whole has not been well rinſed.

"The ſame accident happens if ſoot has fallen on the linen or thread. The difference is ſimply in the colour, which approaches more to brown. The colours are capable of becoming more and more deep if the miſmanagement be not remedied as ſoon as perceived, and that before the goods are ſubjected to other immerſions in the alkaline lees, or of the oxygenated muriatic acid. The ſame accident is to be expected, if the goods, though white at the time of their immerſion, are ſuffered to remain too long in the bleaching liquor. This does not fail to happen, particularly if the articles which are ſuffered to remain even in a weak ſolution, are kept in that ſtate the whole night. The next day they are found to be yellow, or charged with lixivium.

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293. "The only method of remedying theſe accidents conſiſts in the uſe of water, ſlightly acidulated with ſulphuric acid, no matter whether cold or hot, but the hot ſolution operates more ſpeedily. The ſpotted or tinged goods are to be ſoaked in this water for a few minutes, or a quarter of an hour, accordingly as the colour may be more or leſs deep, in conſequence of a ſeries of lixiviations or immerſions, more or leſs repeated. In this ſituation the offenſive colour is ſeen almoſt immediately to diſappear.

294. "Inſtead of making a ſulphuric ſolution expreſsly for that purpoſe, that which has ſerved for the dreſſing may anſwer very well: neither of theſe need be ſtronger than has been there directed, unleſs the goods be conſiderably charged with colour, and there be a great quantity to immerſe at once. The acidulated water is tried by the areometer, and if, in conſequence of having been uſed, it ſhould not be ſufficiently ſtrong, it may be reſtored by adding the requiſite quantity of acid for that purpoſe. It is neceſſary, when any new acid is poured in, to mix it well with the water before any goods are immerſed therein.

"It muſt, in this place, be obſerved, that though the thread and piece-goods may become charged with a foreign colour, in conſequence of the accidents here pointed out, both theſe articles are frequently very well bleached at the under ſurface. It is even a proof that the muriatic acid has operated effectually, in cauſing the lixivium to produce ſuch an effect: but theſe accidents are difficult to be obſerved on objects ſimply cleared, or in the crude ſtate. In the latter caſe, a permanency of the original colour may alone ſhew the neceſſity of uſing the ſulphuric acid, particularly when the lees and the muriatic acid which have been uſed are not at all exhauſted.

295. "*Accidents attending the preparation or dreſſing.* When the piece-goods are immerſed in a ſolution of ſoap, after having been taken out of the ſulphuric acid, while they are ſtill too ſtrongly acidulated, or inſtead of rinſing them they be immediately conveyed from the acid into the ſolution of ſoap; this laſt ſolution is ſubject to curdle, or become immediately decompoſed; whence the operator has the mortification to obſerve the whole ſurface of the goods covered with an infinite number of ſmall ſpots of oil, in the form of clots, of a yellowiſh colour, and very tenacious, particularly on ſtockings or cotton goods, becauſe they incorporate as it were with the nap or texture of the goods: they diſappear

(p) This laſt method appears to be preferable to every other; becauſe it requires only a ſlight attention to the lute, and can never produce thoſe dangers which ariſe from the uſe of retorts.

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appear in conſequence of much waſhing or rinſing. I muſt particularly mention an accident which may happen to any one, namely, that of placing by miſtake ſtockings or other bleached objects, which have received their firſt treatment in the ſolution of ſoap, upon articles which have been expoſed to the vapour of ſulphur. I have placed ſtockings upon gauze, which had been whitened by ſulphur, and found, that after they had remained in this ſituation for the courſe of a night, they became entirely of a brown-red at the place of contact. They appeared as if burnt or marked with a hot iron. This colour, which, no doubt, was produced by the combination of the volatile ſulphuric acid, with the alkali of the ſoap, with which the ſtockings were ſtill impregnated to a certain degree, immediately diſappeared upon expoſing them; firſt, to the action of a bath of the odorant oxygenated muriatic acid, and afterwards to another of water, ſlightly acidulated with the ſulphuric acid.

296. "Every ſalt with exceſs of acid, ſuch as the ſalt of ſorrel, removes the ruddy ſpots here mentioned with equal eaſe. It is true, that this ſalt cannot with convenience be uſed, on account of its dearneſs, but the reſidue of the diſtilling veſſels, that is to ſay, the water which holds in ſolution the reſidue of the diſtillation of the oxygenated muriatic acid, is very ſerviceable in this proceſs, and may be advantageouſly uſed either hot or cold, to remove thoſe very tenacious ſpots, which are not at all capable of being removed by ſoap or alkaline lees.

297. "When the ſpots of oxyd of iron, commonly diſtinguiſhed by the name of ironmould, are ſmall, they may eaſily be taken out with ſalt of ſorrel in powder, laid upon the ſpot itſelf, which is afterwards to be moiſtened with a ſmall quantity of water; or the part which is ſpotted may be ſteeped in a ſolution of the ſame ſalt. It ſoon becomes fainter, and at length diſappears, after which the place muſt be very well rinſed. The ſulphuric acid may be uſefully applied inſtead of the ſalt of ſorrel, as Berthollet ſeems to affirm in his memoir; and I have proved with ſucceſs, that, though the ſpots may penetrate quite through the cloth, and be very broad, yet if they be ſoaked in a bath of ſulphuric acid, either warm or cold, when the goods are taken out of the bath of muriatic acid, the effect will be that the ſpots inſenſibly diſappear. If the goods be of cloſe texture, the operation of the acid is ſlower (q).

298. "With regard to the ſpots of ruſt which are frequently ſeen on thread or cotton ſtockings, they are produced by the needles of the engine, and commonly diſappear during the dreſſing, that is to ſay, in the bath of ſulphuric acid. The ſame obſervation is true of the ſpots of ruſt which ſometimes appear on the piece-goods, in conſequence of their having been in contact with iron. In general, the older any ironmould may be, the more tenacious it is, and the more difficult to be effaced; but every ſpot may be made to diſappear in time.

299. "It frequently happens that piece-goods are ſpotted with tar, during their carriage by water, in boats, where they are liable to be placed upon the pitchy parts of the veſſels, or in contact with tarred ropes. Theſe ſpots may be ſoon taken out, by rubbing them with oil of olive, which diſſolves the tar; or ſtill better, by holding the part in ſpirit of wine, if this proceſs ſhould be thought more convenient. The latter method operates by the complete ſolution of the tar.

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300. "With regard to ſpots of wine, cyder, or any kind of fruit, they may be effaced by dropping a few drops of the oxygenated muriatic acid upon them, which cauſes them almoſt inſtantly to diſappear. But there are certain fruits, ſuch as plumbs, of which the ſpots are more difficult to effaces; they requiring one or two lixiviations. Thoſe that are gray, or reddiſh, at firſt, aſſume a fine yellow colour in the muriatic acid, which does not diſappear during a ſubſequent lixiviation, but requires a ſecond immerſion in the bleaching liquor.

301. "I muſt not omit a ſecond very ſimple and economical method to take out every kind of ſpot occaſioned by fruits, ſuch as ſtrawberries, gooſeberries, &c. It conſiſts in cauſing the ſpotted part to imbibe water, and afterwards to burn one or two common brimſtone matches over the place: the ſulphurous gas which is diſcharged ſoon cauſes the ſpot to diſappear.

302. "There is a kind of indelible ſpot which is produced from red ochre and the charcoal black, with which the weavers mark the turns of the beam, in order to aſcertain the length of the chain of piece-goods. This kind of mark, which is impreſſed on the goods at equal diſtances, is ſo far from being effaced, that it ſeems, in ſome meaſure, to receive ſtrength from the oxygenated muriatic acid, notwithſtanding the intermediate action of the lees."

Uſe of the oxygenated muriatic acid in diſcharging the colours of dyed or printed goods.

303. There are ſeveral proceſſes allied to bleaching which depend on the agency of the oxygenated muriatic acid, and of which we ſhall therefore treat before proceeding to deſcribe the remaining bleaching proceſſes. Theſe are the diſcharging of dyed or printed colours; the bleaching of paper; the cleaning of books, maps, and prints; and the bleaching of wax.

304. White ſilk and wool, on being ſteeped in oxygenated muriatic acid, acquire a yellow colour; hence this acid is of no uſe in bleaching theſe animal ſubſtances. It readily diſcharges the ſimple colours with which ſilk has been dyed, ſuch as, indigo blue, gray, lilac and crimſon, and gray, orange, green, ſaxon blue, apple green, fawn colour, brown lemon, and dipped blue, with which wool has been dyed. It leaves the goods however of the ſame yellow caſt as it imparts to white wool and ſilk, but this yellow colour is readily altered to a clear white by immerſion in the ſulphurous acid as deſcribed in the bleaching of theſe ſubſtances.

Silk dyed with ſome compound colours, as violets, greens, browns, blacks, acquires the ſame yellow co-

(q) The ſalt of ſorrel is ſold in London, in ſmall bottles, by the perfumers and apothecaries, under the name of *ſalt of lemon*. The ſulphuric acid, as preſcribed above, muſt, of courſe, be diluted.

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lour, but not ſo ſpeedily, two immerſions being uſually found neceſſary to diſcharge the colours completely. In the brown violet and puce colours, which are compoſed of blue and red, the blue commonly firſt diſappears, and by a ſubſequent immerſion the red is diſcharged. The ſame happens with the yellow which forms a part of the compoſition of green and orange, the blue of the former and the red of the latter remaining. In blacks which are compoſed of brown laid upon a blue or a root colour, the brown firſt vaniſhes.

When more than one immerſion is required, it is proper to uſe a bath of ſulphuric acid between them, and this is particularly neceſſary where iron has entered into any of the colours.

Theſe effects of the oxygenated muriatic acid ſerve to explain the action of the air in diſcharging the leſs permanent colours of woollen and ſilken goods, and in giving to white clothes a yellow colour. It is evidently oxygen which is in both caſes the active principle, but its action is more ſpeedy in the acid than in the atmoſphere, from the facility with which the former is decompoſed.

305. The colours employed in dying or printing cottons or linens are of two kinds, chemical or, as they are ſometimes called, falſe colours, and faſt or true colours. The former diſappear in a very ſhort time upon one immerſion in the acid, except one deſcription of yellow, which contains in its compoſition ſulphat of copper (blue vitriol), ſulphat of iron (green vitriol or copperas), and acetite of lead (ſugar of lead). Goods which have been dyed with this colour muſt firſt be well ſcoured with ſoap, which ſo far ſeparates or decompoſes the colour, that a ſubſequent immerſion will readily diſcharge it, whereas without this previous ſcouring, the acid would have completely fixed the colour.

Several of the faſt colours, as the blues, yellows, and blacks, require a lixiviation before immerſion, and two, or ſometimes three, immerſions with intermediate baths of ſulphuric acid are neceſſary completely to remove them. Moſt other faſt colours yield to a ſingle immerſion. A peculiar exception to this is the Adrianople red, which never becomes entirely white, however numerous the lixiviations, immerſions, and acid baths employed.

306. "There is another thing no leſs worthy of remark with regard to the black colour, which forms the outline or border of deſigns, namely, that if the muſlin, or cleared fine piece, upon which the different flowers were deſigned which have been diſcharged, be folded together in ſeveral folds, or placed upon a dark-coloured ground, the effaced outline becomes viſible according to the expoſure of the piece under a certain obliquity of the light exhibiting the appearance of a ſlight trace. The kind of outline which, under theſe circumſtances, becomes viſible, cannot be compared to any thing better than the embroidery of muſlins placed on a coloured ground. This trace ſeen at a certain diſtance has the ſame effect, and even when cloſely obſerved, it is impoſſible to determine what it is, becauſe it is not viſible, except under a certain reflection of the light; nevertheleſs the whole piece appears white, and of a very ſuperior quality. I have remarked that this effect does not take place excepting with regard to the old prints of flowered deſigns of the true India calicoes imported from that part of the globe. For in the printed goods of our manufactures, ſuch as thoſe of Paris, Joly, St Denis, and Beauvais, all the traces of the deſigns completely diſappeared, to my great ſurprize. It muſt, therefore, neceſſarily be admitted, that the difference in theſe reſults depend on the qualities of the mordants, which are more or leſs oily, or the manner of ſtriking the blocks in the act of printing.

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"If this effect were produced by the mordant with the outlines of the deſigns in the pieces of printed goods, it might, perhaps, be of advantage to take the ſame method of obtaining a ſubſtitute, inſtead of the rich expenſive embroideries with which the fine muſlins of India and Switzerland are covered. Theſe deſigns likewiſe do not appear in their full effect, but when they are placed upon a tranſparent ſtuff of a deep colour, which exhibits all the outline. This method of producing ſo rich an effect would be extremely ſimple, ſingularly permanent, and highly economical. I think, however, that I may add, that, after many trials, I have at laſt ſucceeded in diſcharging this mordant, ſometimes by a bath of ſulphuric acid, rather ſtronger than uſual, and at other times by ſoaping the goods before and after the bath. This management is very eſſential to be known, in order that the operator may not be expoſed to the mortification of ſeeing the ſame deſigns return again by the ſecond action of the madder applied to the ſame bleached piece in a ſubſequent printing proceſs. To obviate every accident of this kind, it will be proper to inform the owner which of the methods have been uſed to bleach their goods, and in caſe the new method may have been uſed, it would then be prudent to paſs them previouſly through a good bath of ſulphuric acid*."

* *Nicholſ. De Charmes.*

307. Colours laid in oil which do not contain madder, muſt be firſt heated in an alkaline ley, and then ſcoured with ſoap.

Bleaching of Paper.

308. The bleaching of paper has been rendered conſiderably more expeditious by the uſe of the oxygenated muriatic acid. The following proceſſes are given by De Charmes as extracted from different French memoirs.

Bleaching of old printed Papers, to be worked up again.

309. "1. Boil your printed paper for an inſtant in ſolution of ſoda rendered cauſtic by potaſs. The ſoda of varech is good.

"2. Steep them in ſoap-water, and then waſh them, after which the material may be decompoſed, or reduced to a pulp, by the machinery of the paper-mill. The waſhing with ſoap may be omitted without any great inconvenience.

Bleaching of old written Papers, to be worked up again.

310. "Steep your paper in a cold ſolution of ſulphuric acid in water, after which waſh them before they are taken to the mill. If the acidulated water be heated, it will be ſo much the more effectual.

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Bleaching of printed Papers without deſtroying the texture of the Leaves.

311. "1. Steep the leaves in a cauſtic ſolution of ſoda, either hot or cold. 2. And in a ſolution of ſoap. 3. Arrange the ſheets alternately between cloths, in the ſame manner as the paper-makers diſpoſe thin ſheets of paper when delivered from the form. 4. Subject the leaves to the preſs, and they will become whiter, unleſs they were originally loaded with ſize and printers ink. If the leaves ſhould not be entirely white by this firſt operation, repeat the proceſs a ſecond, and, if neceſſary, a third time. The bleached leaves, when dried and preſſed, may be uſed again for the ſame purpoſes as before.

Bleaching of old written Papers without deſtroying the texture of the Leaves.

312. "1. Steep the paper in water acidulated with ſulphuric acid, either hot or cold. 2. And in the ſolution of oxygenated muriatic acid. Theſe papers, when preſſed and dyed, will be fit for uſe as before.

The method of bleaching Rags of the natural brown colour for the Manufactory of white Paper.

313. "1. Let the rags be opened or ſeparated from each other, after previous ſoaking or maceration for a longer or a ſhorter time, according to their texture and quantity. 2. Give a lixiviation in cauſtic vegetable, or mineral alkali. 3. Paſs them through the oxygenated muriatic acid, more or leſs concentrated with alkali. 4. Let the maſs be then worked for a ſufficient time in the apparatus of the paper-mill, and it may be advantageouſly ſubſtituted inſtead of that which is afforded by white rags.

"The white colour will be ſtill better, if, after the maceration, the rags be opened and ſubjected, as uſual, to the action of the mill; after which the paſte itſelf muſt be ſubjected to one lixiviation, one immerſion, and a bath of ſulphuric acid. The maſs being then well waſhed and preſſed out, may be thrown into a trough to be manufactured.

Method of bleaching Rags, of all Colours whatever, in order to make white Paper.

314. "1. Let the rags be opened, as before. 2. Steep them in the oxygenated muriatic acid. 3. If, as it commonly happens, the colour is diſcharged by this firſt immerſion, let theſe bleached and decompoſed rags be immerſed in water acidulated with ſulphuric acid. 4. Complete the diſorganization by the mallets or cylinders of the mill, after having previouſly well waſhed them.

"If the colour ſhould not be ſufficiently diſcharged by the firſt immerſion in the oxygenated muriatic acid, which is very ſeldom the caſe, give them another alkaline lixiviation, and after that a ſecond immerſion in the oxygenated muriatic acid; after which ſteep them in water acidulated with ſulphuric acid, either hot or cold, the latter of which is the moſt active and effectual; and, laſtly, let them be ſubjected to the action of the mallets or cylinders.

"Red and blue colours are moſt tenacious. With regard to black, it will be ſufficient if they be ſteeped after opening their texture, 1. In a diluted ſolution of ſulphuric acid; and, 2. In a ſolution of the oxygenated muriatic acid. If the operator could know that theſe rags had been dyed in the raw ſtate, a ſtill more brilliant white might be obtained by following the ſecond method deſcribed in the preceding article. But it very ſeldom happens that coloured rags have not been bleached before they were dyed. The manipulations may be performed with ſufficient ſpeed to bleach at leaſt three thouſand pounds weight in the courſe of the day, without appropriating any extraordinary edifice or workſhop to this purpoſe *."

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* *Nicholſ. De Charmes.*

315. But by far the beſt method of bleaching paper is by applying the gas to it while in the ſtate of paſte; the method of doing which, with the ſteps which led to it, are thus related in a Memoir of C. Loyſel, in the *Ann. de Chimie* as tranſlated by Mr Nicholſon in his valuable Journal, from which we have extracted it.

316. "The proceſs of bleaching the paſte of the paper maker, even when produced from the moſt common rags, will communicate to it the quality of the beſt ſort. By theſe means our paper manufactories may ſupply our wants in fine white paper, and even obtain the preference in foreign markets. The reſult of this operation would be, that a greater number of workmen would find employment, and the advantages of this increaſe of induſtry would be of ſtill greater national value, than even the foreign export which might be expected.

"The ſucceſs of bleaching the paſte of paper by the method of Citizen Berthollet is no longer problematical. The application which has been made to the paper uſed in making aſſignats, has placed this queſtion beyond all doubt as to its ſolution.

317. "It was at the commencement of the year 2, that the committee of aſſignats and monies of the national convention, of which I was a member, reſolved to employ this method, together with that of ſtereotypage which had been adopted, to oppoſe new obſtacles to the practice of forgery.

"We particularly conſulted Citizens Berthollet, Fourcroy, and Guyton on this enterpriſe. Their approbation of the project, and the information they afforded us, ſoon gave us the power of realiſing it. We were alſo aſſiſted with the knowledge of Citizens Welter, Athenas, Alban, Carny, Marchais and Ribaucour, who with great zeal communicated their proceſſes, and permitted us to inſpect their ſeveral manufactories.

318. "Our firſt proceſſes were executed preciſely according to the method of Citizen Berthollet. The rag was ſubjected in ſucceſſion to different lees, to baths of the bleaching liquor, and ſulphuric acid pointed out in his memoir. Berthollet had ſhewn, and we were alſo convinced by our own experience, that the gas is leſs confined in the ſimple fluid, prepared without addition of fixed alkali, than it is in that which contains potaſs or ſoda; and that it is conſequently more diſpoſed to ſeparate and enter into new combinations. We therefore at firſt made uſe of this ſimple liquor; but the workmen ſoon exhibited a ſtrong repugnance to its uſe on account of the fumes it emits, which are extremely inconvenient, even when chalk is diffuſed in the liquor. This inconvenience forced us to abandon it, though with regret. This ſacrifice was ſo much the more conſiderable, as it occaſioned a loſs of time, and conſiderable increaſe of expence. We decided that

we

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we would receive the gas in a ſolution of potaſs; but as the doſes in which this alkali may be uſed have limits of great extent, we endeavoured to keep as near as poſſible to that preparation which is ſufficient to prevent the ſpontaneous diſengagement of the gas, and by that means cauſe the liquor to loſe the odour we were deſirous of avoiding. This doſe was 5 kilograms of potaſs to 100 litres of water, (11 pounds avoirdupoiſe, to 21½ ale gallons.)

319. "The rags bleached in this manner became of the moſt brilliant white. Nevertheleſs, a part of this perfection diſappeared, when the rag was converted into paſte, and that paſte into paper. It was eaſy to diſcover the cauſe; namely, that the interior parts of the thread in the rag were leſs expoſed to the action of the liquor than thoſe at the ſurface. This motive determined us to abandon the bleaching of the rags, and to operate upon the paſte itſelf.

320. "We were here oppoſed by new obſtacles. When the rag is converted into a paſte proper to be worked, its coherence is ſuch that it ſettles, and no longer permits the leys and baths of the bleaching liquor to penetrate through all its parts, in conſequence of which property the paper was found to have veins and different ſhades of colour. We remedied this inconvenience, by taking the matter in a mean ſtate between the rag and the paſte proper to be converted into ſheets of paper. We ſucceeded in this reſpect by deſtroying the texture of the rag under the firſt cylinder ſo as to ſeparate its fibres, an operation which uſually laſted two hours for a pile of 50 kilograms. Thus it was, that by ſucceſſively avoiding the extremes of too much and too little mechanical connexion, we advanced towards our object.

321. "The apparatus which Citizen Welter imagined, and of which Citizen Berthollet has given a deſcription in the firſt volume of the Journal of Arts and Manufactures, is applicable to all the methods which can be employed to procure the different kinds of bleaching liquor, whether the water of the receiver contains fixed alkali or not; whether the muriatic acid be uſed on the oxyd of manganeſe, or the gas be obtained by ſulphuric acid, upon the mixture of oxyd of manganeſe and muriat of ſoda. This apparatus is particularly preferable to all others in the caſe where the water of the receiver contains no alkali, becauſe the abſorption of the gas is favoured by its being brought into contact with the water at a great number of ſurfaces. But as we had determined to uſe a ſolution of potaſs, we were able to make ſome modifications of this apparatus.

322. "One thouſand litres of water are placed in the receiver, holding in ſolution fifty kilograms of white purified and calcined potaſs.

"When the diſengagement of gas is effected by the muriatic acid, the materials are uſed in the following doſes:

Oxyd of manganeſe	24 kilograms
Muriatic acid at 20 degrees of denſity according to the areometer of Baumé,	68
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which makes for each of the eight diſtilling veſſels 11½ kilograms of materials.

323. "The operation is begun by charging the receiver with 1000 litres of alkaline water, after which the aperture 8 is cloſed with its ſtopper well luted. Each matraſs is then placed in its ſand-bed; and pulverized manganeſe is introduced. The muriatic acid is poured upon the manganeſe, and the ſtoppers into which the tubes of communication paſs, are duly placed. The juncture is luted with paper ſoaked in ſtarch. And the lute is left to dry from ſix to twelve hours, after which the fire is lighted in the furnaces.

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324. "The proceſs of diſtillation laſts from ten to twelve hours. When it is finiſhed the tubes are unluted, the fire extinguiſhed, and the matraſſes ſuffered to cool in their ſand beds, till the temperature of theſe beds has deſcended to 60 or 70 degrees, (centigrade) at which period, water of the ſame heat is poured into the matraſſes. The water dilutes the reſidue of the diſtillation, which mixture is to be poured out, and the veſſels ſuffered to cool in baſkets containing ſtraw. If the precaution of introducing hot water in this manner upon the reſidue were not taken, it would become ſo ſolid when the operation is performed with ſulphuric acid, in the manner we are about to deſcribe, that it could not be extracted without much trouble and danger of breaking the veſſels.

325. "If the diſengagement of the gas be made by ſulphuric acid, the following doſes are uſed:

Oxyd of manganeſe	25 kilograms
Muriat of ſoda	70
Sulphuric acid at 50 degrees of denſity	25
Total	120

"The acid is to be diluted with an equal bulk of water, or 16 litres, which will reduce its denſity to 31 degrees.

"The eighth part of this for each matraſs amounts to 14⅜ kilograms.

326. "The oxyd of manganeſe and muriat of ſoda being pulverized are mixed together. The matraſs is to be charged and the operation conducted as before deſcribed. This method is the moſt economical, becauſe the ſulphuric acid is cheaper than the muriatic, and alſo becauſe it is practicable to obtain from the reſidue of the diſtillation, the ſoda of the muriat which is converted into ſulphat of ſoda; that ſalt being decompoſable by well known proceſſes.

"In order to meaſure the force of theſe liquors, or their bleaching power, we made uſe of the ſolution of indigo preſcribed by Citizen Deſcroizilles.

"One part by meaſure of the bleaching liquid prepared as before mentioned, will uſually deſtroy the blue colour of nine parts of proof ſolution of indigo; it was of the ſame ſtrength as that of Javel, prepared by Citizen Alban.

Choice and Preparation of the Rags.

327. "The ſtrength or tenacity of paper depends upon the ſtaple or fibre of the material from which it is made. Rags of new cloth and cordage compoſe a paper more tough than old rags, and the firſt of theſe materials preſents a great variety on account of the quality of the hemp or flax of which they are formed.

Rags

Vegetable Subſtances.

Rags of fine new cloth, whether raw or bleached by the oxygenated muriatic acid, ſtand in the firſt rank, after which cordage and old rags may be claſſed.

328. " Paper intended for bills of exchange, or other commercial and legal inſtruments ought to be tough, in order that it may not be eaſily torn when thin, for this paper the materials of the firſt claſs muſt be entirely, or in large proportion employed. The price which the conſumers are diſpoſed to pay for this article, is ſufficient to indemnify the manufacturer for his care and induſtry, as this kind of paper is ſold in France for 5 or 6 franks the kilogram.

329. " The other papers alſo require to be more or leſs tough, according to their thinneſs, and the uſe to which they are applied, but a clear white colour is ſought in paper of every deſcription. The firſt operation to which the rags are ſubjected is ſorting, in order that each branch of the manufacture may have its appropriate material, after which they are cut with ſhears into pieces of about one decimeter, or three or four inches ſquare.

330. " I will ſuppoſe that the object of the manufacturer is to obtain paper of a beautiful white. If it is intended to be thin, ſo that, for example, a ream of the ſize denominated *raiſin* ſhould weigh only four or five kilograms, that is to ſay, about one-third of the weight of common paper of the ſame form. The manufacturer makes choice either of new rags already of a fine white, or of unbleached rags.

" In the caſe of the white rags, it is ſufficient to paſs them under the firſt cylinder, then to give them a bath of the bleaching liquor, and afterwards a bath of ſulphuric acid, as we ſhall proceed to direct, after which they are paſſed under the finiſhing cylinder for ſeven or eight hours, and, laſtly, conveyed to the working trough to be made into ſheets of paper.

331. " Rags, which have never been bleached, may be treated by either of the following proceſſes, that is to ſay, the firſt, which preſerves the utmoſt degree of toughneſs to the paper, but is likewiſe the moſt expenſive, conſiſts in decompoſing the rag, and afterwards applying the method of Citizen Berthollet for bleaching piece goods; namely, ſubjecting it to three or four lixiviations, and afterwards alternately to lixiviations, baths of the bleaching liquor, and baths of ſulphuric acid. The weight of the raw unbleached material is diminiſhed from 50 to 45 per cent. in theſe operations.

332. " This method was the firſt which we uſed for the aſſignat paper; but we ſoon perceived that we might omit moſt of the lixiviations and baths of the bleaching fluid, and ſtill preſerve as much toughneſs as the paper required. Nothing further was neceſſary for this purpoſe than to ſuffer the rag to undergo a degree of fermentation more or leſs advanced, by leaving it to rot. In this operation the colouring matter undergoes a ſlow combuſtion, and paſſes to a kind of ſaponaceous ſtate, and is carried off by the water, by waſhing the rags in the veſſel of the firſt cylinder.

" One ſingle lixiviation, two baths of the bleaching liquor, and one of ſulphuric acid, are then ſufficient to bleach completely the raw rags or cordage. This is the ſecond method. We were not, at that time, acquainted with the economical proceſs of Citizen Chaptal in the operations of lixiviation. This will, no doubt, be uſed; but the effect of rotting, carefully conducted, will always be found very advantageous.

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333. " Laſtly, If the rags be neither perfectly white nor raw and unbleached, but in a medium ſtate, they are left to rot for a ſhorter time, for example, 12 or 14 days, and are taken up when the heat of the fermentation raiſes the thermometer to 30° or 35°, after which the proceſs is to be conducted as before mentioned.

Compoſition of a bath of the bleaching liquor, for a pile of decompoſed rags, weighing 50 kilograms.

334. " For each heap of rags a certain number, for example, eight or nine, wooden tubs are diſpoſed in a line, capable of containing in the whole 600 litres of water: 450 litres of pure water is poured in, and 50 litres of bleaching liquor are added in equal portions to each of the veſſels, after which the 50 kilograms of decompoſed rags are diſpoſed in equal portions in each tub. The ſtuff is left for about 12 hours in this bath, agitating it from time to time, after which it is to be completely waſhed in clean water, and put into a bath of ſulphuric acid, compoſed of water 200 litres, and acid at 50 degrees 3 kilograms, which bath will then have the ſtrength of about four degrees of the areometer of Baumé.

" The immerſion in the bath muſt continue for three quarters of an hour or an hour, after which the materials muſt be well waſhed in clear water, and carried to the mill to be manufactured.

335. " If the action of the baths of bleaching liquor be not exhauſted by the immerſion of the decompoſed rags (which may be aſcertained by the ſolution of indigo), it may be applied to other materials of the ſame kind.

336. " Such was the ſtate in which we left this new art in the year 3. Since that time Citizen Welter, to whom chemiſtry and the arts are indebted for a number of ingenious proceſſes, has ſimplified that of preparing the bleaching liquor. He has found, for example, that inſtead of the three veſſels of the receiver, it is ſufficient to employ two even for the ſimple liquor that contains no fixed alkali.

" It was before ſeen that we were obliged to employ an alkaline ſolution in the receiver, to prevent that odour which the ſimple liquor emits when paper ſtuff is agitated in the baths. The uſe of alkali anſwered our purpoſe very well in this reſpect; but this expenditure, beſides weakening the bleaching liquor, nearly double our expence. Though this difference in the price was of little conſequence with regard to the object we then had in view, it is not ſo with regard to the common operation upon paper intended for ſale. Every means of economy muſt then be uſed. Now Citizen Welter found that it is eaſy to obviate the inconvenience of the ſimple liquor in the operation. His method conſiſts in no longer agitating the goods or material in an open bath, but to cloſe it exactly by means of a cover; and he agitates it by means of croſs pieces attached to a handle turned on the outſide.

337. " A rough eſtimate of the price of the ſimple bleaching liquor prepared by the ſulphuric acid, this being the moſt economical proceſs.

" The receiver is ſuppoſed to contain 1000 litres of water.

25 kilograms

	Fr.	cent.
25 kilograms of oxyd of manganeſe coſt at moſt	15	0
70 kilograms of muriat of ſoda	7	0
25 kilograms of ſulphuric acid, at 50°	37	50
Three days work, principal men	9	0
Three days do. aſſiſtant or labourer	4	50
Fuel, about	3	0
Wear and tear	6	0
Our apparatus coſt 622 franks, and the carriage and fixing increaſed our expence to 1000 franks, the intereſt of which, at 10 per cent. is 100 franks; and if the work be repeated ſo many times in the year, the intereſt per operation will be	1	0
Fr.	83	

" Hence the litre of bleaching liquor will coſt nearly 9 cents in round numbers (R).

338. " Eſtimate of the increaſe of expence occaſioned in the operation upon a pile of 50 kilograms of the paſte of paper, ſuppoſing one bath of the bleaching liquor and one of ſulphuric acid, which is moſt commonly the caſe.

Ninety litres of the bleaching liquor at nine cents		9c.
	8 fr.	10
Three kilograms of ſulphuric acid, at 1fr. 50c.	4	50
Workmanſhip	0	50
Total,	13	10

" Which gives for each kilogram of paper an expence of 0,262 franks, or about 27 cents. Now the common paper in the market uſually ſells for about 1 fr. 30c. or 1 fr. 40c. the kilogram, and with the ſimple augmentation of 27 cents for the operations of bleaching, it obtains the preference beyond that which is ſold for three, four, or even five franks, which can only be obtained in a limited quantity, on account of the ſelection of rags. The foregoing methods muſt therefore produce a great diminution in the price of fine paper. They are more particularly advantageous when applied to the manufacture of thin paper, becauſe the expences of bleaching are always proportioned to the weight of the material, and conſequently are leaſt upon thin paper."

Of Whitening and Cleaning Prints, Maps, Books and other Articles of Paper.

339. The oxygenated muriatic acid was firſt applied to this purpoſe by Citizen Chaptal, and the method has been employed with the greateſt ſucceſs by Citizens Vialard and Heudier.

The acid in the ſtate of gas might be uſed for this purpoſe, but it is ſafer and equally efficacious to employ it in the liquid form.

340. ' Simple immerſion in oxygenated muriatic acid, letting the article remain in it a longer or ſhorter ſpace of time, according to the ſtrength of the liquid, will be ſufficient to whiten an engraving. If it be required to whiten the paper of a bound book, as it is neceſſary that all the leaves ſhould be moiſtened by the acid, care muſt be taken to open the book well, and to make the boards reſt on the edge of the veſſel, in ſuch a manner that the paper alone be dipped in the liquid: the leaves muſt be ſeparated from each other, in order that they be equally moiſtened on both ſides. Vegetable Subſtances.

' The liquor aſſumes a yellow tint, and the paper becomes white in the ſame proportion. At the end of two or three hours the book may be taken from the acid liquor and plunged into pure water, with the ſame care and precaution as recommended in regard to the acid liquor, that the water may exactly touch the two ſurfaces of each leaf. The water muſt be renewed every hour to extract the acid remaining in the paper, and to diſſipate the diſagreeable ſmell.

341. ' By following this proceſs, there is ſome danger that the pages will not be all equally whitened, either becauſe the leaves have not been ſufficiently ſeparated, or becauſe the liquid has had more action on the front margins than on thoſe near the binding. On this account the practice followed by book-binders, when they wiſh to whiten printed paper, is to be preferred. They deſtroy the binding entirely, that they may give to each leaf an equal and perfect immerſion; and this is the ſecond proceſs recommended by M. Chaptal.

" They begin (ſays he) by unſewing the book and ſeparating it into leaves, which they place in caſes formed in a leaden tub, with very thin ſlips of wood or glaſs, ſo that the leaves when laid flat are ſeparated from each other by intervals ſcarcely ſenſible. The acid is then poured in, making it fall on the ſides of the tub, in order that the leaves may not be deranged by its motion. When the workman judges, by the whiteneſs of the paper, that it has been ſufficiently acted upon by the acid, it is drawn off by a cock at the bottom of the tub, and its place is ſupplied by clear, freſh water, which weakens and carries off the remains of the acid, as well as its ſtrong ſmell. The leaves are then to be dried, and, after being preſſed, may be again bound up.

" The leaves may be placed alſo vertically in the tub; and this poſition ſeems to poſſeſs ſome advantage, as they will then be leſs liable to be torn. With this view I conſtructed a wooden frame, which I adjuſted to the proper height, according to the ſize of the leaves which I wiſhed to whiten. This frame ſupported very thin ſlips of wood, leaving only the ſpace of half a line between them. I placed two leaves in each of theſe intervals, and kept them fixed in their place by two ſmall wooden wedges, which I puſhed in between the ſlips. When the paper was whitened I lifted up the frame with the leaves, and plunged them into cold water to remove the remains of the acid, as well as the ſmell. This proceſs I prefer to the other.

342.

(R) As the price of all theſe ſeveral items in France muſt materially differ from the ſame in England, it was thought unneceſſary to reduce the numbers.

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342. "By this operation books are not only cleaned, but the paper acquires a degree of whiteneſs ſuperior to what it poſſeſſed when firſt made. The uſe of this acid is attended alſo with the valuable advantage of deſtroying ink-ſpots. This liquor has no action upon ſpots of oil, or animal greaſe; but it has been long known that a weak ſolution of potaſs will effectually remove ſtains of that kind.

343. "When I had to repair prints ſo torn that they exhibited only ſcraps paſted upon other paper, I was afraid of loſing theſe fragments in the liquid, becauſe the paſte became diſſolved. In ſuch caſes I encloſed the prints in a cylindric glaſs veſſel, which I inverted on the water in which I had put the mixture proper for extricating the oxygenated muriatic acid gas. This vapour, by filling the whole inſide of the jar, acted upon the print; extracted the greaſe as well as ink ſpots; and the fragments remained paſted to the paper."

344. Vialard and Heudier have by this proceſs reſtored ſeveral of the moſt valuable books of the French national library, and we believe they were the firſt who carried Chaptal's proceſs into actual execution.

It is neceſſary that we may fully ſucceed in this proceſs to be very preciſe in the quantity of the acid employed, and to uſe conſiderable addreſs in the management of it, otherwiſe we ſhall injure the paper, and render the books incapable of being bound again. But with caution and a little experience, the method is perfectly ſafe and eaſy.

345. As it is convenient to be able to prepare the acid employed for this purpoſe in the moſt ſimple and economical way, we may recommend the following.

"To oxygenate the muriatic acid, nothing is neceſſary but to dilute it, and mix it in a very ſtrong glaſs veſſel with manganeſe, in ſuch a manner that the mixture may not occupy the whole content of the glaſs. Air bubbles are formed on the ſurface of the liquor; the empty ſpace becomes filled with a greeniſh vapour; and, at the end of ſome hours, the acid may be farther diluted with water and then uſed. It has an acid taſte, becauſe the whole is not ſaturated with oxygen; but it poſſeſſes all the virtues of the oxygenated muriatic acid. This proceſs may be followed when there is not time to ſet up an apparatus for diſtilling, in order to procure the oxygenated acid."

346. It has been ſaid that the acid is not capable of removing ſpots of greaſe from books and prints. A method of doing this was lately publiſhed by M. Deſchamps junior, and is as follows:

"After having gently warmed the paper ſtained with greaſe, wax, oil, or any fat body whatever, take out as much as poſſible of it, by means of blotting-paper. Then dip a ſmall bruſh in the eſſential oil of well rectified ſpirit of turpentine, heated almoſt to ebullition (for when cold it acts only very weakly), and draw it gently over both ſides of the paper, which muſt be carefully kept warm. This operation muſt be repeated as many times as the quantity of the fat body imbibed by the paper, or the thickneſs of the paper, may render neceſſary. When the greaſy ſubſtance is entirely removed, recourſe may be had to the following method to reſtore the paper to its former whiteneſs, which is not completely reſtored by the firſt proceſs. Dip another bruſh in highly rectified ſpirit of wine, and draw it, in like manner, over the place which was ſtained, and particularly round the edges, to remove the border, that would ſtill preſent a ſtain. By employing theſe means, with proper caution, the ſpot will totally diſappear; the paper will reſume its original whiteneſs; and if the proceſs has been employed on a part written on with common ink, or printed with printers ink, it will experience no alteration."

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Of Bleaching Yellow Wax.

347. Before the diſcovery of oxymuriatic acid and its application to bleaching, this was effected by expoſing the yellow wax, formed into thin cakes to the free action of the air, ſun, and dews. The acid, however, as being far more expeditious is to be preferred.

In the bleaching of wax, it is proper to employ the ſimple acid, and its action would be the moſt effectual if uſed in the gaſeous form. For this purpoſe, a pneumatic tub with a cover ſecured in the manner recommended by Rupp, is the moſt proper. This ſhould be filled with water, and the wax ſhred very fine, muſt be introduced, and the gas made to paſs through the water, while the agitator is kept in conſtant motion. In the courſe of an hour or two the wax will be bleached, may be ſeparated from the water, melted and formed into cakes.

On applying the Reſiduums to profit.

348. Before we conclude our account of the various bleaching proceſſes in which the oxygenated muriatic acid is concerned, it will be proper to enquire how far the materials employed in procuring this acid may be turned to account after the diſtillation.

The ſubſtances which remain in the diſtilling articles are a portion of undecompoſed oxyd of manganeſe, ſome ſulphat of manganeſe, and a large quantity of ſulphat of ſoda (Glauber's ſalt).

The whole mixture may be employed with advantage as a glazing to coarſe earthen ware. This glazing has a dark colour, ſomething like that of bronze, which it receives from the manganeſe; it is attended with this advantage, that it is perfectly ſafe, and is therefore much ſuperior to any glazing, where lead enters as a part of the compoſition.

349. But the object of moſt importance is to decompoſe the ſulphat of ſoda in order to obtain the alkali. There are ſeveral methods of effecting this, but perhaps the two following are the beſt.

350. The firſt is that contrived by M. M. Malherbe and Athenas. The firſt object in this proceſs, is to reduce the ſulphat to the ſtate of an alkaline ſulphuret (liver of ſulphur).

"Malherbe and Athenas have ſucceeded in this by employing iron as the intermediate ſubſtance: they mixed one part of charcoal duſt with nine parts of the ſulphat of ſoda, and expoſed the mixture to the heat of a reverberating furnace: when the ſulphuret entered into combuſtion, they added from three to five parts of old iron rendered as ſmall as poſſible; and the whole being fuſed together, they obtained a black paſte, compoſed of iron, ſoda, ſulphat of iron, &c. This mixture was lixiviated, and filtered through a baſket filled

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with lime: it was then evaporated to dryneſs, and the reſiduum was calcined in a reverberating furnace. When ſoda of a ſuperior quality is required, the waſhing and calcination muſt be repeated.

"Dize and Le Blanc decompoſed the ſulphat of ſoda, by means of the carbonate of lime, in order to neutralize the alkali, by ſaturating it, at a very high temperature, with carbonic acid. Their proceſs conſiſts in taking two parts of ſulphat of ſoda, dried to deprive it of its water of cryſtallization, two parts of well ground chalk (carbonate of lime), and one part of charcoal powder, mixing them well in a muffled mortar, and then bringing the mixture to a white heat in a reverberating furnace: when the matter is fuſed it is ſtirred till the ſulphur is conſumed, and the ebullition and the jet of the flame produced by the hydrogen gas have ceaſed to appear. It is then taken from the furnace, and it may be lixiviated to obtain the ſoda very pure. In whatever manner the ſulphat is decompoſed, this object merits the greateſt attention at bleachfields on account of the conſiderable degree of economy which reſults from the different manipulations. The ley of oxygenated muriatic acid will be obtained at little or no expence by bleachers, when they ſeriouſly ſet about extracting the ſoda from the ſulphat formed during the diſtillation."

Bleaching by Sulphuric Acid.

351. From the effects produced by ſulphuric acid in the proceſſes of bleaching, in which it has been ſeen to act a material part, a propoſal was lately made to employ it ſolely for this purpoſe, but we believe the project has never been carried into execution. It is certain, that a very weak bath containing one part of acid to five hundred of water * may be employed with the greateſt ſafety, and when cloth remains immerſed in it for a conſiderable time, it acquires a high degree of whiteneſs.

* *Philoſoph. Magazine, p.* 273.

Of Bleaching by Steam.

352. The various proceſſes which we have deſcribed form nearly a complete abridgement of the hiſtory of bleaching; we have endeavoured to follow as cloſely as poſſible the progreſs of human genius, and to ſhow how the rapid advances of modern chemiſtry have contributed to the improvement of this intereſting art.

353. We are now to deſcribe a new method for which we are indebted to C. Chaptal. This ingenious and learned man, publiſhed ſome time ſince a memoir on the method of bleaching with ſteam, a proceſs which we received from the Levant ſoon after the introduction of the art of dying Adrianople red, and which has been ever ſince employed in the interior of France under the name of *Blanchiment à la fumée*. At the time when the diſintereſted Chaptal publiſhed an account of this method, it was a ſecret, the knowledge of which was confined to a few manufacturers. They only employed it in bleaching cotton in the ſtates of wool and thread, in imitation of the eaſtern nations; but Chaptal, with his uſual ingenuity, perceived the poſſibility of extending the proceſs to the bleaching of thread of flax and hemp, and he invited the aſſiſtance of artiſts for the purpoſe of effecting this deſirable end.

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354. This appeal of Chaptal, induced many manufacturers as well in France as in other countries to make trial of this new method; and it was tried nearly at the ſame time at Paris and in Ireland. The apparatus conſtructed by C. Bawens, proprietor of the manufactory of cotton thread and ſtuffs at Bons Hommes near Paſſy, gave ſurpriſing reſults. He could bleach from two to three thouſand ells of cotton in a day, with ſuch facility, and at ſo moderate an expence, as proved the new method to be incomparably better than any before employed. The firſt trial was made on 1500 ells of cloth intended for printing; after the operation, it exhibited no variegation of ſurface, no ſhades, but one uniform complete whiteneſs. His apparatus reſembles perfectly what has been deſcribed by C. Chaptal, and anſwers extremely well for bleaching cotton, both in the wool and when ſpun into thread. There have been ſeveral improvements lately made on it, which render it much more advantageous and of more extenſive utility; but it will be proper before examining theſe, to deſcribe the apparatus recommended by Chaptal, which we ſhall do in his own words.

355. "At the diſtance of about ſixteen inches above the grate of a common furnace, ſupplied with pit-coal, is fixed a copper boiler of a round form, eighteen inches deep and four feet broad. The edges of this copper turned back, are made to reſt on the ſide walls of the brick-work of the furnace; they are about ſeven inches broad. The reſt of the furnace is built of hewn ſtone, and forms an oval boiler ſix feet in height, and five feet in breadth at the centre: the upper part of this boiler has a round hole eighteen inches in diameter, which may be ſhut by a moveable piece of ſtrong ſtone, or a copper lid adapted to it. Upon the edge of the copper boiler which forms the bottom of this kind of Papin's digeſter, is placed a grating made of wooden bars, ſo cloſe together that the cotton placed on them cannot fall through, and ſufficiently ſtrong to bear the weight of about 1600 pounds."

356. In the apparatus of C. Bawens, the mode of heating employed in Count Rumford's furnaces was uſed to reduce the quantity of fuel conſumed; and thus render the proceſs more economical. The heat of the chimney alſo ſerved to heat the bath of weak ſulphuric acid.

In other countries an apparatus has been employed, which poſſeſſes the advantage of winding up the ſtuffs within the copper, which reſembles that of a ſteam engine with its tubes, ſafety valves, and collars of leather; but it has this inconvenience that the ſtuffs muſt be introduced at the top (s).

357. C. O'Reilly, to whom Chaptal had communicated

(s) The following paſſage tranſlated by Nicolſon from the *Journal de Phyſique*, is worthy of notice.

"A new method of bleaching has juſt been tried at Balynah, and has completely ſucceeded. The principle of the proceſs appears to have been publiſhed by a French chemiſt, Chaptal, who is much reſpected by our manufacturers. I ſpeak of the art of diſcolouring piece goods in a digeſter, by cauſtic alkaline ley. Though our firſt

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ed his ideas, soon conceived methods of improving the apparatus, and of applying it to various purposes suited to the different articles.

The first apparatus which he proposed to be executed at Jouy, represented an arched chamber of hewn stone, six feet eight inches long, by three feet ten inches broad; and three feet and a half high above the level of the wooden grate. (See Plate XCII. fig. 8). At one of the extremities is a door three feet long and two high, which is closed by a plate of cast iron, in which a hole is made for the introduction of a conical valve which is kept in its situation by a screw and a spring made as powerful as possible. The object of this valve was to guard against an explosion which might take place from the sudden expansion of the steam, which there is some cause to dread. The door was moveable, and fastened by ten bars and as many screws, which press against the rabbit, (which is covered with tow or wet leather) so as to prevent any of the steam from escaping this way. The door should be made with two iron handles that it may be removed with the more ease.

The copper which forms the bottom of this apparatus, and in which the caustic alkaline solution is boiled, is 18 inches deep, and its other dimensions are less by four inches than those of the chamber. This gives room for the edges of the copper, and for a wooden grate on which the men may walk and conduct the operations. In the middle of the chamber are fixed two reels, on which from eighteen to twenty pieces of cloth are rolled. The axes of these reels pass through collars of leather, which prevent the escape of the steam; they have handles on the outside to roll and unroll the pieces, and there is a regulator communicating with the inside of the copper to point out the height of the liquor, and shew how far it is exhausted. It is heated after Count Rumford's plan.

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358. Another apparatus was constructed at Troyes for the purpose of bleaching hosiery. As these goods cannot be rolled up; and as the action of the vapour might be lessened were they heaped together, O'Reilly contrived frames of wood covered with cloth and placed at the distance of four inches, one above another. Upon these frames the goods were spread in such a manner that the vapour rising from the copper might penetrate to every part, destroy the colouring matter and thus complete the bleaching.

359. From some farther observations he was led to propose a roller placed in such a way that the cloth rolled on it might on occasion be drawn through the liquor in the copper to moisten it now and then, and thus increase the action of the liquor *.

* O'Reilly Essai.

360. After this account of O'Reilly's apparatus, of which a more particular description will be given presently, we come to the actual method of bleaching by steam. The following are the directions given by Chaptal.

361. "The cotton, disposed in handfuls, must first be impregnated with a slight solution of soda rendered caustic by lime. This operation is performed in a wooden or stone trough, in which the cotton is trod down by means of the feet covered with wooden shoes. When the alkaline liquor has uniformly penetrated the cotton, it is put into the boiler, and piled up on the wooden grate before mentioned; the redundant liquor runs through the bars into the copper boiler, and forms

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first attempts did not perfectly succeed, we were not discouraged. The linen was exposed to the action of vapour in the apparatus, but it was not equally affected, as it appeared to be blotched in several places; we were, therefore, obliged to construct an apparatus, in order to unroll and separate the goods, and to expose the greatest surface possible to the action of the vapour. Suppose the boiler of a steam engine, in the form of an elongated ellipsis, provided with a safety valve, two tubes with cocks, to shew the consumption of the liquor, and a mercurial gage, to ascertain the strength of the steam. This boiler is bedded in masonry, or brick work, that it may resist the excessive pressure which necessarily takes place. In the interior part of the apparatus are six reels, three at each end, alternating with each other, in order that the action of the steam may be more equable upon the goods. These reels are slowly and uniformly carried round by simple tooth and pinion work of wood, and the first motion is given to an axis which passes out of the boiler through a stuffing box, which prevents the escape of vapour. At the top is an opening of about sixteen inches diameter, with a rim or flanch, on which the cover is fitted, and firmly secured by screws. Between the two metallic faces are placed strips of soaked leather, to prevent the vapour from escaping. When the cover is taken off, the workmen can enter the boiler, to dispose the goods upon the rollers, each of which contains about fifteen or twenty pieces, making in the whole about forty-five or sixty. The raw material, namely, cunnamara kelp, is an article of inconsiderable expence, or else the soda extracted from sea salt, in which there remains indeed a small portion indecomposed, but which we procure at a very reasonable price. It is rendered caustic by the addition of some good lime, which is made from our lime-stone of Parre. With these a ley is formed, which is equal to fourteen degrees of our hydrometer. In this lixivium the piece goods are boiled, and then conveyed to the digester, on the bottom of which the ley stands to about five inches in depth. The workman stands upon a perforated stage, which prevents him from stepping into the ley while he is arranging the pieces: after which, having placed them on the rollers, the apparatus is closed, the fire lighted, and the operation begins. As soon as ebullition takes place, the handle on the outside is incessantly turned, and as soon as the roller at one end is filled, the handle is shifted to the other roller, and the turning performed in the contrary direction. In this manner the operation is continued till the whole of the contents is bleached. From this description you may easily understand how this operation is performed; I shall, however, take the first opportunity of sending you a plan and description of the apparatus, if you wish for further information. You are at liberty to make whatever use you please of this account: the expence of bleaching is not more than one farthing per yard, including coals, workmen's wages, &c. as well as interest for the capital employed in the apparatus."

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a ſtratum of liquid, which permits the maſs to be heated without any danger of burning either the cotton or the metal. To form the alkaline ley, Alicant ſoda equal to a tenth of the weight of the cotton ſubjected to the operation is employed, and in a boiler ſuch as that the dimenſions of which I have given, about 800 pounds of cotton may be put at one time. The ley is generally of two degrees by the areometer. As ſoon as the cotton is introduced into it, and arranged in the boiler, the upper aperture is ſhut with its uſual covering, ſcarcely any opening being left, that the ſteam developed by the fire may aſſume a much more conſiderable degree of heat, and react with force on the cotton. When every thing is arranged, the fire in the furnace is kindled, and the ley is maintained in a ſtate of ſlight ebullition during 36 hours. The apparatus is then ſuffered to cool, and the cotton being taken out is carefully waſhed; after which it is expoſed on the graſs for two or three days, extending it on poles in the daytime, and ſpreading it out on the graſs during the night. The cotton will then have acquired a high degree of whiteneſs; and if any portions of it be ſtill found coloured, they muſt be put into the boiler for a ſecond operation, or be left on the graſs ſome days longer. Theſe ſhades in bleached cotton ariſe, in particular, from all the parts of the cotton in the firſt operation not having been completely and uniformly impregnated with the ley. They may be owing alſo to the cotton, when arranged in the boiler, having been too much accumulated on certain points. When it is judged that the ley has been exhauſted by ebullition, the boiler is opened, and the dried cotton is moiſtened with a new quantity of the ſolution of ſoda: without this precaution it would be in danger of being burnt. It may be eaſily conceived, by an eſtimate of the matters and time employed in this operation, with how much ſaving of expence it is attended: cotton is bleached by this method in all the manufactories of the ſouth of France, where it is uſed, at the low rate of two ſols per pound."

362. Cloth may be bleached in the ſame way, but requires firſt to be freed from the weavers dreſſing, &c. as formerly directed.

363. While the goods are ſteeping ſo as to be perfectly impregnated with the alkaline ley, the copper is to be filled to the height of a foot with ley of the ſame ſtrength. This may be done by means of a curved leaden funnel, but as the door is ſufficiently large, the ley may be thrown in with buckets.

A workman then enters the chamber, and fixes one end of a piece of cloth by means of packthread to one of the arms of the fartheſt reel A (fig. 9. Plate XCII.) while another workman without turns the handle till the whole piece is wound on; the end of another piece is then faſtened to the firſt, and ſo on till 18 or 20 pieces are wound round the firſt reel. The remaining extremity of the laſt piece is then paſſed over the roller B, near the arch of the chamber; from thence it is carried below the two rollers C, D, in the copper EE; is again carried to the arch, and made to paſs over the roller F, and is laſtly faſtened to an arm of the other reel G. The workman then aſcertains the height of the liquor in the copper by the regulator, and then ſhuts the cock, and cloſes up the door by rags and the proper ſcrews ſo as to prevent all eſcape of ſteam. The fire is then kindled, and the liquor made to boil. The workman then begins to wind off the pieces commencing with the reel to which the laſt end was tacked, till this has received the whole charge; he then lowers the cranks of the lower rollers, ſo as to plunge the goods into the boiling ley, and immediately begins to reel off with diſpatch; again raiſes the rollers and reels the pieces back without paſſing through the ley.

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At the end of two hours, more or leſs according to the fineneſs of the pieces the alkali carried up by the heat will completely have penetrated the fibres of the cloth, which are ſwelled by the extraordinary heat of the ſteam.

The fire is now extinguiſhed, and as ſoon as all is ſufficient cool, the door is opened, and they prepare for immerſing the ſtuffs in the oxygenated muriatic acid, after they are firſt well rinſed in fair water.

364. For immerſion the tub deſcribed in 262 is employed, and the pieces are faſtened and reeled in the manner there deſcribed, till the liquor on examination is found pretty much exhauſted. The pieces are then taken out ſeparately, well rinſed in a ſtream of water, and expoſed on the graſs for three or four days. They are then paſſed through a bath of very weak ſulphuric acid, and will then have acquired a high degree of whiteneſs.

If linen or hempen cloth ſhould retain a ſlight yellow caſt, which will ſometimes happen, the ſteaming muſt be repeated; and they muſt be expoſed again for a day or two on the graſs.

365. Hoſiery and threads are bleached in the ſame way, but they are to be placed on frames at ſuch a diſtance from each other that they may be eaſily penetrated by the ſteam; but as theſe articles cannot, like the cloths, be made to paſs through the ley in the copper, the proceſs is to be ſtopped at the end of two hours, and then the upper frame is completely wet with ley, which oozes through, and thus moiſtens all the lower frames. The boiling is again commenced, and continued for four hours. For the immerſion, the apparatus of Rupp with the vertical reels is the beſt poſſible, and the goods are to be hung on the upper end of the reel. After immerſion, they are rinſed, expoſed on the graſs, and paſſed through the acid bath as other articles.

366. Chaptal has lately applied this method to a very important object, the ſcouring and whitening of foul linen.

"I have no doubt", ſays he, "but that linen garments may be bleached to advantage by the ſame proceſs; but as it was neceſſary to bring theſe notions to the teſt of experiment, I invited Citizen Bawens to allow me to make the experiment on a large ſcale with his apparatus. Accordingly, on the 27th Pluvioſe, in the year 9, I had 200 pair of ſheets from the hoſpital of the Hotel Dieu at Paris, choſen among thoſe that were moſt ſoiled, and taken to the manufactory of Citizen Bawens.

"Three experiments were made upon theſe ſheets:

"*Experiment* 1. One hundred and thirty ſheets were impregnated with a cauſtic alkaline ley, containing one hundredth part of ſoda. They were kept for ſix hours in the engine of ſteam; after which they were impregnated again, in order to be placed again ſix hours in the ſame machine.

"The ſame proceſs was repeated a third time; after which they were carefully rinſed, and no ſpot of

wine,

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wine, greaſe, blood, or animal ejection, was to be ſeen. One quarter of a pound of ſoap was uſed in rinſing theſe cloths.

"All the aſſiſtants were convinced that the ordinary proceſſes would not have given either ſo perfect a white, nor ſo agreeable a lixivial ſmell.

"The texture was in no reſpect altered.

"*Experiment* 2. The alkaline ley contained only ſix parts of ſoda but five pounds of ſoap were alſo added. The cloths were treated in the ſame manner, and the reſults appeared more advantageous. They were eaſily waſhed out.

"*Experiment* 3. To the bath of the ſecond experiment a ſufficient quantity of new ley was added. One hundred and forty ſheets were treated like the preceding, and the reſult was the ſame.

"It muſt be obſerved that the water of the Seine, in which theſe ſheets were rinſed, was at that time very yellow.

"This experiment appeared to me to offer ſeveral reſults worth the attention of the Inſtitute.

"In the firſt place the proceſs is economical. Two hundred pair of ſheets, which were bleaching by three ſucceſſive operations, demanded an expenditure, according to the account furniſhed by Citizen Bawens, which is in the proportion of 7 to 10, compared with that commonly made in the hoſpitals. This expence may be reduced to leſs than one-third, if a ſuitable place and apparatus were appropriated to this uſe.

"2. Two days at moſt are required to complete the operation. This economy of time is incalculably beneficial.

"3. The linen is neither changed nor torn, as it paſſes through the hands only once, and it is of no uſe to beat it.

"4. The extreme heat to which the linen is expoſed in the apparatus, cauſes its texture to be penetrated by the alkaline fluid to ſuch a degree, that the ſubſtances with which it is impregnated cannot be maſked from its actions; ſo that the putrid exhalations, and other ſubſtances attached to its texture, are neceſſarily deſtroyed or changed in their nature.

"This effect muſt be more particularly ſeen with regard to its value, by phyſicians, who are aware with what facility the ſeeds of various diſorders are perpetuated in hoſpitals, and how inſufficient the greater number of proceſſes uſed in waſhing linen have proved to deſtroy them."

367. It only remains that we ſhould give a brief explanation of the manner in which the ſteam, thus confined, acts in bleaching the goods.

It has appeared from the former parts of this article, that the bleaching of vegetable ſubſtances depends on the united influence of moiſture, light, and oxygen, and the mode in which theſe act, as alſo the action which alkalies exert on the colouring matter of cloth, has been explained. This action of the alkali is materially aſſiſted by the increaſed temperature of this vapour bath, by which the fibres of the cloth, &c. are ſwelled and opened; and thus the cauſtic alkali carried up with the ſteam, greedily ſeizes on and deſtroys the colouring matter; or ſhould ſome part of it eſcape, a ſecond ſteaming, after immerſion and expoſure to the air, never fails to diſcharge it. The increaſed temperature, independently of ſwelling and opening the texture of the cloth, ſeems alſo to render the alkali more active than it can be in the ordinary leys, in which the temperature never exceeds 162° Fahrenheit; for one degree of the areometer is always a ſufficient ſtrength, and very ſeldom more than half a degree is required.

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By paſſing the goods through a ſingle bath of oxygenated muriatic acid, or oxymuriat of lime, a combination takes place between the oxygen of the liquor and the carbon produced by the deſtruction of the extracto-reſinous matter by the alkali, and carbonic acid is formed, and this is diſſipated by the ſubſequent expoſure to the atmoſphere.

368. We cannot however agree with O'Reilly *, that the ſteam itſelf poſſeſſes no bleaching power, as we are convinced from the common proceſs of cooking green vegetables in ſteam, by which, as is well known, they loſe their green colour, that this is not the caſe.

* *Eſſai ſur le Blanch.* p. 147.

369. It has been ſuppoſed that the vapour ariſing from a boiling ſolution of cauſtic alkali would not itſelf be cauſtic, or produce the ſame effects as the ſolution; a ſuppoſition which was founded on the concentration of ſalts by evaporation; but we are by no means to infer, from what takes place in the open air, where the moiſture is conſtantly abſorbed as it riſes, that the ſame will happen in a cloſe apparatus, where the temperature is conſiderably increaſed; and, in fact, that alkali is capable of being raiſed by ſteam is fully proved by ſuſpending paper tinged blue over a boiling ſolution of potaſs, when the blue will ſoon be converted into a green.

We ſhall conclude this article with M. Chaptal's obſervations on the art of ſcouring different kinds of ſtuffs.

"This art ſuppoſes, 1ſt, a knowledge of the different ſubſtances capable of ſtaining any kind of cloth; 2d, of the ſubſtances to which recourſe muſt be had in order to make thoſe depoſited on the ſtuff to diſappear; 3d, a knowledge of the effects produced on colours by thoſe re-agents which it may be neceſſary to employ to deſtroy ſtains; 4th, a knowledge of the manner in which the cloth is affected by thoſe re-agents; 5th, of the art of reſtoring a colour changed or faded.—Of thoſe bodies which occaſion ſpots on different kinds of cloth, ſome are eaſily diſtinguiſhed by their appearance, ſuch as greaſy ſubſtances; but others have more complex effects, ſuch as acids, alkalies, perſpired matter, fruits, urine, &c. Acids redden black, fawn, violet and puce-colour, and every ſhade communicated with orchilla-weed, iron, aſtringents, and every blue except indigo and Pruſſian blue. They render the yellows paler, except that of arnatto, which they change into orange.

"Alkalies change to violet the reds produced by Brazil wood, logwood, and cochineal. They render the greens on woollen cloth yellowiſh, make yellow browniſh, and change the yellow produced by arnatto to aurora. Perſpired matter produces the ſame effects as alkalies.

370. "When the ſpots are produced by ſimple bodies on ſtuffs, it is eaſy to remove them by the means already known. Greaſy ſubſtances are removed by alkalies, ſoaps, the yolk of eggs, fat earths; oxyds of iron, by the nitric and oxalic acids; acids by alkalies, and reciprocally. Stains of fruit on white ſtuffs may be removed by the ſulphurous acid, and ſtill better by the oxygenated

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oxygenated muriatic acid. But when the ſpots are of a complex kind, it will be neceſſary to employ ſeveral means in ſucceſſion. Thus, to deſtroy the ſtain of coom from carriage-wheels, after the greaſe has been diſſolved the oxyd of iron may be removed by the oxalic acid.

371. "As colours are often changed by re-agents, it will be neceſſary, in order to reſtore them, that the ſcourer ſhould poſſeſs a thorough knowledge of the art of dyeing, and how to modify the means according to circumſtances. This becomes the more difficult when it is neceſſary to re-produce a colour ſimilar to that of the reſt of the ſtuff, to apply that colour only in one place, and often to reſtore the mordant by which it was fixed, and which has been deſtroyed, or even the firſt tint which gave the colour its intenſity. It may be readily conceived that the means to be employed muſt depend on the nature of the colour and the ingredients by which it was produced; for it is known that the ſame colour may be obtained from very different bodies. Thus, after an alkali has been employed to deſtroy an acid ſpot on browns, violets, blues, poppies, &c. the yellow ſpot which remains may be made to diſappear by a ſolution of tin; a ſolution of ſulphat of iron reſtores the colour to brown ſtuffs which have been galled; acids reſtore to their former ſplendour yellows which have been rendered duſky or brown by alkalies; blacks produced by logwood become red by acids; alkalies change theſe red ſpots to yellow, and a little of the aſtringent principle makes them again become black. A ſolution of one part of indigo in four parts of ſulphuric acid, diluted with a ſufficient quantity of water, may be employed with ſucceſs to revive the blue colour of cotton or wool which has been changed. Scarlet may be revived by means of cochineal and a ſolution of the muriat of tin, &c.

"The choice of re-agents is not a matter of indifference. Vegetable acids are preferable; the ſulphurous acid however may be employed for ſtains occaſioned by fruit: it does not change the blue of ſilk nor colours produced by aſtringents: it does not degrade the yellow of cotton. Ammonia ſucceeds better than fixed alkalies in removing ſpots produced by acids. It is employed in vapour; its action is ſpeedy, and ſeldom alters the colour.

372. "The means of removing greaſy ſpots are well known. This effect is produced by alkalies, fullers earth, volatile oils diſſolved in alcohol, a heat proper for volatilizing greaſe, &c. Spots occaſioned by ink, ruſt, or iron-mould of any kind, and all thoſe produced by the yellow oxyd of iron, are removed by the oxalic acid: the colour may be reſtored by alkalies, or a ſolution of the muriat of tin. Theſe ſpots may be removed alſo by the oxygenated muriatic acid, when they are on white ſtuffs or paper.

"The action of alkalies, and that of perſpired matter, are the ſame: their ſpots may be effaced by acids, or even by a weak ſolution of the muriat of tin. When theſe ſpots ariſe from ſeveral unknown cauſes, in order to deſtroy them recourſe muſt be had to *polychreſt* compoſitions. The following may be conſidered as one of the moſt efficacious. Diſſolve white ſoap in alcohol, and mix this ſolution with the yolks of from four to ſix eggs: add gradually eſſence of turpentine; and incorporate with the whole ſome fullers earth, in ſuch a manner as to form balls of a ſuitable conſiſtence. Moiſten the ſpot; and, having rubbed it with theſe balls, the ſpot will be removed by waſhing the ſtuff. All ſpots, except iron-mould and ink, may be removed in this manner. Vegetable Subſtances.

"Waſhing deſtroys the luſtre, and leaves a tarniſhed place diſagreeable to the eye; but the luſtre may be reſtored by drawing over the waſhed place, and in the direction of the pile, a bruſh moiſtened in water impregnated with a little gum. You may then apply a ſheet of paper, or a piece of cloth, and a conſiderable weight, under which the cloth muſt be left to dry."

Deſcription of Apparatus.

PLATE XCI.

FIG. 1, 2. O'Reilly's Apparatus for preparing SULPHUROUS ACID.

FIG. 1. Elevation of the APPARATUS.

A, The furnace which is made capable of containing three diſtilling veſſels.

a, A curved funnel for introducing the ſulphuric acid.

b, A tube paſſing from the matraſs to an intermediate leaden veſſel B intended to condenſe the ſulphuric acid which comes over undecompoſed, and having five necks, three of which receive tubes ſimilar to b, and from the fourth paſſes the tube d.

c, A tube of ſafety.

d, A tube paſſing from the intermediate veſſel to the firſt of the tall Wolfe's veſſels C intended to condenſe the ſulphurous acid.

D, The ſecond of the Wolfe's veſſels, with tubes to connect it with the firſt and third.

Each of theſe veſſels has a leaden cock to empty the acid liquor into the immerſing tubs.

FIG. 2. Plan of the above VESSELS.

FIG. 3. A Vertical Section of RUPP'S IMMERSING TUB, as improved by O'Reilly.

a, b, The tub.

c, d, The cover perfectly air-tight.

c, The partition dividing the tub into two parts.

f, A funnel filled with a plug.

g, g, The wooden reels on which the ſtuffs are rolled.

h, h, h, h, h, h, h, Seven rollers, over and under which the ſtuffs paſs, ſo as to expoſe a large ſurface to the bleaching liquor.

i, A leaden cock to draw off the liquor.

FIG. 4. Rupp's Original Apparatus, as deſcribed in 253.

FIG. 5, 6, 7, The Original Apparatus for diſtilling the OXYGENATED MURIATIC ACID GAS, deſcribed in 209.

PLATE XCII.

FIG. 8. The Apparatus employed for this purpoſe in IRELAND.

a, The aſh hole.

b, The place for the fire.

c, A

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c, A door by which fuel is introduced.

d, Door of the aſh, with a regiſter to regulate the draught of air.

e, A boiler of caſt iron filled with hot water, in which is placed the alembic.

f, A three-footed iron ſtand to ſupport

gg, A leaden alembic.

h, A glaſs or leaden curved funnel for introducing the ſulphuric acid.

i, A leaden cover firmly fixed by luting to the neck of the alembic, and pierced with three holes for the tranſmiſſion of the funnel, the handle of an agitator, and a condenſing tube.

k, The agitator formed of iron covered with lead.

l, A leaden tube three inches in diameter for conducting the gas into

m, An intermediate veſſel of lead for condenſing the acid which may paſs over from the alembic uncombined.

The tube l deſcends through the firſt opening m 1, nearly to the bottom of the veſſel, which is two-thirds filled with water; the oxygenated muriatic acid traverſes the water, and paſſes out at the top through the leaden tube n into o,o, the pneumatic tub, made of wood fitted with a cover r, which is perfectly air-tight, and through which paſſes an agitator p, with three leaves for mixing the gas with the water.

q, q, q, Three ſhelves in the tub, which by retarding the aſcent of the bubbles of gas, facilitate its union with the water.

s, A ſtop-cock for letting off the liquor.

Fig. 9. A Vertical Section of O'Reilly's Apparatus for bleaching by Steam.

E, E, E, The boiler.

A, G, The two reels.

B, F, The upper rollers.

C, D, The lower moveable rollers.

H, The regulator.

I, A ſtopcock.

K, The door of the chamber.

Fig. 10. The Apparatus, with Frames for Bleaching Thread and Hosiery.

Fig. 11. Plan of Loyſel's Apparatus for Bleaching Paper. Vegetable Subſtances.

1, 1, 1, &c. Eight furnaces, having a chimney of ſheet iron common to each pair of furnaces.

2, 2, 2, &c. Eight veſſels of caſt iron, containing ſand.

3, 3, 3, &c. Eight matraſſes, balloons, or bottles, of ſtone ware, compact and well baked, intended to contain the materials which afford the gas. Each matraſs muſt be filled only to one-third of its capacity at moſt. Bodies of glaſs of little thickneſs may alſo be uſed for this purpoſe.

4, 4, 4, &c. Tubes of glaſs to conduct the gas into the receiver. Or theſe tubes may be made of lead.

5. The receiver. It is compoſed 1. of an external veſſel, covered with plates of lead well ſoldered together, and provided near its bottom with a cock 6, to draw off the liquor when prepared. 2. Another veſſel, 7, likewiſe covered with plates of lead within and without. This ſecond tub is inverted in the firſt to contain the gas in proportion as it is diſengaged, and to keep in contact with the water of the receiver, that portion of gas which had not time to be diſſolved, in paſſing through that fluid.

There is a hole, 8, in the upper part of this ſecond veſſel. It ſerves to ſuffer the common air to eſcape when water is firſt poured into this receiver, and it is afterwards cloſed with a ſtopper of lead or cork, covered with paper, ſoaked in ſtarch, and faſtened to the cork by a piece of cloth or bladder, before the operation began.

Fig. 12. Vertical ſection of the apparatus.

Fig. 13. Elevation of the apparatus.

The diſpoſition of the furnaces about the receiver, and the circular form of the receiving veſſels, was rendered neceſſary by the local circumſtances of the laboratory in which our operations were carried on. In other circumſtances ſquare veſſels might be employed, and all the furnaces might be ranged in a right line under a common chimney.

INDEX.

Fig. 1.

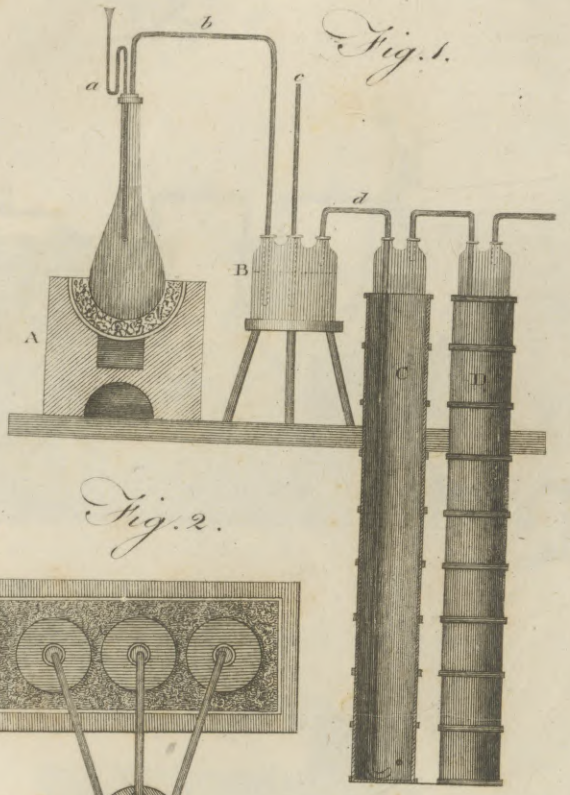
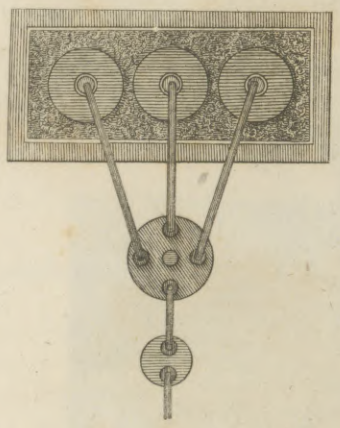


Fig. 2.



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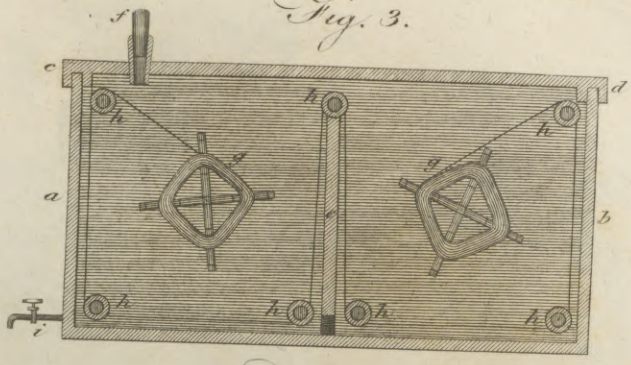

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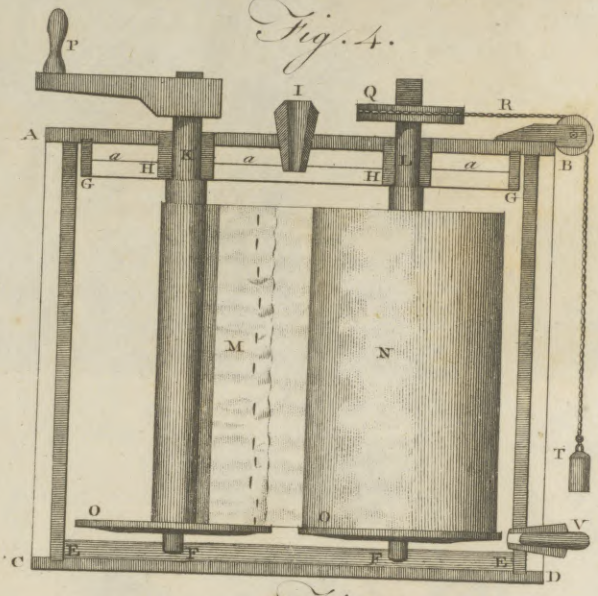

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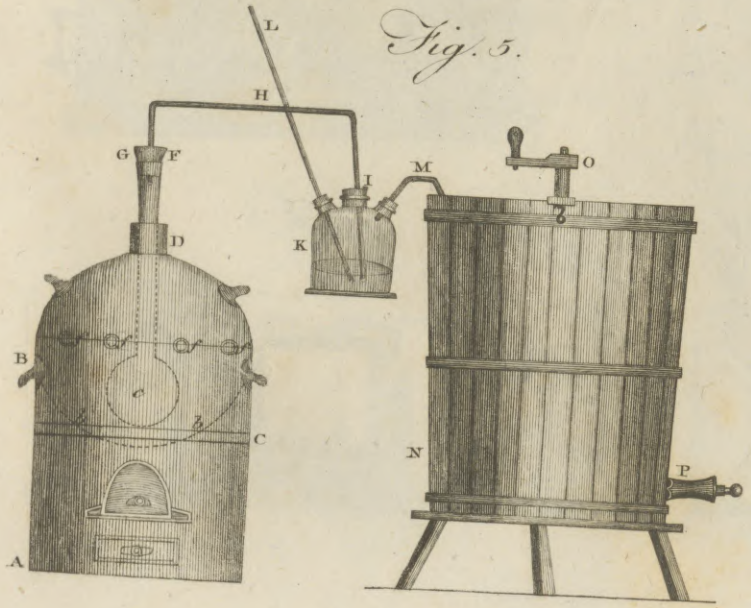

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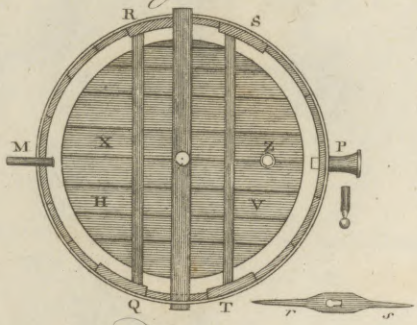

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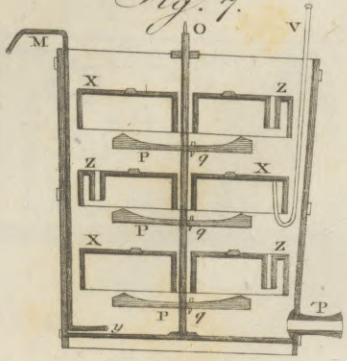


A. Bell Prin. Mat. Sculpter. fecit.

Fig. 8.

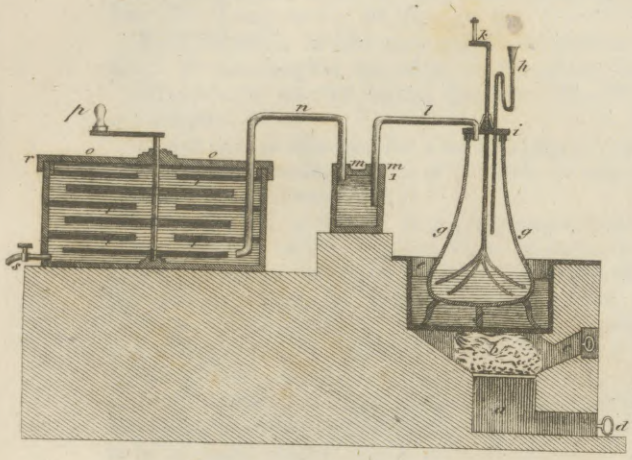
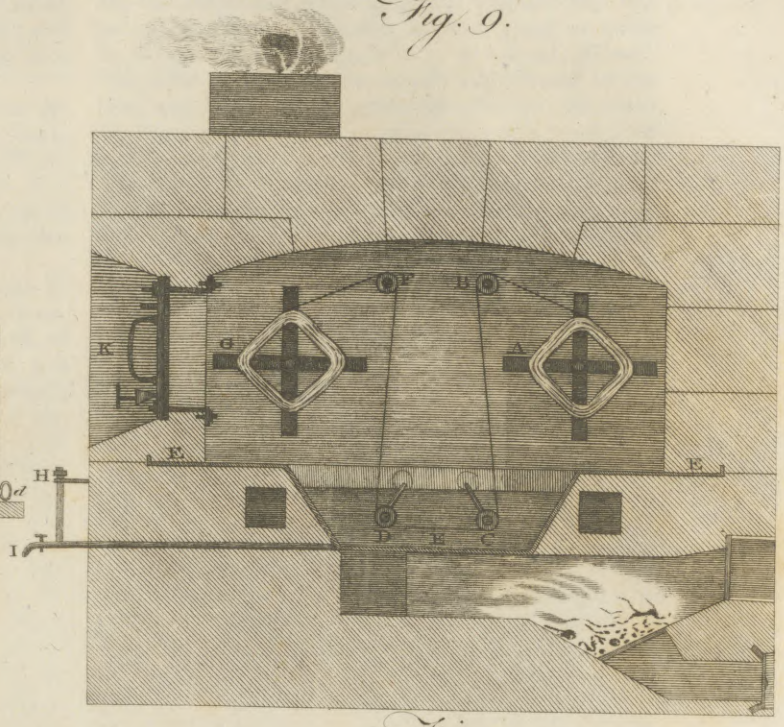


Fig. 9.



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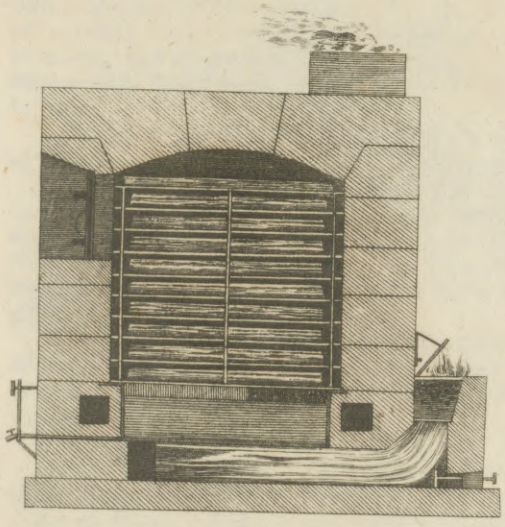


Fig. 11.

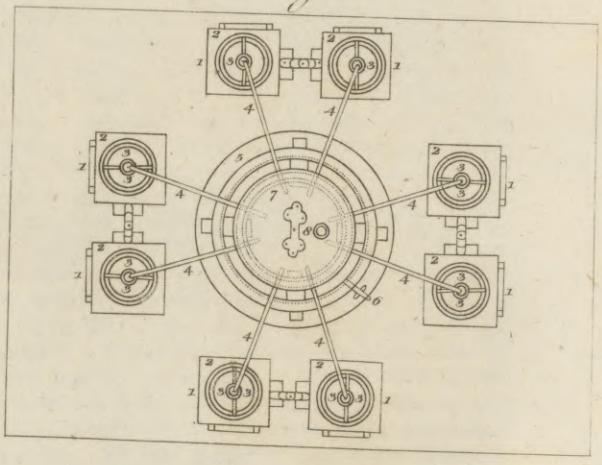


Fig. 12.

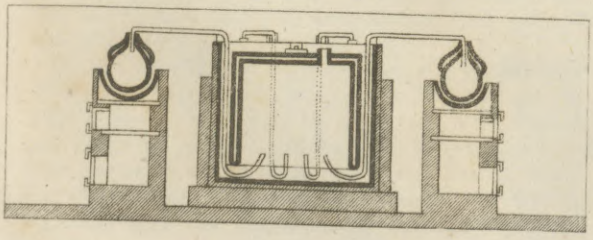
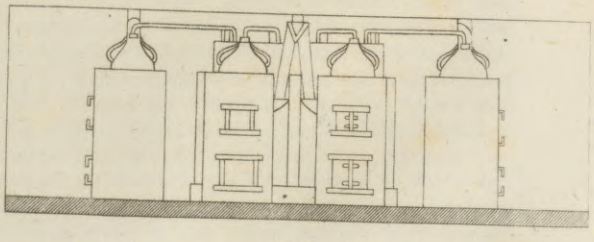


Fig. 13.



A Bell Prin. Mal. Sculpsit fecit.

Bleak || Blenheim.

BLEAK, in *Ornithology*. See CYPRINUS.

BLECHINGLY, a town of Surry in England, which ſends two members to parliament, and the bailiff who returns the members is choſen annually at the lord of the manor's court. The town ſtands on a hill, and has a fine proſpect as far as the South Downs in Suſſex. W. Long. 0. 15. N. Lat. 51. 20.

BLEEDING, in *Therapeutics*; ſee MEDICINE *Index*. As a chirurgical operation, ſee SURGERY *Index*.

Bleeding at the Noſe, called *Epiſtaxis*. See MEDICINE *Index*.

BLEEDING is alſo uſed for a hæmorrhage or flux of blood from a wound, rupture of a veſſel, or other accident. See HÆMORRHAGY.

Bleeding of a Corpſe, is a phenomenon ſaid to have frequently happened in the bodies of perſons murdered, which, on the touch, or even the approach, of the murderer, began to bleed at the noſe, ears, and other part; ſo as formerly to be admitted in England, and ſtill allowed in ſome other parts, as a ſort of detection of the criminal and proof of the fact. Numerous inſtances of theſe poſthumous hæmorrhagies are given by writers. But this kind of evidence ought to be of ſmall weight: for it is to be obſerved, that this bleeding does not ordinarily happen, even in the preſence of the murderer; yet ſometimes in that even of the neareſt friends, or perſons moſt innocent; and ſometimes without the preſence of any, either friend or foe. In effect, where is the impoſſibility that a body, eſpecially if full of blood, upon the approach of external heat, having been conſiderably ſtirred or moved, and a putrefaction coming on, ſome of the blood-veſſels ſhould burſt, as it is certain they all will in time?

BLEEDING is alſo uſed for the drawing out the ſap of plants, otherwiſe called *tapping*. See TAPPING.

BLEKING, a territory in the ſouth part of Sweden, having the Baltic ſea on the ſouth, Smaland on the north, and the province of Schonen on the weſt. Its principal towns are Chriſtianſtadt, Elleholm, Ahuys, Roterby, and Chriſtianople, which laſt is the capital.

BLEMYES, or BLEMMYES, a fabulous people of Ethiopia, ſaid to have had no heads; their eyes, mouth, &c. being ſituated in their breaſts. See ACEPHALOUS.

BLENCH, or BLANCH. See BLANCH.

BLEND, or BLINDE. See BLENDE, MINERALOGY *Index*.

Blend Water, called alſo *morehough*, a diſtemper incident to black cattle, comes either from the blood, from the yellows, or from the change of ground.—In order to cure it, take bole armoniac, and as much charcoal-duſt as will fill an egg-ſhell, a good quantity of the inner bark of an oak, dried and pounded together to a powder, and give it to the beaſt in a quart of new milk and a pint of carning.

BLENHEIM, a village of Germany, in the circle of Suabia, ſituated in E. Long. 2. 30. N. Lat. 48. 40. This village is remarkable for the defeat of the French and Bavarians in 1704, by the Engliſh and their confederates under Prince Eugene and the duke of Marlborough. The French army amounted to 60,000 veterans, who had ſhared in the conqueſts of their grand monarque; and were now commanded by two generals the moſt diſtinguiſhed at that time in France, Marſhal Tallard and the duke of Bavaria. The former had eſtabliſhed his reputation by many victories. He was active and penetrating; his ardour often roſe to impetuoſity; and he was ſo ſhortſighted as to be incapable of ſeeing objects at a very ſmall diſtance. The duke of Bavaria was equally experienced in the field, and had ſtronger motives for activity: His country was ravaged before his eyes, and nothing remained of his poſſeſſions but the army which he commanded. The allied army, commanded by Eugene and Marlborough, amounted to about 52,000 men, troops who had long been familiar with victory, and who had ſeen the French, the Turks, and the Ruſſians, fly before them. Both armies, after many marches and countermarches, approached each other. The French were poſted on a hill near the town of Hochſtet; their right covered by the Danube and the village of Blenheim; their left by the village of Lutzengen; and their front by a rivulet, the banks of which were ſteep and the bottom marſhy. The right wing of the French was commanded by Marſhal Tallard; their left by the duke of Bavaria, and under him General Marſin, an experienced Frenchman. Their poſition being advantageous, they were willing to await the enemy rather than offer battle. On the other hand, Marlborough and Eugene were ſtimulated to engage them at all events, in conſequence of an intercepted letter from Villeroy, intimating that he was preparing to cut off all communication between the Rhine and the allied army. The diſpoſitions, therefore, being made for the attack, and the orders communicated to the general officers, the allied forces advanced into the plain, and were ranged in order of battle. The cannonading began about nine in the morning, and continued to about half after twelve. The troops then advanced to the attack; the right under the direction of Prince Eugene, the left headed by Marlborough, and oppoſed to Marſhal Tallard. Marlborough, at the head of the Engliſh troops, having paſſed the rivulet, attacked the cavalry of Tallard with great bravery. This general being then reviewing the diſpoſition of his troops to the left, his cavalry fought for ſome time without the preſence of their commander. Prince Eugene had not yet attacked the forces of the elector; and it was near an hour before he could bring up his troops to the engagement. Tallard was no ſooner informed that his right was attacked by the duke, than he flew to its head, where he found a furious encounter already begun; his cavalry being thrice driven back, and rallying as often. He had poſted a large body of forces in the village of Blenheim; and he made an attempt to bring them to the charge. They were attacked by a detachment of Marlborough's troops ſo vigorouſly, that inſtead of aſſiſting the main body they could hardly maintain their ground. All the French cavalry being thus attacked in flank, was totally defeated. The Engliſh army now penetrated between the two bodies of the French commanded by the marſhal and elector, while the forces in the village of Blenheim were ſeparated by another detachment. In this diſtreſſed ſituation Tallard flew to rally ſome ſquadrons; but from his ſhortſightedneſs miſtaking a detachment of the enemy for his own, he was made priſoner by the Heſſian troops, who were in the allied army. Meanwhile,

Blenheim.

Blenheim-houſe || Bleſs.

Prince Eugene on his part, after having been thrice repulſed, at laſt put the enemy into confuſion. The rout then became general, and the flight precipitate. The conſternation of the French ſoldiers was ſuch, that they threw themſelves into the Danube, without knowing whither they fled. The allies being now maſters of the field of battle, ſurrounded the village of Blenheim, where a body of 13,000 men had been poſted in the beginning of the action, and ſtill maintained their ground. Theſe troops ſeeing themſelves cut off from all communication with the reſt of the army, and deſpairing of being able to force their way through the allies, threw down their arms, and ſurrendered themſelves priſoners of war. Thus ended the battle of Blenheim, one of the moſt complete victories that ever was obtained. Twelve thouſand French and Bavarians were ſlain in the field or drowned in the Danube; 13,000 were made priſoners of war; and there were taken 100 pieces of cannon, 22 mortars, upwards of 100 pair of colours, 200 ſtandards, 17 pair of kettle-drums, upwards of 3000 tents, 34 coaches, 300 loaded mules, two bridges of boats, and all the French baggage, with their military cheſt. Next day, when the duke of Marlborough viſited his priſoner the marſhal, the latter aſſured him that he had overcome the beſt troops in the world. "I hope, Sir (replied the duke), you will except thoſe troops by whom they were conquered." The allies, in conſequence of this victory, became maſters of a country 100 leagues in extent.

Blenheim-Houſe, a noble and princely houſe erected in honour of the duke of Marlborough at Woodſtock near Oxford, which with the manor of Woodſtock is ſettled on the duke and his heirs, in conſideration of the eminent ſervices by him performed for the public; and for building of which houſe the ſum of 500,000l. was granted by parliament, &c.—The tenure by which his grace holds the manor of Woodſtock is the preſenting at the caſtle of Windſor annually on the day in which the battle of Blenheim was fought, a flag embroidered with flowers-de-lis; which flag is ſhown to all ſtrangers who viſit the caſtle.

BLENNIUS, the Blenny. See Ichthyology *Index*.

BLESS, Henry, painter of hiſtory and landſcape, was born at Bovine, near Dinant, in 1480. He acquired his ſkill in the art merely by the ſtrength of his natural genius, aſſiſted by a diligent ſtudy and obſervation of the works of Patenier, without having any other inſtructor: and at laſt rendered himſelf very eminent, particularly by his landſcapes. His beſt performances were bought up by the emperor Rodolph, and they are ſtill preſerved at Vienna. His ſtyle of compoſition in hiſtorical ſubjects reſembles the ſtyle of the Flemiſh artiſts of that age, and exhibits a great number of figures finiſhed with extreme neatneſs. But he crowded ſeveral ſubjects into one deſign; as in his picture of the diſciples at Emmaus, he repreſented not only that incident, but in different groups diſpoſed in the back ground, he repreſented likewiſe the different parts of the paſſion of our Saviour. And yet, notwithſtanding the impropriety of that manner of compoſing, his pictures were ſo delicately pencilled and finiſhed, and his landſcapes in particular ſo agreeably invented, ſo full of variety, and well executed, that even in Italy his works were in great requeſt, and were diſtinguiſhed there by the appellation of the *owl-pictures*; for he fixed an owl, as his peculiar mark, in every picture he painted; by which the works of this maſter are always indiſputably known. He died in 1550.

Bleſtium, Bletoniſm.

BLESTIUM, a town in Britain. Now *Old-town*, not far from Hereford.

BLETONISM, a faculty of perceiving and indicating ſubterraneous ſprings and currents by ſenſation. The term is modern, and derived from a M. Bleton, who for ſome years paſt has excited univerſal attention by his poſſeſſing the above faculty, which ſeems to depend upon ſome peculiar organization. Concerning the reality of this extraordinary faculty, there occurred great doubts among the learned. But M. Thouvenel, a Frenchman of ſome conſequence and a philoſopher, ſeems to have put the matter beyond diſpute, in two memoirs which he has publiſhed upon the ſubject. He was charged by the king with a commiſſion to analyſe the mineral and medicinal waters in France; and, by repeated trials, he had been ſo fully convinced of the capacity of Bleton to aſſiſt him with efficacy in this important undertaking, that he ſolicited the miniſtry to join him in the commiſſion upon advantageous terms. All this ſhows that the operations of Bleton have a more ſolid ſupport than the tricks of impoſture or the deluſions of fancy. In fact, a great number of his diſcoveries are aſcertained by reſpectable affidavits. The following is a ſtrong inſtance in favour of Bletoniſm. "For a long time the traces of ſeveral ſprings and their reſervoirs in the lands of the Abbé de Vervians had been entirely loſt. It appeared, nevertheleſs, by ancient deeds and titles, that theſe ſprings and reſervoirs had exiſted. A neighbouring abbey was ſuppoſed to have turned their waters for its benefit into other channels, and a law-ſuit was commenced upon this ſuppoſition. M. Bleton was applied to: he diſcovered at once the new courſe of the waters in queſtion: his diſcovery was aſcertained, and the law-ſuit was terminated."

Bleton has been miſtaken more than once; and our author enumerates, with the faireſt candour, the caſes in which he has failed: but theſe caſes are very rare in compariſon with thoſe in which he has ſucceeded. Beſides, even the miſtakes of Bleton do not invalidate the reality of his talents; ſince a talent may be real without being perfect, or exerting itſelf with the ſame ſucceſs in every trial.

Many were indiſpoſed againſt Bletoniſm becauſe they looked upon the facts on which it is founded as inexplicable. But M. Thouvenel aſſigns principles upon which the impreſſions made by ſubterraneous waters and mines may be naturally enough accounted for. Having aſcertained a general law by which ſubterraneous electricity exerts an influence upon the bodies of certain individuals eminently ſuſceptible of that influence, and ſhown that this law is the ſame whether the electrical action ariſes from currents of warm or cold water, from currents of humid air, from coal or metallic mines, from ſulphur, and ſo on, he obſerves, that there is a diverſity in the phyſical and organical impreſſions which are produced by this electrical action, according as it proceeds from different foſſile bodies which are more or leſs conductors of electrical emanations. There are alſo artificial proceſſes, which concur in leading us to diſtinguiſh the different foculſes or conductors of mineral electricity; and in theſe proceſſes

the

Bletoniſm. the uſe of electrometrical rods deſerves the attention of philoſophers, who might perhaps in proceſs of time ſubſtitute in their place a more perfect inſtrument. Their phyſical and ſpontaneous mobility, and its electrical cauſe, are demonſtrated by indiſputable experiments.

On the other hand, our author proves, by very plauſible arguments, the influence of ſubterraneous electrical currents, compares them with the electrical currents of the atmoſphere, points out the different impreſſions they produce according to the number and quality of the bodies which act, and the diverſity of thoſe which are acted upon. The ordinary ſources of cold water make impreſſions proportional to their volume, the velocity of their currents, and other circumſtances. Their ſtagnation deſtroys every ſpecies of electrical influence; at leaſt, in this ſtate they have none that is perceptible. Their depth is indicated by geometrical proceſſes, founded upon the motion and divergence of the electrical rays; but there are ſecond cauſes which ſometimes diverſify theſe indications, and occaſion ſeeming errors. Theſe errors, however, according to our author, are only exceptions to the general rule; exceptions which depend on the difference of mediums and ſituations, and not on the inconſtancy or incertitude of the organical, ſenſitive, or convulſive faculties of the Bletoniſt.

All the hot ſprings in France, traced by our author from the places where they flow to the places where their formation commences (ſometimes at a diſtance of 15 leagues), led him conſtantly to maſſes of coal; where they are collected and heated in baſons of different depths and dimenſions, nouriſhed by the filtration of lakes and the courſe of torrents, and mineraliized by ſaline, ſulphureous, metallic, and bituminous ſubſtances, in the natural furnaces where they are heated, or in the ſtrata through which they flow.

The laſt and the moſt ſingular and important phenomenon which our author met with in the courſe of his experiments muſt not be here omitted. Over the veins of iron mines alone the electrometrical rods aſſume a motion of rotation diametrically oppoſite to that which they exhibit over all other mines. This phenomenon takes place with the ſame diſtinction when iron and other metals are extracted from their mines and depoſited under ground. But the moſt remarkable circumſtance in this diſtinctive action of theſe metals is, that it has a uniform and conſtant direction from eaſt to weſt in all metals, iron excepted, juſt as iron rendered magnetic has an action directed from ſouth to north. The action of red metals is more palpable than that of the white; but the latter, though weaker, has nevertheleſs a real exiſtence in the ſulphur. In the ſupplement to this memoir, there is an accurate acount of the proceſſes that have furniſhed theſe invariable reſults. They will naturally ſuggeſt, ſays our author, the idea of conſtructing an electrical compaſs, which may be of as eminent uſe in experimental philoſophy as the magnetic compaſs is in navigation. The natural and ſpontaneous direction of metallic emanations towards the weſt being aſcertained, it only remains to render them palpable by the conſtruction of an inſtrument which may be ſubſtituted in the place of the electrometrical twig that goes vulgarly by the name of the *divining rod.*

His analyſis of the hot ſprings of Bourbon-Lancy, to the ſource of which in the great mountains of Burgundy he was led by the electrical ſenſations of Bleton, ſhows the great intelligence and ſagacity of our author in operations of this nature. He found the origin of theſe famous hot ſprings in the centre of an oblong riſing ground, full of coal, and commanded on three ſides by a group of mountains, of which the greateſt part was filled with the ſame mineral. From a particular caſe, here circumſtantially deſcribed, in which the electrical rays of the ſubterraneous water and thoſe of the adjacent coal croſſed each other, our author deduces a very natural account of the errors which may ſometimes, though rarely, miſlead for a time the greateſt adepts in Bletoniſm, when they find themſelves in combined ſpheres of electrical activity. Another obſervation, which ſeems confirmed by ſeveral facts, accounts farther for this fallibility; the obſervation is, that electrical rays, whether direct or collateral, iſſuing from ſubterraneous focuſes, ſeem to undergo in certain caſes a ſort of refraction as they paſs from one medium to another, or traverſe bodies which differ with reſpect to the property of tranſmitting this electricity. In a word, it follows from theſe obſervations, that when ſuch privileged inveſtigators of currents or minerals as Bleton are placed upon the electrical ſpheres of theſe bodies, they will indicate their ſituation and their reſpective depths according to the impreſſions they feel within themſelves, or the motions they obſerve in the electrometrical inſtruments which they employ: and if they meet with ſecond accidental cauſes or complications of electrical ſpheres, which modify or alter theſe methods of trial, this will neceſſarily occaſion miſtakes in the reſults of their operations which they may probably rectify; but which, at all events, it would be unjuſt to lay to their charge, or allege as an objection againſt the reality of their talent.

Bletoniſm. Blight.

BLIGHT, in *Huſbandry*, a diſeaſe incident to plants, which affects them variouſly, the whole plant ſometimes periſhing by it, and ſometimes only the leaves and bloſſoms, which will be ſcorched and ſhrivelled up, the reſt remaining green and flouriſhing.

Some have ſuppoſed that blights are uſually produced by an eaſterly wind, which brings vaſt quantities of inſects eggs along with it, from ſome diſtant place, that, being lodged upon the ſurface of the leaves and flowers of fruit-trees, cauſe them to ſhrivel up and periſh.

To cure this diſtemper, they adviſe the burning of wet litter on the windward ſide of the plants, that the ſmoke thereof may be carried to them by the wind, which they ſuppoſe will ſtifle and deſtroy the inſects, and thereby cure the diſtemper.

Others direct the uſe of tobacco-duſt, or to waſh the trees with water wherein tobacco-ſtalks have been infuſed for 12 hours; which they ſay will deſtroy thoſe inſects, and recover the plants.

Pepper-duſt ſcattered over the bloſſoms of fruit-trees, &c. has been recommended as very uſeful in this caſe; and there are ſome that adviſe the pulling of the leaves that are diſtempered.

The true cauſe of blights ſeem to be continued dry eaſterly winds for ſeveral days together, without the intervention of ſhowers, or any morning dew, by which the perſpiration in the tender bloſſom is ſtopped; and

Blighted Corn, Blind.

if it ſo happens that there is a long continuance of the ſame weather, it equally affects the tender leaves, whereby their colour is changed, and they wither and decay.

The beſt remedy for this diſtemper, is gently to waſh and ſprinkle over the tree, &c. from time to time with common water; and if the young ſhoots ſeem to be much infected, let them be waſhed with a woollen cloth, ſo as to clear them, if poſſible, from this glutinous matter, that their reſpiration and perſpiration may not be obſtructed. This operation ought to be performed early in the day, that the moiſture may be exhaled before the cold of the night comes on: nor ſhould it be done when the ſun ſhines very hot.

Another cauſe of blights in the ſpring, is ſharp hoar-froſts, which are often ſucceeded by hot ſunſhine in the day-time. This is the moſt ſudden and certain deſtroyer of the fruits that is known.

BLIGHTED CORN. See SMUT.

1 Blindneſs, what.

BLIND, an epithet applied to a perſon or ſenſitive creature deprived of the uſe of his eyes; or, in other words, to one from whom light, colours, and all the glorious variety of the viſible creation, are intercepted by ſome natural or accidental diſeaſe. Such is the literal acceptation of the term: but it is likewiſe uſed in a metaphorical ſenſe, to ſignify mental or intellectual darkneſs; and frequently implies, at the ſame time,

2 Either natural or metaphorical.

ſome moral or ſpiritual depravity in the ſoul thus blinded, which is either the efficient or continuing cauſe of this internal malady. Yet, even in metaphor, the epithet of *blind* is ſometimes applied to a kind of ignorance, which neither involves the ideas of real guilt nor of voluntary error. It is, however, our preſent intention to conſider the word, not in its figurative, but in its natural and primary ſenſe. Nor do we mean in this place to regard it as a ſubject of medical ſpeculation, or to explore its cauſes and enumerate its cures. Theſe are in the department of another ſcience †. It is rather our deſign to conſider, By what means this inexpreſſible misfortune may be compenſated or alleviated to thoſe who ſuſtain it; what advantages and conſolations they may derive from it; of what acquiſitions they may be ſuſceptible; what are the proper means of their improvement; or by what culture they may become uſeful to themſelves, and important members of ſociety.

† See the Index ſubjoined to *Medicine*.

3 How the blind may be rendered uſeful in an individual or a ſocial capacity.

There is not perhaps any ſenſe or faculty of the corporeal frame, which affords ſo many reſources of utility and entertainment as the power of viſion; nor is there any loſs or privation which can be productive of diſadvantages or calamities ſo multiform, ſo various, and ſo bitter, as the want of ſight. By no avenue of corporeal perception is knowledge in her full extent, and in all her forms, ſo acceſſible to the rational and inquiring ſoul, as by the glorious and delightful medium of light. For this not only reveals external things in all their beauties, in all their changes, and in all their varieties; but gives body, form, and colour, to intellectual ideas and abſtract eſſences; ſo that the whole material and intelligent creation lie in open proſpect, and the majeſtic frame of nature in its whole extent, is, if we may ſpeak ſo, perceived at a ſingle glance. To the blind, on the contrary, the viſible univerſe is totally annihilated; he is perfectly conſcious of no ſpace but that in which he ſtands, or to which his extremities can reach. Sound, indeed, gives him ſome ideas of diſtant objects; but thoſe ideas are extremely obſcure and indiſtinct. They are obſcure, becauſe they conſiſt alone of the objects whoſe oſcillations vibrate on his ear, and do not neceſſarily ſuppoſe any other bodies with which the intermediate ſpace may be occupied, except that which gives the ſound alone: they are indiſtinct, becauſe ſounds themſelves are frequently ambiguous, and do not uniformly and excluſively indicate their real cauſes. And though by them the idea of diſtance in general, or even of ſome particular diſtances, may be obtained; yet they never fill the mind with thoſe vaſt and exalting ideas of extenſion which are inſpired by ocular perception. For though a clap of thunder, or an exploſion of ordnance, may be diſtinctly heard after they have traverſed an immenſe region of ſpace; yet, when the diſtance is uncommonly great, it ceaſes to be indicated by ſound; and therefore the ideas, acquired by auricular experiment, of extenſion and interval, are extremely confuſed and inadequate. The living and comprehenſive eye darts its inſtantaneous view over expanſive valleys, lofty mountains, protracted rivers, illimitable oceans. It meaſures, in an indiviſible point of time, the mighty ſpace from earth to heaven, or from one ſtar to another. By the aſſiſtance of teleſcopes, its horizon is almoſt indefinitely extended, its objects prodigiouſly multiplied, and the ſphere of its obſervation nobly enlarged. By theſe means, the imagination, inured to vaſt impreſſions of diſtance, can not only recall them in their greateſt extent with as much rapidity as they were at firſt imbibed; but can multiply them, and add one to another, till all particular boundaries, and diſtances be loſt in immenſity. Thus nature, by profuſely irradiating the face of things, and clothing objects in a robe of diverſified ſplendour, not only invites the underſtanding to expatiate on a theatre ſo extenſive, ſo diverſified, and ſo attractive; but entertains and inflames the imagination with every poſſible exhibition of the ſublime or beautiful. The man of light and colours beholds the objects of his attention and curioſity from far. Taught by experience, he meaſures their relative diſtances; diſtinguiſhes their qualities; determines the ſituations, poſitions, and attitudes; preſages what theſe tokens may import; ſelects his favourites; traverſes in ſecurity the ſpace which divides them from him; ſtops at the point where they are placed; and either obtains them with eaſe, or immediately perceives the means by which the obſtacles that intercept his paſſage to them may be ſurmounted. The blind not only may be, but really are, during a conſiderable period, apprehenſive of danger in every motion towards any place from whence their contracted power of perception can give them no intelligence. All the various modes of delicate proportion, all the beautiful varieties of light and colours, whether exhibited in the works of nature or art, are to them irretrievably loſt. Dependent for every thing, but mere ſubſiſtence, on the good offices of others; obnoxious to injury from every point, which they are neither capacitated to perceive nor qualified to reſiſt; they are, during the preſent ſtate of being, rather to be conſidered as priſoners at large, than citizens of nature. The ſedentary life, to which by privation of ſight they are deſtined, relaxes their frame, and ſubjects them to all the diſagreeable ſenſations which ariſes from dejection of ſpirits. Hence the moſt

4 Diſadvantages of blindneſs.

Blind.

feeble

Blind. feeble exertions create laſſitude and uneaſineſs. Hence the native tone of the nervous ſyſtem, which alone is compatible with health and pleaſure, deſtroyed by inactivity, exaſperates and embitters every diſagreeable impreſſion. Natural evils, however, are always ſupportable; they not only ariſe from blind and undeſigning cauſes, but are either mild in their attacks, or ſhort in their duration: it is the miſeries which are inflicted by conſcious and reflecting agents alone, that can deſerve the name of evils. Theſe excruciate the ſoul with ineffable poignancy, as expreſſive of indifference or malignity in thoſe by whom ſuch bitter portions are cruelly adminiſtered. The negligence or wantonneſs, therefore, with which the blind are too frequently treated, is an enormity which God alone has juſtice to feel or power to puniſh.

5 The ſituation of the blind deſcribed by poets.

Thoſe amongſt them who have had ſenſibility to feel, and capacity to expreſs, the effects of their misfortunes, have deſcribed them in a manner capable of penetrating the moſt callous heart. The venerable father of epic poetry, who in the perſon of Demodocus the Phæatian bard is ſaid to have deſcribed his own ſituation, proceeds thus:

6 Homer.

Τον περι Μυσ' επιληστε, διδυ δ' αγαθον τε, κακον τε
Οφθαλμων μεν αμερσε, διδυ δ'ηδειαν αοιδην. ODYS. θ

Dear to the muſe, who gave his days to flow
With mighty bleſſings mix'd with mighty wo,
In clouds and darkneſs quench'd his viſual ray,
Yet gave him power to raiſe the lofty lay. POPE.

Milton, in his addreſs to light, after a ſublime deſcription of his arduous and gloomy journey from the regions of primeval darkneſs to this our viſible diurnal ſphere, thus continues to apoſtrophize the celeſtial beam:

7 Milton.

Taught by the heav'nly muſe to venture down
The dark deſcent, and up to reaſcend,
Though hard and rare; thee I reviſit ſafe,
And feel thy ſov'reign vital lamp: but thou
Reviſit'ſt not theſe eyes, that roll in vain
To find thy piercing ray, and find no dawn:
So thick a drop ſerene hath quench'd their orbs,
Or dim ſuffuſion veil'd. Yet not the more
Ceaſe I to wander, where the muſes haunt
Clear ſpring, or ſhady grove, or ſunny hill,
Smit with the love of ſacred ſong: but chief
Thee, Sion, and the flow'ry brooks beneath,
That waſh thy hallow'd feet, and warbling flow,
Nightly I viſit; nor ſometimes forget
Thoſe other two equall'd with me in fate,
So were I equall'd with them in renown.
Blind Thamyris, and blind Mæonides,
And Tireſias and Phineus prophets old:
Then feed on thoughts, that voluntary move
Harmonious numbers; as the wakeful bird
Sing's darkling, and in ſhadieſt covert hid
Tunes her nocturnal note. Thus with the year
Seaſons return; but not to me returns
Day, or the ſweet approach of ev'n or morn,
Or ſight of vernal bloom, or ſummer's roſe,
Or flocks, or herds, or human face divine;
But cloud inſtead, and ever during dark,
Surrounds me, from the cheerful ways of men
Cut off, and for the book of knowledge fair
Preſented with a univerſal blank,
Of nature's works to me expung'd and ras'd,
And wiſdom at one entrance quite ſhut out.
PAR. LOST, Book III.

Blind.

The ſame inimitable author, in his tragedy of Sampſon Agoniſtes, and in the perſon of his hero, deplores the misfortune of blindneſs with a pathos and energy ſufficient to extort the deepeſt ſighs from the moſt unfeeling hearts:

——————— But chief of all,
O loſs of ſight, of thee I muſt complain!
Blind among enemies, O worſe than chains,
Dungeon, or beggary, decrepid age.
Light, the prime work of God, to me is extinct,
And all her various objects of delight
Annull'd, which might in part my grief have eas'd,
Inferior to the vileſt now become
Of man or worm. The vileſt here excel me:
They creep, yet ſee; I dark in light expos'd
To daily fraud, contempt, abuſe, and wrong,
Within doors, or without, ſtill as a fool,
In power of others, never in my own;
Scarce half I ſeem to live, dead more than half.
O dark, dark, dark, amid the blaze of noon,
Irrecoverably dark, total eclipſe
Without all hope of day!
O firſt created Beam, and thou great Word,
Let there be light, and light was over all;
Why am I thus bereav'd thy prime decree?
The ſun to me is dark,
And ſilent, as the moon
When ſhe deſerts the night,
Hid in her vacant interlunar cave.
Since light ſo neceſſary is to life,
And almoſt life itſelf, if it be true
That light is in the ſoul,
She all in every part; why was the ſight
To ſuch a tender ball as th' eye confin'd?
So obvious, and ſo eaſy to be quench'd?
And not, as feeling, throughout all parts diffus'd,
That ſhe might look at will through ev'ry pore?
Then had I not been thus exil'd from light,
As in the land of darkneſs, yet in light,
To live a life half dead, a living death:
And bury'd; but yet more miſerable!
Myſelf the ſepulchre, a moving grave;
Bury'd, yet not exempt
By privilege of death and burial
From worſt of other evils, pains and wrongs,
But made hereby obnoxious more
To all the miſeries of life.

Oſſian, the Caledonian bard, who lived before the authenticated hiſtory of his nation dates its origin, who in his old age participated the ſame calamity, has in more than one paſſage of his works deſcribed his ſituation in a manner ſo delicate, yet ſo pathetic, that it pierces the inmoſt receſſes and excites the fineſt feelings of the heart. Of theſe paſſages, take the following: 8

"O thou that rolleſt above, round as the ſhield of my fathers! whence are thy beams, O ſun! whence thy everlaſting light? Thou comeſt forth in thy awful beauty, and the ſtars hide themſelves in the ſky; the moon, Oſſian.

Blind.

moon, cold and pale, ſinks in the weſtern wave. But thou thyſelf moveſt alone: who can be a companion of thy courſe? The oaks of the mountains fall; the mountains themſelves decay with years; the ocean ſhrinks and grows again; the moon herſelf is loſt in heaven: but thou art for ever the ſame; rejoicing in the brightneſs of thy courſe. When the world is dark with tempeſts; when thunder rolls and lightning glances through the heavens; thou lookeſt in thy beauty from the clouds, and laugheſt at the ſtorm. But to Oſſian thou lookeſt in vain: for he beholds thy beams no more; whether thy yellow hair flows on the eaſtern clouds, or thou trembleſt at the gates of the weſt. But thou art, perhaps, like me, for a ſeaſon; and thy years will have an end: thou ſhalt ſleep in thy clouds, careleſs of the voice of the morning.—Exult then, O ſun, in the ſtrength of thy youth! age is dark and unlovely; it is like the glimmering light of the moon, when it ſhines through broken clouds, and the miſt is on the hills, the howling blaſt of the north is on the plain, the traveller ſhrinks in the midſt of his journey."

9 The dejection attending blindneſs accounted for.

Thus dependent on every creature, and paſſive to every accident, can the world, the uncharitable world, be ſurpriſed to obſerve moments when the *blind* are at variance with themſelves and every thing elſe around them? With the ſame inſtincts of ſelf-preſervation, the ſame iraſcible paſſions which are common to the ſpecies, and exaſperated by a ſenſe of debility either for retaliation or defence; can the blind be real objects of reſentment or contempt, even when they ſeem peeviſh or vindictive? This, however, is not always their character. Their behaviour is often highly expreſſive, not only of reſignation, but even of cheerfulneſs; and though they are often coldly, and even inhumanly, treated by men, yet are they rarely, if ever, forſaken of heaven. The common Parent of nature, whoſe benignity is permanent as his exiſtence and boundleſs as his empire, has neither left his afflicted creatures without conſolation or reſource. Even from their loſs, however oppreſſive and irretrievable, they derive advantages; not indeed adequate to recompenſe, but ſufficient to alleviate, their miſery. The attention of the ſoul, confined to theſe avenues of perception which ſhe can command, is neither diſſipated nor confounded by the immenſe multiplicity nor the rapid ſucceſſion of ſurrounding objects. Hence her contemplations are more uniformly fixed upon herſelf, and the revolutions of her own internal frame. Hence her perceptions of ſuch external things as are contiguous and obvious to her obſervation become more lively and exquiſite. Hence even her inſtruments of corporeal ſenſation are more aſſiduouſly cultivated and improved, ſo that from them ſhe derives ſuch notices and preſages of approaching pleaſure or impending danger as entirely eſcape the attention of thoſe who depend for ſecurity on the reports of their eyes. A blind man, when walking ſwiftly, or running, is kindly and effectually checked by nature from rudely encountering ſuch hard and extended objects as might hurt or bruiſe him. When he approaches bodies of this kind, he feels the atmoſphere more ſenſibly reſiſt his progreſs; and in proportion as his motion is accelerated, or his diſtance from the object diminiſhed, the reſiſtance is increaſed. He diſtinguiſhes the approach of his friend from far by the ſound of his ſteps, by his manner of breathing, and almoſt by every audible token which he can exhibit. Prepared for the dangers which he may encounter from the ſurface of the ground upon which he walks, his ſtep is habitually firm and cautious. Hence he not only avoids thoſe falls which might be occaſioned by its leſs formidable inequalities, but from its general bias he collects ſome ideas how far his ſafety is immediately concerned; and though theſe conjectures may be ſometimes fallacious, yet they are generally ſo true, as to preſerve him from ſuch accidents as are not incurred by his own temerity. The rapid torrent and the deep caſcade not only warn him to keep a proper diſtance, but inform him in what direction he moves, and are a kind of audible ſynoſures to regulate his courſe. In places to which he has been accuſtomed, he as it were recognizes his latitude and longitude from every breath of varied fragrance that tinges the gale, from every aſcent or declivity in the road, from every natural or artificial ſound that ſtrikes his ear; if theſe indications be ſtationary, and confined to particular places. Regulated by theſe ſigns, the *blind* have not only been known to perform long journeys themſelves, but to conduct others through dangerous paths at the dark and ſilent hour of midnight, with the utmoſt ſecurity and exactneſs (A).

10 Some advantages peculiar to the blind.

Blind.

It

(A) We have read, in authors of good credit, of a very ſurpriſing blind guide who uſed to conduct the merchants through the ſands and deſarts of Arabia. Vide *Leo Afric.* Deſcr. Afr. lib. vi. p. 246. and *Caſaub.* Treat. of Enthuſ. c. ii. p. 45.

An inſtance not leſs marvellous, exiſts at this preſent time, 1788, and in our own country. John Metcalf, a native of the neighbourhood of Mancheſter, where he is well known, became blind at a very early age, ſo as to be entirely unconſcious of light and its various effects. This man paſſed the younger part of his life as a waggoner, and occaſionally as a guide in intricate roads during the night or when the tracks were covered with ſnow. Strange as this may appear to thoſe who can ſee, the employment he has ſince undertaken is ſtill more extraordinary: it is one of the laſt to which we could ſuppoſe a blind man would ever turn his attention. His preſent occupation is that of a projector and ſurveyor of highways in difficult and mountainous parts. With the aſſiſtance only of a long ſtaff, I have ſeveral times met this man traverſing the roads, aſcending precipices, exploring valleys, and inveſtigating their ſeveral extents, forms, and ſituations, ſo as to anſwer his deſigns in the beſt manner. The plans which he deſigns, and the eſtimates he makes, are done in a method peculiar to himſelf; and which he cannot well convey the meaning of to others. His abilities in this reſpect are nevertheleſs ſo great, that he finds conſtant employment. Moſt of the roads over the Peak in Derbyſhire have been altered by his directions; particularly thoſe in the vicinity of Buxton: and he is at this time conſtructing a new one betwixt Wilmſlow and Congleton, with a view to open a communication to the great London road, without be-

Blind.

11 Whether the blind are able to diſtinguiſh colours.

It were endleſs to recapitulate the various mechanical operations of which they are capable, by their nicety and accuracy of touch. In ſome the tactile powers are ſaid to have been ſo highly improved, as to perceive that texture and diſpoſition of coloured ſurfaces by which ſome rays of light are reflected and others abſorbed, and in this manner to diſtinguiſh colours. But the teſtimonies for this fact ſtill appear to us too vague and general to deſerve public credit. We have known a perſon who loſt the uſe of his ſight at an early period of infancy, who in the vivacity or delicacy of his ſenſations was not perhaps inferior to any one, and who had often heard of others in his own ſituation capable of diſtinguiſhing colours by touch with the utmoſt exactneſs and promptitude. Stimulated, therefore, partly by curioſity to acquire a new train of ideas, if that acquiſition were poſſible; but ſtill more by incredulity with reſpect to the facts related; he tried repeated experiments, by touching the ſurfaces of different bodies, and examining whether any ſuch diverſities could be found in them as might enable him to diſtinguiſh colours: but no ſuch diverſity could he ever aſcertain. Sometimes, indeed, he imagined that objects which had no colour, or, in other words, ſuch as were black, were ſomewhat different and peculiar in their ſurfaces; but this experiment did not always nor univerſally hold. His ſcepticiſm therefore ſtill continues to prevail (B). That their acouſtic perceptions are diſtinct and accurate, we may fairly conclude from the rapidity with which they aſcertain the acuteneſs or gravity of different tones, as relative one to another; and from their exact diſcernment of the various kinds and modifications of ſound, and of ſonorous objects, if the ſounds themſelves be in any degree ſignificant of their cauſes. From this vivacity and accuracy of external ſenſation, and from the aſſiduous and vigorous application of a comprehenſive and attentive mind alone, we are able to account for the rapid and aſtoniſhing progreſs which ſome of them have made, not only in thoſe departments of literature which were moſt obvious to their ſenſes and acceſſible to their underſtandings, but even in the abſtracteſt, and (if we may be allowed the expreſſion) in the moſt occult ſciences. What, for inſtance, can be more remote from the conceptions of a blind man than the abſtract relations and properties of ſpace and quantity? yet the incompreheniible attainments of Dr Saunderſon in all the branches of mathematics are now fully known and firmly believed by the whole literary world, both from the teſtimony of his pupils and the publication of his works. But ſhould the fact be ſtill uncertain, it might be ſufficiently verified by a living prodigy of this kind with which our country is at preſent honoured. The gentleman of whom we now ſpeak, though blind from his infancy, by the ardour and aſſiduity of his application, and by the force of a genius to which nothing is impenetrable, has not only made incredible advances in mechanical operations, in muſic, and in the languages; but is likewiſe profoundly ſkilled in geometry, in optics, in algebra, in aſtronomy, in chemiſtry, and in all the other branches of natural philoſophy as taught by Newton and received by an admiring world. We are ſorry that neither the modeſty of this amiable philoſopher, nor the limits of this article, will permit us to delineate his character in its full proportions. All we can do is to exhibit his example, that by it the vulgar prejudice, which preſumes to think blindneſs and learning incompatible, may be diſſipated; and that an inſtance of ſucceſs ſo noble and recent may inflame the emulation and encourage the efforts of ſuch as have genius and opportunity to purſue the ſame laudable path (C). If theſe glorious attempts ſhould neither be perceived

Blind.

12 Inſtances how far they are ſuſceptible of abſtract learning.

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ing obliged to paſs over the mountains." Account by Dr Bew, publiſhed in the *Tranſactions of the Mancheſter Society*, vol. i.

(B) See, however, the extraordinary caſe ſubjoined to this article.

(C) As particular anecdotes of this aſtoniſhing genius have been, ſince a former edition of the Encyclopædia, delivered to the Mancheſter Society by G. Bew, M. D. and afterwards publiſhed, we ſhall here take the liberty to tranſcribe them from the original volume in which they are inſerted, as this freedom is authorized by a letter from Dr Bew's own hand.

"Dr Henry Moyes, who occaſionally read Lectures on Philoſophical Chemiſtry at Mancheſter, like Dr Saunderſon, the celebrated profeſſor of Cambridge, loſt his ſight by the ſmallpox in his early infancy. He never recollected to have ſeen: 'but the firſt traces of memory I have (ſays he), are in ſome confuſed ideas of the ſolar ſyſtem.' He had the good fortune to be born in a country where learning of every kind is highly cultivated, and to be brought up in a family devoted to learning.

"Poſſeſſed of native genius, and ardent in his application, he made rapid advances in various departments of erudition; and not only acquired the fundamental principles of mechanics, muſic, and the languages, but likewiſe entered deeply into the inveſtigation of the profounder ſciences, and diſplayed an acute and general knowledge of geometry, optics, algebra, aſtronomy, chemiſtry, and in ſhort of moſt of the branches of the Newtonian philoſophy.

"Mechanical exerciſes were the favourite employments of his infant years. At a very early age he made himſelf acquainted with the uſe of edged tools ſo perfectly, that notwithſtanding his entire blindneſs, he was able to make little wind-mills; and he even conſtructed a loom with his own hands, which ſtill ſhow the cicatrices of wounds he received in the execution of theſe juvenile exploits.

"By a moſt agreeable intimacy and frequent intercourſe which I enjoyed with this accompliſhed blind gentleman, whilſt he reſided in Mancheſter, I had an opportunity of repeatedly obſerving the peculiar manner in which he arranged his ideas and acquired his information. Whenever he was introduced into company, I remarked that he continued ſome time ſilent. The ſound directed him to judge of the dimenſions of the room, and the different voices of the number of perſons that were preſent. His diſtinction in theſe reſpects was very accurate;

Blind.

perceived nor rewarded by an unfeeling world, if human nature ſhould forget to recognize its own excellence ſo nobly diſplayed in inſtances of this kind; yet beſides the enjoyments reſulting from a ſublime and comprehenſive underſtanding, beſides the immortal and inexhauſtible ſources of delight, which are the peculiar portion of a ſelf-approving mind, theſe happy pupils and favourites of Nature are as it were indulged with her perſonal intercourſe. They become more intimately acquainted with her laws, till by exploring the beneficence of her economy, the ſublimity of her ends, the regularity of her procedure, and the beauties of her frame, they imbibe the ſpirit, and feel the preſence, of her glorious Author:

> By ſwift degrees the love of nature works,
> And warms the boſom; till at laſt, ſublim'd
> To rapture and enthuſiaſtic heat,
> We feel the preſent deity, and taſte
> The joys of God to ſee a happy world.
>
> THOMSON.

13 Accounts of the effects of recovered ſight upon thoſe who have been born blind uncertain.

Much labour has been beſtowed to inveſtigate, both from reaſon *à priori* and from experiment, what might be the primary effects of light and luminous objects upon ſuch as have been born blind, or early deprived of ſight, if at a maturer period they ſhould inſtantaneouſly recover their viſual powers. But upon this topic there is much reaſon to fear, that nothing ſatisfactory has yet been ſaid. The fallacy of hypotheſis and conjecture, when formed *à priori* with reſpect to any organ of corporeal ſenſation and its proper object, is too obvious to demand illuſtration. But from the nature of the eye, and the mediums of its perception, to attempt an inveſtigation of the various and multiform phenomena of viſion, or even of the varieties of which every particular phenomenon is ſuſceptible according as the circumſtances of its appearance are diverſified, would be a project worthy of philoſophy in a delirium. Nay, even the diſcoveries which are ſaid to accrue from experiment, may ſtill be held as extremely doubtful and ſuſpicious; becauſe in theſe experiments it does not appear to have beeen aſcertained, that the organs to which viſible objects were preſented immediately after chirurgical operations, could be in a proper ſtate to perceive them. Yet after all, it is extremely probable, that figure, diſtance, and magnitude, are not immediate objects of ocular ſenſation, but acquired and adjuſted by long and reiterated experience (D). There are, however, many deſiderata, which the perceptions of a man born blind might conſiderably illuſtrate, if his inſtruments of viſion were in a right ſtate, and aſſiſted by a proper medium. Such a perſon might perhaps give a clearer account, why objects, whoſe pictures are inverted upon the retina of the eye, ſhould appear to the mind in their real poſitions; or why, though each particular object is painted upon the retina of both our eyes, it ſhould only be perceived as ſingle. Perhaps, too, this new ſpectator of viſible nature might equally amuſe our curioſity and improve our theory, by attempting to deſcribe his earlieſt ſenſations of colour, and its original effects upon his organ and his fancy. But, as we have already hinted, it is far from being certain, that trials of this kind have ever been fairly made. Such readers as may wiſh to ſee a more minute detail of theſe queſtions, may conſult M. Diderot's *Lettre ſur les aveugles, a l'uſage de ceux qui voyent*: *Diderot's* Works, vol. ii.

Blind.

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accurate; and his memory ſo retentive, that he ſeldom was miſtaken. I have known him inſtantly recognize a perſon, on firſt hearing him ſpeak, though more than two years had elapſed ſince the time of their laſt meeting. He determined pretty nearly the ſtature of thoſe he was ſpeaking with by the direction of their voices; and he made tolerable conjectures reſpecting their tempers and diſpoſitions, by the manner in which they conducted their converſation.

"It muſt be obſerved, that this gentleman's eyes were not totally inſenſible to intenſe light. The rays refracted through a priſm, when ſufficiently vivid, produced certain diſtinguiſhable effects on them. The red gave him a diſagreeable ſenſation, which he compared to the touch of a ſaw. As the colours declined in violence, the harſhneſs leſſened, until the green afforded a ſenſation that was highly pleaſing to him, and which he deſcribed as conveying an idea ſimilar to what he felt in running his hand over ſmooth poliſhed ſurfaces. Poliſhed ſurfaces, meandering ſtreams, and gentle declivities, were the figures by which he expreſſed his ideas of beauty: Rugged rocks, irregular points, and boiſterous elements, furniſhed him with expreſſions for terror and diſguſt. He excelled in the charms of converſation; was happy in his alluſions to viſual objects; and diſcourſed on the nature, compoſition, and beauty of colours, with pertinence and preciſion.

"Doctor Moyes was a ſtriking inſtance of the power the human ſoul poſſeſſes of finding reſources of ſatisfaction, even under the moſt rigorous calamities. Though involved 'in ever during darkneſs,' and excluded from the charming views of ſilent or animated nature; though dependent on an undertaking for the means of his ſubſiſtence, the ſucceſs of which was very precarious; in ſhort, though deſtitute of other ſupport than his genius, and under the mercenary protection of a perſon whoſe integrity he ſuſpected, ſtill Dr Moyes was generally chearful, and apparently happy. Indeed it muſt afford much pleaſure to the feeling heart to obſerve this hilarity of temper prevail almoſt univerſally with the blind. Though 'cut off from the ways of men, and the contemplation of the human face divine,' they have this conſolation; they are exempt from the diſcernment and contagious influence of thoſe painful emotions of the ſoul that are viſible on the countenance, and which, hypocriſy itſelf can ſcarcely conceal. This diſpoſition likewiſe may be conſidered as an internal evidence of the native worth of the human mind, that thus ſupports its dignity and chearfulneſs under one of the ſevereſt misfortunes that can poſſibly befall us."

(D) The gentleman couched by Mr Cheſelden had no idea of diſtance; but thought that all the objects he ſaw, touched his eyes, as what he felt did his ſkin. It was alſo a conſiderable time before he could remember which was the cat and which the dog, though often informed, without firſt feeling them.

Blind.

voyent: "A letter concerning the blind for the uſe of thoſe who ſee." To theſe may be added, *Mr Cheſelden's Anatomy*, and *Locke's Eſſay on the human underſtanding*.

When we ruminate on the numberleſs advantages derived from the uſe of ſight, and its immenſe importance, in extending the human capacity, or in improving and cultivating every faculty and every function of the mind, we might be ſtrongly tempted to doubt the fidelity of thoſe reports which we have heard concerning ſuch perſons as, without the aſſiſtance of light, have arrived at high degrees of eminence even in thoſe ſciences which appear abſolutely unattainable but by the interpoſition of external mediums. It has, however, been demonſtrated by a late ingenious author, that *blind* men, by proper inſtruction, are ſuſceptible almoſt of every idea, and of every truth which can be impreſſed on the mind by the mediation of light and colours, except the ſenſations of light and colours themſelves †.

† See *Dr Reid's Inquiry into the Human Mind*, chap. vi. § 1, 2.

Yet there is one phenomenon of this kind which ſeems to have eſcaped the attention of that great philoſopher, and for which no author either of this or any former period has been able to offer any tolerable account. Still, however, it ſeems to merit the attention of a philoſopher. For though we ſhould admit, that the blind can underſtand with great perſpicacity all the phenomena of light and colours; though it were allowed, that in theſe ſubjects they might extend their ſpeculations beyond their inſtructions, and inveſtigate the mechanical principles of optics by the mere force of genius and application, from the data which they had already obtained; yet it will be difficult, if not impoſſible, to aſſign any reaſon why theſe objects ſhould be more intereſting to a blind man than any other abſtract truths whatever. It is impoſſible for the blind, by a retentive memory, to tell you, That the ſky is an azure; that the ſun, moon, and ſtars, are bright; and the roſe is red, the lily white or yellow, and the tulip variegated. By continually hearing theſe ſubſtantives and adjectives joined, he may be mechanically taught to join them in the ſame manner: but as he never had any ſenſation of colour, however accurately he may ſpeak of coloured objects, his language muſt be like that of a parrot; without meaning, or without ideas. Homer, Milton, and Oſſian, had been long acquainted with the viſible world before they were ſurrounded with clouds and ever-during darkneſs. They might, therefore, ſtill retain the warm and pleaſing impreſſions of what they had ſeen. Their deſcriptions might be animated with all the rapture and enthuſiaſm which originally fired their boſoms when the grand or delightful objects which they delineated were immediately beheld. Nay, that enthuſiaſm might ſtill be heightened by a bitter ſenſe of their loſs, and by that regret which a ſituation ſo diſmal might naturally inſpire. But how ſhall we account for the ſame energy, the ſame tranſport of deſcription, exhibited by thoſe on whoſe minds viſible objects were either never impreſſed, or have been entirely obliterated? Yet, however unaccountable this fact may appear, it is no leſs certain than extraordinary.

14 How the blind catch the enthuſiaſm inſpired by viſual perceptions, a paradox.

But delicacy and other particular circumſtances forbid us to enter into this diſquiſition with that minuteneſs and preciſion which it requires. We only mention the fact as one amongſt the few reſources for entertainment, and avenues to reputation, which are ſtill reſerved for the *blind*. Whoever thinks the ſubject of ſufficient conſequence to merit a nicer ſcrutiny, may conſult the *Preface* to *Blacklock's Poems*, written by G. G. Eſq. and printed at Edinburgh 1754, or the account of his life and writings by the Rev. Mr Spence, prefixed to a quarto edition of his poems publiſhed at London in 1756.

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It is hoped, however, that we ſhall not be ſuſpected of partiality for inſerting a character of the ſame author by one who was a foreigner, a ſtranger to his perſon, and prepoſſeſſed in his favour by his works alone.

"Blacklock will appear to poſterity a fabulous character: even now he is a prodigy. It will be thought a fiction and a paradox, that a man quite blind ſince he was three years old (E), beſides having made himſelf ſo good a maſter of various languages, of Greek, Latin, Italian, and French, ſhould alſo be a great poet in his own; and without hardly ever having ſeen the light, ſhould be ſo remarkably happy in deſcription *."

* *Carlo Denina Diſcorſo de la Letteratura*, chap. xi.

15 Of the education of the blind.

It is impoſſible to enter into a detail of particulars with reſpect to the education of the blind. Theſe muſt be left to be determined by the genius, the capacity, the circumſtances, of thoſe to whom the general rules which may be given ſhould be applied. Much therefore muſt depend on their fortunes, much on their temper, and genius; for, unleſs theſe particulars were known, every anſwer which could be given to queſtions of this kind muſt be extremely general, and of conſequence extremely ſuperficial. Beſides, the taſk is ſo much more arduous, becauſe whoever attempts it can expect to derive no aſſiſtance from thoſe who have written on education before him: And though the blind have excelled in more than one ſcience; yet, except in the caſe of Saunderſon, profeſſor of mathematics in the univerſity of Cambridge, concerning whom we ſhall afterwards have occaſion to ſpeak, it does not appear, that any of them have been conducted to that degree of eminence, at which they arrived, upon a premeditated plan. One ſhould rather imagine, that they have been led through the general courſe and ordinary forms of diſcipline; and that, if any circumſtances were favourable to their genius, they rather proceeded from accident than deſign.

This fact, if not ſupported by irrefragable evidence, ſhould, for the honour of human nature, have been ſuppreſſed. When contemplated by a man of benevolence and underſtanding, it is not eaſy to gueſs whether his mortification or aſtoniſhment would be moſt ſenſibly felt. If a heart that glows with real philanthropy muſt feel for the whole vital creation, and become, in ſome meaſure, the *ſenſorium* of every ſuffering inſect or reptile; how muſt our ſympathy increaſe in tenderneſs and force, when the diſtreſſed individuals of our own ſpecies become its objects? Nor do the blind bear ſo

(E) The author is here miſtaken: Dr Blacklock only ſaw the light for five months.

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ſmall a proportion to the whole community, as, even in a political view, to be neglected. But in this, as in every other political crime, the puniſhment returns upon the ſociety in which it is committed. Thoſe abandoned and unimproved beings, who, under the influence of proper culture and diſcipline, might have ſucceſsfully concurred in producing and augmenting the general welfare, become the nuiſances and burdens of thoſe very ſocieties who have neglected them.

16 Why the blind deſerve, and how they may repay public ſympathy.

There is perhaps no rank of beings in the ſenſible univerſe, who have ſuffered from nature or accident, more meritorious of public compaſſion, or better qualified to repay its generous exertions, than the blind. They are meritorious of compaſſion; for their ſphere of action and obſervation is infinitely more limited than that of the deaf, the lame, or of thoſe who labour under any other corporeal infirmity conſiſtent with health. They are better qualified to repay any friendly interpoſition for their happineſs; becauſe, free from the diſtraction which attends that multiplicity of objects and purſuits that are continually obvious to the ſight, they are more attentive to their own internal economy, to the particular notices of good and evil impreſſed on their hearts, and to that peculiar province in which they are circumſcribed by the nature and cultivation of their powers.

17 Proper employments for the blind.

It will eaſily occur to the reader, that, if the pupil ſhould not be placed in eaſy circumſtances, muſic is his readieſt and moſt probable reſource. Civil and eccleſiaſtical employments have either ſomething in their own nature, or in the invincible prejudices of mankind, which renders them almoſt entirely inacceſſible to thoſe who have loſt the uſe of ſight. No liberal and cultivated mind can entertain the leaſt heſitation in concluding, that there is nothing, either in the nature of things or even in the poſitive inſtitutions of genuine religion, repugnant to the idea of a blind clergyman. But the novelty of the phenomenon, while it aſtoniſhes vulgar and contracted underſtandings, inflames their zeal to rage and madneſs. Beſides, the adventitious trappings and ceremonies aſſumed by ſome churches as the drapery of religion, would, according to theſe ſyſtems, render the ſacerdotal office, painful, if not impracticable, to the blind.

* Dr *Nicholas Bacon.*

We have, ſome years ago, read of a blind gentleman*, deſcended from the ſame family with the celebrated Lord Verulam, who, in the city of Bruſſels, was with high approbation created doctor of laws; ſince that period we have been honoured with his correſpondence. He was deprived of ſight at nine years of age by an arrow from a croſs-bow whilſt he was attempting to ſhoot it. When he had recovered his health, which had ſuffered by the ſhock, he purſued the ſame plan of education in which he had been engaged; and having heard that one Nicaſius de Vourde, born blind, who lived towards the end of the 15th century, after having diſtinguiſhed himſelf by his ſtudies in the univerſity of Louvain, took his degree as doctor of divinity in the univerſity of Cologne; this motive prevailed with him to make the ſame attempt. But the public, curſed with prejudices for which the meaneſt ſenſitive nature might bluſh, prejudices equally beneath the brutality and ignorance of the loweſt animal inſtinct, treated his intention with ridicule: even the profeſſors were not far from being of that ſentiment; and they admitted him into their ſchools, rather from an impreſſion that it might amuſe him, than become of any uſe to him. He had the good fortune, however, contrary to their expectations, to obtain the firſt places among his condiſciples. It was then ſaid, that ſuch rapid advances might be made in the preliminary branches of his education; but would ſoon be effectually checked by ſtudies of a more profound and abſtracted nature. This, it ſeems, was repeated from ſchool to ſchool, through the whole climax of his purſuits; and when, in the courſe of academical learning, it became neceſſary to ſtudy poetry, it was the general voice that all was over, and that at length he had reached his *ne plus ultra*. But here he likewiſe confronted their prepoſſeſſions, and taught them the immenſe difference between blindneſs of body and blindneſs of ſoul. After continuing his ſtudies in learning and philoſophy for two years more, he applied himſelf to law, took his degree in that ſcience, commenced pleading counſellor or advocate in the council of Brabant, and has had the pleaſure of terminating almoſt every ſuit in which he has been engaged to the ſatisfaction of his clients.

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18 Law difficult, tho' not impoſſible, for the blind.

Had it not been for a fact ſo ſtriking and ſo well authenticated, though there could have been no doubt that a blind man might diſcharge the office of a chamber-counſel with ſucceſs; yet, as a barriſter, his difficulties muſt have appeared more formidable, if not abſolutely inſuperable. For he ſhould remember all the ſources, whether in natural equity or poſitive inſtitutions, whether in common or ſtatutory law, from whence his argument ought to be drawn. He muſt be able to ſpecify, and to arrange in their proper order, all the material objections of his antagoniſts: theſe he muſt likewiſe anſwer as they were propoſed, *extempore*.

When, therefore, it is conſidered how difficult it is to temper the natural aſſociation of memory with the artificial arrangements of judgment, the deſultory flights of imagination with the calm and regular deductions of reaſon, the energy and perturbation of paſſion with the coolneſs and tranquillity of deliberation; ſome idea may be formed of the arduous taſk which every blind man muſt atchieve, who undertakes to purſue the law as a profeſſion. Perhaps aſſiſtances might be drawn from Cicero's treatiſe on Topics and on Invention; which, if happily applied and improved, might leſſen the diſparity of a blind man to others, but could ſcarcely place him on an equal footing with his brethren. And it ought to be fixed as an inviolable maxim, that no blind man ought ever to engage in any province in which it is not in his power to excel. This may at firſt ſight appear paradoxical; but it is eaſily explained. For the conſciouſneſs of the obvious advantages poſſeſſed by others, habitually prediſpoſes a blind man to deſpondency: and if he ever gives way to deſpair (which he will be too apt to do when purſuing any acquiſition when others have a better chance of ſucceſs than himſelf), adieu, for ever adieu, to all proficiency. His ſoul ſinks into irretrievable depreſſion; his abortive attempts inceſſantly prey upon his ſpirit; and he not only loſes that vigour and elaſticity of mind which are neceſſary to carry him through life, but that patience and ſerenity which alone can qualify him to enjoy it.

19 The blind naturally ſubject to deſpondency, ſhould be ſtimulated by the proſpect of attainable excellence.

In this recapitulation of the learned profeſſions, we have

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have intentionally omitted phyſic; becauſe the obſtacles which a blind man muſt encounter, whether in the theory or practice of that art, will be more eaſily conceived by our readers than deſcribed in detail. From this, therefore, let us paſs to more general ſubjects.

20 Phyſic perhaps impracticable to the blind.

It has been formerly hinted, that the blind were objects of compaſſion, becauſe their ſphere of action and obſervation were limited: and this is certainly true. For what is human exiſtence, in its preſent ſtate, if you deprive it of action and contemplation? Nothing *then* remains but the diſtinction which we derive from form or from ſenſitive and locomotive powers. But for theſe, unleſs directed to happier ends by ſuperior faculties, few rational beings would, in our opinion, be grateful. The moſt important view, therefore, which we can entertain in the education of a perſon deprived of ſight, is to redreſs as effectually as poſſible the natural diſadvantages with which he is encumbered; or, in other words, to enlarge as far as poſſible the ſphere of his knowledge and activity. This can only be done by the improvement of his intellectual, imaginative, or mechanical, powers; and which of theſe ought to be moſt aſſiduouſly cultivated, the genius of every individual alone can determine. Were men to judge of things by their intrinſic natures, leſs would be expected from the blind than others. But, by ſome pernicious and unaccountable prejudice, people generally hope to find them either poſſeſſed of preternatural talents, or more attentive to thoſe which they have than others: For it was not Rocheſter's opinion alone,

21 Too much often expected from the blind.

> That if one ſenſe ſhould be ſuppreſs'd,
> It but retires into the reſt.

Hence it unluckily happens, that blind men, who in common life are too often regarded as rareſhows, when they do not gratify the extravagant expectations of their ſpectators, too frequently ſink in the general opinion, and appear much leſs conſiderable and meritorious than they really are. This general diffidence of their power at once deprives them both of opportunity and ſpirit to exert themſelves; and they deſcend, at laſt, to that degree of inſignificance in which the public eſtimate has fixed them. From the original dawning, therefore, of reaſon and ſpirit, the parents and tutors of the blind ought to inculcate this maxim, That it is their indiſpenſible duty to excel, and that it is abſolutely in their power to attain a high degree of eminence. To impreſs this notion on their minds, the firſt objects preſented to their obſervation, and the firſt methods of improvement applied to their underſtanding, ought, with no great difficulty, to be comprehenſible by thoſe internal powers and external ſenſes which they poſſeſs. Not that improvement ſhould be rendered quite eaſy to them, if ſuch a plan were poſſible: For all difficulties, which are not really or apparently inſuperable, heighten the charms and enhance the value of thoſe acquiſitions which they ſeem to retard. But care ſhould be taken that theſe difficuties be not magnified or exaggerated by imagination; for it has before been mentioned, that the blind have a painful ſenſe of their own incapacity, and conſequently a ſtrong propenſity to deſpair continually awake in their minds. For this reaſon, parents and relations ought never to be too ready in offering their aſſiſtance to the blind in any office which they can perform, or in any acquiſition which they can procure for themſelves, whether they are prompted by amuſement or neceſſity. Let a blind boy be permitted to walk through the neighbourhood without a guide, not only though he ſhould run ſome hazard, but even though he ſhould ſuffer ſome pain.

22 The elements of education for the blind ſhould neither be too difficult nor too eaſy.

23 The powers of action poſſeſſed by the blind ſhould never be ſuperſeded.

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If he has a mechanical turn, let him not be denied the uſe of edge-tools; for it is better that he ſhould loſe a little blood, or even break a bone, than be perpetually confined to the ſame place, debilitated in his frame, and depreſſed in his mind. Such a being can have no employment but to feel his own weakneſs, and become his own tormentor; or to transfer to others all the malignity and peeviſhneſs ariſing from the natural, adventitious, or imaginary evils which he feels. Scars, fractures, and diſlocations in his body, are trivial misfortunes compared with imbecility, timidity, or fretfulneſs of mind. Beſides the ſenſible and dreadful effects which inactivity muſt have in relaxing the nerves and conſequently in depreſſing the ſpirits, nothing can be more productive of jealouſy, envy, peeviſhneſs, and every paſſion that corrodes the ſoul to agony, than a painful impreſſion of dependence on others, and of our inſufficiency for our own happineſs. This impreſſion, which, even in his moſt improved ſtate, will be too deeply felt by every blind man, is redoubled by that utter incapacity of action which muſt reſult from the officious humanity of thoſe who would anticipate or ſupply all his wants, who would prevent all his motions, who would do or procure every thing for him without his own interpoſition. It is the courſe of nature, that blind people, as well as others, ſhould ſurvive their parents; or, it may happen, that they ſhould likewiſe ſurvive, thoſe who, by the ties of blood and nature, are more immediately intereſted in their happineſs than the reſt of mankind. When, therefore, they fall into the hands of the world in general, ſuch exigencies as they themſelves cannot redreſs will be but coldly and languidly ſupplied by others. Their expectations will be high and frequent, their diſappointments many and ſenſible; their petitions will often be refuſed, ſeldom fully gratified; and, even when granted, the conceſſion will be ſo ungraceful, as to render its want infinitely more tolerable than its fruitions. For all theſe reaſons, we repeat it once more (becauſe it can never be too frequently reiterated), that, in the formation of a blind man, it is infinitely better to direct than ſuperſede his own exertions. From the time that he can move and feel, let him be taught to ſupply his own exigencies; to dreſs and feed himſelf; to run from place to place, either for exerciſe, or in purſuit of his own toys or neceſſaries.

In theſe excurſions, however, it will be highly proper for his parent or tutor to ſuperintend his motions at a diſtance, without ſeeming to watch over him. A vigilance too apparent, may impreſs him with a notion that malignity or ſome other ſelfiſh motive may have produced it. When dangers are obvious and great, ſuch as we incur by rivers, precipices &c. thoſe who are intruſted with the blind will find it neither neceſſary nor expedient to make their vigilance a ſecret. They ought then to acquaint their pupil, that they are preſent with him; and to interpoſe for his preſervation, whenever his temerity renders it neceſſary. But ob-

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jects of a nature leſs noxious which may give him ſome pain without any permanent injury or mutilation, may with deſign be thrown in his way; providing, however, that this deſign be always induſtriouſly concealed. For his own experience of their bad effects will be an infinitely more eloquent and ſenſible monitor, than the abſtract and frigid counſels of any adviſer whatever.

24 Exerciſes ſuitable to the blind.

When the volatile ſeaſon of puerile amuſement is expired, and the impetuous hurry of animal-ſpirits ſubſides, through the whole demeanour of his pupil the tutor will probably obſerve a more ſenſible degree of timidity and precaution, and his activity will then require to be ſtimulated more than reſtrained. In this criſis, exerciſe will be found requiſite, rather to preſerve health, and facilitate the vital functions, than merely for recreation. Of all the different kinds of exerciſe, riding, not in a machine, but on horſeback, is by far the moſt eligible, and moſt productive of its end. On theſe occaſions, however, care muſt be taken that the horſes employed may neither be capricious nor unmanageable; for on the manſuetude of the creature which he rides, not only his ſafety, but his confidence, will entirely depend. In theſe expeditions whether long or ſhort, his companion or attendant ought conſtantly to be with him; and the horſe ſhould always either be taught implicitly to follow its guide, or be conducted by a leading rein beſides the bridle which he himſelf holds. Next to this mode of exerciſe, is walking. If the conſtitution of the blind boy be tolerably robuſt, let him be taught to endure every viciſſitude of weather which the human ſpecies can bear with impunity. For if he has been bred with too much delicacy, particular accidents may ſuperſede all his former ſcruples, and ſubject him to the neceſſity of ſuffering what will not only be ſevere in its immediate ſenſation, but dangerous in its future conſequences. Yet, when the cold is ſo intenſe, or the elements ſo tempeſtuous, as to render air and exerciſe abroad impracticable, there are methods of domeſtic exerciſe, which, though not equally ſalutary, may ſtill be eligible; ſuch as dumb-bells, or the bath chair. The firſt of theſe are made of lead, conſiſting of a cylinder, the middle of which may either be rectilineal or arcuated for the conveniency of holding, and terminates at each end in a ſemiglobular maſs. Their weight muſt be conformed to the ſtrength and age of the perſon who uſes them. The method of employing them is to take one in each hand, and ſwing them backwards and forwards over his head, deſcribing a figure ſomewhat like a parabola. This not only ſtrengthens the arms, and opens the cheſt, but promotes the circulation of the fluids. The bath chair is a deal of 12 feet in length, as free from knots and as elaſtic as poſſible, ſupported by a fulcrum at each end, upon which may be placed two rolling cylinders to give it greater play; when ſeated upon this, by alternately depreſſing it with his own weight, and ſuffering it to return to its natural ſituation, he gives himſelf a motion, though not equal in its energy, yet ſomewhat reſembling the trot of a horſe. There are other elaſtic ſeats of the ſame kind conſtructed with ſteel ſprings, but one of this ſimple fabrication may anſwer the purpoſe.

25 Riding on horſeback.

26 Walking in all weathers that are tolerable.

27 Dumb-bells.

28 Bath-chair.

The ſpring deal here recommended by the author, was preferred, as being ſuitable to the blind in all ſpheres or conditions of life; but he has ſince been taught by experience, in a valetudinary ſtate, that the elaſtic chair is of infinitely greater utility. It conſiſts of three falſe bottoms, and one real, which is the baſis of the whole. The loweſt is by far the moſt extenſive. The higheſt is ſtuffed to render it an eaſy ſeat, and covered with pluſh, baize, or duffle. Between each of the falſe bottoms, at either end, behind and before, are placed ſteel ſprings, fixed above and below to the boards; not with nails, but ſtaples, and curved in a ſpiral or ſerpentine form, each conſiſting of ſeven ſpires or volumina. The volumina are formed in ſuch a manner, that one of them can paſs through another, and thus give the ſprings full play in riſing or deſcending. The loweſt bottom or baſis of the whole is protended about four inches; which aſſiſts you to mount the ſeat with more facility, and ſerves as a ſupport for your feet when you ride. This operation is performed by alternately depreſſing or raiſing yourſelf upon the ſeat, ſo that the ſprings yielding to your weight as you deſcend, and reſiſting as you riſe, may give you a motion like that of the deal above deſcribed, but more violent, more rapid, and conſequently more ſalutary. The whole frame of the ſeat is ſurrounded with leather, having different apertures to admit or reject the air occaſioned by the motion. Theſe general hints are ſufficient to give any ingenious artiſan an idea of the nature and ſtructure of the machine, which he may alter or improve as conveniency ſhall dictate.

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To theſe modes of domeſtic exerciſe may be added that of a ſwing, which is formed by a rope ſuſpended from two ſcrews, which ought to be ſtrongly fixed, at proper diſtances, in the joiſts of a capacious chamber, with a board and a cuſhion for a ſeat, and cords faſtened behind and before, leſt the impetuoſity of the motion ſhould ſhake the patient out of his poſition. But this inſtrument of health is ſo often formed by children for their amuſement, and depends ſo much upon the form and extent of the area where it vibrates, that a more minute detail of its nature and office would here be unneceſſary.

29 Diet.

His meals ſhould be temperate, his diet light and of eaſy digeſtion. If the tone of his ſtomach be vigorous, vegetables ſhould be preferred to animal food, particularly thoſe vegetables which are moſt farinaceous and leaſt aceſcent. Fermented liquors and ardent ſpirits ſhould never be given him but to gratify the real demands of exhauſted nature: for though they exhilarate the ſpirits, they at the ſame time corrode the veſſels and relax the nerves; a misfortune doubly pernicious to ſedentary life. The ſafeſt and moſt wholeſome beverages are milk and water. If he ſhould be tired with theſe, he may be indulged with the variety of chocolate, balm, ſage, or ground ivy. Coffee may ſometimes be taken with impunity: but tea ſhould be interdicted with inflexible ſeverity; for no vegetable juice under heaven is more noxious to ſedentary people. Let him alſo, for ſimilar reaſons, be prohibited the uſe of tobacco in all its forms. In the obſervations of diet and exerciſe, let him neither be mechanically regular, nor entirely excentric. In the one caſe, he will be a ſlave to habit, which may create ſome inconvenience; in the other, he will form no habits at all, which may ſtill be productive of greater.

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30
Low ſpirits.

We have more than once hinted, during the courſe of this article, that the blind, as liable to all the inconveniences of ſedentary life, are peculiarly ſubjected to that diſorder which may be called *tædium vitæ* or low ſpirits. This indiſpoſition may be ſaid to comprehend in it all the other diſeaſes and evils of human life; becauſe, by its immediate influence on the mind, it aggravates the weight and bitterneſs of every calamity to which we are obnoxious. In a private letter, we have heard it deſcribed as a formidable precipice, in the regions of miſery, between the awful gulfs of ſuicide on the one hand and phrenzy on the other; into either of which, a gentle breeze, according to the force of its impulſe and the line of its direction, may irrecoverably plunge the unhappy victim; yet from both of which he may providentially eſcape. Though the ſhades of the metaphor may, perhaps, be unnaturally deepened, yet thoſe who have felt the force of the malady will not fail to repreſent it by the moſt dreadful images which its own feelings can ſuggeſt. Parents and tutors therefore, if they have the leaſt pretence to conſcience or humanity, cannot be too careful in obſerving and obviating the firſt ſymptoms of this impending plague. If the limbs of your blind child or pupil be tremulous; if he is apt to ſtart, and eaſily ſuſceptible of ſurpriſe; if he finds it difficult to ſleep; if his ſlumbers, when commenced, are frequently interrupted, and attended with perturbation; if his ordinary exerciſes appear to him more terrible and more inſuperable than uſual; if his appetites become languid and his digeſtion ſlow; if agreeable occurrences give him leſs pleaſure, and adverſe events more pain than they ought to inſpire:—this is the criſis of vigorous interpoſition. The regimen and exerciſe above preſcribed are the beſt preventatives of this evil, and perhaps its beſt remedies when unhappily incurred. But if the ſymptoms ſhould eſcape your attention till the patient is actually ſeized with the diſtemper, you may then, according to its depth and permanency, apply the cold bath, vitriolic acid, and Peruvian bark. Magneſia alba will, from time to time, be found uſeful to lenify the ſevere and corroſive acid generated in the ſtomach; it is preferable to chalk, to crabs eyes, or any of the other abſorbents, becauſe of its laxative tendency. The tincture or infuſion of wild valerian, pills of aſafœtida, and white muſtard-ſeed, are likewiſe preſcribed. Care ſhould be taken that the patient may never be ſuffered to remain coſtive, otherwiſe the function of digeſtion will be impeded. Gentle cathartics ſhould therefore be adminiſtered; but with caution, that their operation may clear the bowels without weakening nature. Emetics may ſometimes give the patient a temporary relief, by exerting and bracing the fibres of the ſtomach; but if uſed too frequently, they will have a contrary effect: previous to the uſe of bark, however, they ſhould always be taken to prepare the veſſel for its reception. The ſymptoms above enumerated would ſeem to indicate the origin of the diſtemper from extreme weakneſs or relaxation of nerves: that relaxation may be cauſed by ſevere and intemperate thought; by ſupine indolence; by exceſſive or habitual drinking; and above all, by venereal gratifications prematurely and frequently indulged, by which the approaches of this evil are accelerated, its continuance inſured, and its poignancy augmented. Parents and tutors, therefore, as they value the welfare of their charge, and would anſwer to God for their conduct, ſhould be ſcrupulouſly careful to obſerve when any of theſe illegitimate propenſities inflame the youthful mind, to check, or rather elude them; not ſo much by ſevere reprehenſion and ſolemn interdict, as by endeavouring to preoccupy the ſoul, and engage the attention with other favourite amuſements. Againſt every act of arbitrary power, the mind ſtrongly and naturally revolts. She ſhould therefore be rather allured to wiſdom and virtue, by rational motives and gentle methods, than by cruel menaces and ſtern commands. Thoſe who are afflicted with low ſpirits may be ſaid to be doubly unfortunate; for they have not only their own internal ſufferings to ſuſtain, but the contempt and ridicule of a thoughtleſs and unfeeling world, by whom their complaints are thought to be imaginary, and their depreſſion affected. Should the ſarcaſtic or ſceptical reader apologize for his want of humanity, by aſking in what theſe internal ſufferings conſiſt, it will be eaſy to give him a clear and ſolid anſwer: They ariſe from a ſevere and acute feeling of nature's incapacity to diſcharge the vital functions with tolerable eaſe; from the ſharp and conſtant irritation inflicted on the ſtomach and lower inteſtines by every thing not ſweet or inſipid that paſſes through them; and from a degree of ſenſibility too exquiſite for the precarious and fluctuating ſtate of our nature: theſe are the vindictive, inexorable demons that arm every thought with the ſtings of ſcorpions, and render the ſenſe of exiſtence itſelf inſupportable. We have heard of hypochondriacs who thought themſelves made of glaſs; and of others who believed their perſons grown to a ſize ſo enormous, that they could not enter into any door: but it has never been our fortune to be perſonally acquainted with any of theſe fantaſtics. Thoſe with whom we have converſed were rather inclined to exaggerate real, than to create imaginary, evils; rather to anticipate gloomy poſſibilities, than to dwell upon improbable or chimerical cataſtrophes: the tender parent, therefore, or the faithful guardian, will beware of treating them with neglect or levity. He will ſuit his converſation, as much as poſſible, to the preſent tone of their feelings; he will avoid all innovations in their management, except ſuch as are abſolutely neceſſary for their cure.

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Be careful never to reaſon nor expoſtulate with your patient on the nature of his malady. Tell him not that his uneaſy feelings, far from being real, are the fictitious impoſitions of a depraved fancy. His diſagreeable ſenſations will be more than ſufficient to demonſtrate the falſehood of your aſſertions: thus your argumentative and perſuaſive powers will not only be exerted in vain, but may conſiderably retard, if not finally prevent, his recovery; and may leave ſuch indelible prepoſſeſſions againſt you, in his mind, as no length of time, no viciſſitudes of life, will ever be able to efface. Opium has alſo been recommended; but excepting deſperate caſes, it will be found a fallacious and dangerous remedy:—fallacious, becauſe the eaſe it gives is only temporary, and infallibly ſucceeded by ſharper paroxyſms:—dangerous, becauſe it may be rendered habitual, and ſubject the patient to unmixed torment when omitted. Though we have already inculcated a regimen and exerciſe which appeared pro-

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per for the blind in general, and not incompatible with peculiar ſituations, it ſtill ſeems neceſſary to add a few reſults of painful experience upon theſe ſubjects, as being particularly conducive to the preſent eaſe and future amendment of ſuch as labour under the diſeaſes now in queſtion. And firſt, let it be obſerved, that animal food is their proper nutriment, as being of eaſieſt digeſtion; better too, if well done upon the ſpit or gridiron: for inſtead of being allowed to imbibe adventitious fluids, it ſhould be as much as poſſible drained of its own; neither ſhould it be too fat: beef, mutton, or fowls, arrived at maturity, give the ſtomach leaſt labour; veal, lamb, chickens, and every other kind of young meat, anſwer the purpoſes of nature with more difficulty, as the parts are not only too ſucculent, but prevented by their ſoftneſs and lubricity from acting forcibly one upon another to facilitate the efforts of the ſtomach in digeſtion. Of all vegetable ſubſtances, white bread is perhaps the only ingredient which they can eat with the greateſt impunity; and even this would ſtill be ſafer were the paſte formed with as little water as poſſible, and prepared without fermentation. Whether eggs are vegetable or animal ſubſtances, let phyſicians determine; but this we know, that by people in low ſpirits they may be eaten, even at ſupper, with great impunity. Every other herb or root is not only extremely flatulent, but productive of that ſharp and intenſe acid for which we have formerly preſcribed magneſia as the beſt remedy. Patients of this deſcription ſhould rather be frequent than liberal in their meals, and ſcrupulouſly careful of all heterogeneous mixture. Their moſt eligible beverage, except ſimple water, if they can afford it, is port wine, as being leaſt convertible into that poignant fluid: porter likewiſe, if not ſtale, may, by its ſtrength and bitterneſs, aſſiſt the action of the ſtomach. Neither of theſe fermented liquors ſhould be taken in large quantities at once: let the clamours of nature be ſatisfied, and no more; for if the ſpirits are unnaturally elated, they will be certain to ſink proportionably when the ſtimulus ceaſes to operate. The moderate uſe of genuine rum or brandy, properly diluted, when the other liquors cannot be had, may be productive of good effects, but ſhould never be uſed at or near natural periods of repoſe; becauſe, even when diluted, they occaſion a febricity or pyrexia, incompatible with ſound and refreſhing ſleep. Care ſhould likewiſe be taken that the patient may never be too much warmed, either by clothes or exerciſe, eſpecially when in bed. Exertions of body, particularly in the open air, are indiſpenſably neceſſary for promoting digeſtion and acquiring ſtrength; but ſhould never be carried to fatigue. The mind ſhould likewiſe be diverted from attention to itſelf and its diſorder, by reading and converſation. But there is an uncommon degree of diſcernment and delicacy requiſite in the topics, that they may neither be too cheerful nor too ſerious, for the ſtate of the mind, when they are applied. Neither let theſe injunctions be eſteemed trivial: ſuch little attentions, uniformly and tenderly exerted for their ſatisfaction, will contribute in no ſmall degree to their preſent tranquillity, and of conſequence to their future reſtoration. We have thought it neceſſary to expatiate thus far, on a ſubject gloomy and forbidding in itſelf, but of ſufficient importance to demand particular attention; and, beſides, what we have ſaid may not only be uſeful to the blind in particular, but applicable to all thoſe who labour under the ſame depreſſion. It only remains to add, that the order, the periods, and the quantities, in which the remedies above enumerated ſhould be applied, muſt be determined by wiſdom and experience, or regulated by the advice of a ſkilful and vigilant phyſician. We are ſorry that truth obliges us to acknowledge, that we have found the faculty leſs intelligent in this diſeaſe, and leſs attentive to its various aſpects, than could be wiſhed, or than its malignity requires.

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31 Natural curioſity to be gratified when poſſible; when otherwiſe, a reaſon to be given.

The natural curioſity of children renders them extremely and indefatigably inquiſitive. This diſpoſition is often peculiarly prevalent in the blind. Parents and tutors, therefore, ſhould gratify it whenever their anſwers can be intelligible to the pupil; when it is otherwiſe, let them candidly confeſs the impoſſibility or impropriety of anſwering his queſtions. At this period, if their hearts be tender and their powers inventive, they may render his amuſements the vehicles, and his toys the inſtruments, of improvement: why, for inſtance, may not the centrifugal and centripetal forces be illuſtrated from the motion of a top, or the nature and power of elaſticity by the rebound of a ball? Theſe hints may lead to others, which if happily improved and applied, may wonderfully facilitate the progreſs of knowledge. Nor will the violence of exerciſe, and the tumult of play, be productive of ſuch perils and accidents as may be apprehended.

For the encouragement of ſuch parents as chooſe to take theſe advices with regard to exerciſe, let us inform them, that though, till the age of twenty, ſome blind perſons were on moſt occaſions permitted to walk, to run, to play at large, they have yet eſcaped without any corporeal injury from theſe excurſions.

32 The blind not to be indulged in promiſcuous company.

Parents of middle, or of higher rank, who are ſo unfortunate as to have blind children, ought, by all poſſible means, to keep them out of vulgar company. The herd of mankind have a wanton malignity, which eternally impels them to impoſe upon the blind, and to enjoy the painful ſituations in which theſe impoſitions place them. This is a ſtricture upon the humanity of our ſpecies, which nothing but the love of truth and the dictates of benevolence could have extorted from us. But we (F) have known ſome who have ſuffered ſo much from this diabolical mirth in their own perſons, that it is natural for us, by all the means in our power, to prevent others from becoming its victims.

Blind people have infinitely more to fear from the levity and ignorance, than from the ſelfiſhneſs and ill-nature, of mankind. In ſerious and important negociations, pride and compaſſion ſuſpend the efforts of knavery or ſpleen; and that very infirmity, which ſo frequently renders the blind defenceleſs to the arts of the

(F) The author of theſe obſervations, though he chooſes to expreſs himſelf in this manner, is blind.

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the inſidious, or to the attempts of malice, is a powerful incentive to pity, which is capable of diſarming fury itſelf. Villainy, which frequently piques itſelf more upon the arts by which it prevails, than upon the advantages which it obtains, may often with contempt reject the blind, as ſubjects beneath the dignity of its operation; but the ill-natured buffoon conſiders the moſt malicious effects of his merriment as a mere jeſt, without reflecting on the ſhame or indignation which they inſpire when inflicted on a ſenſible temper.

33 They muſt not be permitted to hear marvellous and frightful tales.

But vulgar credulity and ignorance are no leſs dangerous to thoſe who want ſight, than the falſe and mechanical wit ſo univerſally practiſed in common life. We know, we ſympathetically feel, the ſtrong propenſity of every illiterate mind, to relate or to believe whatever is marvellous and dreadful. Theſe impreſſions, when early imbibed, can ſcarcely be eradicated by all the conſpiring efforts of mature reaſon and confirmed experience. Thoſe philoſophers who have attempted to break the alliance between darkneſs and ſpectres, were certainly inſpired by laudable motives. But they muſt give us leave to aſſert, that there is a natural and eſſential connexion betwixt night and *orcus*. Were we endued with ſenſes to advertiſe us of every noxious object before its contiguity could render it formidable, our panics would probably be leſs frequent and ſenſible than we really feel them. Darkneſs and ſilence, therefore, have ſomething dreadful in them, becauſe they ſuperſede the vigilance of thoſe ſenſes which give us the earlieſt notices of things. If you talk to a blind boy of inviſible beings, let benevolence be an inſeparable ingredient in their character. You may, if you pleaſe, tell him of departed ſpirits, anxious for the welfare of their ſurviving friends; of miniſtering angels, who deſcend with pleaſure from heaven to execute the purpoſes of their Maker's benignity; you may even regale his imagination with the ſportive gambols and innocent frolics of fairies; but let him hear as ſeldom as poſſible, even in ſtories which he knows to be fabulous, of vindictive ghoſts, vindictive fiends, or avenging furies. They ſeize and pre-occupy every avenue of terror which is open in the ſoul; nor are they eaſily diſpoſſeſſed. Sooner ſhould we hope to exorciſe a ghoſt, or appeaſe a fury, than to obliterate their images in a warm and ſuſceptible imagination, where they have been habitually impreſſed, and where theſe feelings cannot be diſſipated by external phenomena. If horrors of this kind ſhould agitate the heart of a blind boy, which may happen notwithſtanding the moſt ſtrenuous endeavours to prevent it, the ſtories which he has heard will be moſt effectually diſcredited by ridicule. This, however, muſt be cautiouſly applied, by gentle and delicate gradations. If he is inſpired with terror by effects upon his ſenſes, the cauſes of which he cannot inveſtigate, indefatigable pains muſt be taken to explain theſe phenomena, and to confirm that explication, whenever it can be done, by the teſtimony of his own ſenſes, and his own experience. The exertion of his locomotive and mechanical powers (the rights of which we have formerly endeavoured to aſſert) will ſenſibly contribute to diſpel theſe terrors.

34 The aſſociation between darkneſs and ſpectres founded in nature.

35 The method of diſſipating the fears of the blind.

Blind.

His inventive faculties ought likewiſe to be indulged with the ſame freedom. The data which they explore may be preſented in ſuch a manner, as to render diſcoveries eaſy: but ſtill let invention be allowed to operate. The internal triumph and exultation which the mind feels from the attainment and conviction of new truths heighten their charms, impreſs them deep on the memory, and give them an influence in practice of which they could not otherwiſe have boaſted.

36 The invention of the blind may be aſſiſted, but neither anticipated nor checked.

There are a ſort of people in the world, whoſe views and education have been ſtrictly confined to one province, and whoſe converſation is of conſequence limited and technical. Theſe, in literary intercourſe, or faſhionable life, are treated with univerſal contempt, and branded with the odious name of *mere men of buſineſs*. Nor is it any wonder that the converſation of ſuch ſhould prove nauſeous and diſguſting. It would be arrogance in them to expect, that indifferent perſons ſhould either enter into their private intereſts, or the peculiarities of their craft, with a warmth equal to their own. We have known the intruſion of ſuch a perſon involve a numerous company in gloom, and terminate the freedom and vivacity of agreeable diſcourſe in lazy yawning and diſcontented ſilence. Of all innocent characters, this ought to be avoided by the blind; becauſe, of all others, it is the character which they run the greateſt hazard of adopting. The limitation of their powers naturally contracts their views and purſuits, and, as it were, concentres their whole intellectual faculties in one, or at beſt in few objects. Care ſhould therefore be taken to afford the mind a theatre for it exertions, as extenſive as poſſible, without diverting it from one great end, which, in order to excel, it ought for ever to have in proſpect.

37 The manners of the blind.

There are few ſciences in which the blind have not diſtinguiſhed themſelves: even thoſe whoſe acquiſition ſeemed eſſentially to depend upon viſion, have at laſt yielded to genius and induſtry, though deprived of that advantage. Mr Saunderſon, whom we formerly mentioned, has left behind him the moſt ſtriking evidences of aſtoniſhing proficiency in thoſe retired and abſtract branches of mathematics which appeared leaſt acceſſible to perſons of his infirmity. Sculpture (G) and painting are not, perhaps, the moſt practicable arts for a blind man; yet he is not excluded from the pleaſing creation and extenſive regions of fancy. However unaccountable it may appear to the abſtract philoſophers, yet nothing is more certain in fact, than that a blind man may, by the inſpiration of the muſes, or, to ſtrip the figure of its mythological dreſs, may, by the efforts of a cultivated genius, exhibit in poetry the moſt natural images and animated deſcriptions, even of viſible objects,

(G) Yet there are inſtances of perſons who have been enabled to take the figure and idea of a face by the touch, and mould it in wax with the utmoſt exactneſs; as was the caſe of the blind ſculptor mentioned by De Piles, who thus took the likeneſs of the Duke de Bracciano in a dark cellar, and made a marble ſtatue of King Charles I. with great elegance and juſtneſs. Vid. *De Piles* Cours de Peint. p. 329. and *Wolf.* Pſychol. Rat. § 162.

Blind. jects, without either incurring or deſerving the imputation of plagiariſm.

In the ſiſter art of muſic, there are, at preſent, living and noble inſtances how far the blind may proceed.

If we look into former periods, we ſhall find illuſtrious and pregnant examples, how amply nature has capacitated the blind to excel both in the ſcientific and practical departments of muſic. In the 16th century, when the progreſs of improvement both in melody and harmony was rapid and conſpicuous, Franciſcus Salinas was eminently diſtinguiſhed. He was born A.D. 1513, at Burgos in Spain; and was ſon to the treaſurer of that city. Though afflicted with incurable blindneſs, he was profoundly ſkilled both in the theory and practice of muſic. As a performer, he is celebrated by his cotemporaries with the higheſt encomiums. As a theoriſt, his book, if we may believe Sir John Hawkins, is equal in value to any now extant in any language. Though he was deprived of ſight in his earlieſt infancy, he does not content himſelf to delineate the various phenomena in muſic, but the principles from whence they reſult, the relations of ſound, the nature, of arithmetical, geometrical, and harmonical ratios, which at that period were eſteemed eſſential to the theory of muſic, with a degree of intelligence which would have deſerved admiration though he had been in full poſſeſſion of every ſenſe requiſite for theſe diſquiſitions. He was taken to Rome in the retinue of Petrus Sarmentus archbiſhop of Compoſtella; and having paſſed twenty years in Italy, he returned to Salamanca, where he obtained the profeſſorſhip of muſic, an office at that time equally reſpectable and lucrative. Having diſcharged it with reputation and ſucceſs for ſome time, he died at the venerable age of 77.

In the ſame period flouriſhed Caſpar Crumbhorn, blind from the third year of his age: yet he compoſed ſeveral pieces in many parts with ſo much ſucceſs, and performed both upon the flute and violin ſo exquiſitely, that he was diſtinguiſhed by Auguſtus elector of Saxony. But preferring his native Sileſia to every other country, he returned thither, and was appointed organiſt of the church of St Peter and Paul in the city of Lignitz, where he likewiſe had often the direction of the muſical college, and died June 11th 1621.

To theſe might be added Martini Peſenti of Venice, a compoſer of vocal and inſtrumental muſic almoſt of all kinds, though blind from his nativity; with other examples equally worthy of public attention. But if vulgar prejudice is capable of bluſhing at its own contemptible character, or of yielding to conviction, thoſe already quoted are more than ſufficient to ſhow the muſical jugglers of our time, who are generally as abſolute ſtrangers to learning and taſte as to virtue, that their art is no monopoly with which thoſe alone who ſee are inveſted by the irreverſible decree of heaven.

For Saunderſon's method of calculation, both in arithmetic and algebra, ſee the account prefixed to his own treatiſe on that ſubject. But there is a much fuller and more circumſtantial detail both of its nature and its various uſes, given by Mr Diderot in his "Letter concerning the Blind, for the uſe of thoſe who ſee," which we ſhall here tranſlate.

Blind. 38 Sanderſon's plan of notation.

"It is much eaſier (ſays that author) to uſe ſigns already invented, than to become their inventor; as one is forced to do, when engaged in circumſtances for which he is not provided. Of what advantage might not this be to Saunderſon to find a palpable arithmetic already prepared for him at five years of age, which he might otherwiſe have felt the neceſſity of inventing for himſelf at the advanced period of twenty-five? This Saunderſon, Madam, is an author deprived of ſight, with whom it may not be foreign to our purpoſe to amuſe you. They relate prodigies of him; and of theſe prodigies there is not one, which his progreſs in belles lettres, and his mathematical attainments, do not render credible.

"The ſame inſtrument ſerved him for algebraical calculations, and for the conſtruction of rectilineal figures. You would not perhaps be ſorry that I ſhould give you an explanation of it, if you thought your mind previouſly qualified to underſtand it: and you ſhall ſoon perceive that it preſuppoſes no intellectual preparations of which you are not already miſtreſs; and that it would be extremely uſeful to you if you ſhould ever be ſeized with the inclination of making long calculations by touch.

"Imagine to yourſelf a ſquare, ſuch as you ſee fig. 1. divided into four equal parts by perpendicular lines at the ſides, in ſuch a manner, that it may preſent you the nine points 1, 2, 3, 4, 5, 6, 7, 8, 9. Suppoſe this ſquare pierced with nine holes capable of receiving pins of two kinds, all of equal length and thickneſs, but ſome with heads a little larger than the others. Plate XCIII.

"The pins with large heads are never placed any where elſe but in the centre of the ſquare; thoſe with ſmaller heads never but at the ſides, except in one ſingle caſe, which is that of making the figure 1, where none are placed at the ſides. The ſign of 0 is made by placing a pin with a large head in the centre of the little ſquare, without putting any other pin at the ſides*. The number 1 is repreſented by a pin with a ſmall head placed in the centre of the ſquare, without putting any other pin at the ſides; the number 2, by a pin with a large head placed in the centre of the ſquare, and by a pin with a ſmall head placed on one of the ſides at the point 1: the number 3, by a pin with a large head placed in the centre of the ſquare, and by a pin with a ſmall head placed on one of the ſides at the point 2: the number 4, by a pin with a large head placed in the centre of the ſquare, and by a pin with a ſmall head placed on one of the ſides at the point 3: the number 5, by a pin with a large head placed in the centre of the ſquare, and by a pin with a ſmall head placed on one of the ſides at the point 4: the number 6, by a pin with a large head placed in the centre of the ſquare, and by a pin with a ſmall head placed on one of the ſides at the point 5: the number 7, by a pin with a large head placed in the centre of the ſquare, and by a pin with a ſmall head placed on one of the ſides at the point 6: the number 8, by a pin with a large head placed in the centre of the ſquare, and by a pin with a ſmall head placed on one of the ſides at the point 7: the number 9, by a pin with a large head placed in the centre of the ſquare, and by a pin with a ſmall head placed on one of the ſides at the point 8. * See fig. 2.

"Here

Blind.

"Here are plainly ten different expreſſions obvious to the touch, of which every one anſwers to one of our ten arithmetical characters. Imagine now a table as large as you pleaſe, divided into ſmall ſquares, horizontally ranged, and ſeparated one from the other at ſimilar diſtances, as you ſee it in fig. 3. Thus you will have the inſtrument of Saunderſon.

39 This notation applied to numerical operations.

"You may eaſily conceive that there is not any number which one cannot expreſs upon this table; and, by conſequence, no arithmetical operation which one cannot execute upon it.

"Let it be propoſed, for inſtance, to find the ſum, or to work the addition of the nine numbers following.

1	2	3	4	5
2	3	4	5	6
3	4	5	6	7
4	5	6	7	8
5	6	7	8	9
6	7	8	9	0
7	8	9	0	1
8	9	0	1	2
9	0	1	2	3

"I expreſs them on the table in the order as they are dictated to me; the firſt figure at the left of the firſt number, upon the firſt ſquare to the left of the firſt line; the ſecond figure, to the left of the firſt number, upon the ſecond ſquare to the left of the ſame line; and ſo of the reſt.

"I place the ſecond number upon the ſecond row of ſquares, units beneath units, and tens beneath tens, &c.

"I place the third number upon the third row of ſquares, and ſo of the reſt. Then with my fingers running over each of the rows vertically from the bottom to the top, beginning with that which is neareſt to my right, I work the addition of the numbers which are expreſſed, and mark the ſurplus of the tens at the foot of that column. I then paſs to the ſecond column, advancing towards the left; upon which I operate in the ſame manner; from thence to the third; and thus in ſucceſſion I finiſh my addition.

40 The ſame inſtrument applied to the conſtruction of rectilineal figures.

"We ſhall now ſee how the ſame table ſerved him for demonſtrating the properties of rectilineal figures. Let us ſuppoſe this propoſition to be demonſtrated, That parallelograms which have the ſame baſis and the ſame height are equal in their ſurfaces. He placed his pins as may be ſeen fig. 4. He gave names to the angular points, and finiſhed his demonſtration with his fingers.

"If we ſuppoſe that Saunderſon only employed pins with large heads to mark the limits of his figures, around theſe he might arrange his pins with ſmall heads in nine different manners, all of which were familiar to him. Thus he ſcarcely found any embarraſſment but in thoſe caſes where the great number of angular points which he was under a neceſſity of naming in his demonſtration obliged him to recur to the letters of the alphabet. We are not informed how he employed them.

"We only know, that his fingers ran over the board with aſtoniſhing agility; that he undertook with ſucceſs the longeſt calculations; that he could interrupt the ſeries, and diſcover his miſtakes; that he proved them with the greateſt eaſe; and that his labours required infinitely leſs time than one could have imagined, by the exactneſs and promptitude with which he prepared his inſtruments and diſpoſed his table.

Blind.

41 Preparation of the inſtrument.

"This preparation conſiſted in placing pins with large heads in the centres of all the ſquares: having done this, no more remained to him but to fix their values by pins of ſmaller heads, except in caſes where it was neceſſary to mark a unit; then he placed in the centre of a ſquare a pin with a ſmall head, in the place of a pin with a large head with which it had been occupied.

"Sometimes, inſtead of forming an entire line with theſe pins, he contented himſelf with placing ſome of them at all the angular points, or points of interſection; around which he tied ſilk threads, which finiſhed the formation of the limits of his figures." See fig. 4.

It may be added by way of improvement, that for the diviſion of one ſeries of numbers from another, a thin piece of timber in the form of a ruler with which lines are drawn, having a pin at each end for the holes in the ſquares, might be interpoſed between the two ſeries to be diſtinguiſhed.

This geometrician left other inſtruments behind him; but as we do not know their uſes, we need not add their deſcriptions.

It muſt be owned, that by the rotation here exhibited every modification of number may be expreſſed, and of conſequence every arithmetical operation ſucceſsfully performed; but we have been recently favoured with another form of palpable arithmetic, which appears to us equally comprehenſive and much more ſimple than that of Saunderſon. It was originally invented, and is ſtill uſed in calculation, by Dr Henry Moyes; a gentleman whom we had formerly occaſion to mention with merited applauſe in this article, and whoſe character and attainments we have endeavoured more fully to illuſtrate than had been done in the former edition; as well from perſonal knowledge as from the anecdotes of Dr Bew, as the moſt eligible introduction to the account of his notation, given in the words of his own letter, and exemplified in a figure copied from a drawing directed by himſelf.

"To the Editor of the Encyclopædia Britannica.

42 Dr Moyes's form of a palpable notation.

"Sir, In compliance with your requeſt, I ſend you the following brief account of a palpable notation which I have generally uſed for theſe 20 years to aſſiſt my memory in numerical computations. When I began to ſtudy the principles of arithmetic, which I did at an early period of life, I ſoon diſcovered to my mortification, that a perſon entirely deprived of ſight could ſcarcely proceed in that uſeful ſcience without the aid of palpable ſymbols repreſenting the ten numerical characters. Being at that time unacquainted with the writings of Saunderſon, in which a palpable notation is deſcribed, I embraced the obvious, though, as I afterwards found, imperfect expedient of cutting into the form of the numerical characters thin pieces of wood or metal. By arranging theſe on the ſurface of a board, I could readily repreſent any given number, not only to the touch, but alſo to the eye; and by covering the board with a lamina of wax, my ſymbols were prevented from changing their places, they adhering to the board from the ſlighteſt preſſure. By this

Blind.

contrivance, I could ſolve, though ſlowly, any problem in the ſcience of numbers: but it ſoon occurred to me, that my notation, conſiſting of ten ſpecies of ſymbols or characters, was much more complicated than was abſolutely neceſſary, and that any given number might be diſtinctly expreſſed by three ſpecies of pegs alone. To illuſtrate my meaning, let A, B, C, D, (fig. 5.), repreſent a ſquare piece of mahogany a foot broad and an inch in thickneſs; let the ſides AB, BC, CD, DA, be each divided into 24 equal parts; let every two oppoſite diviſions be joined by a groove cut in the board ſufficiently deep to be felt with the finger, and let the board be perforated at each interſection with an inſtrument a tenth of an inch in diameter.

"The ſurface of the board being thus divided into 576 little ſquares, with a ſmall perforation at each of their angles, let three ſets of pegs or pins, reſembling thoſe repreſented in the plate at the figures 6, 7, 8, be ſo fitted to the holes in the board, that when ſtuck into them they may keep their poſitions like thoſe of a fiddle, and require ſome force to turn them round. The head of each peg belonging to the firſt ſet is a right-angled triangle about one-tenth of an inch in thickneſs; the head of each peg belonging to the ſecond ſet differs only from the former in having a ſmall notch in its ſloping ſide or hypothenuſe; and the head of each peg belonging to the third ſet is a ſquare of which the breadth ſhould be equal to the baſe of the triangle of the other two. Theſe pegs ſhould be kept in a caſe conſiſting of three boxes or cells, each cell being allotted to a ſet, and the caſe muſt be placed cloſe by the board previous to the commencement of every operation. Each ſet ſhould conſiſt of 60 or 70 pegs (at leaſt when employed in long calculations); and when the work is finiſhed, they ſhould be collected from the board and carefully reſtored to their reſpective boxes.

"Things being thus prepared, let a peg of the firſt ſet be fixed into the board, and it will acquire four different values according to its poſition reſpecting the calculator. When its ſloping ſide is turned towards the left, it denotes one, or the firſt digit; when turned upwards, or from the calculator, it denotes two, or the ſecond digit; when turned to the right, it repreſents three; and when turned downwards, or towards the calculator, it denotes four, or the fourth digit. Five is denoted by a peg of the ſecond ſet, having its ſloping ſide or hypothenuſe turned to the left; ſix, by the ſame turned upwards; ſeven, by the ſame turned to the right; and eight, by the ſame turned directly down, or towards the body of the calculator. Nine is expreſſed by a peg of the third ſet when its edges are directed to right and left; and the ſame peg expreſſes the cypher when its edges are directed up and down. By three different pegs the relative values of the ten digits may therefore be diſtinctly expreſſed with facility; and by a ſufficient number of each ſet the ſteps and reſult of the longeſt calculation may be clearly repreſented to the ſenſe of feeling. It ſeems unneceſſary to illuſtrate this by an example; ſuffice it to expreſs in our characters the preſent year of the Chriſtian era in 1788: Take a peg of the firſt ſet and fix it in the board with its ſloping ſide turned towards the left equal to one; take now a peg of the ſecond ſet and fix it in the next hole in the ſame groove, proceeding as uſual from left to right, with its ſloping ſide turned to the right, equal to 7; next take a peg of the ſame ſet and fix it in the next hole, with its ſloping ſide turned downwards, equal to 8; laſtly, take another peg of the ſame ſet, and place it in the next hole in the ſame poſition, equal to 8; and the whole will expreſs the number required. Blind.

"When it is neceſſary to expreſs a vulgar fraction, I place the numerator in the groove immediately above, and the denominator in that immediately below the groove in which the integers ſtand; and in decimal arithmetic an empty hole in the integer groove repreſents the comma or decimal point. By ſimilar breaks I alſo denote pounds, ſhillings, pence, &c. and by the ſame expedient I ſeparate in diviſion the diviſor and quotient from the dividend.

"This notation, which ſupplies me completely with coefficients and indices in algebra and fluxions, ſeems much ſuperior to any of the kind hitherto made public in the weſt of Europe. That invented and deſcribed by Mr Grenville, having no leſs than ten ſets of pegs, is by much too complicated for general practice; and that which we owe to the celebrated Saunderſon is apt to puzzle and embarraſs the calculator, as the pegs repreſenting the numerical digits can ſeldom or never be in the ſame ſtraight line. If you agree with me that the above notation may promote the knowledge, and therefore the happineſs, of perſons denied the benefit of ſight, you have my conſent to give it a place in the preſent edition of your valuable work. I am, Sir, with reſpect, your obedient ſervant,

HENRY MOYES."

We have ſeen the machine above mentioned, which was exhibited to the ſociety for the improvement of polite arts, &c. by Mr Grenville, who is himſelf alſo deprived of ſight. But though this has met with the approbation of Mr Stanley, we cannot forbear to think it leſs ſimple in its ſtructure than that of Dr Moyes's, more multiform in its apparatus, and of conſequence more laborious and complex in the proceſs of its operation; for where every ſingle peg has only one power, and acquires no diverſity of value from its poſition, their forms muſt be indefinitely varied and their numbers prodigiouſly multiplied; which muſt coſt both the memory and judgment of the pupil numberleſs painful and fatiguing exertions before he contracts a habit of uſing the inſtrument with promptitude and ſucceſs. On theſe accounts, a particular deſcription of it is omitted in this place.

43
A new mathematical inſtrument propoſed.

In the higher parts of mathematics, ſuch as conic ſections, the ſame ſolid figures which are mediums of perception to thoſe who ſee, may perform the ſame uſeful office to the blind. But, for the ſtructure of ſuperficial figures, we ſhould imagine, that a kind of matter might be found ſoft enough to be eaſily ſuſceptible of impreſſions, yet hard enough to retain them till effaced by an equal preſſure. Suppoſe, for inſtance, a table were formed, four feet broad and eight in length; for the figures, that they may be the more ſenſible to the touch, ought to be larger than ordinary. Suppoſe this table had brims, or a moulding round it, riſing an inch above the ſurface: let the whole expanſe, then, be filled with bees-wax, and the ſurface above preſſed extremely

Blind.

extremely even with a poliſhed board, formed exactly to fit the ſpace within the mouldings. This board will always be neceſſary to efface the figures employed in former propoſitions, and prepare the ſurface for new ones. We think we have pondered the minuteſt inconvenience that can ariſe from this method of delineating and conceiving geometrical truths; and, after all, the table appears to us the beſt and the leaſt troubleſome apparatus which a blind man can uſe. We can ſee no reaſon why general ideas of geography or topography might not be conveyed to him in the ſame manner, by ſpheres compoſed of or covered with the ſame impreſſible matter.

44 Geographical inſtruments propoſed for the blind.

Such were the mediums that occurred to the author, when this article was originally written, for conveying to perſons deprived of ſight thoſe remote and complicated truths which viſion alone was thought capable of repreſenting; but a work has been lately publiſhed at Paris which ſuperſedes every former attempt to promote or facilitate the improvement of the blind. The invention of a plan ſo arduous in its appearance and ſo practicable in its execution, demanded the higheſt exertions of the nobleſt genius to produce it, and the moſt ſtrenuous efforts of indefatigable humanity to render it effectual. It is entitled, "An Eſſay on the Education of the Blind." Its object is to teach them, by palpable characters impreſſed on paper, not only the liberal arts and ſciences, but likewiſe the principles of mechanical operation, in ſuch a manner, that thoſe who have no genius for literary improvement may yet become reſpectable, uſeful, and independent members of ſociety, in the capacity of common artiſans. By theſe tangible ſignatures they are taught to read, to write, and to print; they are likewiſe inſtructed in geometry, in algebra, geography, and, in ſhort, in every branch of natural philoſophy. Nor are their efforts circumſcribed by mere utility; a taſte for the fine arts has likewiſe been cultivated among them. They have been taught to read muſic with their fingers as others do with their eyes; and though they cannot at once feel the notes and perform them upon an inſtrument, yet are they capable of acquiring any leſſon with as much exactneſs and rapidity as thoſe who enjoy all the advantages of light. But we ſhall give a more particular account of the wonderful topics contained in this eſſay. In his firſt chapter the author diſcovers the end propoſed by that delineation of culture which he offers to the blind; it is to enlarge their ſphere of knowledge, and of conſequence to increaſe their capacities and improve their powers of action, ſo that they may become happy and independent in themſelves, and uſeful and agreeable to others. The 2d chapter contains an anſwer to the objections urged againſt the general utility of this inſtitution. Theſe objections are candidly ſtated, and anſwered in the moſt ſatisfactory manner; but were we to recapitulate them in detail, it would protract this article to a length much beyond its due proportion, even upon the extended plan of the Encyclopædia. The 3d chapter treats of reading as adapted to the practice of the blind. The 4th chapter conſiſts of anſwers to various objections againſt the method of reading propoſed for the blind; but theſe, for reaſons formerly given, we cannot with propriety delineate in this article. In the 5th chapter is ſhown the art of printing as practiſed by the blind for their peculiar uſe. In the 6th chapter is deſcribed the manner of teaching the blind the art of printing for thoſe that ſee. In the 7th is repreſented the manner of teaching the blind to write. The 8th chapter explains the method of teaching the blind arithmetic; the 9th, geography; the 10th, muſic. The 11th, contains an account of the mechanic arts in which the blind are employed, and of the way by which they are formed for ſuch occupations. The 12th ſhows in general the proper manner of inſtructing the blind, and draws a parallel between their education and that of the deaf and dumb. Chapter 13th treats of the method of inſtructing them in the languages, mathematics, hiſtory, &c. What remains of the books is taken up with notes which illuſtrate each particular chapter; a ſhort hiſtorical account of the riſe, the progreſs, and the preſent ſtate, of the academy for the formation of the blind; an ode on the cultivation of the blind, by one that laboured under that affliction; an extract from the regiſter of the royal academy of ſciences; opinion of the printers; models of the various pieces which blind children are capable of printing; and an account of the exerciſes performed by blind children in preſence of the king, queen, and royal family, during the Chriſtmas ſolemnities 1786. Thus having given a curſory view of the various topics contained in the eſſay, we proceed to give ſome account of the manner in which the blind print and write.

45 Account of a new plan for the improvement of the blind.

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46 Printing performed by the blind.

The blind compoſitor, then, has a box for every alphabetical character in uſe; on the outſide of theſe boxes are palpably marked the peculiar character belonging to each; they are filled with types, which he chooſes and ſets as they are called for, but not in the poſition in which they are to be read; on the contrary, they are inverted as objects are ſeen painted on the retina of an eye by an optician. Having thus fixed and arranged his types, he chooſes a page of the ſtrongeſt paper that can be found, which he gently moiſtens in a degree ſufficient to render it more eaſily ſuſceptible of impreſſions, without being dilacerated or worn by the ſhock which it muſt afterwards undergo. He then lays it upon the types; and by the cautious operation of the preſs, or by the eaſy ſtrokes of a little hammer, which are frequently repeated over the whole expanſe, he cauſes the impreſſion of the type to riſe on the oppoſite ſide of the paper, where, when dry, it continues not only obvious to the ſight but the touch, and is far from being eaſily effaced. On the upper ſide of the paper the letters appear in their proper poſition, and by their ſenſible elevation above the common ſurface render it practicable for the blind to read them with their fingers. Their manner of writing is analogous to this operation: the pupil, by repeated experiments, having familiariſed himſelf to the forms of the letters, both in their inverted and in their proper poſition, gradually learns to delineate them upon paper, moiſtened as before, with the point of an iron pen, which has no ſplit, and which is juſt ſharp enough to impreſs without piercing the paper: thus, on the ſide next to the writer's hand, the letters are formed ſunk and inverted; but when the paper is turned they appear right and *in relievo*. Thus the blind are enabled to form and decypher, not only the characters required in common language, but alſo mathematical diagrams, arithmetical and geographical

47 Their manner of writing, &c.

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proceſſes, and all the characters uſed in the written language of muſic. If this account ſhould appear incredible to any of our readers, let him be informed, that the author of this article has converſed with two gentlemen of learning and veracity who ſaw the blind perform all the wonders here recapitulated with aſtoniſhing ſucceſs, to the univerſal ſatisfaction of numberleſs ſpectators whom curioſity and compaſſion impelled to viſit the academy, that they might behold with their own eyes a ſpectacle ſo intereſting to humanity. Let the incredulous be alſo informed, that the compoſer of the article has in his own hands a copy of this work now reviewed, which is printed and bound by the blind themſelves. They exhibit at their own academy every Wedneſday and Saturday between one and two o'clock at noon, to crowds of charitable admirers, by whoſe liberal donations the inſtitution is now chiefly ſupported.

48 The blind ſuſceptible of aſtronomy.

The knowledge of aſtronomy might likewiſe be of infinite uſe, both by enlarging the blind perſon's ideas of the univerſe, and by giving him higher and more confirmed impreſſions of that energy by which the ſtars are moved, and of that deſign by which their motions are regulated. But theſe objects are too vaſt; their diſtances, their magnitudes, their periods of revolution, are too complex to be apprehended in the mind, or impreſſed in the memory, without ſenſible mediums. For this purpoſe, an orrery, or ſome machine of a ſimilar conſtruction, will be indiſpenſably requiſite.

49 Of natural philoſophy.

The ſcience of cauſes and effects might likewiſe yield him the moſt ſublime and rational entertainment of which an intelligent being, in his preſent ſtate, is ſuſceptible. By this he might enter into the laws, the viciſſitudes, the economy of nature. Nor is it abſolutely neceſſary that he ſhould be an ocular witneſs of the experiments by which theſe laws are detected and explained. He may ſafely take them for granted; and if, at any time, a particular experiment ſhould prove faithleſs, he may, from general principles, be able to diſcover its fallacy, whether in the nature of the ſubject, the inaptitude of the inſtruments, or the proceſs of the execution. The laws of motion, the various ratios or proportions of forces whether ſimple or compound, he may calculate and aſcertain by the ſame means and in the ſame method ſo happily uſed by Saunderſon.

50 Of moral philoſophy and theology.

Moral and theological knowledge he may eaſily obtain, either from books, or inſtructions delivered *viva voce*. The laſt, if communicated by one who underſtands and feels the ſubject, with a proper degree of perſpicuity and ſenſibility, are infinitely the moſt eligible. By morals, we would not merely be underſtood to mean a regular and inculpable ſeries of action, but the proper exertion and habitual arrangement of the whole internal economy, of which external actions are no more than mere expreſſions, and from which the higheſt and moſt permanent happineſs alone can proceed. By theology, we do not mean that ſyſtematic or ſcholaſtic jargon, which too frequently uſurps its venerable name; but thoſe ſublime and liberal ideas of the nature and government of a Supreme being, whether diſcoverable by nature or revealed in Scripture, which enforce every moral obligation, which teach us what is the ultimate good of our nature, which determine our efforts and animate our hopes in purſuing this moſt important of all objects. What Cicero ſays of the arts and ſciences may with great propriety be applied to religion: *Nam cætera neque temporum ſunt, neque ætatum omnium, neque locorum; et hæc ſtudia adoleſcentiam alunt, ſenectutem oblectant, ſecundas res ornant, adverſis perfugium ac ſolatium præbent: delectant domi, non impediunt foris; pernoctant nobiſcum, peregrinantur, ruſticantur.* Tranſlated thus: 'For other ſtudies are not ſuited to every time, to every age, and to place: but theſe give ſtrength in youth, and joy in old age; adorn proſperity, and are the ſupport and conſolation of adverſity; at home they are delightful, and abroad they are eaſy; at night they are company to us; when they travel, they attend us; and in our rural retirements, they do not forſake us.'

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To this may be added, that the joys of religion are for ever adequate to the largeſt capacity of a finite and progreſſive intelligence; and as they are boundleſs in extent, ſo they are endleſs in duration. We have already, more than once, obſerved, that the ſoul of a blind man is extremely obnoxious to melancholy and dejection. Where, therefore, can he find a more copious, intimate, permanent, and efficacious ſource of comfort than in religion? Let this then be inculcated with the utmoſt care and aſſiduity. Let the whole force of the ſoul be exerted in ſhowing him that it is reaſonable. Let all the nobleſt affections of the heart be employed in recommending it as amiable; for we will venture to aſſert, that the votary of religion alone is the man,—

Quem, ſi fractus illabatur orbis,
Impavidum ferient ruinæ;

Thus tranſlated;

Whom, though with nature's wreck oppreſs'd,
Unmanly fears could ne'er infeſt.

When the ſituation of the blind, and its natural effects upon their characters, are conſidered; when we reflect how exquiſite their diſtreſſes, how pungent their diſappointments, how ſenſible their regrets, how tedious and gloomy their periods of ſolitude; we muſt be wretches indeed, if we can grudge either labour or expence in procuring them every ſource of entertainment, which, when procured, remains in their own power, and yields what may be in ſome meaſure termed *ſelf-derived enjoyment*. Theſe amuſements are prolific of numberleſs advantages: they afford us at once entertainment and exertion; they teach us to explore a thouſand reſources for preſervation and improvement, which would otherwiſe have eſcaped our attention; they render us awake and ſenſible to a thouſand notices both of external and intellectual objects, which would otherwiſe have paſſed unobſerved.

Thus far have we proceeded without mentioning philological learning; though we know it to be attainable by the blind in a high degree, and though we are conſcious of its importance both to their uſe and ornament. But as it is not indiſpenſable, and as its acquiſition is tedious and operoſe, we thought it leſs neceſſary to be early and minutely ſpecified. We cannot doubt, that learning different languages adds to the treaſure of our ideas, and renders thoſe which

we

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we poſſeſs more clear and definite. It muſt be acknowledged, that the poſſeſſion of other languages elucidates our own. The technical terms of almoſt every ſcience are exotic; and without clearly underſtanding thoſe, we cannot properly poſſeſs the ideas of which they are the vehicles. But theſe motives are common to every candidate for philological improvement with the blind.

51 Of grammar.

The paths of grammar, however, are dry and rugged; and it will be neceſſary for the pedagogue, whoever he is, to take all the opportunities that offer of enlightening the darkneſs and poliſhing the aſperities of the road. When, therefore, the intellect of the pupil begins to open and exert its penetration, it will be proper to ſhow him how the nature, the forms, and arrangements, of words, flow from our ideas and their relations. Every ſubſtance muſt naturally be in ſome ſtate; it muſt either act, or be acted upon. The actions which it performs or ſuffers muſt be performed or ſuffered in ſome definite manner or degree. It muſt likewiſe have ſome qualities, whether temporary and accidental, or natural and permanent. Theſe qualities muſt likewiſe be ſuſceptible of degrees. When different ſubſtances are conſidered in the ſame ſtate, its common participation forms a connexion: when regarded in different ſtates, that difference forms an oppoſition. The conſtant reputation of the names of ſubſtances and qualities produces a diſagreeable monotony in language. They muſt therefore be implied in other words, which likewiſe in ſome caſes ſerve to connect the parts of a ſentence. There is a difference between ſuch words as imply the connexion of ſentences, and ſuch as imply the connexion of ſtates or circumſtances. Actions to be performed or ſuffered may be either poſitively affirmed of any ſubſtance, or merely attributed to them. Living and percipient ſubſtances have immediate ſenſations of pain or pleaſure, which likewiſe are productive of deſire and averſion. To theſe ſentiments particular ſounds are adapted, whether immediately inſpired by nature, or reſulting from aſſociation and tacit convention.

Thus we have a foundation for all the different parts of ſpeech; and from their natures and offices their forms and arrangements may be deduced, according to the analogy of every language.

52 The blind ſuſceptible of logic, hiſtory, and the *belles lettres*.

The art of reaſoning, the knowledge of hiſtory, and a taſte for the *belles lettres*, are eaſily attainable by the blind; and as they are copious funds of entertainment, they ſhould be inculcated, though at the expence of care and labour.

53 A companion ſhould be united to the blind by more than the ties of intereſt and convenience.

The relations of perſons ſubjected to this misfortune, if in eaſy circumſtances, will find it highly conducive to the improvement of their charge, to ſelect ſome one among his coevals, of a ſound underſtanding, a ſweet and patient temper, a docile mind, a warm heart, and a communicative diſpoſition. Theſe two ſhould be taught to find their intereſt and happineſs in their connexion one with another. Their bed, their board, their walks, their entertainments, their leſſons, ſhould be common. Theſe are the beſt eyes with which art can endow a blind man: and if properly ſelected, they will on ſome occaſions yield very little, in utility and perfection, to thoſe of nature; nay, at ſome junctures they may be preferable.

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If the blind muſt depend upon the exerciſe of their own powers for bread, we have already pointed out muſic as their eaſieſt and moſt obvious province; but let it at the ſame time be remembered, that mediocrity in this art may prove the bittereſt and moſt effectual curſe which a parent can inflict upon his offspring, as it ſubjects them to every vicious impreſſion or habit which may be imbibed or contracted from the loweſt and moſt abandoned of mankind. If your pupil, therefore, be not endowed with natural talents exquiſitely proper both for the theory and practice of this art, ſuffer him by no means to be initiated in it. If his natural genius favours your attempts, the ſpinet, harp, or organ, are the moſt proper inſtruments for him to begin: becauſe by theſe inſtruments he may be made more eaſily acquainted with the extent of muſical ſcales, with the powers of harmony, with the relations of which it is conſtituted, and of courſe with the theory of his art. It would be not only unneceſſary, but impracticable, to carry him deep into the theory, before he has attained ſome facility in the practice. Let, therefore, his head and his hands (if we may uſe the expreſſion) be taught to go *pari paſſu*. Let the one be inſtructed in the ſimpleſt elements, and the others conducted in the eaſieſt operations, firſt: contemplation and exerciſe will produce light in the one and promptitude in the other. But as his capacity of ſpeculation and powers of action become more and more mature, diſcoveries more abſtract and retired, taſks more arduous and difficult, may be aſſigned him. He ſhould be taught the names and gradations of the diatonic ſcale, the nature and uſe of time, the diverſity of its modes whether ſimple or mixed. He ſhould be taught the quantity or value of notes, not only with reſpect to their pitch, but to their duration. Yet, let him be inſtructed not to conſider theſe durations as abſolutely fixed, but variable according to the velocity of the movements in which they are placed. Thus we reckon a ſemibreve equal to 4 vibrations of a pendulum; a minim to 2; a crotchet to 1, &c. But if the number of aliquot parts, into which a ſemibreve is divided, be great, and conſequently the value of each particular part ſmall, the minim, crotchet, quaver, &c. will increaſe in their intrinſic durations, though they muſt always preſerve the ſame proportions relatively one to another. He ſhould never be habituated to take a piece of muſic, either from the ſound of a voice or an inſtrument. His companion ought to read the muſic by the names and values of its character, with the ſame exactneſs as the words in any other language. When he becomes a conſiderable adept in the art, tangible ſigns may be invented, by which he may not only be enabled to read, but even to ſet, muſic for himſelf. Such exerciſes will render him infinitely more accurate, both in his principles and practice, than he would otherwiſe be.

54 Muſic one of the moſt proper employments for the blind. Mediocrity, however, pernicious.

There is a hint of ſuch tangible ſigns given in Tanſure's muſical grammar, p. 93. and which, though (like the reſt of the book) obſcure and indigeſted, may be improved and applied with advantage.

For the ſake of thoſe in whoſe hands it may not be, we quote the paſſage at length.

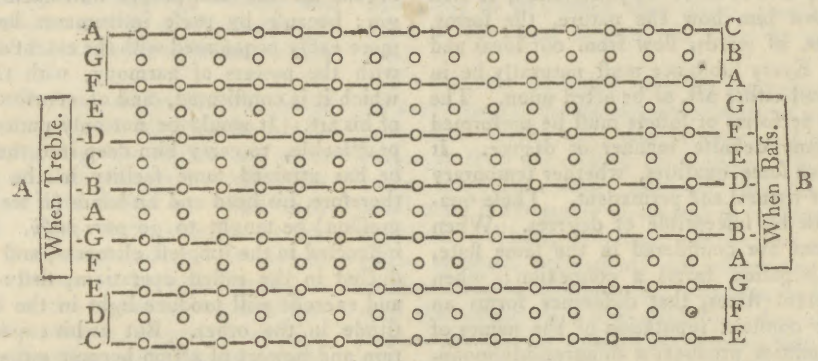
55 Scheme of muſical imitation.

"As it is the pleaſure of the Almighty, that ſome perſons are deſtitute of *eye-ſight*; in like manner it is

Blind. his infinite goodneſs to make them a double amends another way, by giving them a greater ſhare of memory, &c. whereby they become very dexterous in playing on muſical inſtruments, mathematics, &c. as we may obſerve by Dr Stanley organiſt of St Andrew's Holburn in London, the blind profeſſor of mathematics in the univerſity of Cambridge, and many others too tedious here to mention, who were born *blind*, and never ſaw the leaſt glance of light; yet God gave them ſuch a light in *knowledge*, that they became the wonder of all ſuch as had the benefit of ſeeing, &c. Blind.

"And as *blind perſons*, at firſt, cannot poſſibly have ſo clear an idea of *notes* and *muſical characters* as they that ſee them, until they are taught by a maſter or tutor: I have (for the good-will I bear to ſuch unfortunate perſons) contrived the following table; that, by *feeling*, they may underſtand notes, and learn any tune that ſhall be ſet them, in their maſter's abſence.

A New MUSIC-TABLE *for ſuch as are* BLIND.



EXPLANATION.

"Let A—B be a ſmooth board, 3 or 4 feet long, 1 inch thick, and 9 inches wide, with 5 ſquare ledges glued thereon, each being half an inch aſunder, half an inch wide, and half an inch high; which riſing ledges repreſent our 5 lines of muſic, and their ſpaces: and the 2 outward lines, being made a little lower, may ſerve as leger lines on occaſion. The cyphers repreſent ſo many holes bored into every line and ſpace, half an inch aſunder; wherein *pegs* of different ſhapes are to be ſet, to repreſent the ſeveral ſorts of notes and characters of the tune; which pegs the blind perſon may know by feeling, as well as he does his keys of the organ or harpſichord: ſo that, by keeping his fingers on the 5 lines, he feels the ſeveral pegs as they come on, and are ſet to repreſent the ſeveral ſorts of notes, on both line and ſpace; whilſt his right hand ſtrikes the reſpective key, &c. he firſt knowing the names of all his keys, his lines, ſpaces, and the mark of every peg. Let each peg be about half an inch high, when ſet in very faſt. [N. B. The blind perſon muſt firſt be taught the names of the above lines and ſpaces in both the treble and baſs cliffs; and that he muſt feel his treble with his right hand, and his baſs with the left hand; each being contrary, as you may ſee by the letters of the above table, A and B; and muſt learn each part ſeparate.]

"Of pegs, he muſt have a great number of every ſort, to ſet his tune with, which he may mark as follows:

For a *Semibreve*, 4 top-notches.
Minim, 2 top-notches.
Crotchet, 1 top-notch,
Quaver, 1 corner cut off.
For a *Semiquaver*, 2 corners cut off.
Demiſemiquaver, all 4 corners cut off.
Reſts, a notch in the corner.
A *Flat*, 1 notch on the ſide.
Sharp, 2 notches on the ſide.
Point, 3 notches on the ſide.
Bar, a flat thin top.
Repeat, a ſharp pointed top, &c. &c. &c.

"But it is beſt for every performer to make and mark his own pegs; and deliver them one by one as they are called for by the perſon that ſets his *tune*."

Thus far our author. We have already complained that Tanſure's Muſical Notation is imperfect; and perhaps every table or inſtrument of the ſame kind may be liable to the ſame cenſure, as not being comprehenſive of all the characters in the written language of muſic, ſo that the blind reader may find no deficiency in acquiring any leſſon: yet as the cuſhion of Mr Cheeſe appears to have more powers than any other inſtrument for the ſame purpoſe that has hitherto occurred to our obſervation, though attended with many formidable objections, we here inſert it. It may poſſibly, however, be beſt for every blind adept in the muſical art, after being ſufficiently inſtructed in its theoretical and practical principles, to invent for himſelf a table, by which may be expreſſed all the various phenomena of muſic, in which, by varying the forms and poſitions of his pegs, he may habitually aſſociate them with ſounds, durations, reſts, intervals, chords, cadences, da-capos, repeats, and all the various graces which give animation and expreſſion to muſical ſounds: for thus, being the immediate creatures of his own imagination, they will more eaſily become familiar to his memory, and be more ſtrongly and readily aſſociated with the phenomena

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phenomena which they are intended to ſignify, than if he had aſſumed the inventions of any other.

56 Cheeſe's machine, Pl. XCIII. fig. 9.

Mr Cheeſe's deſcription of his machine for teaching muſic to people deprived of ſight, and to enable them to preſerve their compoſitions, in the act of compoſing, without the aſſiſtance of a copyiſt.—"That part of the machine which repreſents the book, or paper, is a ſmall cuſhion ſtuffed, on a little frame; along which, is ſewed a number of packthread ſtrings at equal diſtances from each other; theſe repreſent the lines in a muſic book: the five which compoſe the ſtave, are made of large twine; and thoſe which repreſent the leger or occaſional lines, drawn through the heads of the notes, where the muſic exceeds the compaſs of the eſtabliſhed ſtave, and made of ſmall twine, and are on this machine of the ſame length as the others.

"If the practitioner only wiſhes to write harpſichord muſic, the cuſhion may be what length he pleaſes, and about five or ſix inches wide: the ſtrings muſt be ſewed in the following order; beginning with the firſt or loweſt, near the edge of the cuſhion; four ſmall ones, which correſpond with the notes in the baſe of the inſtrument ff, rr, cc, ee: Next five large ones, for the ſtave which correſpond with the lines in the book, or notes in the inſtrument g, b, d, f, r; one ſmall one, which repreſents the occaſional line between the baſe and treble, or middle c; five large ones for the treble ſtave, which make the notes e, g, b, d, f; three ſmall ones, which repreſent the leger lines when the muſic goes in alt. Theſe provide for the note a in alt, c in alt, and e in alt; in the ſpace above which, next the edge of the cuſhion, the f in alt is wrote, when it is wanting, which completes the compaſs of the inſtrument.

"Thoſe who only ſing or play on ſingle inſtruments, ſuch as violins, &c. ſhould have their cuſhions not above half the width of thoſe above-mentioned, upon which there ſhould be but one ſtave, and that in the following order:—Two ſmall lines at bottom, five large ones in the middle, and three ſmall ones at top. Neither of the outſide lines of theſe ſmall cuſhions ſhould be ſewed cloſe to the edge, as there are notes ſuppoſed above and below. At either end of theſe ſmall cuſhions, there ſhould be a ſmall wire ſtaple, in order that any number of them may be combined together at pleaſure, by running a rod through the ſtaples: this will enable the practitioner to write what muſicians call SCORE, in any number of parts he pleaſes; and by this means a thorough knowledge of the great works of Handel, and all other claſſical authors, may be acquired as well without ſight as with it.

"The characters uſed to write on this machine are pins; ſome with two, three, or more heads; others bent in different forms—ſome, the heads taken off and the top beat flat; ſome of theſe are ſplit; others the heads taken off, and placed near the middle. The bars are pieces of wire crooked at each end; a double bar is made by placing two ſingle ones cloſe together; a double ſharp and double flat in the ſame manner.

"The characters are kept in a box in the ſame ſtyle as the printer keeps his types; each different compartment of which muſt be marked with a character in writing, ſignifying what each, contained in the ſeveral compartments, is intended to repreſent. That the maſter may be acquainted with them, the ſtudent muſt be taught to diſtinguiſh each of the characters contained in the box by the feel, as well as the names of each line and ſpace upon the cuſhion. When he can do this readily, ſome muſic ſhould be read to him, which it will be well for him to copy on the cuſhion: and when that is filled, let it be laid on the deſk of the harpſichord before him; and then by feeling over a paſſage or ſentence at a time, and afterwards playing it, his playing always commencing with the beginning of the piece, or at ſome particular part of it, this will ſoon enable him to recollect the whole, when the hands are taken off the cuſhion, to play what has been laſt felt. One of thoſe characters, called a direct, muſt be placed againſt the note to be next felt: This will enable the ſtudent to go on again, after playing, without any difficulty. The perſon who reads the muſic, muſt be inſtructed not to call the lines or ſpaces by the letters which diſtinguiſh them, leſt confuſion may enſue, every eighth being the ſame; but muſt read in the following manner: firſt the name of the character muſt be mentioned, whether minim, crotchet, or quaver, &c. then the line or ſpace; as for example, minim on the firſt line, crotchet on the firſt ſpace, quaver on the ſecond, &c. &c. When the muſic exceeds the compaſs of the ſtave, it muſt be particularly mentioned whether above or below, firſt calling the character, then the leger line or ſpace.

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"The technical term at the beginning of each piece, is better remembered than wrote down on the machine: The accidental terms, which are beſt marked by placing ſome character, not much uſed, either above or below the note on which it happens, the ingenious mind will find out a method of doing for itſelf.

"This machine will not only teach muſic; but calling the characters letters, any one will be enabled to ſpell, read, or write down his ſentiments on any ſubject, and even convey them to his friend without the aſſiſtance of a ſecretary. Arithmetic may be alſo taught upon this machine; as by calling the dot 1, and the pauſe 10, a complete ſet of figures will be formed.

"*Explanation of the figures.* A, B, C, D, the form of the cuſhion, which in its full ſize is about three feet long, and five inches and three quarters wide, having thereon a repreſentation of muſical notes, ſhown by different pins ſtuck on it. The lines a, b, c, d, e, are of large packthread; and the lines f, g, h, are of ſmall twine.

"Pins, N° 1. A ſemibreve. 2. A ſemibreve reſt. 3. A minim. 4. A minim reſt. 5. Dots. 6. A crotchet. 7. A crotchet reſt. 8. A quaver. 9. A quaver reſt. 10. A ſharp. 11. A ſemiquaver. 12. A ſemiquaver reſt. 13. A demiquaver. 14. A demiquaver reſt. 15. A flat. 16. A demiſemiquaver. 17. A demiſemiquaver reſt. 18. A ſemidemiquaver. 19. A ſemidemiquaver reſt. 20. A natural. 21. Bars. 22. A direct. 23. A tye. 24. Baſs. 25. Tenor cliff. 26. Treble cliff. 27. A repeat. 28. Pauſe. 29. This character placed on any line or ſpace, ſignifies as many notes on that line or ſpace as there are doubles on the pins; if turned upwards, it implies the ſame number aſcending; if downward, that number deſcending. 30. A beat or inverted ſhake. 31. A ſhake; and where there is a dot placed over it, ſignifies a turned ſhake. Two dots placed over each other, above the notes, without this character, ſignify a turn only. 32. This character is uſed over the note to ſignify *forte;* and if a dot is placed

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placed above it, *fortiſſimo:* if the dot is placed above the note and below the character, it implies *creſcendo;* if the character is placed below the note, it ſignifies *piano;* and if a dot is placed under it, *pianiſſimo;* but if the dot is above the character, and below the note, it ſignifies *diminuendo.* In concertos, the inventor uſes the ſame character placed above the note in the ſame manner, with two dots over it to ſignify *toote:* and below the notes, with two dotes under it, to ſignify *ſolo:* in vocal muſic, the ſame character above the notes, with three dots over it, ſignifies *ſymphony;* and below the notes, with three dots under it, ſignifies *ſong.*"

It is certain, that when playing concertos, or, if you pleaſe, when performing in *ſcore*, the blind muſt depend upon memory, and upon memory alone: but happily their retentive powers are remarkably ſtrong; and there are few pieces in muſic which will be found either too intricate to be acquired, or too long to be remembered, by a perſon deprived of ſight. Mr Stanley, the gentleman formerly mentioned by Tanſure, performs what is ſtill more aſtoniſhing. If our information, which we cannot doubt, be true, he accompanies any leſſon with a thorough baſs, though he never has heard it before. We have never yet heard of any perſon, though bleſſed with the full uſe of ſight, and with all the advantages accruing from it, who could thus anticipate harmony before the chords were founded, and accompany it in a manner ſuitable to its nature.

When he becomes a more profound theoriſt, if he has adopted the notion that muſic and geometry are congenial and inſeparable (which, however, in our judgment is frivolous), he may peruſe Malcom's Eſſay on Muſic, and Treydell's Theory and Practice of Muſic. But if he chooſes to hear the ſame principles delivered without that unneceſſary parade and oſtentation of profundity, let him be inſtructed by D'Alembert (ſee the article Music in this Dictionary); by Rameau, in his principles of compoſition; and by Rouſſeau's Muſical Dictionary (the ſubſtance of which is engroſſed in the preſent Work, either under the reſpective detached articles, or in the notes added to the article Music). It is true, that the forms and proportions of inſtruments, the thickneſs, length, and tenſion of muſical ſtrings, may be mathematically adjuſted; their relations one to another may be determined by the coincidence of their vibrations, or by the number and velocity of theſe vibrations when diſſonant; but experience and a good ear are amply ſufficient for theſe purpoſes. Yet, if the neceſſity of geometry in muſic ſhould ſtill remain an indelible article in his creed, he may peruſe Dr Smith's Philoſophical Principles of Harmony. There has alſo lately been publiſhed an explication of Tartini's theory, entitled, *The Principles and Power of Harmony;* which, after he has made conſiderable progreſs, may be read to him with ſenſible improvement.

57 Apoſtrophe to the public.

Thus we have endeavoured to form an eſtimate of the inconveniences ſuffered, and the advantages poſſeſſed, by the blind; we have attempted to ſhow, of what kind of culture their remaining faculties are ſuſceptible, and what appeared to us the eaſieſt and propereſt means of their improvement. We have illuſtrated not only its poſſibility, but its certainty, by inconteſtable facts, which demonſtrate, even in the eyes ſcepticiſm and incredulity, to what degrees of eminence, both in the mechanical and liberal arts, the blind may be carried. Blind.

It now remains to demand a categorical anſwer from ſociety, Whether it is more humane and eligible, that ſuch unhappy perſons ſhould be ſuffered to languiſh out their lives in torpid and miſerable obſcurity, wretched in themſelves, and burdenſome to others; or to cultivate and improve their powers in ſuch a manner, as that they may be qualified for internal enjoyment and public utility? Surely there is not a human being, who does not diſgrace the works of God, that can be at any loſs in anſwering this queſtion. Have we not then a right to call the world to an account? have we not a right to demand, why rational beings ſuſceptible of felicity in themſelves, and capable of transfuſing happineſs through the ſocieties with whom they are connected, ſhould be abandoned to a ſtate of inſignificance and miſery? Is it poſſible that men who are every moment ſubjected to the ſame contingencies with which they behold their fellow-creatures afflicted, ſhould not with all their ſouls endeavour to alleviate the misfortunes of their ſuffering brethern? Is the native and hereditary portion of human woe ſo light and ſupportable in itſelf, that we ſhould neglect and deſpiſe thoſe to whom it is embittered by accidental circumſtances of horror and diſtreſs? You who are parents, who feel the ſtrong and powerful pleadings of nature, do not, by a brutal negligence and inſenſibility, render the exiſtence which you have given a curſe to its poſſeſſors. Do not give them reaſon to upbraid your memory; and to anſwer thoſe who aſk what patrimony you have left them, that their ſole inheritance was ignorance, incapacity, and indigence. You men of wealth and eminence, you whom Providence has rendered conſpicuous on the theatre of nature, to whom it has given the nobleſt opportunities of participating the divine beatitude by the exerciſe of univerſal benevolence and genuine patriotiſm; yours is the glorious province of bringing neglected merit from obſcurity, of healing the wounds inflicted by adverſe fortune, and of cultivating thoſe talents which may be exerted for your own advantage and the honour of your ſpecies. Thus you ſhall riſe in the heraldry of heaven, and your names diffuſe a luſtre through the extent of ſpace and the archives of eternity. Otherwiſe the temporary glare and parade of your ſituation can produce nothing elſe but a deſpicable mimicry of real and intrinſic greatneſs, and are no more than a ſplendid maſk to cover what in itſelf is infamous or deteſtable.

By way of appendix to the preceding article, we ſhall add one or two very ſingular hiſtories, with which is is hoped our readers will not be diſpleaſed.

An account of ſome remarkable particulars that happened to a lady after having had the confluent kind of ſmallpox.] "In the courſe of this diſeaſe, during which the lady was attended by the late Sir Hans Sloane, ſeveral threatening ſymptoms appeared, which however were at length overcome; and the patient being thought out of danger, took ſeveral doſes of ſuch purgative medicines as are uſually adminiſtered in the decline of the diſeaſe, without any bad conſequence.

"But in the evening of the day on which ſhe had taken the laſt doſe that was intended to be given her

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Plate XCIII.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 1.

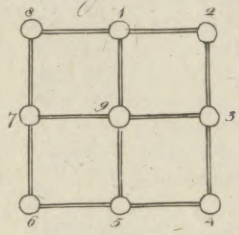


Fig. 2.

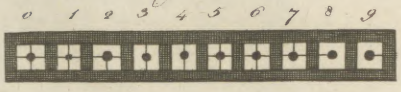


Fig. 5.

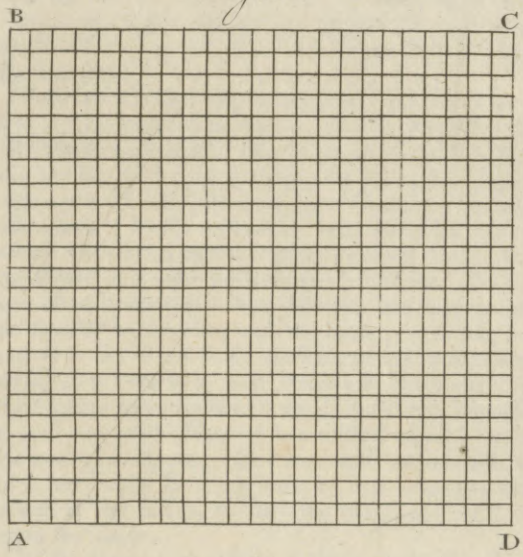


Fig. 3.

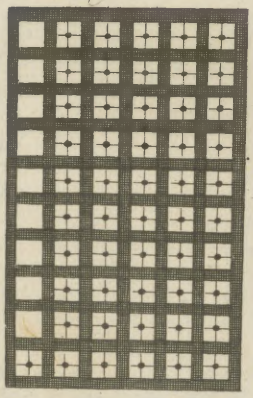


Fig. 4.

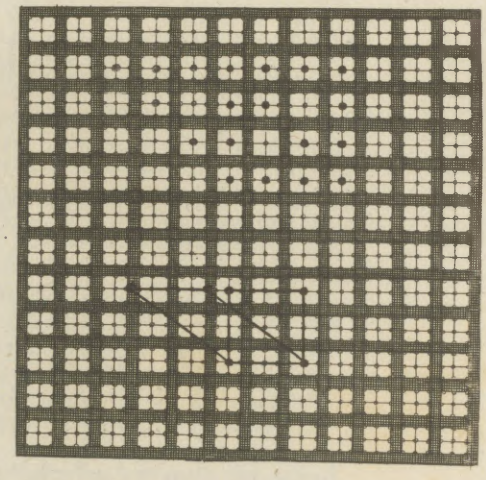
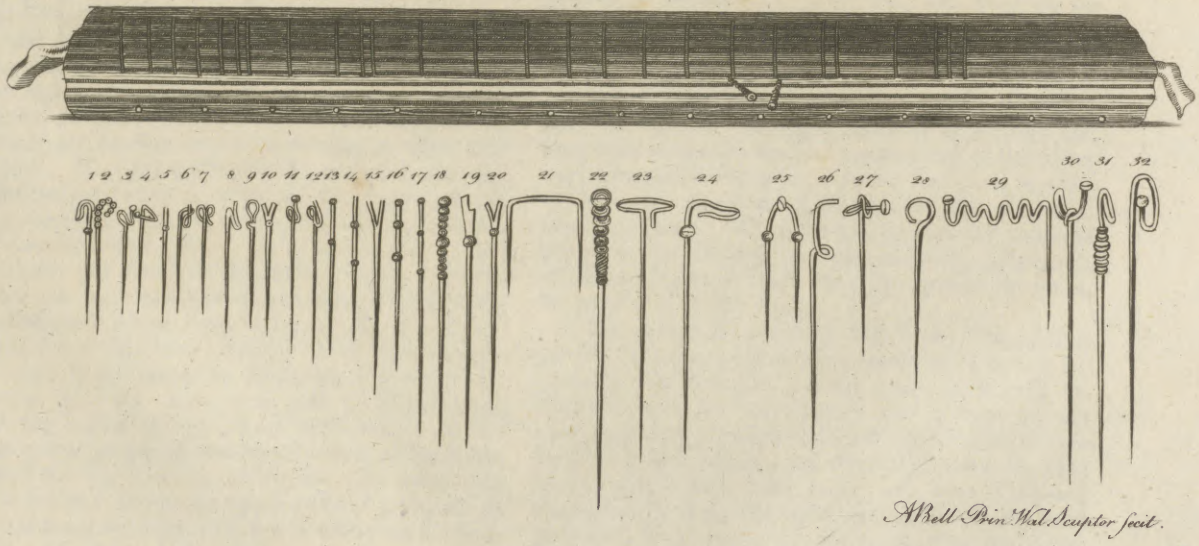


Fig. 9.



A Bell Prin. Wal. Sculptor fecit.

Blind. on that occaſion, ſhe was ſuddenly ſeized with pains and convulſions in the bowels; the pain and other ſymptoms became gradually leſs violent as the force of the medicine abated, and by ſuch remedies as were thought beſt adapted to the caſe, they ſeemed at length to be entirely ſubdued.

"They were, however, ſubdued only in appearance; for at eleven o'clock of the forenoon of the next day they returned with great violence, and continued ſome hours; when they went off, they left the muſcles of the lower jaw ſo much relaxed, that it fell down, and the chin was ſupported on the breaſt. The ſtrength of the patient was ſo much exhauſted during this paroxyſm, that ſhe lay near two hours with no other ſigns of life than a very feeble reſpiration, which was often ſo difficult to be diſcerned that thoſe about her concluded ſhe was dead.

"From this time the fits returned periodically every day, at about the ſame hour. At firſt they ſeemed to affect her nearly in the ſame degree; but at length all the ſymptoms were aggravated, the convulſions became more general, and her arms were ſometimes convulſed alternately; it alſo frequently happened, that the arm which was laſt convulſed remained extended and inflexible ſome hours after the ſtruggles were over. Her neck was often twiſted with ſuch violence, that the face looked directly backwards, and the back part of the head was over the breaſt; the muſcles of the countenance were alſo ſo contracted and writhed by the ſpaſms, that the features were totally changed, and it was impoſſible to find any reſemblance of her natural aſpect by which ſhe could be known. Her feet were not leſs diſtorted than her head; for they were twiſted almoſt to diſlocation at the inſtep, ſo that ſhe could not walk but upon her ancles.

"To remove or mitigate theſe deplorable ſymptoms, many remedies were tried; and, among others, the cold bath: but either by the natural effect of the bath, or by ſome miſmanagement in the bathing, the unhappy patient firſt became blind, and ſoon afterwards deaf and dumb. It is not eaſy to conceive what could increaſe the miſery of deafneſs, dumbneſs, blindneſs, and frequent paroxyſms of excruciating pain: yet a very conſiderable aggravation was added; for the loſs of her ſight, her hearing, and her ſpeech, was followed by ſuch a ſtricture of the muſcles of her throat, that ſhe could not ſwallow any kind of aliment either ſolid or liquid. It might reaſonably be ſuppoſed that this circumſtance, though it added to the degree of her miſery, would have ſhortened its duration; yet in this condition ſhe continued near three quarters of a year; and during that time was ſupported in a very uncommon manner, by chewing her food only; which having turned often, and kept long in her mouth, ſhe was obliged at laſt to ſpit out. Liquors were likewiſe gargled about in her mouth for ſome time; and then returned in the ſame manner, no part of them having paſſed the throat by an act of deglutition: ſo that whatever was conveyed into the ſtomach, either of the juices of the ſolid food, or of liquids, was either gradually imbibed by the ſponginеſs of the parts, which they moiſtened, or trickled down in a very ſmall quantity along the ſides of the veſſels.

"But there were other peculiarities in the caſe of this lady, yet more extraordinary. During the privation of her *ſight* and *hearing*, her *touch* and her *ſmell* became ſo exquiſite, that ſhe could diſtinguiſh the different colours of ſilk and flowers, and was ſenſible when any ſtranger was in the room with her. Blind.

"After ſhe became blind, and deaf, and dumb, it was not eaſy to contrive any method by which a queſtion could be aſked her, and an anſwer received. This, however, was at laſt effected, by talking with the fingers, at which ſhe was uncommonly ready. But thoſe who converſed with her in this manner, were obliged to expreſs themſelves by touching her hand and fingers inſtead of their own.

"A lady who was nearly related to her, having an apron on, that was embroidered with ſilk of different colours, aſked her, in the manner which has been deſcribed, if ſhe could tell what colour it was? and after applying her fingers attentively to the figures of the embroidery, ſhe replied, that it was red, and blue, and green; which was true. The ſame lady having a pink coloured ribbon on her head, and being willing ſtill further to ſatisfy her curioſity and her doubts, aſked what colour that was? her couſin, after feeling ſome time, anſwered, that it was pink colour: this anſwer was yet more aſtoniſhing, becauſe it ſhowed not only a power of diſtinguiſhing different colours, but different kinds of the ſame colour; the ribbon was not only diſcovered to be red, but the red was diſcovered to be of the pale kind called a *pink*.

"This unhappy lady, conſcious of her own uncommon infirmities, was extremely unwilling to be ſeen by ſtrangers, and therefore generally retired to her chamber, where none but thoſe of the family were likely to come. The ſame relation, who had by the experiment of the apron and ribbon diſcovered the exquiſite ſenſibility of her *touch*, was ſoon after convinced by an accident, that her power of *ſmelling* was acute and refined in the ſame aſtoniſhing degree.

"Being one day viſiting the family, ſhe went up to her couſin's chamber, and after making herſelf known, ſhe intreated her to go down, and ſit with her among the reſt of the family, aſſuring her, that there was no other perſon preſent: to this ſhe at length conſented, and went down to the parlour door; but the moment the door was opened, ſhe turned back, and retired to her own chamber much diſpleaſed; alleging, that there were ſtrangers in the room, and that an attempt had been made to deceive her: it happened indeed that there were ſtrangers in the room; but they had come in while the lady was above ſtairs, ſo that ſhe did not know they were there. When ſhe had ſatisfied her couſin of this particular, ſhe was pacified; and being afterwards aſked how ſhe knew there were ſtrangers in the room, ſhe anſwered, by the ſmell.

"But though ſhe could by this ſenſe diſtinguiſh in general between perſons with whom ſhe was well acquainted and ſtrangers, yet ſhe could not ſo eaſily diſtinguiſh one of her acquaintance from another without other aſſiſtance. She generally diſtinguiſhed her friends by feeling their hands; and when they came in, they uſed to preſent their hands to her, as a mean of making themſelves known; the make and warmth of the hand produced, in general, the differences that ſhe diſtinguiſhed; but ſhe ſometimes uſed to ſpan the wriſt, and meaſure the fingers. A lady, with whom ſhe was very well acquainted, coming in one very hot day, after having

Blind. having walked a mile, preſented her hand as uſual; ſhe felt it longer than ordinary, and ſeemed to doubt whoſe it was; but after ſpanning the wriſt, and meaſuring the fingers, ſhe ſaid, 'It is Mrs M. but ſhe is warmer to-day than ever I felt her before.'

"To amuſe herſelf in the mournful and perpetual ſolitude and darkneſs to which her diſorder had reduced her, ſhe uſed to work much at her needle; and it is remarkable, that her needle-work was uncommonly neat and exact: among many other pieces of her work that are preſerved in the family, is a pin-cuſhion, which can ſcarcely be equalled. She uſed alſo ſometimes to write: and her writing was yet more extraordinary than her needle-work: it was executed with the ſame regularity and exactneſs; the character was very pretty, the lines were all even, and the letters placed at equal diſtances from each other: but the moſt aſtoniſhing particular of all, with reſpect to her writing, is, that ſhe could by ſome means diſcover when a letter had by ſome miſtake been omitted, and would place it over that part of the word where it ſhould have been inſerted with a caret under it. It was her cuſtom to ſit up in bed at any hour of the night, either to write or to work, when her pain or any other cauſe kept her awake.

"Theſe circumſtances were ſo very extraordinary, that it was long doubted whether ſhe had not ſome faint remains both of hearing and ſight, and many experiments were made to aſcertain the matter; ſome of theſe experiments ſhe accidentally diſcovered, and the diſcovery always threw her into violent convulſions. The thought of being ſuſpected of inſincerity, or ſuppoſed capable of acting ſo wicked a part as to feign infirmities that were not inflicted, was an addition to her miſery which ſhe could not bear, and which never failed to produce an agony of mind not leſs viſible than thoſe of her body. A clergyman who found her one evening at work by a table with a candle upon it, put his hat between her eyes and the candle, in ſuch a manner that it was impoſſible ſhe could receive any benefit from the light of it if ſhe had not been blind. She continued ſtill at her work, with great tranquillity; till, putting up her hand ſuddenly to rub her forehead, ſhe ſtruck it againſt the hat, and diſcovered what was doing; upon which ſhe was thrown into violent convulſions, and was not without great difficulty recovered. The family were by theſe experiments, and by ſeveral accidental circumſtances, fully convinced that ſhe was totally deaf and blind; particularly by ſitting unconcerned at her work, during a dreadful ſtorm of thunder and lightning, though ſhe was then facing the window, and always uſed to be much terrified in ſuch circumſtances. But Sir Hans Sloane, her phyſician, being ſtill doubtful of the truth of facts which were ſcarce leſs than miraculous, he was permitted to ſatisfy himſelf by ſuch experiments and obſervations as he thought proper; the iſſue of which was, that he pronounced her to be abſolutely deaf and blind.

"She was at length ſent to Bath, where ſhe was in ſome meaſure relieved; her convulſions being leſs frequent, and her pains leſs acute: but ſhe never recovered her ſpeech, her ſight, or her hearing in the leaſt degree.

"Many of the letters dated at Bath, in ſome of which there are inſtances of interlineations with a caret, the writer of this narrative hath ſeen, and they are now in the cuſtody of the widow of one of her brothers, who, with many other perſons, can ſupport the facts here related, however wonderful, with ſuch evidence as it would not only be injuſtice, but folly, to diſbelieve." Blind.

An account of a French lady, blind from her infancy, who can read, write, and play at cards, &c.]—"A young gentlewoman of a good family in France, now in her 18th year †, loſt her ſight when only two years old, her mother having been adviſed to lay ſome pigeons blood on her eyes, to preſerve them in the ſmall-pox; whereas, ſo far from anſwering the end, it ate into them. Nature, however, may be ſaid to have compenſated for the unhappy miſtake, by beauty of perſon, ſweetneſs of temper, vivacity of genius, quickneſs of conception, and many talents which certainly much alleviate her misfortune. † *Annual Regiſter* for 1762.

"She plays at cards with the ſame readineſs as others of the party. She firſt prepares the packs allotted to her, by pricking them in ſeveral parts; yet ſo imperceptibly, that the cloſeſt inſpection can ſcarcely diſcern her indexes. She ſorts the ſuits, and arranges the cards in their proper ſequence, with the ſame preciſion, and nearly the ſame facility, as they who have their ſight. All ſhe requires of thoſe who play with her, is to name every card as it is played; and theſe ſhe retains ſo exactly, that ſhe frequently performs ſome notable ſtrokes, ſuch as ſhow a great combination and ſtrong memory.

"The moſt wonderful circumſtance is, that ſhe ſhould have learned to read and write; but even this is readily believed on knowing her method. In writing to her, no ink is uſed, but the letters are pricked down on the paper; and by the delicacy of her touch, feeling each letter ſhe follows them ſucceſſively, and reads every word with her finger ends. She herſelf in writing makes uſe of a pencil, as ſhe could not know when her pen was dry; her guide on the paper is a ſmall thin ruler and of the breadth of her writing. On finiſhing a letter, ſhe wets it, ſo as to fix the traces of her pencil, that they are not obſcured or effaced; then proceeds to fold and ſeal it, and write the direction; all by her own addreſs, and without the aſſiſtance of any other perſon. Her writing is very ſtraight, well cut, and the ſpelling no leſs correct. To reach this ſingular mechaniſm, the indefatigable cares of her affectionate mother were long employed, who accuſtomed her daughter to feel letters cut in cards or paſteboard, brought her to diſtinguiſh an A from a B, and thus the whole alphabet, and afterwards to ſpell words; then, by the remembrance of the ſhape of the letters, to delineate them on paper; and, laſtly, to arrange them ſo as to form words and ſentences.

"She has learned to play on the guittar, and has even contrived a way of pricking down the tunes as an aſſiſtance to her memory. So delicate are her organs, that in ſinging a tune, though new to her, ſhe is able to name the notes.

"In figured dances ſhe acquits herſelf extremely well, and in a minuet with inimitable eaſe and gracefulneſs. As for the works of her ſex, ſhe has a maſterly hand; ſhe ſews and hems perfectly well; and in all her works ſhe threads the needles for herſelf, however ſmall.

"By the watch her touch never fails telling her exactly the hour and minute."

From

Pore-Blind || Total Blindneſs.

From this account, however, it would appear, that except reading and writing, the French lady has nothing to boaſt of in which ſhe is not excelled by Mr Stanley already mentioned, if we may credit all that is reported of him. The works peculiar to her ſex are gained mechanically; but the *diſtinguiſhing colours*, telling the preciſe time by a watch, naming the notes in muſic, and many other things depending upon the ear and touch, are ſaid to be ſo familiar to him, that his friends ceaſe to think them extraordinary. Attainments ſtill more wonderful are aſcribed to him; as, the naming the number of perſons in a room on entering it; the directing his voice to each perſon in particular, even to ſtrangers when they have once ſpoken; the miſſing any perſon abſent, and telling who that perſon is; and, laſtly, his being able to form juſt conceptions of youth, beauty, ſymmetry, and ſhape.

Pore-Blind, or *Pur-blind*. A perſon who is very ſhortſighted is ſaid to be *pur-blind*.

Moon-Blind, denotes horſes that loſe their ſight at certain times of the moon. See FARRIERY.

Blind-Harry. See *Henry the Minſtrel*.

Blind-Worm. See ANGUIS.

BLINDE, among mineraliſts, a ſpecies of lead-marcaſite, by our miners called mock-ore, mock-lead, and wild lead, &c. The German mineraliſts call it *blende*, whence our denomination *blinde*. It anſwers to what in Agricola is called *Galena inanis*.

It uſually lies immediately over the veins of lead-ore, in the mines which produce it, for it is not found in all. When the miners ſee this, they know the vein of ore is very near.

BLINDS, or BLINDES, in the art of war, a ſort of defence commonly made of oziers, or branches interwoven, and laid acroſs between two rows of ſtakes, about the height of a man, and four or five feet aſunder, uſed particularly at the heads of trenches, when they are extended in front towards the glacis; ſerving to ſhelter the workmen, and prevent their being overlooked by the enemy.

BLINDING, a ſpecies of corporal puniſhment anciently inflicted on thieves, adulterers, perjurers, and others; and from which the ancient Chriſtians were not exempt. Sometimes lime and vinegar, or barely ſcalding vinegar, was poured into the eyes till their balls were conſumed; ſometimes a rope was twiſted round the head till the eyes ſtarted out. In the middle age, they changed total blindneſs for a great darkneſs or diminution of ſight; which they produced by holding a red-hot iron diſh or baſon before the eyes till their humours were dried and their coats ſhrivelled up.

The inhabitants of the city Apollonia executed it on their watch whom they found aſleep.—Democritus (according to Plutarch, Cicero, and A. Gellius), put out his own eyes, that he might be leſs diſturbed in his mental contemplations, when thus freed from the diſtraction of the objects of ſight.

BLINDNESS, a privation of the ſenſe of ſight, ariſing from a total deprivation of its organs, or an involuntary obſtruction of their functions. See the article BLIND.

Total Blindness, is that wherein all ſight or perception, even of light, is wanting, as is the caſe of thoſe who are ſaid to be *ſtone-blind*. A blind man, by the civil law, cannot make a teſtament except under certain modifications; but in every caſe he is diſabled from being a witneſs to a teſtament, on account of his blindneſs.

Partial Blindneſs || Blindneſs.

Partial Blindness, is that wherein ſome faint glimmering is left, as is always the caſe in people who have ripe cataracts, who are never ſo blind but they can diſcern day from night.

Perpetual Blindness, is that which remains alike under all the diverſity of ſeaſons, times, ages, &c.

Tranſient Blindness, is that which gives way of itſelf in due time, as that of whelps, which continues for ſeveral days, ſometimes nine, rarely twelve, after they are littered. The Nogais Tartars, according to Father Du Ban the Jeſuit, who lived among them, are born blind, and open not their eyes till ſeveral days.

Periodical Blindness, is that which comes and goes by turns, according to the ſeaſon of the moon, time of day, and the like.

Diurnal Blindness, is called *hemeracopia*.

Nocturnal Blindness, called alſo *nyctalopia*, that which enſues on the ſetting of the ſun in perſons who ſee perfectly in the day, but become quite blind as ſoon as night comes on. Brigg, in Phil. Tranſ. N° 159. p. 560, where an inſtance of it is given. See a ſingular caſe of this kind related by Dr Samuel Pye, in the Medic. Obſerv. and Inquir. vol. i. p. 111.

The cauſes of blindneſs are either ordinary, as a decay of the optic nerve (an inſtance whereof we have in the Academy of Sciences, where upon opening the eye of a perſon long blind, the optic nerve was found extremely ſhrunk and decayed, and having no medulla in it); or ſome external violence, vicious conformation, growth of a cataract, *gutta ſerena*, ſmallpox, or the like. See MEDICINE *Index*.

Extraordinary cauſes of blindneſs are malignant ſtenches, poiſonous juices dropped into the eye, baneful vermin, long confinement in the dark, or the like. The ducks which breed under ground, and break out into the Zirchnitzer ſea in Carniola after all great ſtorms, are blind at their firſt eruption; but in ſome time come to their ſight. The author of the Embaſſy of D. Garcias de Sylva Figueroa into Perſia tells us, that in ſeveral parts of that kingdom are found vaſt numbers of blind people of all ages, ſexes, and conditions; by reaſon of a ſpecies of little flies which prick the eyes and lips, and enter the noſtrils, carrying certain blindneſs with them when they light on the eyes.

BLINDNESS, in *Farriery*, is a diſeaſe incident to horſes, eſpecially thoſe of an iron-gray or dapple-gray colour, when ridden too hard or backed too young. It may be diſcovered by the walk or ſtep, which in a blind horſe is always uncertain and unequal, becauſe he dares not ſet down his feet boldly when led in one's hand; though if the ſame horſe be mounted by an expert horſeman, and the horſe of himſelf be mettled, the fear of the ſpur will make him go more freely; ſo that his blindneſs can hardly be perceived. Another mark whereby a horſe may be known to have loſt his ſight is, that upon hearing any body enter the ſtable, he will prick up his ears, and move them backwards and forwards, as miſtruſting every thing, and being in continual alarm by the leaſt noiſe. Dr Lower firſt ſhowed the cauſe of the ordinary blindneſs in horſes,

Blinks || Block.

which is a ſpongy excreſcence, growing in one, ſometimes in two or three places of the *uvea*, which being at length overgrown, covers the pupil when the horſe is brought into the light, though in a dark ſtable it dilates again.

BLINKS, among ancient ſportſmen, denoted boughs broken down from trees, and thrown in the way where deer are likely to paſs, to hinder their running, or rather to mark which way a deer runs, in order to guide the hunter.

BLINKING OF BEER, in Lincolnſhire, ſignifies letting the wort ſtand for ſome time in the vat, till it hath acquired ſome degree of acidity, in order to diſpoſe it to fine, and be the ſooner ready for drinking.

BLISSOM, among huſbandmen, corruptly called *bloſſom*, is the act of a ram when coupling with an ewe.

BLISTER, in *Medicine*, a thin bladder containing a watery humour, whether occaſioned by burns and the like accidents, or by veſicatories applied to different parts of the body for that purpoſe.—Cantharides, or Spaniſh flies, applied in the form of a plaſter, are chiefly uſed with this intention. See CANTHARIDES.

BLITE. See BLITUM, BOTANY *Index*.

BLITH, a town of Nottinghamſhire, in England, ſeated in W. Long. 0. 55. N. Lat. 53. 25.

BLITUM, BLITE, *Strawberry Spinach*. See BOTANY *Index*.

BLOATING, a puffing up or inflation of the exterior habit of the body, lodged chiefly in the adipoſe cells. It is the ſame with what phyſicians call an *emphyſema*.

BLOCK is uſed for a piece of marble as it comes out of the quarry, before it has aſſumed any form from the hand of a workman.

BLOCK, in the mechanic arts, a large piece of ſolid wood whereon to faſten work or to faſhion it; ſtrength and ſtability being the requiſite properties. In this ſenſe, we ſay a *chopping block*; a *ſugar-finer's block*; a *ſmith's block*, on which his anvil is faſtened; an *executioner's block*, on which the criminal's head is laid to be ſtruck off.

BLOCK, among cutters in wood, is a form made of pear-tree, box, or other hard and cloſe-grained wood, free from knots, on which they cut their figures in relievo with knives, chiſſels, &c.

BLOCK, in *Falconry*, denotes the perch whereon a bird of prey is kept. This is to be covered with cloth.

BLOCKS, in ſea-language, are pieces of wood belonging to ſhips, in which the ſhivers of pulleys are placed, and wherein the running-ropes go. Of theſe ſome are ſingle, ſome double; and ſome have three, four, or five, ſhivers in them. They are named and diſtinguiſhed by the ropes they carry, and the uſes they ſerve for.

Mounting BLOCK, an eminence uſually of ſtone, cut in ſteps or notches, ſerving as a help to mount on horſeback. Theſe were much in uſe among the ancients, who were unacquainted with ſtirrups. The Romans erected them at proper ſtations along all their great roads.

BLOCK, *Daniel*, portrait painter, was born at Stettin in Pomerania in 1580, and gave early proofs of a good genius; which induced his parents to place him as a diſciple with Jacob Scherer, a maſter capable of giving him the beſt directions, to qualify him for proceeding ſucceſsfully in his profeſſion. He chiefly painted portraits, in which (according to Sandrart) he was very eminent, and had the honour to paint the portraits of Chriſtian IV. king of Denmark, and of Guſtavus Adolphus king of Sweden. The extraordinary merit of this maſter recommended him to the eſteem of the prince of Mecklenburg, who retained him in his ſervice for 44 years; and by order of that prince, he painted the portraits of his whole family at full length, as large as life, and in the antique habit; by which works his reputation was eſtabliſhed effectually. By the agreeable manner of his colouring, and the eaſy attitudes of his figures, his paintings became ſo acceptable to all perſons of rank, that before the decline of life, he had acquired a very large fortune; but unfortunately he loſt it all, in the compaſs of a few hours, by the ſudden irruption of a plundering party, and with great difficulty his own life was preſerved. He died in 1661.

Blockade || Bloemart.

BLOCKADE, in the art of war, the blocking up a place, by poſting troops at all the avenues leading to it, to keep ſupplies of men and proviſions from getting into it; and by theſe means propoſing to ſtarve it out, without making any regular attacks.

To raiſe a BLOCKADE, is to force the troops that keep the place blocked up from their poſts.

BLOCKLAND, ANTHONY DE MONTFORT, hiſtory and portrait painter, was born of a noble family at Montfort in 1532. He learned the art of painting in the ſchool of Francis Floris, whoſe manner he always followed; and became an artiſt of great diſtinction, by endeavouring principally to imitate the taſte of the Roman ſchool in deſign and compoſition. His genius was beſt adapted to grand compoſitions, of which he deſigned many: ſome at Delft, but more at Utrecht. His deſigns had grandeur, the airs of his heads were noble, and the profiles of his female figures approached near to the taſte of Parmigiano. Several of his works are in ſo good a taſte, and particularly a Venus, and the hiſtory of Joſeph and his Brethren, that they ſeem to have been painted by a maſter educated in the ſchool of Florence. He died in 1583.

BLOCZIL, a fortreſs of Overyſſel in the United Provinces, ſeated on the river Aa, at the place where it falls into the Zuyder Zee. It has a port ſufficient to contain 200 veſſels, and ſerves to defend thoſe ſhips that croſs the ſea. It has ſix good baſtions, and ſeveral other regular fortifications. E. Long. 6. 0. N. Lat. 52. 44.

BLOEMART, ABRAHAM, painter of landſcape, cattle, hiſtory, and portrait, was born at Gorcum in 1564, according to Houbraken; but according to Sandrart, whoſe authority ſeems to claim the preference, he was born in 1567, and lived moſtly at Utrecht. In his youth he applied himſelf diligently to deſign after the works of Francis Floris, and afterwards received inſtructions from ſeveral artiſts of no great repute; but the power of his own genius proved his principal director in the art of painting. He formed a manner peculiar to himſelf, making nature his model for many of the objects he painted, particularly his cattle, in which he excelled. He died in 1647. He left four

ſons

Bloemart, Blois.

ſons who were all of the artiſts; but the moſt famous was *Cornelius*, the ſubject of the following article.

BLOEMART, *Cornelius*, the youngeſt ſon of Abraham, was born in 1603 at Utrecht. The firſt principles of drawing and painting he learned from his father; but his natural inclination for the art of engraving was ſo powerful, that he applied himſelf wholly to the purſuit of it. He firſt ſtudied under Criſpin de Paſs, an engraver much more famous for the neatneſs than the good taſte of his works. Not ſatisfied with what he learned from this artiſt, he went to Rome, in order to perfect himſelf from the works of the greateſt maſters: And in that city (where the far greater part of his engravings were made) he died in a very advanced age.—"The manner of engraving, adopted by this excellent artiſt, appears to me (ſays Mr Strutt) to be not only quite original, but the ſource from which we may trace that ſtyle in which the greateſt and beſt French maſters excelled; thoſe I mean who worked with the graver only. He covered the lights upon his diſtances, and the other parts of his plates which required tinting, with great care. The lights, whether on the diſtant hills, trees, buildings, or figures, in the engravings prior to his time, had been left quite clear, and by ſo many white ſpots ſcattered in various parts of the ſame deſign, the harmony was deſtroyed, the ſubject confuſed, and the principal figures prevented from relieving with any ſtriking effect. By this judicious improvement, Bloemart gave to his prints a more clear and finiſhed appearance, than all the laboured neatneſs even of Jerom Wierix had been able to produce. He drew correctly: but from his ſtyle of engraving, which was executed entirely with the graver, the extremities of his figures are heavy, and his heads are not always equally beautiful or expreſſive. With reſpect to the mechanical part of the works, few indeed have excelled him, either in clearneſs, or freedom of execution. His great fault, however, is want of variety. The naked parts of his figures, the draperies, and the back-ground, are equally neat, and engraved preciſely in the ſame manner. Hence the effect is flat; and the fleſh, for want of ſufficient diſtinction, appears cold and ſilvery. His works are juſtly held in high eſtimation. They are very numerous, and many of them difficult to be procured."

BLOIS, a town of France, in the department of Loire and Cher, is ſeated on the banks of the river Loire, partly on a plain, and partly on an eminence, in the midſt of one of the moſt agreeable countries of France. The caſtle is the ornament of this city. At the firſt view, it ſeems to be two diſtinct buildings; but it is joined by a paſſage cut out of the rock. Joining to this, on the weſt-ſide, is the tower of *Chateau Regnaud*, ſo called becauſe that lordſhip may be diſcovered from hence, though 20 miles diſtant. At the eaſt-end of this is another ſmall tower, which is partly ancient and partly modern. That part of the caſtle which was built by the duke of Orleans, in the room of that which he demoliſhed in 1632, is a ſuperb edifice, but unfiniſhed. The court, before it, where the church of St Saviour is built, is very large, and was formerly uſed for tournaments. The moſt remarkable thing in this caſtle is a fine long gallery, adorned with many curious and uncommon pieces; it is in the midſt of two gardens, one of which is full of fruit-trees, and the other of parterres, fountains, caſcades, and marble ſtatues brought from Italy. Beyond theſe, there is a large park, where there is game in abundance. On all the gates of the city there is the image of the Virgin Mary, who they believe freed them from the plague in 1631. There are ſeveral pariſh-churches, chapters, and religious houſes for both ſexes. The church of St Solenne is the cathedral, and is the handſomeſt in the city. The front of the Jeſuits church is decorated with three orders of architecture, the Doric, Ionic, and Corinthian; but there is only the Doric on the inſide. The town-houſe is a tolerable building, and ſtands in a ſtreet which terminates at the quay, where there is a public walk that has a fine proſpect on the Loire, over which there is a bridge that leads to the ſuburbs of Vienna. There are a few houſes on the bridge, and a tower at each end to guard the entrance. About three quarters of a mile from the city, the water runs down the clefts of a rock into a large aqueduct, by which it is conveyed to a reſervoir near the walls, and from hence diſtributed by leaden pipes to the ſeveral parts of the city. The country about Blois produces corn, wine, cattle, and game of every kind, and the waters a great quantity of fiſh. The meadows are ſo rich and fertile, that the cows yield excellent milk, good in conſumptive caſes, and which affords the beſt cream in the kingdom. About a league from Blois, there are mineral ſprings, which have the ſame virtues as thoſe of Forges. The trade of Blois is chiefly in wine and brandy; but they alſo make ſome ſerges and ſtuffs at this place. Several kings have kept their courts at Blois; for which reaſon they ſpeak the French language in perfection, and the inhabitants are accounted witty and polite. E. Long. 1. 30. N. Lat. 47. 35.

Blois || Bloemen.

BLOMARY, or BLOOMARY, in *Metallurgy*, the firſt forge through which iron paſſes, after it is melted out of the ore.

BLOEMEN, PETER VAN, a celebrated painter, born at Antwerp, was brother to John Francis Van Bloemen, called by the Italians ORIZONTI, and lived for ſeveral years at Rome along with his brother. As ſoon as he found himſelf competently ſkilled in colouring and penciling, as well as in deſigning, he returned to his native city, where, in the year 1699, he was appointed director of the academy. The compoſition of this maſter is rich, and his pictures are generally filled with a number of figures. His ſubjects are, the marchings of ſquadrons of cavalry, encampments, artillery, battles, Italian fairs, markets, and feſtivals; in which he ſhowed great correctneſs in his deſign and in his drawing; and an elegance in the manner of dreſſing his figures; whom he frequently repreſented in oriental habits. He deſigned horſes in an admirable ſtyle; and in his battles gave them abundance of ſpirit, graceful attitudes, and an expreſſion that was full of life and nature. His landſcapes are enriched with elegant architecture, with baſſo-relievos, and mutilated ſtatues, in a noble taſte; and rendered ſtill more pleaſing by a good tone of colour, by animals of different kinds, and excellent figures.—His beſt works are admired in all parts of Europe, and afford large prices: but it is to be obſerved, that ſome of his pictures ſeem rather to be

too

Bloemen || Blond.

too much laboured or ſtiff, and (according to the artiſts phraſe) ſmell of the palette; and thoſe are proportionably leſs eſtimable.

BLOEMEN, *John Francis Van.* Vid. ORIZONTI.

BLOEMEN, *Norbert Van*, brother of the preceding, was a painter of portraits and converſations; but in merit was very inferior to his brothers, although he had a good deal of employment.

BLOND, CHRISTOPHER LE, painter of portraits in miniature and all kinds of ſubjects on paper, was born in 1670. Very few circumſtances relative to his education or life are mentioned by any writers till he was known at Rome in the year 1716, being at that time painter to the Count Martinetz, ambaſſador at the court of Rome. By the ſolicitation of Overbeke he was induced to go to Amſterdam, and in that city was employed to paint ſmall portraits for bracelets, rings, and ſnuff-boxes; of which, although they were painted in water-colours, yet the colouring was as lively and natural as if they had been painted in oil. However, as he found his ſight much impaired by the minuteneſs of his work, he diſcontinued water-colour painting, and attempted the uſe of oil with a reaſonable degree of ſucceſs. After he had reſided for ſome years in the Low Countries, he went to England, and ſet up a new method of printing mezzotinto plates in colours ſo as to imitate the pictures of which they were copies. In this manner he executed in England ſeveral large plates, from pictures of the greateſt maſters, and diſpoſed of the prints by lottery. But thoſe who obtained the prizes (Mr Strutt ſays) appear not to have held them in any very great eſtimation. "The prints (he adds) certainly poſſeſs ſome merit, excluſive of their novelty; but, in general, the colours are flat and dirty; the effect is neither ſtriking nor judiciouſly managed; and the drawing is frequently very incorrect, eſpecially in the extremities of his figures." Mr Pilkington ſpeaks of them with greater approbation. "The artiſt (he ſays) imitated his models with ſo much ſkill, ſuch exact reſemblance, ſuch correctneſs of outline, ſuch ſimilarity of colour and expreſſion, that at firſt they amazed every beholder who viewed them at a proper diſtance; and many of thoſe prints are ſtill extant, which are much eſteemed by perſons of good taſte." And Mr Walpole obſerves, that ſome heads, coloured progreſſively, according to their ſeveral gradations, bear witneſs to the ſucceſs and beauty of his invention. He had another merit to the public, with which few inventors begin; for he communicated his ſecret in a thin quarto, intitled *Coloritto*, or "The harmony of colouring in painting reduced to mechanical practice, under eaſy precepts and infallible rules." His method was performed by ſeveral mezzotinto plates for one piece, each expreſſing different ſhades and parts of the piece in different colours. He was not, however, it is ſaid, the original inventor of that manner of managing colours, but took it from Laſtman and others, who, with much greater regularity of morals, equal capacities, and more diſcreet conduct, had before undertaken it without ſucceſs. Le Blond, whoſe head was continually full of ſchemes, next ſet on foot a project for copying the cartoons of Raphael in tapeſtry, and made drawings from the pictures for that purpoſe. Houſes were built and looms erected at the Mulberry Ground at Chelſea; but the expences being too great, or the contributions not equal to the firſt expectations, the ſcheme was ſuddenly defeated, and Le Blond diſappeared, to the no ſmall diſſatisfaction of thoſe who were engaged with him. From hence he went to Paris, where, Baſan informs us, he was in the year 1737; and in that city he died, 1740, in an hoſpital. Le Blond was alſo author of a treatiſe, in French, on ideal beauty. It was publiſhed in 1732, and has ſince been tranſlated into Engliſh.

Blondel || Blood.

BLONDEL, DAVID, a proteſtant miniſter, diſtinguiſhed by his ſkill in eccleſiaſtical and civil hiſtory, was born at Chalons ſur Marne, and was admitted miniſter at a ſynod of the Iſle of France, in 1614. He wrote, 1. A defence of the reformed churches of France. 2. A work againſt the decretal epiſtles. 3. *De Epiſcopis et Preſbyteris:* and other pieces. Bayle informs us that he had a very ſingular way of ſtudying; he lay on the ground, and had round about him the books which he wanted for the work he was about. He died in 1655, aged 64.

BLONDEL, *Francis*, regius profeſſor of mathematics and architecture, was employed in ſeveral negociations, arrived at the dignity of marſhal de camp and counſellor of ſtate, and had the honour of being choſen to teach the dauphin the mathematics; he was alſo made member of the Academy of Sciences at Paris, and director of the Academy of Architecture. He died at Paris in 1688, aged 68. He wrote, 1. Notes on the Architecture of Savot. 2. A courſe of architecture and mathematics. 3. The art of throwing bombs. 4. A new manner of fortifying places. 5. A compariſon between Pindar and Horace; and other works.

BLONDUS, FLAVIUS, an hiſtorian born at Forli, in Italy, in 1388, was ſecretary to Eugenius IV. and other popes. He compoſed a great many books; and, among others, a Hiſtory from the year 400 to 1440. He died in 1463.

BLONIEZ, a town of Poland, in the province of Warſovia. E. Long. 20. 35. N. Lat. 52. 0.

BLOOD, a red liquor circulating through the veſſels of the human body and the bodies of the larger animals, which appears immediately and eſſentially neceſſary to the preſervation of life.

1 No animal without ſome liquid equivalent to blood.

Though there is no living creature as yet known whoſe life doth not immediately depend upon the circulation of ſome kind of fluid through its veſſels, yet unleſs ſuch fluid is of a red colour, it does not obtain the name of *blood;* and therefore ſuch creatures as have a colourleſs or milky liquor circulating through their veſſels, are called *exſanguious animals.*

2 Blood of different thickneſs in different animals.

The blood has a very different degree of thickneſs or viſcidity in different animals, and even in the ſame animal at different times. Though it is in all caſes endowed with a conſiderable degree of tenacity, yet in ſtrong animals that tenacity is remarkably greater than in weak ones; and hence the blood of bulls was made uſe of by the ancients as a poiſon, its extreme viſcidity rendering it totally indigeſtible by the powers of the human ſtomach. It is well known alſo by phyſicians, that there are ſome ſtates of the human body in which the blood becomes vaſtly tenacious, ſo as in a great meaſure to refuſe any intimate connexion with water; and others, in which its craſis is almoſt totally diſſolved, ſo as to appear, when drawn out of the body, like a fluid and half putrid maſs. See MEDICINE *Index.*

3 That of bulls anciently uſed as a poiſon.

The

Blood.

The common appearance of the blood when drawn from a vein in the human body is well known. It firſt ſeems an homogenous red liquor; then it conſolidates into one uniform maſs; in a little time, a yelloviſh watery liquor begins to ſeparate from it, which is more or leſs in quantity according to the ſtate in which the blood happens to be; the red maſs, in the mean time, contracts greatly in its dimenſions, and increaſes in ſolidity. But this increaſe of ſolidity is likewiſe proportional to the ſtate of the blood at the time: in ſtrong people, if attacked with a violent inflammatory diſeaſe, the ſolid part is exceedingly tough, inſomuch that Dr Huxham ſays he has ſometimes found it almoſt like a piece of fleſh itſelf; whereas, in other diſeaſes, the ſolid part is very ſoft and tender, breaking in pieces with the ſlighteſt touch. The ſpontaneous ſeparation of the blood into craſſamentum, ſerum, and coagulable lymph, hath been already taken notice of under ANATOMY. See ANATOMY *Index*.

4 Appearance of the blood when drawn from a vein.

5 Blood chemically analyſed.

The attention of phyſiologiſts hath been very much engaged by inquiries into the nature and compoſition of the blood, and accordingly it hath been examined in all poſſible ways. By a chemical analyſis, it diſcovers the ſame principles with other animal ſubſtances; giving over in diſtillation a great quantity of phlegm, a volatile ſpirit, with much fetid oil; after which, there remains a charred matter, that, burnt in an open fire, leaves a white earth ſimilar to calcined hartſhorn.

6 Contains an acid, according to ſome chemiſts.

Some eminent chemiſts, Mr Homberg particularly, have aſſerted that blood contains an acid as well as an alkali, but that the former doth not ariſe till towards the end of the diſtillation: but what is very ſingular, and indeed muſt throw no ſmall ſuſpicion on the whole account is, that the acid and alkali, notwithſtanding their great tendency on all other occaſions to unite with each other, do here remain ſeparate, ſo that the liquor may be even rediſtilled without their forming any neutral compound.

7 Experiment in confirmation of this.

An experiment in confirmation of this is recorded in the memoirs of the Royal Academy for 1712. Six pounds of human blood diſtilled to dryneſs with a gentle heat, were reduced to a pound and a half; after which, the maſs was urged with a graduated fire, till the retort at laſt became red hot. The produce was 17 ounces of liquor; 12 of which were a red and very empyreumatic volatile ſpirit, the other five were oil. The caput mortuum was a light coal weighing four ounces and a half. On rectifying the volatile ſpirit in a ſmall retort, about an ounce of a red fetid liquor remained, which had a very acid ſmell, and turned the juice of turnſole red. Mr Homberg now imagined, that the acid contained in the blood of animals could not diſengage itſelf perfectly by theſe diſtillations without addition. He therefore determined to diſtil human blood with an admixture of ſome other ſubſtance; but as earths contain a ſalt, which might render the operation uncertain, he determined to uſe only the caput mortuum of a former diſtillation of the ſame ſubſtance. For this purpoſe, four pounds of the coagulum of human blood being well mixed with a large quantity of this reſiduum, and the whole dried in the ſun, it was put into a retort, and diſtilled with a fire raiſed, towards the end of the operation, to the utmoſt violence. The oil being ſeparated from the volatile ſpirit, the latter was rectified; and the conſequence was, that there came over four pounds of a red acid liquor, that turned the tincture of turnſole very red. All the diſtillations of the aqueous liquors already mentioned, obtained by ſimilar proceſſes, being mixed together, and ſeparated from their yet remaining oil, by careful dilution with water and filtration, they were at length diſtilled together; the liquor that came over was clear as water, and its firſt quantities contained a great deal of volatile ſalt, but the laſt two ounces were found to be as ſour as diſtilled vinegar.—The ſame products were obtained from the blood of carnivorous animals, as well as from that of animals feeding ſolely upon vegetables.

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8 Dr Lewis's account of the blood.

In Dr Lewis's notes on Newman's Chemiſtry we have the following account of the blood, and the parts into which it may be reſolved. "Recent blood is equally fluid, and in taſte ſomewhat ſaline. Viewed by a microſcope, it appears compoſed of numerous red globules ſwimming in a tranſparent fluid. On ſtanding for a little time, it ſeparates into a thick craſſamentum and fluid ſerum. By agitation, it continues fluid: A conſiſtent polypous matter adheres to the ſtirrer, which by repeated ablution with water, becomes white.—Received from the vein in warm water, it depoſites a quantity of tranſparent filamentous matter, the red portion continuing diſſolved in the water. On evaporating the fluid, a red powdery ſubſtance is left.—It congeals by froſt, and becomes fluid again by warmth; after liquefaction, it quickly putrefies.—Fluid and florid blood expoſed to a temperate air, putrifies ſooner than ſuch as is more denſe. Inſpiſſated to dryneſs, it leaves a dark-coloured maſs, amounting, at a medium, to about one-fourth of the weight of the blood, of a bitter ſaline taſte, eaſily inflammable, burning with a bluiſh flame. The exſiccated blood is not ſoluble in acid or alkaline liquors; but gives ſome tincture to water and to ſpirit of wine, and is more powerfully acted upon by dulcified ſpirit of nitre. Recent blood is coagulated by the mineral acids, and by moſt of the combinations of them with earthy and metallic bodies. With vegetable acids, and with ſolutions of neutral ſalts, it mingles equably without coagulation. Alkalies, both fixed and volatile, render it more fluid, and preſerve it from coagulating.

"The ſerum of blood is more ſaline than the craſſamentum, and does not ſo ſpeedily putrefy. It freezes ſomewhat more difficultly than pure water; and its aqueous part evaporates, by a gentle warmth, ſomewhat more readily, leaving about one-twelfth of the weight of the ſerum of a ſolid yelloviſh pellucid matter. Expoſed to heat a little greater than that of the human body, it coagulates into a ſolid maſs, without any conſiderable evaporation. Both this coagulum and the inſpiſſated ſerum are readily inflammable in the fire, not diſſoluble in water, or in ſpirit of wine, in acid or in alkaline liquors."

9 Texture of the blood, according to Lewenhoeck.

But the texture of the blood diſcoverable by a microſcope, hath engaged the attention of the learned much more than the chemical analyſis ever did. Lewenhoeck was the firſt who diſcovered, or fancied he diſcovered, that the blood, as it exiſts in the body of an animal, conſiſts of a quantity of red globular particles ſwimming in a large quantity of tranſparent liquor. Each of theſe globules, he imagined, was compoſed of ſix ſmaller ones packed together. While the ſix continued to adhere, their colour was red; but when ſeparated,

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parated, they became yellow, and thus formed what is called the *ſerum*. He even pretended to have diſcovered that each of the ſerous globules conſiſted of ſix ſmaller ones, and that theſe when broken down conſtituted ſome more ſubtile and penetrating liquor than the ſerum, &c. This was for a long time received almoſt univerſally as an undoubted fact; and many theories were built upon it, and elaborate calculations made, of which (we hope) no account needs now be given, as the falſity of theſe pretended diſcoverics is generally allowed. Father de Torre, with microſcopes which he pretended were capable of magnifying to an incredible degree, found that the red particles of the blood were of an annular figure, with a perforation in the middle; and that the ring itſelf was formed of ſeveral joints. Some of theſe extraordinary magnifiers, however, being ſent over to England, thoſe who were appointed by the Royal Society to make trial of them found them totally uſeleſs, ſo that the credit of Father de Torre's diſcoveries muſt have reſted principally on his own evidence. The falſity of his hypotheſis, as well as that of Lewenhoeck, was detected by the late Mr Hewſon, whoſe microſcopical experiments on the blood being the lateſt that have appeared, we ſhall tranſcribe the following particular account of them given by himſelf in a letter to Dr Haygarth phyſician in Cheſter.——"The red particles of the blood, improperly called *globules*, are flat in all animals, and of very different ſizes in different animals. In man they are ſmall, as flat as a ſhilling, and appear to have a dark ſpot in the middle. In order to ſee them diſtinctly, I dilute the blood with freſh ſerum. My predeceſſors, not having thought of this, could not ſee them diſtinctly. And Lewenhoeck in particular, imagining a round figure fitteſt for motion, concluded they muſt be round in the human body; though he and others allowed that in frogs, &c. where they viewed them diſtinctly from the blood being thinner, they were flat. Now I prove that they are flat in all animals. In the human blood, where theſe particles are ſmall, it is difficult to determine what that black ſpot is which appears in the centre of each. Some have concluded that it was a perforation: but in a frog, where it is ſix times as large as in a man, it is eaſy to ſhow that it is not a perforation, but on the contrary is a little ſolid, which is contained in the middle of a veſicle. Inſtead, therefore, of calling this part of the blood red *globules*, I ſhould call it red *veſicles*; for each particle is a flat veſicle, with a little ſolid ſphere in its centre.

10 According to Father de Torre.

11 According to Mr Hewſon.

"I find that the blood of all animals contains veſicles of this ſort. In human blood there are millions of them; and they give it the red colour. But in inſects they are white, and leſs numerous in proportion than in man and quadrupeds. As they are flat in all animals, I ſuſpect that ſhape is a circumſtance of importance, but can be altered by a mixture with different fluids. And I find that it is by a determinate quantity of neutral ſalt contained in the ſerum, that this fluid is adapted to preſerving theſe veſicles in their flat ſhape: for, if they be mixed with water, they become round, and diſſolve perfectly; but add a little of any neutral ſalt to the water, and they remain in it, without any alteration in their ſhape, and without diſſolving.

"Now, when it is conſidered, that the blood of all animals is filled with theſe particles, we muſt believe that they ſerve ſome very important purpoſe in the animal economy; and ſince they are ſo complicated in their ſtructure, it is improbable they ſhould be made by mechanical agitation in the lungs or blood-veſſels, as has been ſuſpected, but probably have ſome organs ſet apart for their formation. This I ſhall endeavour to prove, when I have explained their ſtructure a little more particularly, and mentioned the manner in which I exhibit it. I take the blood of a toad or frog, in which they are very large; I mix it with the ſerum of human blood to dilute it; I find them appear all flat; ſo they do in the blood-veſſels of this animal, as I have diſtinctly ſeen in the web between its toes, whilſt the animal was alive and fixed in the microſcope. Their appearance in theſe animals is not unlike ſlices of cucumber. I next mix a little of the blood with water, which immediately makes them all round, and then begins to diſſolve them whilſt they are round. I incline the ſtage of the microſcope, ſo as to make them roll down it; and then I can diſtinctly ſee the ſolid in the middle fall from ſide to ſide like a pea in a bladder. A neutral ſalt added to them at this time brings them back to their flat ſhape: but if the ſalt be not added, the water gradually diſſolves away the veſicle; and then the little ſphere is left naked. Such is the compoſition of theſe particles. I have exhibited theſe experiments to a conſiderable number of my acquaintance, who all agree in their being ſatisfactory.

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"The microſcope I uſe is a ſingle lens, and therefore as little likely to deceive us as a pair of ſpectacles, which, as is allowed by all who uſe them, do not diſfigure objects, but only repreſent them larger.

"From farther experiments, I am convinced, that the uſe of the thymus and lymphatic glands is to make the middle ſolid pieces: and I can prove it in as ſatisfactory a manner as you can do the uſe of any viſcus in the human body; that is, by opening theſe glands, and examining the fluid contained in their cells, which I find to be full of theſe little ſolids. I moreover find, that the lymphatic veſſels take them up from thoſe glands, and convey them into the blood-veſſels which carry them to the ſpleen, in whoſe cells they have the veſicles laid over them; ſo that the thymus and lymphatic glands make the central particles, and the ſpleen makes the veſicles that ſurround them. That this is the uſe of the ſpleen appears from examining the lymph which is returned from its lymphatic veſſels; for that lymph, contrary to what is obſerved in other parts of the body, is extremely red.

"But beſides having theſe glands ſet apart for making the red veſicles of the blood, I find that they are alſo made in the lymphatic veſſels in different parts of the body, whoſe coats have blood-veſſels properly conſtructed for this ſecretion. So that the thymus and lymphatic glands are no more than appendages of the lymphatic ſyſtem, for making the middle particles; and the ſpleen an appendage to the lymphatic veſſels, for making the veſicles which contain theſe middle particles.

"I conjecture that it is the coagulable lymph which is converted into this red part of the blood, from a curious fact that has long been known; namely, that the blood in the ſplenic vein does not coagulate when expoſed

Blood. posed to the air, as the blood of other veins does; so that it seems to be robbed of its coagulable lymph in passing through the spleen.

"It is very remarkable, that the spleen can be cut out of an animal, and the animal do well without it. I made the experiment on a dog, and kept him a year and a half without observing his health to be in the least impaired. From this some have concluded the spleen to be an useless weight; which is absurd, when we consider that all animals with red blood have it. Therefore it is more consistent with what we know of the animal economy, to conclude, that since an animal can do well without it, there is probably some part of the body that can supply its place.

"Insects have vesicles constructed in a similar way to ours, but differing in colour. But insects have neither spleen, thymus, nor lymphatic glands; and therefore in them probably these vesicles are entirely fabricated in the lymphatic vessels. But to us, and other of the more perfect animals, besides the lymphatic vessels, nature has given those glands, that a proper quantity of those important vesicles might be the better secured to us; just as she has given us two ears, the better to secure us hearing through life, though we can hear perfectly well with one."

12 Objection to his hypothesis. This letter, we apprehend, contains the strength of Mr Hewson's evidence for his hypothesis; on which we shall only remark, that if the red globules are prepared in the manner above mentioned, and the lymphatic vessels are excretories of those glands where the red particles are formed; then if there is any vessel where all these excretories unite, in that vessel the lymph ought to appear very red, on account of the accumulated quantity of red globules brought thither from all parts of the body. But no such redness seems ever to have been taken notice of by any anatomist: this therefore must be an objection to Mr Hewson's hypothesis; and such a one, perhaps, as will not be easily removed.

13 Opinion of Dr Wilson. Many other hypotheses have been invented concerning the formation of the red blood, and various opinions delivered concerning its red colour. In a lecture delivered at Newcastle in 1773, by Dr Wilson of that place, he asserts "that it is self-evidently the office of the veins to elaborate the fluids into that form and composition which we know by the name of *red blood*." The self-evidence here, however, is by no means apparent to us; nor doth he at all point it out in an intelligible manner.

14 Of Dr Cullen. —Dr Cullen, in his physiological part of The Institutions of Medicine, acknowledges that we know but little of the formation of any of the animal fluids; and concerning the microscopical observations, &c. on the blood, gives his opinion in the following words, § ccliv. "The red globules have been considered as an oily matter, and from thence their distinct and globular appearance has been accounted for: but there is no direct proof of their oily nature; and their ready union with, and diffusibility in, water, renders it very improbable. As being microscopical objects only, they have been represented by different persons very differently. Some have thought them spherical bodies, but divisible into six parts, each of which in its separate state was also spherical; but other persons have not observed them to be thus divisible. To many observers they have appeared as perfectly spherical; while others judge them to be oblate spheroids, or lenticular. To some they have appeared as annular, and to others as containing a hollow vesicle. All this, with several other circumstances relating to them, very variously represented, show some uncertainty in microscopical observations; and it leaves me, who am not conversant in such observations, altogether uncertain with respect to the precise nature of this part of the blood. The chemical history of it is equally precarious; and therefore what has been hitherto said of the production and changes happening to these red globules, we chuse to leave untouched.—We suppose that the red globules, when viewed singly, have very little colour; and that it is only when a certain number of them are laid upon one another, that the colour appears of a bright red: but this also hath its limits; so that when the number of globules laid on one another is considerable, the colour becomes of a darker red. Upon this supposition, the colour of the mass of blood will be brighter or darker as the colouring part is more or less diffused among the other parts of the mass; and we think this appears to be truly the case from every circumstance that attends the changes which have been at any time observed in the colour of the blood."

Blood.

15 He accounts for the colour of the blood from the number of red particles contained in it.

16 Colour of the blood accounted for from the action of the air. Concerning the uncertainty of microscopical, as well as chemical experiments, we shall not dispute; though the conclusion against them seems carried too far. But with regard to the colour of the blood, we apprehend it hath been known, almost, if not altogether, since the discovery of the circulation, that the florid or dark colour depends on the presence or absence of air, and not upon any number of globules.—Thus the blood returning from the veins is of a dark colour. Though diluted with the fresh chyle from the subclavian vein, it continues of the same dark colour till it passes through the lungs, upon which it instantly assumes a very florid red; but it can never be proved that the globules in the pulmonary vein are at all less numerous than in the pulmonary artery.—That this change of colour may be effected by the air through membranes much thicker than we can suppose the vessels of the lungs to be, has been demonstrated by Dr Priestley, but whether the change is occasioned by the mere separation of some principle from the blood, or by the absorption of another in its stead, is not yet determined, though the latter is indeed acknowledged by Dr Priestley himself to be the more probable opinion. He even supposes the redness to be owing to a portion of dephlogisticated air absorbed in the lungs. It must therefore be the elastic principle of this air which is absorbed, while the other combined with part of the phlogiston emitted by the blood is converted into fixed air.

17 Uses of the blood in animals. This leads us to consider the uses to which the blood is subservient in the animal œconomy, and the changes that happen to it in respiration. The uses of this fluid are so various, and of such an important nature, that some have not scrupled to affirm the blood to be actually possessed of a living principle, and that the life of the whole body is derived from it. This opinion was first broached by the celebrated Harvey, the discoverer of the circulation: but in this he was never much followed; and the hypothesis itself, indeed, has been pretty much laid aside and neglected, till of late that it was revived by Mr J. Hunter, professor of anatomy

18 The vital principle thought by some to reside in the blood.

Blood.

19 Mr Hunter's arguments in favour of this opinion.

in London. This gentleman ſupports his opinion by the following arguments: 1. The blood unites living parts, in ſome circumſtances, as certainly as the yet recent juices of the branch of one tree unite it with that of another. Were either of theſe fluids to be conſidered as extraneous or dead matters, he thinks they would act as ſtimuli, and no union would take place in the animal or vegetable kingdom. This argument, Mr Hunter imagines, is ſtill farther eſtabliſhed by the following experiment. Having taken off the teſticle from a living cock, he introduced it into the belly of a living hen. Many weeks afterwards, upon injecting the liver of the hen, he injected the teſticle of the cock; which had come in contact with the liver, and adhered to it. He alleges, that in the nature of things, there is not a more intimate connection between life and a ſolid, than between life and a fluid. For although we are more accuſtomed to connect it with the one than the other, yet the only real difference which can be ſhown between a ſolid and a fluid is, that the particles of the one are leſs moveable among themſelves than thoſe of the other. Beſides, we often ſee the ſame body fluid in one caſe and ſolid in another. 2. The blood becomes vaſcular like other living parts. Mr Hunter affirms, that, after amputations, the coagula in the extremities of arteries may be injected by injecting theſe arteries; and he has a preparation in which he thinks he can demonſtrate veſſels riſing from the centre of what had been a coagulum of blood, and opening into the ſtream of the circulating blood. 3. Blood taken from the arm in the moſt intenſe cold which the human body can bear, raiſes the thermometer to the ſame height as blood taken in the moſt ſultry heat. This he conſiders as a ſtrong proof of the blood's being alive; as living bodies alone have the power of reſiſting great degrees both of heat and cold, and of maintaining in almoſt every ſituation, while in health, that temperature which we diſtinguiſh by the name of *animal heat*. 4. Blood is capable of being acted upon by a ſtimulus. In proof of this, he obſerves, that it coagulates from expoſure, as certainly as the cavities of the abdomen and thorax inflame from the ſame cauſe. The more it is alive, that is, the more the animal is in health, it coagulates the ſooner on expoſure; and the more it has loſt of its living principle, as in the caſe of violent inflammations, the leſs is it ſenſible to the ſtimulus produced from its being expoſed, and it coagulates the later. 5. The blood preſerves life in different parts of the body. When the nerves going to a part are tied or cut, the part becomes paralytic, and loſes all power of motion; but it does not mortify. If the artery be cut, the part dies, and mortification enſues. What keeps it alive in the firſt caſe? Mr Hunter believes it is the living principle which alone can keep it alive; and he thinks that this phenomenon is inexplicable on any other ſuppoſition, than that life is ſupported by the blood. 6. Another argument he draws from a caſe of a fractured os humeri he had occaſion to obſerve. A man was brought into St George's hoſpital for a ſimple fracture of the os humeri, and died about a month after the accident. As the bones had not united, Mr Hunter injected the arm after death. He found that the cavity between the extremities of the bones was filled up with blood which had coagulated. This blood was become vaſcular. In ſome places it was very much ſo. He does not maintain that all coagulated blood becomes vaſcular: and indeed the reaſon is obvious; for it is often thrown out and coagulated in parts where its becoming vaſcular could anſwer no end in the ſyſtem: as, for example, in the cavities of aneuriſmal ſacs. If it be ſuppoſed, that, in ſuch caſes as that juſt now mentioned, the veſſels are not formed in the coagulum, but come from the neighbouring arteries, he thinks it equally an argument that the blood is alive; for the ſubſtance into which veſſels ſhoot muſt be ſo. The very idea that ſuch a quantity of dead matter as the whole maſs of blood, circulates in a living body, appears to him abſurd.

Blood.

20 Nervous ſyſtem alone thought by ſome to contain the vital principle.

The ſyſtem which at preſent ſtands oppoſed to that of Mr Hunter, conſiders the brain and nervous ſyſtem as the fountain of life; and that, ſo far from receiving its life from the blood, the nervous ſyſtem is capable of inſtantaneouſly changing the craſis of the blood, or any other animal fluid; and though the nervous ſyſtem cannot continue its action for any length of time if the action of the blood-veſſels is ſuſpended, yet the heart and blood-veſſels cannot act for a ſingle moment without the influence of the nervous fluid. Hence, ſay they, it is plain we muſt ſuppoſe the nervous ſyſtem, and not the blood, to contain properly the life of the animal, and conſequently to be the principal vital organ. The ſecretion of the vital fluid from the blood by means of the brain, is, by the ſupporters of this hypotheſis, denied. They ſay, that any fluid ſecreted from the blood muſt be aqueous, inelaſtic, and inactive; whereas the nervous fluid is full of vigour, elaſtic, and volatile in the higheſt degree. The great neceſſity for the circulation of the blood through all parts of the body, notwithſtanding the preſence of the nervous fluid in the ſame parts, they ſay is, becauſe ſome degree of tenſion is neceſſary to be given to the fibres, in order to fit them for the influx of the nervous fluid; and this tenſion they receive from the repletion of the blood-veſſels, which are everywhere diſperſed along with the nerves.

21 Deciſive arguments in favour of Mr Hunter's opinion.

To follow this diſpute through every argument that hath been, or that may be, uſed by both parties, would prove tedious, and to us appears in a great meaſure unneceſſary, as the following ſhort conſiderations ſeem to decide the matter abſolutely againſt the patrons of the nervous ſyſtem. In the firſt place, then, if we can prove the life of the human body to have exiſted in, or to have been communicated from a fluid to the nervous ſyſtem, the analogical argument will be very ſtrongly in favour of the ſuppoſition that the caſe is ſo ſtill. Now, that the caſe once was ſo, is moſt evident; for the human body, as well as the body of every other living creature, in its firſt ſtate, is well known to be a gelatinous maſs, without muſcles, nerves, or blood-veſſels. Nevertheleſs, this gelatinous matter, even at that time, contained the nervous fluid. Of this there can be no doubt, becauſe the nerves were formed out of it, and had their power originally from it; and what is remarkable, the brain is obſerved to be that part of the animal which is firſt formed. Of this gelatinous fluid we can give no other account, than that it was the nutritious matter from which the whole body appears to be formed. At the original formation of man, and other animals, therefore, the nutritious matter was the ſubſtratum of the whole body, conſiſting of muſcles, nerves, blood-

Blood. blood-veſſels, &c. nay more, it was the immediate efficient cauſe of the nervous power itſelf. Why ſhould it not be ſo now as well as then! Again, in the formation of the embryo, we ſee a vital principle exiſting as it were at large, and forming to itſelf a kind of regulator to its own motions, or a habitation in which it chooſes to reſide, rather than to act at random in the fluid. This habitation, or regulator, was undoubtedly the nervous ſyſtem, and continues ſo to this moment; but at the ſame time, it is no leſs evident that a nutritious fluid was the immediate origin of theſe ſame nerves, and of that very nervous fluid. Now we know, that the fluid which in the womb nouriſhes the bodies of all embryo animals, is neceſſarily equivalent to the blood which nouriſhes the bodies of adult ones; and conſequently, as ſoon as the blood became the only nutritious juice of the body, at that ſame time the vital or nervous fluid took up its reſidence there, and from the blood diffuſed itſelf along the nerves, where it was regulated exactly according to the model originally formed in the embryo. Perhaps it may be ſaid, that the vital power, when once it hath taken poſſeſſion of the human or any other body, requires no addition or ſupply, but continues there in the ſame quantity from firſt to laſt. If we ſuppoſe the nervous power to be immaterial, this will indeed be the caſe, and there is an end of reaſoning upon the ſubject; but if we call this power a volatile and elaſtic fluid, it is plain that there will be more occaſion for recruits to ſuch a power than to any other fluid of the body, as its volatility and elaſticity will promote its eſcape in great quantities through every part of the body. It may alſo be objected, that it is abſurd to ſuppoſe any fluid, or mechanical cauſe, capable of putting matter in ſuch a form as to direct its own motions in a particular way: but even of this we have a poſitive proof in the caſe of the electric fluid. For if any quantity of this matter has a tendency to go from one place to another where it meets with difficulty, through the air for inſtance, it will throw ſmall conducting ſubſtances before it, in order to facilitate its progreſs. Alſo, if a number of ſmall and light conducting ſubſtances are laid between two metallic bodies, ſo as to form a circle, for example; a ſhock of electricity will deſtroy that circle, and place the ſmall conducting ſubſtances nearer to a ſtraight line between the two metals, as if the fluid knew there was a ſhorter paſſage, and reſolved to take that, if it ſhould have occaſion to return †. Laſtly, it is univerſally allowed, that the brain is a ſecretory organ, made up of an infinite number of ſmall glands, which have no other excretories than the medullary fibres and nerves. As a conſiderable quantity of blood is carried to the brain, and the minute arteries end in theſe ſmall glands, it follows, that the fluid, whatever it is, muſt come from the blood. Now, there is no gland whatever, in the human, or any other body, but will diſcharge the fluid it is appointed to ſecrete, in a very conſiderable quantity, if its excretory is cut. Upon the cutting of a nerve, therefore, the fluid ſecreted by the brain ought to be diſcharged; but no ſuch diſcharge is viſible. A ſmall quantity of glairy matter is indeed diſcharged from the large nerves; but this can be no other than the nutritious juice neceſſary for their ſupport. This makes it plain, even to demonſtration, that the fluid ſecreted in the brain is *inviſible* in its nature; and as we know the nervous fluid hath its reſidence in the brain, it is very probable, to uſe no ſtronger expreſſion, that it is the peculiar province of the brain to ſecrete this fluid from the blood, and conſequently that the blood originally contains the vital principle. Blood.

† See *Electricity*.

22 Vivifying ſpirit ſuppoſed to be derived from the air.

After it is allowed that the blood contains the vital principle, it becomes another queſtion not very eaſily reſolved, Whence is this vital principle derived?—For this we can only diſcover two ſources; namely, the chyle or aliment from which the blood is prepared, and reſpiration. The latter hath been commonly held as the principal ſource of the vital principle; and, for a long time, it was generally thought that there was a kind of vivifying ſpirit in the air, which being abſorbed by the blood at each inſpiration, communicated to that fluid the quality neceſſary for preſerving animal life. As a proof of this it was urged, that life cannot be ſupported without reſpiration, and that air which hath been often breathed ceaſes to be capable of ſupporting life; becauſe when once it has been totally deprived of its vivifying ſpirit, it can communicate none to the blood in any ſubſequent reſpirations.—This doctrine, however, hath been denied, and generally thought to be exploded by modern diſcoveries. Dr Hales brings ſeveral experiments againſt it; of which the following may ſerve for a ſpecimen, and which we ſhall give in his own words.

23 This doctrine for ſome time generally denied.

24 Dr Hales's experiment againſt a vivifying ſpirit, *Statical Eſſays*, vol. i. p. 255.

"I tied a middled-ſized dog alive on a table, and, having laid bare his wind-pipe, I cut it aſunder juſt below the larynx, and fixed faſt to it the ſmall end of a common foſſet: the other end of the foſſet had a large bladder tied to it, which contained 162 cubic inches; and to the other end of the bladder was tied the great end of another foſſet whoſe orifice was covered with a valve which opened inwards, ſo as to admit any air that was blown into the bladder, but none could return that way; yet, for further ſecurity, that paſſage was alſo ſtopped by a ſpigot.

"As ſoon as the firſt foſſet was tied faſt to the wind-pipe, the bladder was blown full of air through the other foſſet; when the dog had breathed the air in the bladder to and fro for a minute or two, he then breathed very faſt, and ſhowed great uneaſineſs, as being almoſt ſuffocated.

"Then with my hand I preſſed the bladder hard, ſo as to drive the air into his lungs with ſome force; and thereby make his abdomen riſe by the preſſure of the diaphragm, as in natural breathings; then taking alternately my hand off the bladder, the lungs with the abdomen ſubſided: I continued in this manner to make the dog breathe for an hour; during which time, I was obliged to blow freſh air into the bladder every five minutes, three parts in four of that air being either abſorbed by the vapours in the lungs, or eſcaping through the ligatures upon my preſſing hard on the bladder.

"During this hour, the dog was frequently near expiring, whenever I preſſed the air but weakly into his lungs; as I found by his pulſe, which was very plain to be felt in the great crural artery near the groin, which place an aſſiſtant held his finger on moſt part of the time: but the languid pulſe was accelerated ſo as to beat faſt, ſoon after I dilated the lungs much by preſſing hard upon the bladder; eſpecially when the motion of the lungs was promoted by preſſing alternately

Blood. the abdomen and the bladder, whereby both the contraction and dilatation of the lungs was increaſed.

" And I could by this means rouſe the languid pulſe whenever I pleaſed, not only at the end of every five minutes, when more air was blown into the bladder from a man's lungs, but alſo towards the end of the five minutes, when the air was fulleſt of fumes.

" At the end of the hour, I intended to try whether I could have by the ſame means kept the dog alive ſome time longer, when the bladder was filled with the fumes of burning brimſtone; but being obliged to ceaſe for a little time from preſſing the air into his lungs, while matters were preparing for this additional experiment, in the mean time the dog died, which might otherwiſe have lived longer if I had continued to force the air into the lungs.

" Now, though this experiment was ſo frequently diſturbed, by being obliged to blow more air into the bladder 12 times during the hour; yet ſince he was almoſt ſuffocated in leſs than two minutes, by breathing of himſelf to and fro the firſt air in the bladder, he would have died in leſs than two minutes when one-fourth of the old air remained in the bladder immediately to taint the new air admitted from a man's lungs; ſo that his continuing to live through the whole hour, muſt be owing to the forcible dilatation of the lungs by compreſſing the bladder, and not to the vivifying ſpirit of the air."

25 Dr Prieſtley's opinion. Dr Prieſtley at firſt concluded from his own obſervations, and no doubt very juſtly, that air which hath been often breathed becomes pernicious by its accumulated phlogiſton, ſtimulating the lungs, and making the animal fall into convulſions. Reſpiration, therefore, he ſuppoſed to be a phlogiſtic proceſs, in which the blood parts with its ſuperfluous phlogiſton. He did not ſay, that the blood receives nothing in exchange; but rather that it may receive ſome nitrous principle, which gives it the red colour; but as to a vivifying ſpirit, he doth not appear to have the leaſt idea of any ſuch thing being received at that time. Nay, in his firſt volume, p. 277. he expreſsly adopts the other hypotheſis, namely, that the vital principle is received from the chyle. " My conjecture (ſays he) is, that animals have a power of converting phlogiſton, from the ſtate in which they receive it in their nutriment, into that ſtate in which it is called the *electrical fluid;* that the brain, beſides its other proper uſes, is the great laboratory and repoſitory for this purpoſe; that by means of the nerves this great principle, thus exalted, is directed into the muſcles, and forces them to act in the ſame manner as they are forced into action when the electric fluid is thrown in them *ab extra*."

26 Dr Hales's experiment inconcluſive. Theſe theories were oppoſed in the former edition of this work. With regard to Dr Hales's opinion, that the want of elaſticity, or preſſure, is the reaſon why phlogiſticated air cannot ſupport animal life, we apprehended it to be totally inconcluſive, becauſe it doth not at all appear that phlogiſticated air wants elaſticity; on the contrary, from Dr Prieſtley's experiments it appears to be more elaſtic than common air. Beſides, we know that the elaſticity of every fluid muſt always be in proportion to the preſſure upon it, as reaction is always equal to action. Suppoſing therefore the elaſticity of any portion of air to be deſtroyed, the preſſure of the ſuperincumbent atmoſphere will reduce it into a proportionably leſs bulk, and then it is equally elaſtic with the reſt; for if it was not, it would behove it ſtill to yield under the preſſure. Hence we may ſee, that as the bladder made uſe of in Dr Hales's experiment was by no means ſufficient to keep off the preſſure of the external atmoſphere, the death of the dog could not be fairly aſcribed to want of elaſticity in the tainted air. When he applied more force than the natural elaſticity of the air, he kept the dog *alive*, as he calls it, for an hour; but we can by no means allow a mechanical circulation of the blood to be life, any more than we can allow a dead body to be alive on account of the motion of its arm or any other member by mechanical means. The experiment, however, is valuable, becauſe it ſhows that reſpiration is one of the immediate mechanical agents by which the circulation of the blood is carried on; but in order to prove that the dog was really kept alive by this means, he ought to have recovered from the effects of the experiment. Had Dr Hales tried a ſimilar experiment on himſelf, by taking the foſſet in his mouth, cloſing his noſtrils, and cauſing another perſon compreſs the bladder, we have not the leaſt doubt that he would then have felt ſuch a method of breathing not to be a way of preſerving life, but of deſtroying it. Blood.

27 Cauſe of the diminution of air by phlogiſton, &c. As to Dr Prieſtley's concluſions, it was argued, that " though he found air diminiſhed by admitting phlogiſton to it, Dr Prieſtley finds the mere acceſſion of any material ſubſtance can never diminiſh, but muſt increaſe, its bulk. The diminution, therefore, on the acceſſion of phlogiſton, is an evident proof that ſome part of the air is actually taken away. That the phlogiſton received is not incorporated with the air is likewiſe evident, as well as that it takes up ſpace in the tainted air, becauſe, by agitation in water, the phlogiſtic matter ſeparates from the air, and enters into the water. The conſequence of this is, that the air is ſtill farther diminiſhed in bulk; and what remains is pure air, fit for ſupporting animal life, and of being farther diminiſhed by phlogiſton as before. It appears alſo certain, that phlogiſton is not endowed with any inherent power by which it can expand itſelf; otherwiſe it would fly off *in vacuo*, which it never is known to do. Another circumſtance we muſt alſo attend to is, that the action of phlogiſton ſeems to be entirely confined to a particular part of the atmoſphere; namely, that which is now ſo well known by the name of *fixed air*. This it entirely deprives of its elaſtic principle, ſo that it is actually no longer air, but becomes a ſolid ſubſtance, making a part, and that no inconſiderable one, of innumerable terreſtrial ſubſtances, as chalk, limeſtone, &c."

That the juſtneſs of the concluſion about to be drawn from Dr Prieſtley's experiments may be more apparent, the phenomena were ſummed up in the two following propoſitions. " 1. Phlogiſton cannot act by itſelf without the aſſiſtance of air. 2. The emiſſion of phlogiſton is attended with the total deſtruction of the elaſticity of a certain quantity of fixed air, which then ceaſes to be fluid. Hence we affirm, that it is not the phlogiſtic ſubſtance which acts upon the air, but the elaſtic principle in the fixed air contained in the common atmoſphere that acts on the phlogiſtic ſubſtance. This elaſtic principle, entering the phlogiſtic body, diſplaces a quantity of phlogiſton equivalent to its own quantity,

28 Why a phlogiſtic ſubſtance parts with its phlogiſton.

Blood. quantity, and takes its place; and hence proceeds the first diminution of the air, not from an accession of phlogiston, but from an escape of the elastic principle belonging to fixed air. The phlogiston and fixed particles of the air now hang loose like smoke or vapour, and are ready to be attracted by any thing capable of imbibing them; and hence proceeds the second diminution by agitation in water.

29 Proof of a reception of the vivifying principle from the air.

"Now to apply this reasoning to the point in question: The blood is found to emit phlogiston from the lungs at every exspiration: therefore we affirm it hath received a proportional quantity of elastic vapour which it had not before. Again: The air expelled from the lungs is found to contain much of the fixable part floating loose, and capable of being attracted by lime-water, &c.; therefore we say, this elastic principle hath come from that part of the atmosphere. But, to put the matter beyond doubt, the very inspection of arterial and venous blood will show, that the first hath a quantity of elastic matter in it which the last wants: and as the brain as well as all other parts of the body are supplied with arterial blood, we think it abundantly evident, that this elastic principle is absolutely and essentially necessary to life; that it is continually expended thereon; and that it may be said with the utmost propriety, that every time we draw the air into our lungs, we receive a portion of vivifying or vital spirit from it into our blood. Add to all this, that many substances which are commonly observed to phlogisticate air, appear to receive an elastic spirit by so doing. Putrefying bodies swell: they would not do so *in vacuo*; and therefore we must conclude, that they receive this elastic principle which swells them from the external air; and experience shows that it is communicated by this fixable part of the atmosphere.

"The foregoing reasoning, which to us appeared sufficiently conclusive, leads to a very important discovery in natural philosophy, viz. That it is to the atmosphere, and to that particular part of it which goes by the name of *fixed air*, that we are every moment indebted for that vital spirit which animates our bodies, and is the immediate bond of union betwixt our immaterial spirit and this visible world. It may be asked indeed, If fixed air is capable of supplying this spirit in such plenty, how comes it to be so instantaneously fatal when breathed? The reply to this, however, is obvious: it communicates too great a degree of elasticity to the blood; whence the circulation is stopped, and instant death ensues. That this is really the case, appears from the following account of the symptoms observed on the dissection of persons who have been suffocated by this kind of air.

30 Objection answered.

Edinburgh Medical Comment. vol. iii. p. 256.

31 Appearances on the dissection of those suffocated by fixed air.

"1. The vessels of the brain are gorged with blood, and the ventricles of that viscus are filled sometimes with a frothy, sometimes with a bloody, serosity. 2. The trunk of the pulmonary artery is much distended, and the lungs appear nearly in a natural state. 3. The right ventricle and auricle of the heart, the venæ cavæ, and jugular veins, are full of frothy blood. 4. Bloody serosity is often found in the bronchiæ. 5. The trunk of the pulmonary veins, and the left auricle, are either empty, or almost empty, of blood. 6. The blood found in the places that have been mentioned is generally fluid, and as it were in a dissolved state. It is easily extravasated into the cellular texture, of the head particularly, because it is in this part that it abounds most. 7. The epiglottis in suffocated persons is raised, and the glottis open and free. 8. The tongue is much swelled, and can hardly be contained within the mouth. 9. The eyes protrude, and preserve their lustre to the second or third day. They are often even brighter than natural. 10. The body preserves its heat for a long time. Nay the heat is sometimes greater than it is during life, or at least consistently with health. 11. The limbs are flexible for a long time after death. 12. The face is more swelled, and often more red than usual. 13. The neck and upper extremities are sometimes so much swelled, that they appear to be inflamed. These swellings, however, do not, like œdematous ones, preserve the impressions of the finger. Blood.

32 Fixed air supposed the cause of animal heat.

"This account seemed so much in favour of what we had already advanced concerning the action of fixed air, that no observation was made upon it farther than that this elastic principle would seem also to be the cause of animal-heat; for as the blood evidently received a vast quantity of elastic fluid, it also received a much greater proportion of heat than usual."

33 This theory corrected.

Such was the mode of reasoning adopted at that time, derived from the discoveries which had been made in *Aerology*. Succeeding discoveries, however, have made it evident, that fixed air is not one of the natural component parts of our atmosphere, but that it consists of two different fluids; one of which has been called *phlogisticated*, the other *dephlogisticated air*. It is the latter which supplies the vital principle; and the above reasoning still holds good, only substituting the words *dephlogisticated air* for *fixed air*. The poisonous quality of the latter seems also still to depend on its too easy decomposition; by which means the elastic principle is discharged into the blood in such quantity as to burst the small vessels, as has already been observed. This is shown indeed by the remedies most proper for the recovery of those who have suffered from the noxious qualities of fixed air. These consist in evacuation, and especially sprinkling the body with cold water, in order to take off the superfluous heat, and produce an universal contraction of the vessels.

34 Circulation of the blood how carried on.

It now remains only to give some account of the means by which the circulation of the blood is carried on in the living body. From the time of Harvey till very lately, this was supposed to be chiefly the muscular power of the heart and arteries, which by some physiologists have been thought to be prodigiously great; and accordingly many calculations, requiring no small degree of mathematical knowledge to understand them, have been made of the forces requisite to perform this circulation. Other physiologists, however, have thought proper to take in several auxiliary helps, as the motion of the muscles, respiration, &c. and from Dr Hales's experiment above mentioned, it appears that respiration hath a considerable influence in this matter. It cannot, however, be the sole cause, seeing the circulation is carried on in animals which do not respire.—In 1773, Dr Wilson, in the lecture already quoted, suggested a new principle of motion, which we believe was never used before to account for the circulation of animal fluids. It is shortly this: "As the fluids of the human body do all of them suffer a continual waste, and consequently require a constant supply in proportion, we must look upon their going out of the body to be the

35 New hypothesis by Dr Wilson.

Blood. the end of their motion, and on their entering into the body to be the beginning of it; and hence we are to look for the origin of all the motion of the fluids in that part of the ſyſtem where the new ſupplies are taken in. This is the primæ viæ, where the lacteals abſorb a fluid from the digeſted aliment, and convey it into the blood. The power by which this is accompliſhed, is neceſſarily independent of the heart, as having not the leaſt connection with it. It has been ſaid to be the ſame with that which cauſes fluids riſe in the capillary tubes; but though very probably the powers in both caſes may be the ſame, there is this remarkable difference between them, that in the capillary tubes the fluids only riſe to a certain height, and will not riſe at all unleſs the tubes are empty. In the lacteals they riſe in veſſels already full, and continue to do ſo. Neither is the force whereby this abſorption is performed to be accounted little; ſeeing the ſupply by the chyle muſt conſtantly be equal to the waſte which is continually taking place in the fluids already contained in the veſſels. We ſee alſo with what force an abſorption of this kind ſometimes takes place in other caſes; thus ropes will abſorb water with ſuch ſtrength as to raiſe immenſe weights faſtened to them, and which no mechanical injection of water into ſmall tubes could poſſibly accompliſh. What is already ſaid of the lacteals applies alſo to the lymphatics; and from thence we are almoſt tempted to conclude, that the caſe is the ſame with the ſanguiferous veins alſo; that though there may be a continuation of ſome arteries into the veins correſponding with them, yet that for the moſt part theſe veſſels extravaſate the blood into ſmall cavities, which is then taken up by the abſorbent power of the veins, and returned to the heart.

"If, however, the veſſels continued abſolutely full, it would be impoſſible that any motion could be carried on in them; and to continue and regulate the circulation, the heart with its cavities is provided. Let us ſuppoſe, that by the above-mentioned power the veins are all full, and the auricles or chambers into which the veins empty themſelves are full alſo; where is the collected ſtream in the veins to go next? There is no room for more in the auricle. What muſt be done? The auricle contracts and empties itſelf. The conſequence is a ſudden vacuum equal to what the auricle could contain; the turgid veins, urged by the abſorbing power above-mentioned, ruſh their contents into the auricle to fill up the vacuum again; and all behind moving in the venous direction advances forward with ſo much force, that the veins near the heart ſuſtain a pulſation from the regurgitation of the impetuous ſtream, when the auricle ſhuts upon it to empty itſelf. In ſhort, the full auricle occupies a determinate quantity of ſpace in the breaſt: when it is emptied, there is a non-reſiſting vacuum of ſo much ſpace as was full before, and thither there is a mechanical niſus from the remoteſt filament of a vein over the whole body, which becomes conſpicuous in the torrent that ruſhes every other moment from the mouth of the vena cava into this vacuum."

This is a ſhort abſtract of Dr Wilſon's new theory of the circulation. According to him, this abſorbing power of the veins is the principal agent, while the heart and arteries do no more than empty themſelves of the blood with which they are filled by the veins. Even this cauſe, however, he ſays, would not be ſufficient to carry on the circulation for a ſingle moment, without the preſence of another which he calls *life*, and does not conſider as abſolutely unmechanical, though we cannot reduce it either to mechanical rules or ideas. But as we apprehend all ſpeculations concerning ſuch cauſes muſt be arbitrary and without foundation, we forbear to give any account of the Doctor's opinions on this ſubject. Blood.

36 Blood contains no air while in the bodies of animals.

It hath been a general opinion, that blood, as it exiſts in the bodies of animals, contains a conſiderable quantity of common air; and indeed it is certain, that blood, after it has been drawn from the veins of any animal, and afterwards placed under the receiver of an air-pump, yields a very conſiderable quantity of air upon exhauſting the receiver: but if a portion of any blood-veſſel is tied up ſo as to prevent the eſcape of its contents, and then cut out of the body and placed under a receiver, it will not ſwell, or ſhow the leaſt ſign of its containing any quantity of air whatever.

37 Medicinal and other uſes of blood.

Blood was formerly held in great eſteem as a medicine for ſome particular diſeaſes. Baths of the blood of infants have been recommended as an infallible remedy for the elephantiaſis, &c.; and the blood of goats and ſome other animals was uſed by the Galeniſts, and is recommended even by Dr Mead in pleuriſies: but the firſt abominable medicine, as well as the other, is now deſervedly exploded. The principal uſe of blood in the arts is for making Pruſſian blue, or ſometimes for clarifying certain liquors; it is alſo recommended in agriculture as an excellent manure for fruit-trees. A mixture of blood with lime makes an exceedingly ſtrong cement; and hence it is of uſe in the preparation of ſome chemical lutes, the making floors*, &c. As a food, it hath been diſputed whether blood really affords any nouriſhment or not. The beſt judges now, however, are generally agreed that it is very nutritious; and though out of the body, like the white of an egg, it is very inſoluble, yet, like that too, *in* the body it is commonly of eaſy digeſtion. It is, however, highly alkaleſcent in hot climates: on which account the prohibition of it to the Iſraelites was very proper. Even in this country, when blood was uſed as food in great quantity, the ſcurvy was more frequent than at other times; but to a moderate uſe of it here no ſuch objection takes place. * See *Architecture*, n° 116.

In ſome countries, we are told that the barbarians were accuſtomed to intoxicate themſelves by drinking the warm blood of animals; and as it has been ſhown that this fluid is the immediate reſervoir of the vital principle, it ſeems by no means improbable that it may be poſſeſſed of an inebriating quality. Some expreſſions in Scripture ſeem to countenance this hypotheſis.

Religious uſes of Blood. Among the ancients blood was uſed for the ſealing and ratifying covenants and alliances, which was done by the contracting parties drinking a little of each others blood; and for appeaſing the manes of the dead; in order to which blood was offered on their tombs as part of the funeral ceremony.

The blood of victims was anciently the portion of the gods; and accordingly was poured or ſprinkled on the altars in oblation to them.

The prieſts made another uſe of blood, viz. for divination:

Blood. tion: the ſtreaming of blood from the earth, fire, and the like, was held a prodigy or omen of evil.

The Roman prieſts were not unacquainted with the uſe of blood in miracles; they had their fluxes of blood from images, ready to ſerve a turn; witneſs that ſaid to have ſtreamed from the ſtatue of Minerva at Modena, before the battle at that place. But we know not whether in this their ſucceſſors have not gone beyond them. How many relations in eccleſiaſtical writers of Madonas, crucifixes, and wafers, bleeding? At leaſt the liquefaction of the blood of St Januarius at Naples, repeated annually for ſo many ages, ſeems to tranſcend by far all the frauds of the Grecian or Roman prieſthood. But the chemiſts at laſt got into the ſecret; and we find M. Neumann at Berlin to have performed the miracle of the liquefaction of dried blood, with all the circumſtances of the Neapolitan experiment.

Among the ſchoolmen we find a famous diſpute, under Pope Pius II. whether the blood of Chriſt, which fell from him in the three days paſſion, retained or loſt the hypoſtatic union; and conſequently whether it was the proper object of adoration. The Dominicans maintained the former, the Franciſcans the latter. It ſeems the Dominican doctrine gained the aſcendant, as being fitted to favour the profits of the monks; who becoming poſſeſſed ſome way or other of a few drops of this precious liquor, were ſecured of ample offerings from the deluded laity, who flocked to pay their homage to the ſacred relic. Joſeph of Arimathea is ſaid to have firſt brought into Britain two ſilver veſſels filled with the blood of Chriſt, which by his order was buried in his tomb. King Henry III. had a cryſtal, containing a portion of the ſame blood, ſent him by the maſter of the temple at Jeruſalem, atteſted with the ſeals of the patriarch; which treaſure the king committed to the church of St Peter's Weſtminſter, and obtained from the biſhops an indulgence of ſix years and 116 days to all that ſhould viſit it. Mat. Paris even aſſures us, that the king ſummoning his nobles and prelates to celebrate the feaſt of St Edward in St Peter's church, was chiefly *pro veneratione ſancti ſanguinis Chriſti nuper adepti*, "in veneration of the holy blood of Chriſt lately acquired." Divers others of our monaſteries were poſſeſſed of this profitable relic; as the college of Bons Hommes at Aſhridge, and the abbey of Hales, to whom it was given by Henry, ſon of Richard duke of Cornwall, and king of the Romans. To it reſorted a great concourſe of peopble for devotion and adoration; till in 1538, as the Reformation took place, it was perceived to be only honey clarified and coloured with ſaffron, as was ſhown at Paul's croſs by the biſhop of Rocheſter. The like diſcovery was made of the blood of Chriſt, found among the relics in the abbey of Feſchamp in Normandy, pretended to have been preſerved by Nicodemus, when he took the body from the croſs, and given to that abbey by William duke of Normandy: it was buried by his ſon Richard, and again diſcovered in 1171, and attended with different miracles; but the cheat, which had been long winked at, was at length expoſed, the relation of which is given by Speed.

Avenger of Blood, among the Jews, was the next of kin to the perſon murdered, who was to purſue the murderer.

Eccleſiaſtical judges retire, when judgment is to be given in *caſes of blood*, by reaſon the church is ſuppoſed to abhor blood: it condemns no perſon to death; and its members become irregular, or diſabled from their functions, by the effuſion of blood. Field of Blood, Blood-white.

Field of Blood, in Syriac *aceldama*, was a field purchaſed by the Jews with the thirty pieces of ſilver, which had been given to Judas for betraying his Maſter, and which he had reſtored. It ſtill ſerves for a burial-ground, in which all pilgrims who die in their pilgrimage at Jeruſalem, are interred.

Blood Hounds, in *Zoology*, the canis ſagax of Linnæus ‡, *le chien courant* of Buffon, the *ſleuthounde* of the Scots: The hound or dog, with long, ſmooth, and pendulous ears. It was a dog of great uſe, and in high eſteem with our anceſtors: its employ was to recover any game that had eſcaped wounded from the hunter, or been killed and ſtole out of the foreſt. It was remarkable for the acuteneſs of its ſmell, tracing the loſt beaſt by the blood it had ſpilt; from whence the name is derived. This ſpecies could, with the utmoſt certainty, diſcover the thief by following his footſteps, let the diſtance of his flight be ever ſo great, and through the moſt ſecret and thickeſt coverts; nor would it ceaſe its purſuit till it had taken the felon. They were likewiſe uſed by Wallace and Bruce during the civil wars. The poetical hiſtorians of the two heroes frequently relate very curious paſſages on this ſubject; of the ſervice theſe dogs were of to their maſters, and the eſcapes they had from thoſe of the enemy. The blood-hound was in great requeſt on the confines of England and Scotland; where the borderers were continually preying on the herds and flocks of their neighbours. The true blood-hound was large, ſtrong, muſcular, broad-breaſted, of a ſtern countenance, of a deep tan-colour, and generally marked with a black ſpot above each eye. ‡ See *Canis*.

Blood-Shotten. See Ophthalmia, Medicine *Index*.

Blood-Spaven. See Farriery *Index*.

Spitting of Blood, or *Hæmoptöe*. See Medicine *Index*.

Whole and Half Blood; a kinſman of the *whole blood* is he that is derived from the ſame couple of anceſtors; whereas a perſon of *half blood* deſcends from either of them ſingly by a ſecond marriage.

Blood of Chriſt, the name of a military order inſtituted at Mantua in 1608. The number of knights was reſtricted to 20, beſides the grand-maſter. Their device was, *Domine, probaſti me;* or, *Nihil hoc, triſte, recepto:* "Lord, thou haſt proved me;" or, "Fortified by this, no evil can prevail."

Precious Blood, a denomination give to a reformed congregation of Bernardine nuns at Paris, firſt eſtabliſhed under that name in 1661.

Dragon's Blood. See Dragon.

Blood-Stone. See Hæmatites, Mineralogy *Index*.

Blood-Veſſels. See Anatomy *Index*.

Blood-White, in ancient law writers, ſignifies *blood*, and a cuſtomary amercement paid as a compoſition for the ſhedding or drawing of blood. The word is alſo written *blodwhite*, *blodwita*, *blodwyta*, *bloodwit*, *blodwit*, *bloudwit*, and *bluidweit*. It is formed from the ancient Saxon *blud*, "blood", and *vite* or *wite*, "a fine or penalty". The word alſo denotes an exemption from this penalty,

Blood-wort. penalty, granted by the king to certain perſons and communities as a ſpecial favour. King Henry II. granted to all tenants within the honour of Wallingford—*Ut quieti ſint de hidagio et blodwite et bredwite.*

Blood-Wort. See RUMEX, BOTANY *Index.*

BLOOD, *Thomas*, generally known by the appellation of *Colonel Blood*, was a diſbanded officer of Oliver Cromwell's, famous for his daring crimes and his good fortune. He was firſt diſtinguiſhed by engaging in a conſpiracy to ſurpriſe the caſtle of Dublin; which was defeated by the vigilance of the duke of Ormond, and ſome of his accomplices were executed. Eſcaping to England, he meditated revenge againſt Ormond; and actually ſeized him one night in his coach at St James's ſtreet, where he might have finiſhed his purpoſe if he had not ſtudied refinements in his vengeance. He bound him on horſeback behind one of his aſſociates, reſolving to hang him at Tyburn, with a paper pinned to his breaſt: but, when they got into the fields, the duke, in his efforts for liberty, threw himſelf and the aſſaſſin, to whom he was faſtened, to the ground; and, while they were ſtruggling in the mire, he was reſcued by his ſervants; but the authors of this attempt were not then diſcovered. A little after, in 1671, Blood formed a deſign of carrying off the crown and regalia from the Tower; a deſign to which he has prompted, as well by the ſurpriſing boldneſs of the enterpriſe, as by the views of profit. He was very near ſucceeding. He had bound and wounded Edwards the keeper of the jewel-office, and had got out of the Tower with his prey; but was overtaken and ſeized, with ſome of his aſſociates. One of them was known to have been concerned in the attempt upon Ormond; and Blood was immediately concluded to be the ringleader. When queſtioned, he frankly avowed the enterpriſe; but refuſed to diſcover his accomplices. "The fear of death (he ſaid) ſhould never engage him either to deny a guilt or betray a friend." All theſe extraordinary circumſtances made him the general ſubject of converſation; and the king was moved with an idle curioſity to ſee and ſpeak with a perſon ſo noted for his courage and his crimes. Blood might now eſteem himſelf ſecure of pardon; and he wanted not addreſs to improve the opportunity. He told Charles, that he had been engaged, with others, in a deſign to kill him with a carabine above Batterſea, where his majeſty often went to bathe; that the cauſe of this reſolution was the ſeverity exerciſed over the conſciences of the godly, in reſtraining the liberty of their religious aſſemblies: that when he had taken his ſtand among the reeds, full of theſe bloody reſolutions, he found his heart checked with an awe of majeſty; and he not only relented himſelf, but diverted his aſſociates from their purpoſe: that he had long ago brought himſelf to an entire indifference about life, which he now gave for loſt; yet could he not forbear warning the king of the danger which might attend his execution: that his aſſociates had bound themſelves by the ſtricteſt oaths to revenge the death of any of their confederacy; and that no precaution or power could ſecure any one from the effect of their deſperate reſolutions. Whether theſe conſiderations excited fear or admiration in the king, they confirmed his reſolution of granting a pardon to Blood; but he thought it a requiſite point of decency firſt to obtain the duke of Ormond's conſent. Arlington came to Ormond in the king's name, and deſired that he would not proſecute Blood, for reaſons which he was commanded to give him. The duke replied, that his majeſty's commands were the only reaſon that could be given: and being ſufficient, he might therefore ſpare the reſt. Charles carried his kindneſs to Blood ſtill farther; he granted him an eſtate of 500l. a year in Ireland; he encouraged his attendance about his perſon; he ſhowed him great countenance; and many applied to him for promoting their pretenſions at court. And while old Edwards, who had bravely ventured his life, and had been wounded, in defending the crown and regalia, was forgotten and neglected, this man, who deſerved only to be ſtared at and deteſted as a monſter, became a kind of favourite. Blood enjoyed his penſion about ten years, till being charged with fixing an imputation of a ſcandalous nature on the duke of Buckingham, he was thrown into priſon, where he died Auguſt 24. 1680.

Bloody ‖ Bloſſom.

BLOODY, ſomething belonging to or abounding with blood.

Bloody-Flux. See MEDICINE *Index.*

Bloody-hand is when a treſpaſſer is apprehended in a foreſt with his hands or other parts bloody; which is a circumſtance of his having killed the deer, though he be not found chaſing or hunting them.

Bloody Rain. See RAIN.

Bloody Sweat. Many inſtances of this are recorded, in which it has been owing to bodily diſorder, or extreme mental agitation and agony. See particularly Ariſtotle's Hiſt. Animal. lib. iii. cap. 19. apud Oper. tom. i. Thuanus Hiſt. Temp. &c. lib. ii. apud Oper. tom. i. Melanges d'Hiſtoire et de Literature, &c. par M. V. Marville, tom. iii. p. 149. Acta Phyſico-Med. Norimbergæ, vol. i. p. 84. and vol. viii. p. 428.

Bloody-Urine. See MEDICINE *Index.*

BLOOM, a maſs of iron after having undergone the firſt hammering called *blomary*. It has yet to undergo many hammerings before it become iron fit for the ſmith's uſe, and be firſt made what they call the *ancony*. See ANCONY.

BLOOT, PETER, a Flemiſh painter, whoſe works are not frequently ſeen in theſe kingdoms; nor are they eaſily purchaſed in Holland, being carefully preſerved in private collections, and are highly eſteemed. The ſubjects he choſe to paint were always taken from the loweſt life; ſuch as boors drinking, feaſting, dancing, or quarreling; ſhepherds piping, and ſometimes the marriages of villagers. He was a faithful, and indeed too ſervile an imitator of nature; never departing from the actions, attitudes, or draperies of his models. He ſhowed a good knowledge of the chiaroſcuro and perſpective; he had a delicate manner of penciling, and his colouring was mellow; but he had no idea of elegance: yet his pictures have in many reſpects great merit, and his defects ſeem rather imputable to the taſte of his country than to his own genius; ſome of his works being for the lightneſs of the touch, the neatneſs of handling, and tranſparence of colour, equal to the beſt of his time. He died in 1667.

BLOSSOM, in a general ſenſe, denotes the flower of any plant. See the article FLOWER.

BLOSSOM, in a more proper ſenſe, is reſtrained to the flowers of trees which they put forth in the ſpring

and

Bloſſom || Blount.

as the forerunners of their fruit, otherwiſe called their *bloom*. The office of the bloſſom is partly to protect, and partly to draw nouriſhment to, the embryo fruit or ſeed.

Blossom, or *Peach-coloured*, in the manege, a term applied to a horſe that has his hair white, but intermixed all over with ſorrel and bay hairs. Such horſes are ſo inſenſible and hard both in the mouth and the flanks, that they are ſcarcely valued; beſides they are apt to turn blind.

BLOSSOMING of Plants, the act of blowing, or putting forth flowers or bloſſoms, called alſo *flowering*. The bloſſoming of the Glaſtonbury thorn piouſly on Chriſtmas-day morning, is a vulgar error; owing to this, that the plant, beſides the uſual bloſſoming in the ſpring, ſometimes puts forth a few white tranſient bloſſoms in the middle of winter. For the bloſſoming of the roſe of Jericho on the ſame day, as it is commonly held in England, or in the time of midnight maſs, as it is held in France, is ſomewhat more than an error, being really a fraud on one ſide, and a ſuperſtition on the other. This roſe, whoſe leaves are only cloſed and ſhrivelled up in winter, will, at any time, upon ſetting its pedicle in water, expand and bloſſom a-new; becauſe the pedicle being ſpongy imbibes the fluid apace, and thus fills and ſwells out the ſhrivelled leaves: which property ſome monks have turned to good account.

BLOTELING, or Blooteling, Abraham, an engraver who flouriſhed about the year 1672. He was a native of Amſterdam, and deſigned as well as engraved. From the ſtyle of his etchings, which have great merit, he is ſuppoſed to have frequented the ſchool of the Viſſchers. He came into England about the year 1672, or 1673, at the time the French invaded Holland; but he did not reſide there long. He not only etched, but alſo ſcraped, ſeveral mezzotintos, which were much eſteemed. Vertue informs us, that whilſt he was in England, he received 30 guineas for an etching of the duke of Norfolk. From hence he returned to Amſterdam, where, in all probability, he died. In the year 1685, he publiſhed at Amſterdam the *gems* of Leonardo Auguſtino, and etched the plates himſelf.

BLOUNT, Thomas, a learned Engliſh writer of the 17th century, born at Bordeſley in Worceſterſhire. He had not the advantage of an univerſity education; but, by ſtrength of genius and great application, made a conſiderable progreſs in literature. Upon the breaking out of the popiſh plot in the reign of King Charles II. being much alarmed on account of his being a zealous Roman Catholic, he was ſeized with a palſy; and died in December 1679, aged 61. He wrote, 1. The Academy of Eloquence, containing a complete Engliſh rhetoric. 2. Gloſſographia, or a dictionary interpreting ſuch hard words, whether Hebrew, Greek, Latin, Italian, &c. as are now uſed in our refined Engliſh tongue, &c. 3. Boſcobel; or the Hiſtory of his Majeſty's Eſcape after the Battle of Worceſter. 4. A law dictionary. 5. Animadverſions upon Sir Richard Baker's chronicle. 6. *Fragmenta Antiquitatis;* and other works.

Blount, *Sir Henry*, an Engliſh writer, born at his father's ſeat in Hertfordſhire in 1602. After a regular education, he ſet out on his travels in 1634. He became acquainted with a janizary at Venice, and accompanied him into the Turkiſh dominions. Having been abroad two years, he returned and publiſhed a relation of his travels in the Levant, which went through ſeveral editions. He was knighted by Char. I. and was at the battle of Edge-hill, at which time he is ſuppoſed to have had the charge of the young princes; but, after the king's death, was employed by the parliament, and by Cromwell. Yet after the reſtoration of the royal family he was appointed high ſheriff of the county of Hertford, and from that time lived as a private gentleman above 20 years. He publiſhed, 1. An account of his travels. 2. Six comedies written by John Lilly, under the title of *Court Comedies*. 3. The Exchange Walk, a ſatire; and 4. An Epiſtle in praiſe of Tobacco. He died October 9th 1682.

Blount, *Sir Thomas Pope*, baronet, an eminent writer, and the eldeſt ſon of the former, was born at Upper Holloway, in the county of Middleſex, September 12th 1649. He was educated under the eye of his father; and always diſtinguiſhed himſelf as a lover of liberty, a ſincere friend to his country, and a true patron of learning. He was advanced to the degree of baronet by King Charles II. in whoſe reign he was elected burgeſs for St Alban's in two parliaments, and was knight of the ſhire in three parliaments after the Revolution. He wrote in Latin, 1. A critique on the moſt celebrated writers. 2. Eſſays on ſeveral ſubjects. 3. A natural hiſtory, extracted out of the beſt modern writers; and, 4. Remarks upon poetry, with characters and cenſures of the moſt conſiderable poets, whether ancient or modern. He died June 30th 1697.

Blount, *Charles*, younger brother of Sir Thomas Pope Blount, had alſo an excellent capacity, and was an eminent writer. His *Anima Mundi*, or *An Hiſtorical narration of the opinions of the ancients, concerning man's ſoul after this life, according to unenlightened nature*, gave great offence, and was complained of to the biſhop of London. But the work which rendered him moſt known, was his tranſlation of Philoſtratus's *Life of Apollonius Tyanæus*, publiſhed in 1680; which was ſoon ſuppreſſed, as an attack on revealed religion. Another work of the ſame complexion he publiſhed the ſame year, called *Great is Diana of the Epheſians*, &c. in which, under colour of expoſing ſuperſtition, he ſtruck at revelation. In 1648, he printed a kind of *Introduction to Polite Literature*. In the warmth of his zeal for the Revolution, he wrote a pamphlet to prove King William and Queen Mary conquerors; which was condemned to be burnt by both houſes of parliament. The cloſe of his life was very unhappy. For, after the death of his wife, he became enamoured of her ſiſter, who was only ſcrupulous againſt their union on account of their prior connexion by the marriage. On this ſubject he wrote a letter, as the caſe of a third perſon, with great learning and addreſs. But the archbiſhop of Canterbury and other divines deciding againſt him, and the lady on this growing inflexible, threw him into a frenzy in which he ſhot himſelf, in 1693. After his death, his miſcellaneous pieces were collected and publiſhed.

Blount, Blow.

BLOW, Dr John, a famous muſician and compoſer was born in 1648 at North Collingham in the

Blow, Military Blow.

county of Nottingham; and was one of the firſt ſet of children after the Reſtoration, being bred up under Captain Henry Cook. He was alſo a pupil of Hingeſton, organiſt to Oliver Cromwell, and after that of Dr Chriſtopher Gibbons. On the 16th day of March, 1673, he was ſworn one of the gentlemen of the chapel in the room of Roger Hill; and in July 1674, upon the deceaſe of Mr Pelham Humphrey, was appointed maſter of the children of the chapel. In 1685, he was made one of his majeſty's private muſic; and in 1687, was appointed almoner and maſter of the choriſters of the cathedral church of St Paul. Blow was not a graduate of either univerſity; but Archbiſhop Sancroft, in virtue of his own authority in that reſpect, conferred on him the degree of doctor in muſic. Upon the deceaſe of Purcell in 1695, he became organiſt of Weſtminſter-abbey. In the year 1699, he was appointed compoſer to his majeſty, with a ſalary. Blow was a compoſer of anthems while a chapel-boy, and on the ſcore of his merit, was diſtinguiſhed by Charles II. The king admired very much a little duet of Cariſſimi to the words 'Dite o Cieli,' and aſked of Blow if he could imitate it. Blow modeſtly anſwered he would try; and compoſed in the ſame meaſure, and the ſame key of D with a minor third, that fine ſong, 'Go perjured man.' The *Orpheus Britannicus* of Purcell had been publiſhed by his widow ſoon after his deceaſe; and contained in it ſome of that author's fineſt ſongs: the favourable reception it met with was a motive with Blow to the publication in the year 1700, of a work of the ſame kind, entitled *Amphion Anglicus*, containing compoſitions for one, two, three, and four voices, with accompaniments of inſtrumental muſic, and a thorough baſe figured for the organ, harpſichord, or theorbolute. To this book are prefixed commendatory verſes by ſundry perſons; and among them an ode, in the ſecond ſtanza of which are the following lines:

'His *Gloria Patri* long ago reach'd Rome,
'Sung and rever'd too in St Peter's dome;
'A canon will outlive her jubilees to come.'

The canon here meant is that fine one to which the Gloria Patri in Dr Blow's gamut ſervice is ſet. Dr Blow ſet to muſic an ode for St Cecilia's day, in 1684, the words by Mr Oldham, publiſhed together with one of Purcell on the ſame occaſion performed the preceding year. He alſo compoſed and publiſhed a collection of leſſons for the harpſichord or ſpinet, and an ode on the death of Purcell, written by Mr Dryden. There are alſo extant of his compoſition ſundry hymns printed in the *Harmonia Sacra*, and a great number of catches in the latter editions of the Muſical Companion. This great muſician died in the year 1708, and lies buried in the north aiſle of Weſtminſter-abbey. On his monument is the canon above mentioned, engraven on a book with an inſcription above it.

BLOW, in a general ſenſe, denotes a ſtroke given either with the hand, a weapon, or inſtrument. In fencing, blows differ from thruſts, as the former are given by ſtriking, the latter by puſhing.

Military BLOW, *alapa militaris*, that given with a ſword on the neck or ſhoulder of a candidate for knighthood, in the ceremony of dubbing him. The cuſtom ſeems to have taken its riſe from the ancient ceremony of manumiſſion. In giving the blow, the prince uſed the formula *Eſto bonus miles*, "Be a valiant ſoldier;" upon which the party roſe a complete knight, and qualified to bear arms in his own right.

Blow || Blubber.

BLOW, in *Law*. See BATTERY.

Fly-Blows, the ova of flies depoſited on fleſh, or other ſubſtances proper for hatching them.

Blow-Pipe, in *Chemiſtry* and *Mineralogy*, an inſtrument by which the blaſt of the breath may be directed upon the flame of a lamp or candle, in ſuch a manner as to vitrify any ſmall portion of mineral ſubſtance; and thus the proceſs of aſſaying in the dry way may be performed in a very ſhort time, where either want of inſtruments or opportunity prevents other methods from being uſed.

Mr Bergman obſerves that this inſtrument is extremely uſeful to chemiſts, as many experiments are daily neglected, either becauſe they require furnaces and a large apparatus of veſſels; from the want of time to examine them in the ordinary way; or from the quantity required in the common way for examination, when the matter may be too ſcarce or too dear. In all theſe caſes the blow-pipe may be advantageouſly uſed; as, 1. Moſt of the experiments which can be performed in the large way may alſo be done with the blow-pipe. 2. The experiments which in the large way require many hours, may in this method be finiſhed in a few minutes; and, 3. The ſmalleſt particle is ſufficient. The only defect is, that the proportions cannot be determined with any preciſion; and therefore where the experiments can be tried on a large ſcale, it is always to be preferred. See CHEMISTRY and MINERALOGY *Index*.

BLOWING, in a general ſenſe, denotes an agitation of the air, whether performed with a pair of bellows, the mouth, a tube, or the like. Butchers have a practice of blowing up veal, eſpecially the loins, as ſoon as killed, with a pipe made of a ſheep's ſhank, to make it look larger and fairer.

Blowing of Glaſs, one of the methods of forming the various kinds of works in the glaſs manufacture. It is performed by dipping the point of an iron blowing pipe in the melted glaſs, and blowing through it with the mouth, according to the circumſtances of the glaſs to be blown. See GLASS.

Blowing of Tin, denotes the melting its ore, after being firſt burnt to deſtroy the mundic.

Machines for Blowing the air into Furnaces. See FURNACE.

BLOWING, among gardeners, denotes the action of flowers, whereby they open and diſplay their leaves. In which ſenſe, blowing amounts to much the ſame with flowering or bloſſoming.

The regular blowing ſeaſon is in the ſpring; though ſome plants have other extraordinary times and manners of blowing, as the Glaſtonbury thorn. Divers flowers alſo, as the tulip, cloſe every evening, and blow again in the morning. Annual plants blow ſooner or later as their ſeeds are put in the ground; whence the curious in gardening ſow ſome every month in ſummer, to have a conſtant ſucceſſion of flowers. The blowing of roſes may be retarded by ſhearing off the buds as they put forth.

BLUBBER, denotes the fat of whales and other large ſea-animals, whereof is made train-oil. It is properly

Sea-Blubber || Bluing.

properly the *adeps* of the animal: it lies immediately under the ſkin, and over the muſcular fleſh. In the porpoiſe it is firm and full of fibres, and inveſts the body about an inch thick. In the whale, its thickneſs is ordinarily ſix inches; but about the under lip, it is found two or three feet thick. The whole quantity yielded by one of theſe animals ordinarily amounts to 40 or 50, ſometimes to 80 or more, hundred weight. The uſe of blubber to the animal ſeems to be partly to poiſe the body, and render it equiponderant to the water; partly to keep off the water at ſome diſtance from the blood, the immediate contact whereof would be apt to chill it; and partly alſo for the ſame uſe that clothes ſerve us, to keep the fiſh warm, by reflecting or reverberating the hot ſteams of the body, and ſo redoubling the heat: ſince all fat bodies are, by experience, found leſs ſenſible of the impreſſions of cold than lean ones. Its uſe in trade and manufactures is to furniſh train-oil, which it does by boiling down. Formerly this was performed aſhore in the country where the whales were caught: but of late the fiſhers do not go aſhore; they bring the blubber home ſtowed in caſks, and afterwards boil it down in the preparation of the oil.

Sea Blubber. See Medusa.

BLUE, one of the ſeven colours into which the rays of light divide themſelves when refracted through a glaſs priſm. For an account of the particular ſtructure of bodies by which they appear of a blue colour, ſee the article Chromatics.—The principal blues uſed in painting are Pruſſian blue, bice, Saunders blue, azure, or ſmalt, verditer, &c.; for the preparation of which, ſee *Colour-Making*.—In dyeing, the principal ingredients for giving a blue colour, are indigo and woad. See Dyeing.

Blue Colour of the Sky. See Sky.

Blue Bird. See Motacilla, Ornithology *Index*.

Blue Fiſh. See Coryphena, Ichthyology *Index*.

Blue Japan. Take gum-water, what quantity you pleaſe, and white-lead a ſufficient quantity; grind them well upon a porphyry; then take iſinglaſs ſize what quantity you pleaſe, of the fineſt and beſt ſmalt, a ſufficient quantity; mix them well: to which add, of your white-lead, before ground, ſo much as may give it a ſufficient body. Mix all theſe together to the conſiſtence of a point.

Blue John, among miners, a kind of mineral which has lately been fabricated into vaſes and other ornamental figures. It is of the ſame quality with the cubical ſpar, with reſpect to its fuſibility in the fire. It loſes its colour, and becomes white in a moderate heat: the weight of a cubic foot of the blueſt kind is 3180 ounces, and that of the leaſt blue is 3140 ounces. This ſubſtance began firſt to be applied to uſe about 18 years ago at one of the oldeſt mines in Derbyſhire, called *Odin mine*, probably from its being dedicated to Odin the great god of the northern nations, at the foot of a high mountain called *Mam-Tor* in Caſtleton. Here the greateſt quantities are ſtill found; the largeſt pieces are ſold for 9l. a ton, the middle-ſized for 6l. and the leaſt for 50s.

Pruſſian Blue. See Chemistry *Index*.

BLUING, the act or art of communicating a blue colour to bodies otherwiſe deſtitute thereof. Laundreſſes blue their linen with ſmalt; dyers their ſtuffs and wools with woad or indigo.

Bluing of Metals || Boadicea.

Bluing of Metals is performed by heating them in the fire till they aſſume a blue colour; particularly practiſed by gilders, who blue their metals before they apply the gold and ſilver leaf.

Bluing of Iron, a method of beautifying that metal ſometimes practiſed; as for mourning buckles, ſwords, and the like. The manner is thus: Take a piece of grind-ſtone or whet-ſtone, and rub hard on the work, to take off the black ſcurf from it: then heat it in the fire; and as it grows hot, the colour changes by degrees, coming firſt to light, then to a darker gold colour, and laſtly to a blue. Sometimes they alſo grind indigo and ſalad-oil together; and rub the mixture on the work with a woollen rag, while it is heating, leaving it to cool of itſelf. Among ſculptors we alſo find mention of bluing a figure of bronze, by which is meant the heating of it, to prepare it for the application of gold-leaf, becauſe of the bluiſh caſt it acquires in the operation.

BLUFF-head, among ſailors. A ſhip is ſaid to be bluff-headed that has an upright ſtern.

BLUNDERBUSS, a ſhort fire-arm with a wide bore, capable of holding a number of bullets at once.

BLUSHING, a ſuffuſion or redneſs of the cheeks, excited by a ſenſe of ſhame, on account of conſciouſneſs of ſome failing or imperfection.

Bluſhing is ſuppoſed to be produced from a kind of conſent or ſympathy between ſeveral parts of the body, occaſioned by the ſame nerve being extended to them all. Thus the fifth pair of nerves being branched from the brain to the eye, ear, muſcles of the lips, cheeks, palate, tongue, and noſe; a thing ſeen or heard that is ſhameful, affects the cheeks with bluſhes, driving the blood into the minute veſſels thereof, at the ſame time that it affects the eye and ear. For the ſame reaſon it is, as Mr Derham obſerves, that a ſavoury thing ſeen or ſmelt affects the glands and parts of the mouth: if a thing heard be pleaſing, it affects the muſcles of the face with laughter: if melancholy, it exerts itſelf on the glands of the eyes, and occaſions weeping, &c. And to the ſame cauſe Dr Willis aſcribes the pleaſure of kiſſing.

BOA, or Boae-*arum*, in *Ancient Geography*, an iſland on the coaſt of Illyricum over againſt Tragurium. A place of baniſhment for condemned perſons; now called *Bua*, an iſland in the Adriatic, joined to the continent and to Tragurium, now *Tran*, by a bridge.

Boa. See Ophiology *Index*.

BOADADA basher, in the Turkiſh military orders, an officer of the janizaries whoſe buſineſs it is to walk every day about the principal parts of the city, with a number of janizaries to attend him, to keep order, and ſee that all things are regular, even to the dreſs. This office is for three months, and from this the perſon is uſually advanced to be a ſerach.

BOADICEA, a valiant Britiſh queen in the time of Nero, the emperor, wife to Praſutagus king of the Iceni in Britain, who by his will left the emperor and his own daughters co-heirs to his great treaſures, in expectation of procuring by that means Nero's protection for his family and people: but he was no ſooner dead, than the emperor's officers ſeized all. Boadicea oppoſed theſe unjuſt proceedings; which was reſented

Boar. to ſuch a pitch of brutality, that they ordered the lady to be publicly whipped, and her daughters to be raviſhed by the ſoldiers. The Britons took arms, with Boadicea at their head, to ſhake off the Roman yoke; and made a general and bloody maſſacre of the Romans in all parts. The whole province of Britain would have been loſt, if Suetonius Paulinus had not haſtened from the iſle of Mona to London, and with 10,000 men engaged the Britons. The battle was fought for a long time with great vigour and doubtful ſucceſs, till at laſt victory inclined to the Romans. Boadicea, who had behaved with all bravery imaginable, deſpatched herſelf by poiſon.

BOAR, in the manege. A horſe is ſaid to boar when he ſhoots out his noſe as high as his ears, and toſſes his noſe in the wind.

Boar, a male ſwine. See Sus.

The wild boar, among huntſmen, has ſeveral names, according to its different ages: the firſt year, it is called *a pig of the ſaunder;* the ſecond it is called *a hog;* the third, *a hog-ſteer;* and the fourth, *a boar*; when leaving the ſaunder, he is called a *ſingler* or *ſangler*. The boar generally lives to 25 or 30 years, if he eſcapes accidents. The time of going to rut is in December, and laſts about three weeks. They feed on all ſorts of fruits, and on the roots of many plants; the root of fern in particular ſeems a great favourite with them; and when they frequent places near the ſea-coaſts, they will deſcend to the ſhores and demoliſh the tenderer ſhell-fiſh in very great numbers. Their general places of reſt are among the thickeſt buſhes that can be found: and they are not eaſily put up out of them, but will ſtand the bay a long time. In April and May they ſleep more ſound than at any other time of the year, and this is therefore the ſucceſsful time for the taking them in the toils. When a boar is rouzed out of the thicket, he always goes from it, if poſſible, the ſame way by which he came to it; and when he is once up, he will never ſtop till he comes to ſome place of more ſecurity. If it happens that a ſaunder of them are found together, when any one breaks away, the reſt all follow the ſame way. When the boar is hunted in the wood where he was bred, he will ſcarcely ever be brought to quit it; he will ſometimes make towards the ſides to liſten to the noiſe of the dogs, but retires into the middle again, and uſually dies or eſcapes there. When it happens that a boar runs ahead, he will not be ſtopped or put out of his way, by man or beaſt, ſo long as he has any ſtrength left. He makes no doubles or croſſings when chaſed; and when killed makes no noiſe, if an old boar; the ſows and pigs will ſqueak when wounded.

The ſeaſon for hunting the wild boar begins in September, and ends in December, when they go to rut. If it be a large boar, and one that has lain long at reſt, he muſt be hunted with a great number of dogs, and thoſe ſuch as will keep cloſe to him; and the huntſman, with his ſpear, ſhould always be riding in among them, and charging the boar as often as he can, to diſcourage him: ſuch a boar as this, with five or ſix couple of dogs, will run to the firſt convenient place of ſhelter, and there ſtand at bay and make at them as they attempt to come up with him. There ought always to be relays alſo ſet of the beſt and ſtaunchеſt hounds in the kennel; for if they are of young eager dogs, they will be apt to ſeize him, and be killed or ſpoiled before the reſt come up. The putting collars with bells about the dogs necks is a great ſecurity for them; for the boar will not ſo ſoon ſtrike at them when they have theſe, but will rather run before them. The huntſmen gencrally kill the boar with their ſwords or ſpears: but great caution is neceſſary in making the blows; for he is very apt to catch them upon his ſnout or tuſks; and if wounded and not killed, he will attack the huntſman in the moſt furious manner. The places to give the wound with the ſpear is either between the eyes in the middle of the forehead, or in the ſhoulder; both theſe places make the wound mortal. Boar, Board.

When this creature makes at the hunter, there is nothing for it but courage and addreſs; if he flies for it, he is ſurely overtaken and killed. If the boar comes ſtraight up, he is to be received at the point of the ſpear: but if he makes doubles and windings, he is to be watched very cautiouſly, for he will attempt getting hold of the ſpear in his mouth; and if he does ſo, nothing can ſave the huntſman but another perſon attacking him behind; he will on this attack the ſecond perſon, and the firſt muſt then attack him again: two people will thus have enough to do with him; and were it not for the forks of the boar-ſpears that make it impoſſible to preſs forward upon them, the huntſman who gives the creature his death's wound, would ſeldom eſcape falling a ſacrifice to his revenge for it. The modern way of boar-hunting is generally to diſpatch the creature by all the huntſmen ſtriking him at once; but the ancient Roman way was, for a perſon on foot, armed with a ſpear, to keep the creature at bay; and in this caſe the boar would run of himſelf upon the ſpear to come at the huntſman, and puſh forward till the ſpear pierced him through.

The hinder claws of a boar are called *guards*. In the corn, he is ſaid to *feed;* in the meadows or fallow-fields, to *rout*, *worm*, or *fern;* in a cloſe, to *graze*. The boar is farrowed with as many teeth as he will ever have; his teeth increaſing only in bigneſs, not in number: among theſe there are four called *tuſhes*, or *tuſks;* the two biggeſt of which do not hurt when he ſtrikes, but ſerve only to whet the other two loweſt, with which the beaſt defends himſelf, and frequently kills, as being greater and longer than the reſt.

It is very remarkable, that theſe creatures in the Weſt Indies are ſubject to the ſtone; few of them are abſolutely free from it, yet ſcarcely any have the ſtones of any conſiderable ſize. It is common to find a great number in the ſame bladder; and they are uſually of about a ſcruple weight, are angular, and very regular, each having five angles.

Among the ancient Romans boar's fleſh was a delicacy; a boar ſerved up whole was a diſh of ſtate.

The boar was ſometimes alſo the military enſign borne by the Roman armies, in lieu of the eagle.

Among phyſicians, a boar's bladder has been reputed a ſpecific for the epilepſy. The tuſh of the wild boar ſtill paſſes with ſome as of great efficacy in quinſies and pleuriſies.

BOARD, a long piece of timber, ſawed thin for building and ſeveral other purpoſes. See Timber.

Deal-boards are generally imported into England ready ſawed, becauſe done cheaper abroad, in regard we

Board || Boat.

we want ſaw-mills. Cap-boards are imported from Sweden and Dantzic. Oak-boards chiefly from Sweden and Holland; ſome from Dantzic. We alſo import white boards for ſhoemakers; mill and ſcale-boards, &c. for divers artificers. Scale-board is a thinner ſort, uſed for the covers of primers, thin boxes, and the like. It is made with large planes; but might probably be ſawed with mills to advantage.

BOARD is alſo uſed for a kind of table or bench, whereon ſeveral artificers perform their work. In this ſenſe we ſay a work-*board*, ſhop-*board*, tailor's-*board*, &c.

BOARD is alſo uſed for a flat machine, or *frame*, uſed in certain games, and the like. In this ſenſe, we ſay a draught-*board*, a cheſs-*board*, a ſhovel-*board*, and the like.

BOARD, *Bureau*, is alſo uſed for an office where accounts are taken, payments ordered, and the like. In this ſenſe, we ſay the *board* of works, *board* of ordnance, *board* of treaſury, and the like.

BOARD, among ſeamen. *To go aboard*, ſignifies to go into the ſhip. *To ſlip by the board*, is to ſlip down by the ſhip's ſide. *Board and board*, is when two ſhips come ſo near as to touch one another, or when they lie ſide by ſide. *To make a board*, is to turn to windward; and the longer your boards are, the more you work into the wind. *To board it up*, is to beat it up, ſometimes upon one tack and ſometimes upon another. *She makes a good board*, that is, the ſhip advances much at one tack. *The weather board*, is that ſide of the ſhip which is to windward.

BOARDING, in a naval engagement, a deſperate and furious aſſault made by one ſhip on another, after having found every other method to reduce her ineffectual: it may be performed in different places of the ſhip, according to their circumſtances and ſituation, by the aſſailant detaching a number of men armed with piſtols and cutlaſſes on the decks of his antagoniſt, who ſtands in the ſame predicament with a city ſtormed by the beſiegers. This expedient, however, is rarely attempted by king's ſhips, which generally decide the combat without grappling each other; but chiefly practiſed by privateers, which, bearing down on the enemy's quarter or broadſide, drop from the bowſprit, which projects over the defendant's deck, an earthen ſhell, called a *ſtink-pot*, charged with fiery and ſuffocating combuſtibles, which immediately burſts, catches fire, and fills the deck with inſufferable ſtench and ſmoke: in the middle of the confuſion thus occaſioned, the privateer's crew ruſh aboard, under cover of the ſmoke, and eaſily overpower the aſtoniſhed enemy, unleſs they have cloſe quarters to which they can retreat and beat them off the deck.

BOAT, a ſmall open veſſel, conducted on the water by rowing or ſailing. The conſtruction, machinery, and even the names of boats, are very different, according to the various purpoſes for which they are calculated, and the ſervices on which they are to be employed. Thus they are occaſionally ſlight or ſtrong, ſharp or flat bottomed, open or decked, plain or ornamented; as they may be deſigned for ſwiftneſs or burden, for deep or ſhallow water, for ſailing in a harbour or at ſea, and for convenience or pleaſure.

The largeſt boat that uſually accompanies a ſhip is the *long-boat*, which is generally furniſhed with a maſt and ſails: thoſe which are fitted for men of war, may be occaſionally decked, armed, and equipped, for cruiſing ſhort diſtances againſt merchant-ſhips of the enemy, or ſmugglers, or for impreſſing ſeamen, &c. The *barges* are next in order, which are longer, ſlighter, and narrower: they are employed to carry the principal ſea-officers, as admirals, and captains of ſhips of war, and are very unfit for ſea. *Pinnaces* exactly reſemble barges, only that they are ſomewhat ſmaller, and never row more than eight oars; whereas a barge properly never rows leſs than ten. Theſe are for the accommodation of the lieutenants, &c. *Cutters* of a ſhip, are broader, deeper, and ſhorter, than the barges and pinnaces; they are fitter for ſailing, and are commonly employed in carrying ſtores, proviſions, paſſengers, &c. to and from the ſhip. In the ſtructure of this ſort of boats, the lower edge of every plank in the ſide overlays the upper edge of the plank below, which is called by ſhip-wrights *clinch-work*. *Yawls* are ſomething leſs than cutters, nearly of the ſame form, and uſed for ſimilar ſervices; they are generally rowed with ſix oars. Boat.

The above boats more particularly belong to men of war; as merchant-ſhips ſeldom have more than two, viz. a long-boat and yawl: when they have a third, it is generally calculated for the countries to which they trade, and varies in its conſtruction accordingly. Merchant-ſhips employed in the Mediterranean find it more convenient to uſe a *lanch*, which is longer, more flat-bottomed, and better adapted every way to the harbours of that ſea, than a long-boat.

A *wherry* is a light ſharp boat, uſed in a river or harbour for carrying paſſengers from place to place. *Punts* are a ſort of oblong flat-bottomed boats, nearly reſembling floating ſtages; they are uſed by ſhip-wrights and caulkers, for breaming, caulking, or repairing a ſhip's bottom. A *moſes* is a very flat broad boat, uſed by merchant-ſhips amongſt the Caribbee iſlands, to bring hogſheads of ſugar off from the ſea-beach to the ſhipping which are anchored in the roads. A *felucca* is a ſtrong paſſage-boat uſed in the Mediterranean, from 10 to 16 banks of oars. The natives of Barbary often employ boats of this ſort as cruiſers.

For the larger ſort of boats, ſee the articles CRAFT, CUTTER, PERIAGUA, and SHALLOP.

Of all the ſmall boats, a *Norway yawl* ſeems to be the beſt calculated for a high ſea, as it will often venture out to a great diſtance from the coaſt of that country, when a ſtout ſhip can hardly carry any ſail.

An account of ſeveral trials made on a BOAT, *or Sloop, fit for inland navigation, coaſting voyages, and ſhort paſſages by ſea, which is not, like ordinary veſſels, liable to be overſet or ſunk by winds, waves, water-ſpouts, or too heavy a load; contrived and conſtructed by Monſieur Bernieres, director of the bridges and cauſeways in France*, &c. &c. Some of theſe trials were made on the firſt of Auguſt 1777, at the gate of the invalids in Paris, in the preſence of the provoſt of the merchants, of the body of the town, and a numerous concourſe of ſpectators of all conditions.

The experiments were made in the way of compariſon with another common boat of the ſame place, and of equal ſize. Both boats had been built ten years, and their exterior forms appeared to be exactly ſimilar. The common boat contained only eight men, who rocked it and made it incline ſo much to one ſide, that it

Boat-Bill || Boatſwain.

it preſently filled with water, and ſunk; ſo that the men were obliged to ſave themſelves by ſwimming; a thing common in all veſſels of the ſame kind, either from the imprudence of thoſe who are in them, the ſtrength of the waves or wind, a violent or unexpected ſhock, their being overloaded, or overpowered in any other way.

The ſame men who had juſt eſcaped from the boat which ſunk, got into the boat of M. Bernieres; rocked it, and filled it, as they had done the other, with water. But, inſtead of ſinking to the bottom, though brim full, it bore being rowed about the river, loaded as it was with men and water, without any danger to the people in it.

M. Bernieres carried the trial ſtill farther. He ordered a maſt to be erected in this ſame boat, when filled with water; and to the top of the maſt had a rope faſtened, and drawn till the end of the maſt touched the ſurface of the river, ſo that the boat was entirely on one ſide, a poſition into which neither winds nor waves could bring her; yet, as ſoon as the men who had hauled her into this ſituation let go the rope, the boat and maſt recovered themſelves perfectly in leſs than the quarter of a ſecond; a convincing proof that the boat could neither be ſunk nor overturned, and that it afforded the greateſt poſſible ſecurity in every way. Theſe experiments appeared to give the greater pleaſure to the public, as the advantages of the diſcovery are not only ſo ſenſible, but of the firſt importance to mankind.

Boat-Bill. See CANCROMA.

Boat-Inſect. See NOTONECTA, ENTOMOLOGY *Index*.

BOATING, a kind of puniſhment in uſe among the ancient Perſians for capital offenders. The manner of boating was thus: the perſon condemned to it being laid on his back in a boat, and having his hands ſtretched out, and tied faſt on each ſide of it, had another boat put over him, his head being left out through a place fit for it. In this poſture they fed him, till the worms, which were bred in the excrements he voided as he thus lay, ate out his bowels, and ſo cauſed his death, which was uſually 20 days in effecting, the criminal lying all this while in moſt exquiſite torments.

BOATSWAIN, the officer who has the boats, ſails, rigging, colours, anchors, and cables, committed to his charge.

It is the duty of the boatſwain particularly to direct whatever relates to the rigging of a ſhip, after ſhe is equipped from a royal dock-yard. Thus he is to obſerve that the maſts are properly ſupported by their ſhrouds, ſtays, and back-ſtays, ſo that each of thoſe ropes may ſuſtain a proportional effort, when the maſt is ſtrained by the violence of the wind, or the agitation of the ſhip. He ought alſo to take care that the blocks and running-ropes are regularly placed, ſo as to anſwer the purpoſes for which they are intended; and that the ſails are properly fitted to their yards and ſtays, and well furled or reefed when occaſion requires.

It is likewiſe his office to ſummon the crew to their duty; to aſſiſt with his mates in the neceſſary buſineſs of the ſhip; and to relieve the watch when it expires. He ought frequently to examine the condition of the maſts, ſails, and rigging: and remove whatever may be judged unfit for ſervice, or ſupply what is deficient; and he is ordered by his inſtructions to perform this duty with as little noiſe as poſſible.

Boatswain's Mate has the peculiar command of the long-boat, for the ſetting forth of anchors, weighing or fetching home an anchor, warping, towing, or mooring; and is to give an account of his ſtore.

Boatſwain's Mate || Boccace.

BOB, a term uſed for the ball of a ſhort pendulum.

BOBARTIA. See BOTANY *Index*.

BOBBIN, a ſmall piece of wood turned in the form of a cylinder, with a little border jutting out at each end, bored through to receive a ſmall iron pivot. It ſerves to ſpin with the ſpinning-wheel, or to wind thread, worſted, hair, cotton, ſilk, gold, and ſilver.

BOBBING, among fiſhermen, a particular manner of catching eels, different from ſniggling. Bobbing for eels is thus performed: They ſcour well ſome large lobs, and with a needle run a twiſted ſilk through them from end to end, taking ſo many as that they may warp them about a board a dozen times at leaſt: then they tie them faſt with the two ends of the ſilk, that they may hang in ſo many hanks; which done, they faſten all to a ſtrong cord, and, about a handful and a half above the worms, fix a plummet three quarters of a pound weight, and make the cord faſt to a ſtrong pole. With this apparatus fiſhing in muddy water they feel the eels tug luſtily at the bait; when they think they have ſwallowed it ſufficiently, they gently draw up the rope to the top, and bring them aſhore.

BOBIO, an epiſcopal town of Italy, in the Milaneſe and territory of Pavia, ſeated on the river Treba, in E. Long. 9. 30. N. Lat. 44. 48.

BOCA-CHICA, the ſtrait or entrance into the harbour of Carthagena in South America. It is defended by ſeveral forts belonging to the Spaniards, all which were taken by the Engliſh in 1741; they were nevertheleſs obliged to raiſe the ſiege of Carthagena in a ſhort time after.

Boca-del-Drago, a ſtrait ſo called, between the iſland of Trinidad and Andaluſia, in the province of Terra Firma in South America.

BOCANUM, in *Ancient Geography*, a town of Mauritania Tingitana, to the ſouth of Mount Atlas; ſaid to be that of Morocco in Africa. W. Long. 9. 0. N. Lat. 31. 0.

BOCCA, in glaſs-making, the round hole in the working furnace, by which the metal is taken out of the great pots, and by which the pots are put into the furnace. This is to be ſtopped with a cover made of earth and brick, and removeable at pleaſure, to preſerve the eyes of the workmen from the violence of the heat.

BOCCACE, or BOCCACIO, JOHN, one of the moſt polite and learned writers of his age, was born in Tuſcany in 1313. His father firſt placed him with a merchant; but as he gave ſigns of genius, he was put afterward to ſtudy the canon law: he loſt almoſt as much time at this as at the laſt occupation; and thought of nothing but poetry. He came under the inſtruction of Petrarch; but did not ſo entirely devote himſelf to poetry, as to forget other ſtudies. In the proſecution of theſe, however, as he ſought everywhere for the beſt maſters, and had not an income ſufficient for his expences, he was reduced to ſuch circumſtances as to ſtand in need of the bounty of others: he was particularly obliged to Petrarch, who furniſhed him with money as well as books, and aſſiſted him in many other reſpects. Boccace was a great admirer of the

Boccale || Bocarella.

the Greek language: he found means to get Homer tranſlated into Latin for his own uſe; and procured a profeſſor's chair at Florence for Leontius Pylatus, in order to explain this poet. The republic of Florence honoured Boccace with the freedom of that city; and employed him in public affairs, particularly to negociate the return of Petrarch: but this poet not only refuſed to return to Florence, but perſuaded Boccace alſo to retire from thence, on account of the factions which prevailed in that republic. Having quitted Florence, he went to ſeveral places in Italy, and ſtopped at laſt at the court of Naples, where King Robert gave him a very kind reception. He conceived a violent affection for the natural daughter of that prince, which made him remain a conſiderable time at Naples. He alſo made a long ſtay in Sicily, where he was in high favour with Queen Joan. He returned to Florence when the troubles were a little appeaſed: but not liking the courſe of life he muſt have followed there, he retired to Certaldo; and, far from the noiſe of buſineſs, he ſpent his time in ſtudy agreeably to his own humour. His great application brought on him an indiſpoſition, of which he died in 1376. He wrote ſeveral books, ſome learned and ſerious, others of gallantry and full of ſtories. It is by his *Decameron* chiefly that he has immortalized himſelf. Petrarch found ſo many charms in this compoſition, that he was at the pains to tranſlate it into Latin for his own ſatisfaction.

BOCCALE, or Bocal, a liquid meaſure uſed at Rome, anſwering to what among us is called a bottle, being equivalent to about an Engliſh quart. Seven boccales and a half make the rubbia.

BOCCALINI, Trajan, a celebrated ſatirical writer, born at Rome, who, in the beginning of the 17th century, obtained the admiration of all Italy by his refined and delicate criticiſms. Sovereign princes themſelves did not eſcape the laſh of his ſatire. The cardinals Borgheſe and Gætan having declared themſelves his protectors, he publiſhed his *Ragguaglio di Parnaſſo*, and *La Secretaria di Apollo*, which is the continuation of the former. Theſe two works were received by the public with uncommon applauſe. He there feigns, that Apollo, holding his court at Parnaſſus, heard the complaints of the whole world, and did juſtice according as the caſes required. He at length printed his *Pietra di Parangone;* wherein he attacks the court of Spain, ſetting forth their deſigns againſt the liberty of Italy, and inveighing particularly againſt them for the tyranny they exerciſed in the kingdom of Naples. The Spaniards complained of him in form, and were determined at any rate to be revenged. Boccalini was frightened, and retired to Venice; but was there aſſaſſinated in a very ſtrange manner. He lodged with one of his friends, who having got up early one morning, left Boccalini in bed: a minute after, ſome armed men entered his chamber, and gave him ſo many blows with bags full of ſand, that they left him for dead; ſo that his friend returning ſome time after, found him ſpeechleſs. Great ſearch was made at Venice for the authors of this murder; and though they were never diſcovered, it was univerſally believed that they were employed by the court of Spain.

BOCCARELLA, in the glaſs-manufacture, a ſmall hole or aperture of the furnace, one of which is placed on each ſide the bocca, almoſt horizontally with it. Out of them the ſervitors take coloured or finer metal from the piling pot.

Bocciardi || Bochart.

BOCCIARDI, Clemente, called *Clementone*, hiſtory and portrait painter, was born at Genoa in 1620, and was the diſciple of Bernardo Strozzi, an artiſt of good reputation; but he found in himſelf ſo ſtrong an ambition to arrive at excellence in his profeſſion, that he left Genoa, and went to Rome; there, to explore that true ſublimity of ſtyle, which can only be obtained by a judicious obſervation of the ancient ſculptures and the works of the celebrated modern artiſts. By the guidance of an excellent genius, and alſo by a moſt induſtrious application to deſign, he diſcovered the art of uniting and blending the antique and modern guſto in a ſtyle that at once exhibited both gracefulneſs and ſtrength. Moſt of the works of this maſter (except his portraits, which were lively, natural, and graceful) are in the chapels of Genoa, Piſa, and other cities of Italy; of which places they are, at this day, accounted the greateſt ornaments, and are moſt exceedingly eſteemed.

BOCCONI, Sylvio, a celebrated natural hiſtorian, born at Palermo in Sicily. After he had gone through the uſual courſe of ſtudies, he applied himſelf chiefly to natural hiſtory, in which he made a moſt ſurpriſing progreſs. He was afterwards ordained prieſt, and entered into the Ciſtercian order, at which time he changed his Chriſtian name *Paul* into that of *Sylvio*. This new way of life did not in the leaſt divert him from his favourite ſtudy: for he purſued it with greater vigour than ever, and travelled not only over Sicily, but likewiſe viſited the iſle of Malta, Italy, the Low Countries, England, France, Germany, Poland, and ſeveral other nations; and, in 1696, was admitted a member of the academy of the virtuoſi in Germany. Upon his return to Sicily, he retired to a convent of his own order near Palermo; where he died in 1704, being 71 years of age. He left many curious works.

BOCCONIA, greater tree celandine. See Botany *Index*.

BOCHART, Samuel, one of the moſt learned men in the 17th century, was born at Roan in Normandy. He made a very early progreſs in learning, and became a great proficient in the oriental languages. He was many years paſtor of a Proteſtant church at Caen; where he was tutor to Wentworth Dillon earl of Roſcommon, author of the Eſſay on Tranſlated Verſe. Here he particularly diſtinguiſhed himſelf by his public diſputations with Father Veron, a very famous controvertiſt. The diſpute was held in the caſtle of Caen, in the preſence of a great number of Catholics and Proteſtants. Bochart came off with great honour and reputation; which were not a little increaſed in the year 1646, upon the publication of his *Phaleg* and *Canaan*, which are the titles of the two parts of his *Geographia Sacra*. He acquired alſo great fame by his *Hierozoicon*, printed in London in 1675. This treats *de animalibus ſacræ ſcripturæ*. The great learning he diſplayed in his works rendered him eſteemed not only amongſt thoſe of his own profeſſion, but amongſt all lovers of knowledge of whatever denomination. In 1652, the queen of Sweden invited him to Stockholm, where ſhe gave him many proofs of her regard and eſteem. At his return to Caen, he reſumed the functions of the miniſtry,

Bochius || Bodin.

ſtry, and was received into the academy of that city. His learning was not his principal qualification, he had a modeſty equal to it; and hence enjoyed his great reputation in tranquillity, ſheltered from thoſe unhappy quarrels which ſo many other learned men draw upon themſelves. He died ſuddenly while he was ſpeaking in the above academy, on the 16th of May, 1667, aged 78. A complete edition of his works was publiſhed in Holland, in two volumes folio, 1712.

BOCHIUS, or BOCQUI, JOHN, a Latin poet, born at Bruſſels in 1555. He travelled into Italy, Germany, Poland, and Muſcovy, and at his return became ſecretary to the duke of Parma. He died on the 13th of January, 1609. The critics in the Netherlands ſet ſo great a value on his poetry, that they gave him the name of the *Belgic Virgil*. He wrote, 1. *De Belgii Principatu*. 2. *Parodia Heroica Pſalmorum Davidicorum*. 3. *Obſervationes Phyſicæ, Ethicæ, Politicæ, et Hiſtoricæ, in Pſalmos*. 4. *Vita Davidis*. 5. *Orationes*. 6. *Poemata*.

BOCHETTA, a place of Italy, famous in the war of 1746 and 1747. It is a chain of mountains over which the great road lies from Lombardy to Genoa; and on the very peak of the higheſt mountain is a narrow paſs, which will hardly admit three men to go abreaſt. This paſs is properly called the *Bochetta;* for the defence of which there are three forts. It is the key of the city of Genoa; and was taken in 1746 by the imperialiſts; by which means they opened a way to that city.

BOCKHOLT, a town of Germany in the circle of Weſtphalia and dioceſe of Munſter, capital of a ſmall diſtrict, and ſubject to the biſhop of Munſter. E. Long. 6. 20. N. Lat. 51. 40.

BOCKING, a very large village of Eſſex in England, adjoining to Braintree, from which it is ſeparated only by a ſmall ſtream. Its church is a deanery, and very large; and there are here two or three meeting-houſes; but the market is kept at Braintree. In both pariſhes there are about 1500 houſes, which in general are but indifferent, and the ſtreets narrow and badly paved. There is a large manufactory of baize, chiefly for exportation. It is 42 miles north-eaſt of London.

BOCK-LAND, in the Saxons time, is what we now call *freehold lands*, held by the better ſort of perſons by charter or deed in writing; by which name it was diſtinguiſhed from *folkland* or copy-hold land, holden by the common people without writing.

BODERIA, or BODOTRIA, the ancient name for the frith of Forth in Scotland.

BODIN, JOHN, native of Angiers, one of the ableſt men in France in the 16th century, famous for his *Method of Hiſtory*, his *Republic*, and other works. He was in great favour with Henry III. who impriſoned John de Serre for writing an injurious piece againſt Bodin, and forbid him upon pain of death to publiſh it. But his favour was not of long continuance. The duke of Alençon, however, gave him ſeveral employments; and carried him to England with him as one of his counſellors, where he had the pleaſure and glory to ſee his books *de Republica* read publicly in the univerſity of Cambridge, having been tranſlated into Latin by the Engliſh. He had written them in French. In the Ragguagli of Boccalini he is condemned as an atheiſt to the fire, for having ſaid in his books that liberty of conſcience ought to be granted to ſectaries. He declared himſelf pretty freely againſt thoſe who aſſerted that the authority of monarchs is unlimited; but yet he diſpleaſed the republicans. Upon the death of the duke of Alençon, Bodin retired to Laon, where he married. He had an office in the preſidial of this city; and in Charles IX.'s time he was the king's ſolicitor, with a commiſſion for the foreſts of Normandy. He died of the plague at Laon, in 1596.

Bodkin, Bodley.

BODKIN, a ſmall inſtrument made of ſteel, bone, ivory, &c. uſed for making holes.

BODLEY, SIR THOMAS, founder of the Bodleian library at Oxford, was born at Exeter in Devonſhire, in 1544. When he was about 12 years of age, his father, Mr John Bodley, being a proteſtant, was obliged to leave the kingdom. He ſettled at Geneva with his family, and continued there till the death of Queen Mary. In that univerſity, then in its infancy, young Bodley ſtudied the learned languages, &c. under ſeveral eminent profeſſors. On the acceſſion of Queen Elizabeth, he returned with his father to England; and was ſoon after entered of Magdalen college in Oxford. In 1563, he took the degree of bachelor of arts, and the year following was admitted fellow of Merton college. In 1565, he read a Greek lecture in the hall of that college. He took a maſter of arts degree the year after, and read natural philoſophy in the public ſchools. In 1569, he was one of the proctors of the univerſity, and for ſome time after officiated as public orator. In the year 1576, he quitted Oxford, and made the tour of Europe; but returned to his college after four years abſence. He became gentleman-uſher to Queen Elizabeth, in the year 1583; and in 1585 he married the widow of Mr Bell, daughter of Mr Carew of Briſtol, a lady of conſiderable fortune. Mr Bodley was ſoon after ſent ambaſſador to the king of Denmark, and other German princes. He was next charged with an important commiſſion to Henry III. of France; and in 1588, went ambaſſador to the United Provinces, where he continued till the year 1597. On his return to England, finding his preferment obſtructed by the jarring intereſts of Burleigh and Eſſex, he retired from court, and could never afterwards be prevailed on to accept of any employment. He now began the foundation of the Bodleian library, which was completed in 1599. Soon after the acceſſion of King James I. he received the honour of knighthood, and died in the year 1612. He was buried in the choir of Merton college. His monument is of black and white marble, on which ſtands his effigy in a ſcholar's gown, ſurrounded with books. At the four corners are the emblematical figures of Grammar, Rhetoric, Muſic, and Arithmetic; two angels, &c.; with a ſhort inſcription, ſignifying his age and time of his death. Sir Thomas Bodley was a polite ſcholar, an able ſtateſman, and a worthy man. Mr Granger obſerves, that he merited much as a man of letters; but incomparably more in the ample proviſion he made for literature, in which he ſtands unrivalled; and that his library is a mauſoleum which will perpetuate his memory as long as books themſelves endure. Sir Thomas wrote his own Life to the year 1609; which, together with the firſt draught of the Statutes, and his Letters, have been publiſhed from the originals

Bodmin || Boece.

originals in the Bodleian library, by Mr Thomas Hearn, in 1703.

BODMIN, a town of Cornwall in England, ſeated in a bottom between two high hills, which renders the air very unwholeſome. It conſiſts chiefly of one ſtreet, and the many decayed houſes ſhow that it has once been a place of greater note. It is a mayor-town, ſends two members to parliament, and had formerly the privilege of the coinage of tin. W. Long. 4. 5. N. Lat. 50. 32.

BODON, a fortified town of Bulgaria, in Turkey in Europe, with an archbiſhop's ſee. It is ſeated on the Danube, in E. Long. 25. 24. N. Lat. 45. 10.

BODROCH, a town of Hungary, ſeated on the north-eaſt ſhore of the river Danube, in E. Long. 20. 20. N. Lat. 46. 15.

BODRUN. See TEOS.

BODY, in *Phyſics*, an extended ſolid ſubſtance, of itſelf utterly paſſive and inactive, indifferent either to motion or reſt.

Colour of Bodies. See CHROMATICS.

BODY, with regard to animals, is uſed in oppoſition to ſoul, in which ſenſe it makes the ſubject of anatomy. The height of the human body is ſaid to be different in different parts of the day; ordinarily it is an inch more in the morning than at night†. The body ceaſes to grow in height when the bones are arrived at a degree of firmneſs and rigidity which will not allow of farther extenſion by the effort of the heart and motion of the blood.

† *Phil. Tranſ.* N° 283.

BODY, among painters, as to *bear a body*, a term ſignifying that the colours are of ſuch a nature, as to be capable of being ground ſo fine, and mixing with the oil ſo entirely, as to ſeem only a very thick oil of the ſame colour.

BODY, in the manege. A horſe is chiefly ſaid to have a *good body*, when he is full in the flank. If the laſt of the ſhort ribs be at a conſiderable diſtance from the haunch-bone, although ſuch horſes may for a time have pretty good bodies, yet, if they are much laboured, they will loſe them: and theſe are properly the horſes that have no flank. It is alſo a general rule, that a man ſhould not buy a light-bodied horſe, and one that is fiery, becauſe he will ſoon deſtroy himſelf.

BODY, in the art of war, a number of forces, horſe and foot, united and marching under one commander.

Main BODY *of an army*, the troops encamped in the centre between the two wings, and generally infantry; the other two bodies are the vanguard and the rearguard; theſe being the three into which an army, ranged in order of battle, is divided.

BODY, in matters of literature, denotes much the ſame with ſyſtem, being a collection of every thing belonging to a particular ſcience or art, diſpoſed in proper order: thus we ſay, a body of divinity, law, phyſic, &c.

Body-Corporate. See CORPORATION.

BOECE, or BOETHIUS, HECTOR, the hiſtorian, was born at Dundee about the year 1470, ſtudied at Aberdeen, and afterwards in the univerſity of Paris. There he became acquainted with Eraſmus, and laid the foundation of a friendſhip which was ſo honourable to him. In 1500 he was recalled to Aberdeen by Biſhop Elphingſton, who made him principal of that univerſity. Gratitude for this promotion engaged him to write with particular attention the Life of that prelate. It appeared in his hiſtory of the dioceſe of Aberdeen; and may be conſidered, perhaps, as the moſt valuable portion of that work. His Hiſtory of Scotland, a more uſeful undertaking, was firſt publiſhed in the year 1526. In 1574 it underwent a ſecond impreſſion, and was enriched with the 18th book and a part of the 19th. A farther continuation of it was executed by Joannes Ferrerius Pedemontanus. Boece died about the year 1550. He has been compared, and not without reaſon, to Geoffroy of Monmouth. He had a propenſity to fable and exaggeration; a fault which the elegance of his expreſſion does not compenſate. His judgment was not equal to his genius; and his fictions as an hiſtorian are a contraſt to his probity as a man. John Ballenden, archdeacon of Murray, tranſlated his hiſtory into the Scotiſh language at the deſire of James V. This tranſlation William Harriſon converted, though with imperfections, into Engliſh; and his aſſociate Hollingſhed publiſhed his work in his chronicle, with additions and improvements by the ingenious Francis Thynne.

Boedromia || Boehmen.

BOEDROMIA, in *Antiquity*, ſolemn feaſts held at Athens in memory of the ſuccour brought by Ion to the Athenians, when invaded by Eumolpus ſon of Neptune, in the reign of Erectheus. Plutarch gives another account of the boedromia; which, according to him, were celebrated in memory of the victory obtained by Theſeus over the Amazons, in the month Boedromion.

BOEDROMION, in *Chronology*, the third month of the Athenian year, anſwering to the latter part of our Auguſt and beginning of September.

BOEHMEN, JACOB, called the *Teutonic philoſopher*, was a noted viſionary of the 17th century, born in a village of Germany near Gorlitz, in 1575. He was bred a ſhoemaker: and marrying, ſupported a large family by this occupation; until, after amuſing himſelf with chemiſtry, a viſionary turn of mind, heated by ſermons and German divinity, got the better of his common ſenſe, and produced raptures and notions of divine illumination. Theſe he firſt gave vent to in 1612, by a treatiſe entitled *Aurora, or the riſing of the Sun;* being a mixture of aſtrology, philoſophy, chemiſtry, and divinity, written in a quaint obſcure ſtyle. This being cenſured by the magiſtrates of Gorlitz, he remained ſilent for ſeven years: but improving that interval by purſuing the flights of his imagination, he reſumed his pen; and reſolving to redeem the time he had loſt, in the remaining five years of his life, he publiſhed above 20 books, which greatly needed what he concluded with, *A table of his principles, or a key to his writings;* though this has not proved ſufficient to render them intelligible to common apprehenſions. The key above mentioned appeared in 1624, and he did not long ſurvive it. For early in the morning of the 18th of November that year, he called one of his ſons, and aſked him "if he alſo heard that excellent muſic?" to which being anſwered in the negative, he ordered the door to be ſet open, that the muſic might be the better heard. He aſked afterwards what o'clock it was? and being told it had ſtruck two, he ſaid "It is not yet my time; my time is three hours hence." In the interim he was heard to ſpeak theſe words:

Bœotia, Boerhaave.

"O thou ſtrong God of hoſts, deliver me according to thy will! O thou crucified Lord Jeſus, have mercy upon me, and receive me into thy kingdom!" When it was near ſix o'clock, he took his leave of his wife and ſons, and bleſſed them, and ſaid, "Now I go hence into paradiſe; then bidding his ſon turn him, he immediately expired his laſt breath in a deep ſigh. A great number of perſons have been miſled by the viſions of this fanatic, notwithſtanding his talents in involving the plaineſt things in myſtery and enigmatical jargon. Among others, the famous Quirinus Kahlman may be reckoned the principal of his followers in Germany: who ſays, he had learned more being alone in his ſtudy, from Boehmen, than he could have learned from all the wiſe men of that age together; and, that we may not be in the dark as to what ſort of knowledge this was, he acquaints us, that amidſt an infinite number of viſions it happened, that, being ſnatched out of his ſtudy, he ſaw thouſands of thouſands of lights riſing round about him Nor has he been without admirers, and thoſe in no ſmall number, in England: among the foremoſt of whom ſtands the famous Mr William Law, author of *Chriſtian Perfection*, &c. who has favoured his countrymen with an Engliſh edition of Jacob Boehmen's works in 2 vols 4to.

BŒOTIA, the name of two ancient kingdoms, one of which was founded or rather reſtored by Cadmus, and named by him *Bœotia*, from the ox which is ſaid to have directed him to the place where he built the capital of his new kingdom, better known afterwards by the name of *Thebes*. But as the inhabitants were ſcarcely ever diſtinguiſhed as a nation by the name of *Bœotians*, but of *Thebans*, we refer to the article THEBES for their hiſtory, &c.

The other Bœotia was in Theſſaly, and is ſaid to have been founded by Bœotus the ſon of Neptune and brother of Æolus, by Arne the daughter of Æolus king of Æolis. This laſt, having ſent his daughter to Metapontium a city of Italy, ſhe was there delivered of thoſe two ſons, the eldeſt of whom ſhe called after her father's name *Æolus*; and he poſſeſſed himſelf of the iſlands in the Tyrrhenian, now the Tuſcan ſea, and built the city of Lipara. Bœotus the younger ſon went to his grandfather and ſucceeded him in his kingdom, called it after his own name, and the capital city *Arne*, from his mother. All that we know of theſe Bœotians is, that they held this ſettlement upwards of 200 years; and that the Theſſalians expelled them from it; upon which they came and took poſſeſſion of that country, which till then had been called *Cadmeis*, and gave it the name of *Bœotia*. Diodorus and Homer tell us, that theſe Bœotians ſignalized themſelves at the Trojan war; and the latter adds, that five of Bœotus's grandſons, viz. Peneleus, Leitus, Prothœnor, Arceſilaus, and Clonius, were the chiefs who led the Bœotian troops thither.

BOERHAAVE, HERMAN, one of the greateſt phyſicians, as well as the beſt men, that this or perhaps any age has ever produced, was born in 1668, at Vorhout, a village near Leyden. At the age of 16 he found himſelf without parents, protection, advice, or fortune. He had already ſtudied theology and the other eccleſiaſtical ſciences, with the deſign of devoting himſelf to a clerical life; but the ſcience of nature, which equally engaged his attention, ſoon engroſſed his whole time. This illuſtrious perſon, whoſe name afterwards ſpread throughout the world, and who left at his death above 200,000l. could at that time barely live by his labours, and was compelled to teach mathematics to obtain neceſſaries. But in 1693, being received doctor in the ſcience of phyſic, he began practice; and his merit being at length diſcovered, many powerful friends patronized him, and procured him three valuable employments: the firſt was that of profeſſor of medicine in the univerſity of Leyden; the ſecond, that of profeſſor of chemiſtry; and, thirdly, that of profeſſor of botany. The Academy of Sciences at Paris, and the Royal Society at London, invited him to become one of their members. He communicated to each his diſcoveries in chemiſtry. The city of Leyden became in his time the ſchool of Europe for this ſcience, as well as for medicine and botany. All the princes of Europe ſent him diſciples, who found in this ſkilful profeſſor, not only an indefatigable teacher, but even a tender father, who encouraged them to purſue their labours, conſoled them in their afflictions, and ſolaced them in their wants. When Peter the Great went to Holland in 1715, to inſtruct himſelf in maritime affairs, he alſo attended Boerhaave to receive his leſſons. His reputation was ſpread as far as China: a mandarin wrote to him with this inſcription, "To the illuſtrious Boerhaave, phyſician in Europe;" and the letter came regularly to him. The city of Leyden has raiſed a monument in the church of St Peter, to the ſalutary genius of Boerhaave, *Salutifero Boerhaavii genio ſacrum*. It conſiſts of an urn upon a pedeſtal of black marble: ſix heads, four of which repreſent the four ages of life, and two the ſciences in which Boerhaave excelled, form a group iſſuing between the urn and its ſupporters. The capital of this baſis is decorated with a drapery of white marble, in which the artiſt has ſhown the different emblems of diſorders and their remedies. Above, upon the ſurface of the pedeſtal, is the medallion of Boerhaave: at the extremity of the frame, a ribband diſplays the favourite motto of this learned man; *Simplex vigilum veri*, "Truth unarrayed."

Boerhaave.

From the time of the learned Hippocrates, no phyſician has more juſtly merited the eſteem of his cotemporaries, and the thanks of poſterity, than Boerhaave. He united to an uncommon genius, and extraordinary talents, the qualities of the heart, which gave them ſo great a value to ſociety. He made a decent, ſimple and venerable appearance, particularly when age had changed the colour of his hair. He was an eloquent orator, and declaimed with dignity and grace. He taught very methodically, and with great preciſion; he never tired his auditors, but they always regretted that his diſcourſes were finiſhed. He would ſometimes give them a lively turn with raillery; but his raillery was refined and ingenious, and it enlivened the ſubject he treated of, without carrying with it any thing ſevere or ſatirical. A declared foe to all exceſs, he conſidered decent mirth as the ſalt of life. It was the daily practice of this eminent perſon, through his whole life, as ſoon as he roſe in the morning, which was generally very early, to retire for an hour to private prayer, and meditation on ſome part of the Scriptures. He often told his friends, when they aſked him how it was poſ-

ſible

Boerhaave. sible for him to go through so much fatigue? that it was *this* which gave him spirit and vigour in the business of the day. *This* he therefore recommended as *the best rule* he could give: for nothing, he said, could tend more to the health of the body than the tranquillity of the mind; and that he knew nothing which could support himself, or his fellow-creatures, amidst the various distresses of life, but a well-grounded confidence in the supreme Being upon the principles of Christianity. This was strongly exemplified in his own illness in 1722, which can hardly be told without horror; and by which the course of his lectures as well as his practice was long interrupted. He was for five months confined to his bed by the gout, where he lay upon his back without daring to attempt the least motion; because any effort renewed his torments, which were so exquisite, that he was at length not only deprived of motion but of sense. Here his medical art was at a stand; nothing could be attempted, because nothing could be proposed with the least prospect of success. But, having (in the sixth month of his illness) obtained some remission, he determined to try whether the juice of fumitory, endive, or succory, taken thrice a-day in a large quantity, (viz. above half a pint each dose), might not contribute to his relief; and by a perseverance in this method he was wonderfully recovered. This patience of Boerhaave's was founded not on vain reasonings, like that of which the Stoics boasted; but on a religious composure of mind, and Christian resignation to the will of God.

Of his sagacity and the wonderful penetration with which he often discovered and described, at the first sight of a patient, such distempers as betray themselves by no symptoms to common eyes, such surprising accounts have been given, as scarcely can be credited, though attested beyond all doubt. Yet this great master of medical knowledge was so far from having presumptuous confidence in his abilities, or from being puffed up by his riches, that he was condescending to all, and remarkably diligent in his profession: and he often used to say that the life of a patient (if trifled with or neglected) would one day be required at the hand of the physician. He always called the poor his *best patients;* for God (said he) is their paymaster. The activity of his mind sparkled visibly in his eyes. He was always cheerful, and desirous of promoting every valuable end of conversation; and the excellency of the Christian religion was frequently the subject of it: for he asserted, on all proper occasions, the divine authority and sacred efficacy of the Scriptures; and maintained, that they only could give peace of mind, that sweet and sacred peace which passeth all understanding; since none can conceive it but he who has it; and none can have it but by divine communication. He never regarded calumny nor detraction (for Boerhaave himself had enemies), nor ever thought it necessary to confute them. "They are sparks (said he) which, if you do not blow, will go out of themselves. The surest remedy against scandal, is to *live it down* by a perseverance in well-doing; and by praying to God that he would cure the distempered minds of those who traduce and injure us." Being once asked by a friend, who had often admired his patience under great provocations, whether he knew what it was to be angry, and by what means he had so entirely suppressed that impetuous and ungovernable passion? he answered, with the utmost frankness and sincerity, that he was naturally quick of resentment: but that he had, by daily prayer and meditation, at length attained to this mastery over himself. Boerhaave || Boethius.

About the middle of the year 1737, he felt the first approaches of that fatal illness which brought him to the grave, viz. a disorder in his breast, which was at times very painful, often threatened him with immediate suffocation, and terminated in an universal dropsy: but during this afflictive and lingering illness, his constancy and firmness did not forsake him; he neither intermitted the necessary cares of life, nor forgot the proper preparations of death. About three weeks before his dissolution, when the Rev. Mr Schultens, one of the most learned and exemplary divines of the age, attended him at his country house, the doctor desired his prayers, and afterwards entered into a most remarkable judicious discourse with him on the spiritual and immaterial nature of the soul; and this he illustrated to Mr Schultens with wonderful perspicuity, by a description of the effects which the infirmities of his body had upon his faculties; which yet they did not so oppress or vanquish, but his soul was always master of itself, and always resigned to the pleasure of its Maker—and then he added, "He who loves God ought to think nothing desirable but what is most pleasing to the supreme goodness." These were his sentiments, and such was his conduct in this state of weakness and pain. As death approached nearer, he was so far from terror or confusion, that he seemed less sensible of pain, and more cheerful under his torments, which continued till the 23d day of September, 1738, on which he died (much honoured and lamented) between four and five in the morning, in the 70th year of his age—often recommending to the bye-standers a careful observation of St John's precepts concerning the love of God, and the love of man, as frequently inculcated in his first epistle, particularly in the fifth chapter. His funeral oration was spoken in Latin before the university of Leyden, to a very numerous audience, by Mr Schultens, and afterwards published at their particular desire. He wrote, 1. *Institutiones Medicæ.* 2. *Aphorismi de cognoscendis et curandis Morbis.* 3. *Institutiones et Experimenta Chemiæ.* 4. *Libellus de Materia Medica, et remediorum formulis quæ serviunt aphorismis.* Swieten published, *Commentaries upon his Aphorisms*, in 5 vols 4to; and several other works, all greatly esteemed.

BOERHAAVIA. See BOTANY *Index.*

BOESCHOT, a town of the Austrian Netherlands, in the province of Brabant, seated on the river Nethe, in E. Long. 4. 45. N. Lat. 51. 5.

BOETHIUS, or BOETIUS, FLAVIUS ANICIUS MANLIUS TORQUATUS SEVERINUS, a prose as well as poetical writer of the 6th century, born of one of the noblest families of the city of Rome. The time of his birth is related to have been about that period in the Roman history when Augustulus, whose fears had induced him to a resignation of the empire, was banished, and Odoacer king of the Herulians began to reign in Italy, viz. in the year of Christ 476, or somewhat after. The father of Boetius dying while he was yet an infant, his relations undertook the care of his education and the direction of his studies. His excel-

Boethius

lent parts were soon discovered; and, as well to enrich his mind with the study of philosophy as to perfect himself in the Greek language, he was sent to Athens. Returning young to Rome, he was soon distinguished for his learning and virtue, and promoted to the principal dignities in the state, and at length to the consulate. Living in great affluence and splendour, he addicted himself to the study of theology, mathematics, ethics, and logic; and how great a master he became in each of these branches of learning, appears from those works of his now extant. The great offices which he bore in the state, and his consummate wisdom and inflexible integrity, procured him such a share in the public councils, as proved in the end his destruction: for as he employed his interest with the king for the protection and encouragement of deserving men, so he exerted his utmost efforts in the detection of fraud, the repressing of violence, and the defence of the state against invaders. At this time Theodoric the Goth had attempted to ravage Campania; and it was owing to the vigilance and resolution of Boetius that this country was preserved from destruction. At length, having murdered Odoacer, Theodoric became king of Italy, where he governed 33 years with prudence and moderation, during which time Boetius possessed a large share of his esteem and confidence. It happened about this time that Justin, the emperor of the east, upon his succeeding to Anastasius, made an edict condemning all the Arians, except the Goths, to perpetual banishment from the eastern empire: in this edict Hormisda bishop of Rome, and also the senate, concurred. But Theodoric, who, as being a Goth, was an Arian, was extremely troubled at it; and conceived an aversion against the senate for the share they had borne in this proscription. Of this disposition in the king, three men of profligate lives and desperate fortunes, Gaudentius, Opilio, and Basilius, took advantage. Having entertained a secret desire of revenge against Boetius, for having been instrumental in the dismission of the latter from a lucrative employment under the king, they accused him of several crimes; such as the stifling a charge, the end whereof was to involve the whole senate in the guilt of treason; and an attempt, by dethroning the king, to restore the liberty of Italy; and, lastly, they suggested, that, to acquire the honours he was in possession of, Boetius had had recourse to magical art. Boetius was at this time at a great distance from Rome; however, Theodoric transmitted the complaint to the senate, enforcing it with a suggestion that the safety, as well of the people as the prince, was rendered very precarious by this supposed design to exterminate the Goths. The senate, perhaps fearing the resentment of the king, and having nothing to hope from the success of an enterprise which, supposing it ever to have been meditated, was now rendered abortive, without summoning him to his defence, condemned Boetius to death. The king, however, apprehending some bad consequence from the execution of a sentence so flagrantly unjust, mitigated it to banishment. The place of his exile was Ticinum, now the city of Pavia, in Italy: being in that place separated from his relations, who had not been permitted to follow him into his retirement, he endeavoured to derive from philosophy those comforts which that alone was capable of affording to one in his forlorn situation, sequestered from his friends, in the power of his enemies, and at the mercy of a capricious tyrant; and accordingly he there composed that valuable discourse, entitled, *De Consolatione Philosophiæ*. About two years after his banishment, Boetius was beheaded in prison by the command of Theodoric. His tomb is to be seen in the church of St Augustine, at Pavia, near the steps of the chancel.

Boethius || Bogomili.

The extensive learning and eloquence of this great man are conspicuous in his works, which seem to have been collected with great care: an edition of them was printed at Venice, in one volume folio, in 1499. In 1570, Glareanus, of Basil, collated that with several manuscripts, and published it, with a few various readings in the margin. His chief performance is that above mentioned, *De Consolatione Philosophiæ*; a work well known in the learned world, and to which the afflicted have often applied. In particular, our Saxon king Alfred, whose reign, though happy upon the whole, was attended with great vicissitudes of fortune, had recourse to it at a time when his distresses compelled him to seek retirement: and that he might the better impress upon his mind the noble sentiments inculcated in it, he made a complete translation of it into the Saxon language, which, within these few years, has been given to the world in its proper character. And Camden relates, that Queen Elizabeth, during the time of her confinement by her sister Mary, to mitigate her grief, read and afterwards translated it into very elegant English. But it deserves also particular notice, that he is the most considerable of all the Latin writers on music; and that his treatise *De Musica* supplied for some centuries the want of those Greek manuscripts which were supposed to have been lost.

BOG properly signifies a quagmire, covered with grass, but not solid enough to support the weight of the body; in which sense it differs only from marshes or fens, as a part from the whole: some even restrain the term *bog* to quagmires pent up between two hills; whereas fens lie in champaign and low countries, where the descent is very small.—To drain boggy lands, a good method is, to make trenches of a sufficient depth to carry off the moisture; and if these are partly filled up with rough stones, and then covered with thornbushes and straw, to keep the earth from filling up the interstices, a stratum of good earth and turf may be laid over all; the cavities among the stones will give passage to the water, and the turf will grow at top as if nothing had been done.

BOG, or *Bog of Gight*, a small town of Scotland, seated near the mouth of the river Spey, in W. Long. 2. 23. N. Lat. 57. 48.

Bog-Spavin. See FARRIERY *Index*.

BOGARMITÆ. See BOGOMILI.

BOGHO, or BUEIL, a town in the county of Nice in Piedmont, situated on the frontiers of France, in E. Long. 6. 45. N. Lat. 44. 12.

BOGLIO, a district in the territories of the duke of Savoy, lying on the river Tinca on the frontiers of Provence; the capital is of the same name.

BOGLIO, a town of Piedmont, and county of Nice, being the capital of a territory of the same name. E. Long. 4. 50. N. Lat. 44. 12.

BOGOMILI, or BOGARMITÆ, in *Church History*,

Bogoto
||
Bohemia.

a ſect of heretics, which ſprung up about the year 1179. They held, that the uſe of churches, of the ſacrament of the Lord's ſupper, and all prayer, except the Lord's prayer, ought to be aboliſhed; that the baptiſm of catholics is imperfect; that the perſons of the Trinity are unequal; and that they oftentimes made themſelves viſible to thoſe of their ſect. They ſaid, that devils dwelt in the churches, and that Satan had reſided in the temple of Solomon from the deſtruction of Jeruſalem to their own time.

BOGOTO, the capital of New Granada in Terra Firma in South America, near which are gold mines. It is ſubject to Spain. W. Long. 73. 55. N. Lat. 4. 0.

BOGUDIANA (Pliny), a part of the Mauritania Tingitana in Africa. According to Cluverius, it is the *Tingitana*, anciently ſo called from King Bogud.

BOHEA, in *Commerce*, one of the coarſeſt kinds of tea that come from China. See THEA.

BOHEMIA, a kingdom of Europe ſubject to the houſe of Auſtria, and ſurrounded on every ſide with woods and mountains as with a natural rampart. It is bounded on the eaſt by Moravia and part of Sileſia, on the north by Luſatia and Upper Saxony, on the weſt by Franconia, and on the ſouth by Bavaria. Although this kingdom is ſituated in the middle of Germany, and its king is an elector of the empire, it has nevertheleſs its particular aſſemblies, cuſtoms, and language, different from the Germans. It is one of the moſt elevated countries of Europe: for no river enters into it, though many have their ſource there; the chief of which are the Elbe, the Oder, the Viſtula, and the Morava. The air is cold and unwholeſome; for they have more epidemical diſeaſes than in the neighbouring countries. There are mines of ſilver, copper, lead, and even ſome veins of gold. The capital city is Prague; the others are Cuttenburg, Konigengretz, Pilſen, Czaſlaw, Budweys, Egra, Glatz, Tabor, and a great number of others: for they reckon more than 100 cities, among which almoſt 40 have the title of *Royal*. The name *Bohemia*, in the German language, ſignifies the *home* or *abode*, *of the Boii*, a people of ancient Gaul, who under their leader Sergoveſus ſettled in that country about 590 years before the Chriſtian æra. Theſe Boii were ſoon after expelled by the Marcomanni, a nation of the Suevi, who were afterwards ſubdued by the Sclavi, a people of Scythia, whoſe language is ſtill ſpoken in Bohemia and Moravia. Notwithſtanding this expulſion of the Boii, the preſent inhabitants are ſtill called *Bohemians* by foreigners, but the natives call themſelves *Zechs*. At firſt they were governed by dukes; but the emperor Otho I. conquered the duke of Bohemia, and reduced the province under the empire. Afterwards Henry V. gave the title of *king* to Ladiſlaus duke of Bohemia; and ſince that time theſe kings have been electors and chief cup-bearers of the empire, and the kingdom has been elective; which privileges have been confirmed by the golden bull. Formerly the kings of Bohemia received the kingdom as a fief of the empire, which ceremony was practiſed upon the frontiers; after which, the ſtandards of the principalities of which it is compoſed were given to them, without being torn and given to the people, as is done with the enſigns of the other fiefs of the empire. Ferdinand I. of Auſtria, having married Anne, ſiſter of Louis, laſt king of Bohemia, who died without iſſue, and being elected king, that kingdom has remained in his family ever ſince. But the crown is conferred with ſome appearance of election; which right the ſtates of Bohemia ſtill pretend to claim, notwithſtanding that, by the treaty of Weſtphalia, Bohemia is declared hereditary in the houſe of Auſtria. Bohemia.

The king of Bohemia is the firſt ſecular elector, and gives his opinion after the elector of Cologn; though he does not aſſiſt at the aſſembly of electors, except at the election of an emperor. For theſe 200 years paſt they have not appeared at the collegiate aſſemblies, nor even at the imperial diets. However, in 1708, the emperor cauſed one of his deputies, in quality of king of Bohemia, to enter into the college of electors at the diet of Ratiſbon, by the form of re-admiſſion, together with the deputy of the elector of Brunſwick. The ſtates of Bohemia have never been comprehended in the government, or in the circles of the empire; they are not ſubject to any of its juriſdictions, nor to the Roman months, taxes, or public contributions; and they owe nothing to the empire but what the emperor Leopold voluntarily impoſed upon himſelf, which amounts to 6000 livres a-year for the imperial chamber. The king pays homage to the emperor and the empire for his ſtates as firſt ſecular elector; otherwiſe he has a right to exerciſe, through the whole extent of his dominions, all authority that the royalty can give, provided he do not violate the laws of the kingdom; according to which he cannot raiſe contributions or taxes but at the time when the ſtates are aſſembled, the appointing of which is entirely in their own power. The government of Bohemia is different from that of all other ſtates, the affairs of the kingdom being managed by ſix different courts. Firſt, the council of the regency, or the great royal council, in which preſides the great judge or burgrave of Bohemia, and who has under him 18 lieutenants of the king and other aſſeſſors. Secondly, The council or ſuperior chamber of juſtice, at which the great maſter of the kingdom is preſident. Thirdly, The chamber of fiefs. Fourthly, The new tribunal to judge the appeals of the German vaſſals in their differences on the account of fiefs; which court has alſo its preſident, vice-preſident, and aſſeſſors. Fifthly, the royal chamber of finances, which has a preſident and vice-preſident. Sixthly, The chancery, which always follows the court. Beſides, every circle of Bohemia is governed by two bailiffs, who adminiſter juſtice in their prefecture. The ſtates are compoſed of the clergy, lords, nobles, and burghers. As to Moravia, there is a grand bailiff who governs it in the name of the king of Bohemia, as margrave of Moravia. He is at the head of the royal council, which is compoſed of three aſſeſſors, and in which all is tranſacted in the name of the king. This province is divided into five circles, each of which has its bailiff. There are, beſides, other officers of juſtice, who have a right of judging only at certain times, and in particular caſes, where an appeal is allowed.

Bohemia was divided by the emperor Charles IV. into 12 provinces, in each of which he ordered two captains to be appointed every year for the adminiſtration of the government. The ſame emperor cauſed the church of Prague to be erected into an archbiſhopric, with this advantage, that the archbiſhop of Prague

ſhould

Bohemian Bole || Boiemum.

Boii || Boileau.

should have the prerogative that the archbiſhop of Mentz formerly enjoyed, viz. of crowning the king of Bohemia. The duchy of Sileſia, the marquiſate of Moravia, and that of Luſatia, formerly held of this crown, but now only that of Moravia, which is incorporated with the kingdom of Bohemia, and is in the poſſeſſion of the houſe of Auſtria.

The only remarkable occurrence in the Bohemian hiſtory is the rebellion of the diſciples of John Huſs, and Jerome of Prague, on account of their leaders having been burnt as heretics. This occaſioned a bloody war of 16 years continuance. For a particular account of which, ſee the article HUSSITES.

BOHEMIAN BOLE. See BOLE.

Bohemian Brethren, a ſect of Chriſtian reformers which ſprung up in Bohemia in the year 1467. They treated the pope and cardinals as antichriſt, and the church of Rome as the whore ſpoken of in the Revelation. They rejected the ſacraments of the Romiſh church, and choſe laymen for their miniſters. They held the Scriptures to be the only rule of faith, and rejected the popiſh ceremonies in the celebration of the maſs, nor did they make uſe of any other prayer than the Lord's Prayer. They conſecrated leavened bread. They allowed no adoration but of Jeſus Chriſt, in the communion. They rebaptized all ſuch as joined themſelves to their congregation. They abhorred the worſhip of ſaints and images, prayers for the dead, celibacy, vows, and faſts; and kept none of the feſtivals but Chriſtmas, Eaſter, and Whitſuntide.

In 1504, they were accuſed by the Catholics to King Ladiſlaus II. who publiſhed an edict againſt them, forbidding them to hold any meetings either privately or publicly. When Luther declared himſelf againſt the church of Rome, the Bohemian brethren endeavoured to join his party. At firſt that reformer ſhowed a great averſion to them; but the Bohemians ſending their deputies to him in 1523 with a full account of their doctrines, he acknowledged that they were a ſociety of Chriſtians whoſe doctrine came neareſt to the purity of the goſpel. This ſect publiſhed another confeſſion of faith in 1535, in which they renounced anabaptiſm, which they at firſt practiſed: upon which a union was concluded with the Lutherans, and afterwards with the Zuinglians, whoſe opinions from thenceforth they continued to follow.

BOHOL, one of the Philippine iſlands in Aſia, lying to the northward of Mindanoa, in E. Long. 122. 5. N. Lat. 10. 0.

BOIANO, a town of Italy, in the kingdom of Naples, and county of Moleſe, with a biſhop's ſee. It is ſeated at the foot of the Apennines, near the river Tilerno, in E. Long. 14. 38. N. Lat. 41. 30.

BOIARDO (MATTEO MARIA of Ferrara), count of Scandiano, celebrated for his Italian poems, lived in the 15th century. His principal work is his *Orlando inamorato*. His Latin eclogues and ſonnets are alſo much admired.

BOJARS, denote Ruſſian noblemen. See Ruſſia.

BOIEMUM, in *Ancient Geography*, a part of Germany, ſurrounded with the Montes Sudeti, (Ptolemy); now called Bohemia. It took its name from the Boii, a people of Gaul, who removed thither before Cæſar's expedition into that country, (Cæſar); though he ſeems to err in the name. The Boii were afterwards driven out by the Marcomanni, and ſettled in the weſt of Vindelicia, which was afterwards called Bayern, and hence the name Bavaria.

BOII, (Cæſar); a people of Celtica, extending from the Ligeris to the Elaver, whence came the Boii of Gallia Ciſalpina, whoſe migration is related by Livy.

Boii. See BOHEMIA.

BOIGUACU, in *Zoology*, a ſynonyme of the boa conſtrictor. See BOA, OPHIOLOGY *Index*.

BOIL, or FURUNCLE. See the *Index* ſubjoined to MEDICINE, and SURGERY.

BOILEAU, SIEUR NICHOLAS DESPREAUX, the celebrated French poet, was born at Paris in 16[illegible]6. After he had gone through his courſe of polite literature and philoſophy, his relations engaged him to the ſtudy of the law, and he was admitted advocate. But though he had all the talents neceſſary for the bar, yet he could not adapt himſelf to a ſcience which turns upon continual equivocations, and often obliges thoſe who follow it to clothe falſehood in the garb of truth. He therefore determined to ſtudy theology; but he could not long endure the thorns of ſchool divinity. He imagined, that, to allure him more cunningly, chicanery, which he thought to avoid, had only changed her habit; and ſo he renounced the Sorbonne, betook himſelf entirely to the belles lettres, and took poſſeſſion of one of the foremoſt places in Parnaſſus. The public gave his works the encomium they deſerved; and Louis XIV. who always loved to encourage the ſciences and polite literature, was not only pleaſed to have M. Boileau's works read to him conſtantly as he compoſed them, but ſettled a yearly penſion of 2000 livres upon him, and gave him the privilege of printing all his works. He was afterwards choſen a member of the French academy and alſo of the academy of medals and inſcriptions. This great man, who was as remarkable for his integrity, his innocence, and diffuſive benevolence, as for the keenneſs of his ſatires, died of a dropſy on the 2d of March 1711, in the 75th year of his age. The Lutrin of Boileau, ſtill conſidered by ſome French critics of the preſent time as the beſt poem to which France has given birth, was firſt publiſhed in 1647. It is with great reaſon and juſtice that Voltaire confeſſes the Lutrin inferior to the Rape of the Lock. Few poets can be ſo properly compared as Pope and Boileau; and, wherever their writings will admit of compariſon, we may, without any national partiality, adjudge the ſuperiority to the Engliſh bard. Theſe two great authors reſembled each other as much in the integrity of their lives, as in the ſubjects and execution of their ſeveral compoſitions. There are two actions recorded of Boileau, which ſufficiently prove that the inexorable ſatiriſt had a moſt generous and friendly heart; when Patru, the celebrated advocate, who was ruined by his paſſion for literature, found himſelf under the painful neceſſity of ſelling his expenſive library, and had almoſt agreed to part with it for a moderate ſum, Boileau gave him a much ſuperior price; and, after paying the money, added this condition to the purchaſe, that Patru ſhould retain, during his life, the poſſeſſion of the books. The ſucceeding inſtance of the poet's generoſity is yet nobler:—when it was rumoured at court that the king intended to retrench the penſion of Corneille, Boileau haſtened to Madame de Monteſpan, and ſaid, that his ſovereign, equitable as

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Boiling. he was, could not, without injuſtice, grant a penſion to an author like himſelf, juſt aſcending Parnaſſus, and take it from Corneille, who had ſo long been ſeated on the ſummit; that he entreated her, for the honour of the king, to prevail on his majeſty rather to ſtrike off *his* penſion, than to withdraw that reward from a man whoſe title to it was incomparably greater; and that he ſhould more eaſily conſole himſelf under the loſs of that diſtinction, than under the affliction of ſeeing it taken away from ſuch a poet as Corneille. This magnanimous application had the ſucceſs which it deſerved, and it appears the more noble, when we recollect that the rival of Corneille was the intimate friend of Boileau. The long unreſerved intercourſe which ſubſiſted between our poet and Racine was highly beneficial and honourable to both. The dying farewell of the latter is the moſt expreſſive eulogy on the private character of Boileau: "*Je regarde comme un bonheur pour moi de mourir avant vous,*" ſaid the tender Racine, in taking a final leave of his faithful and generous friend.

BOILING, or EBULLITION, the bubbling up of any fluid. The term is moſt commonly applied to that bubbling which happens by the application of fire, though that which enſues on the mixture of an acid and alkali is ſometimes alſo diſtinguiſhed by the ſame name. Boiling, in general, is occaſioned by the diſcharge of an elaſtic fluid through that which is ſaid to boil; and the appearance is the ſame, whether it is common air, fixed air, or ſteam, that makes its way through the fluid. The boiling of water is proved by Dr Hamilton of Dublin, in his eſſay on the aſcent of vapour, to be occaſioned by the lowermoſt particles of the water being heated and rarefied into vapour by reaſon of the vicinity of the bottom of the containing veſſel; in conſequence of which, being greatly inferior in ſpecific gravity to the ſurrounding fluid, they aſcend with great velocity, and lacerating and puſhing up the body of water in their aſcent, give it the tumultuous motion called *boiling*. That this is occaſioned by ſteam, and not by particles of air or fire, as ſome have imagined, may be very eaſily proved in the following manner: Let a common drinking glaſs be filled with hot water, and then inverted into a veſſel of the ſame: as ſoon as the water in the veſſel begins to boil, large bubbles will be obſerved to aſcend in the glaſs, which will diſplace the water in it, and in a ſhort time there will be a continual bubbling from under its edge; but if the glaſs is then drawn up, ſo that its mouth may only touch the water, and a cloth dipt in cold water be applied to the outſide, the ſteam within it will be inſtantly condenſed, and the water will aſcend ſo as to fill it entirely, or very nearly ſo. See the article EVAPORATION.

BOILING, in trade and manufactures, is a preparation given to divers ſorts of bodies by making them paſs over the fire, chiefly in water, though ſometimes in other liquors. In this ſenſe we ſpeak of the boiling of ſalt, boiling of ſugar, copperas, &c.

BOILING of Silk with Soap is the firſt preparation in order to dyeing it. Thread is alſo boiled in a ſtrong lixivium of aſhes to prepare it for dyeing.

BOILING, in the culinary art, is a method of dreſſing meats by coction in hot water, intended to ſoften them, and diſpoſe them for eaſier digeſtion. The effects of boiling are different according to the kinds and qualities of the water. Pulſe boiled in ſea-water grow harder; mutton boiled in the ſame becomes ſofter and tenderer than in freſh water, but taſtes ſaltiſh and bitter. Boiling ‖ Bois de Caiſſi.

BOILING to Death (*caldariis decoquere*), in the middle age; a kind of puniſhment inflicted on thieves, falſe coiners, and ſome other criminals.

BOILING is alſo a method of trying or eſſaying the goodneſs or falſeneſs of a colour or dye. The ſtuff is to be boiled in water with certain drugs, different according to the kind or quality of the colour, to try whether or no it will diſcharge, and give a tincture to the water. With this view crimſon ſilks are boiled with alum, and ſcarlets with ſoap, in quantity equal to the weight of the ſilk.

BOILING-Wells, in *Natural Hiſtory*. See *BURNING-Springs*, and ICELAND.

BOINITZ, a town of Upper Hungary, in the county of Zell, remarkable for its baths and the quantity of ſaffron that grows about it. E. Long. 19. 10. N. Lat. 48. 42.

BOIOBI, in *Zoology*, the name of a ſpecies of ſerpent found in America, and called by the Portugueſe *cobra de verb*. It is about an ell in length, of the thickneſs of a man's thumb, and is all over of a very beautiful and ſhining green. Its mouth is very large, and its tongue black. It loves to be about houſes, and never injures any creature unleſs provoked or hurt; but it will then bite, and its poiſon is very fatal. The natives take as a remedy againſt its poiſon, the root *caa apia* bruiſed, and mixed with water. See *CAA Apia*.

BOIORUM DESERTA, in *Ancient Geography*, a diſtrict of Pannonia, ſo called from the exciſion of the Boii by the Getae. Now the Weinerwald, of Lower Auſtria, towards Stiria, to the eaſt of Mount Cetius, or the Hahlenberg, and ſouth of Vindobona or Vienna.

BOIQUIRA, the American name for the rattle-ſnake.

BOIS-LE-DUC, called by the Dutch *Hertogen-boſch*, a large, ſtrong, and handſome town of the Netherlands, in Dutch Brabant, ſeated between the rivers Dommel and Aa, among moraſſes, in E. Long. 6. 16. N. Lat. 51. 45.

Bois de Soignies, the foreſt of Soignies in the Auſtrian Netherlands and province of Brabant, about three miles ſouth-eaſt of Bruſſels.

Bois de Coiſſi, the name give to a South American tree growing about Surinam, held in the higheſt eſtimation by the Indians in that part of the world, and now recommended to the phyſicians of Europe by Dr Fernin in a treatiſe lately publiſhed at Amſterdam. The root is eſteemed an excellent ſtomachic, reſtoring the appetite, and aſſiſting digeſtion; but it is chiefly celebrated as an infallible remedy againſt even the moſt inveterate intermittents. It is ſaid alſo to be uſed with great ſafety and advantage in every ſpecies of remittent and continued fever, with patients of all ages, ſexes, and conditions, even during pregnancy, and in the puerperal ſtate. Before employing it, however, it is abſolutely neceſſary to adminiſter either a purgative or emetic. The beſt method of exhibiting it is in decoction: half an ounce of the bark of the root muſt be boiled in a cloſe veſſel with ſix pints of water till one

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Boiſſard || Bokhara.

half be conſumed; the decoction is then ſtrained off, and a cupful taken every two hours till the fever is entirely extinguiſhed. Six or ſeven days after a cure is thus performed, it is generally neceſſary to repeat the purgative.

BOISSARD, JOHN JAMES, a famous antiquarian, born at Beſançon the capital of Franche Compte in France. He publiſhed ſeveral collections which are of great uſe to ſuch as are deſirous to underſtand the Roman antiquities. He had a great paſſion for this ſtudy; and drew with his own hand plans of all the ancient monuments of Italy. He died at Metz, October 30th 1602. His principal works are, 1. Four volumes in folio of Roman antiquities, adorned with plates engraved by Theodore de Bey and his two ſons. 2. *Theatrum vitæ humanæ;* which contains the lives of 198 famous perſons, with their portraits. 3. A treatiſe *de Divinatione et magicis Præſtigiis.* Theſe works are ſcarce, and eſteemed by the antiquarians.

BOIT, an excellent painter in enamel. He was born in Stockholm, and bred a jeweller: which profeſſion he intended to follow in England; but changed his deſign, and went into the country, where he taught children to draw. He there engaged a gentleman's daughter, who was one of his ſcholars, to promiſe him marriage; but the affair being diſcovered, he was thrown into priſon. In that confinement, which laſted two years, he ſtudied enamelling; an art to which he fixed, on his return to London, and practiſed with the greateſt ſucceſs. The prices he is ſaid to have obtained for his work are almoſt incredible: but being engaged in a very large deſign for the court, and Queen Anne dying before it was completed, he ran in debt, his goods were ſeized by execution, and he fled to France; where he changed his religion, was countenanced by the regent, and obtained a penſion of 250l. *per annum*, but died ſuddenly at Paris in 1726. There is a large piece done by him at Kenſington, repreſenting Queen Anne ſitting, and Prince George ſtanding by her; and at Bedford-houſe is another very large plate of the duke's father and mother.

BOITJAPO, in *Zoology*, the name of a ſpecies of ſerpent found in *America;* and called by the Portugueſe there, *cobra di apo.* It grows to ſeven or eight feet long, is about the thickneſs of a man's arm, and very ſmall and taper towards the tail. Its back is of an olive colour; its belly yellow, and covered with very regular and elegant triangular ſcales. It feeds on frogs, &c. but is very poiſonous, and its bite extremely fatal.

BOKHARA, a city of Tartary in Aſia, and capital of Great Bukharia, ſituated one day's journey to north of the river Jehun, or Amu; in E. Long. 65. 50. N. Lat. 39. 15. In 1219 it was beſieged by Jenghiz Khan, as being part of Sultan Mohammed's dominions, a deſcendant of the famous Mahmud Gazni. At that time, beſides the city-walls, which were very ſtrong, Bokhara had an outward encloſure 12 leagues in compaſs; which ſhut in not only the ſuburbs, but alſo many pleaſant ſeats and farms watered by the river Soghd, from whence the ancient Sogdiana took its name. The Mogul army arrived before the place in July, and continued the ſiege during the following winter. In March 1220, they forced the outer wall, and began to beſiege the city in form. Sultan Mohammed had left in the city a very numerous garriſon under the command of three generals, who made a ſally at the head of 20,000 men: but being repulſed with great loſs, their courage failed them; and, inſtead of ſtaying to defend the inhabitants, as ſoon as they had got into the city by one gate, paſſed out by another with their families, and almoſt all their ſoldiers, hoping to eſcape by the darkneſs of the night; but their deſign being diſcovered, they were purſued by a detachment of 30,000 Moguls; and being overtaken at the river Amu, they were, after a bloody diſpute, almoſt all cut to pieces. Mean time, Jenghiz Khan, being informed of the confuſion into which the city had been thrown by the deſertion of the garriſon, ordered an attack to be made on all ſides at once; but while he was preparing for this, the magiſtrates and clergy went out and preſented him with the keys of the city. Jenghiz Khan granted them their lives, on condition that they gave no ſhelter to any of the ſultan's ſoldiers, and put out all who ſhould be ſuſpected of being in that prince's intereſt; which they promiſed to do upon oath. All the young people, however, who were diſpleaſed with the ſurrender, retired with the governor to the caſtle, which was very ſtrong, and reſolved to defend themſelves to the laſt extremity. Jenghiz Khan having taken poſſeſſion of Bokhara, entered on horſeback into the great moſque, and aſked merrily if that was the ſultan's palace? On being anſwered that it was the houſe of God, he alighted; and giving the principal magiſtrate his horſe to hold, mounted the gallery where the eccleſiaſtics uſually ſat, and then taking up the Koran, threw it under the feet of his horſes. Having ſtaid there for ſome time, he retired to his camp; where, ſome days after, having aſſembled the principal people of Bokhara, and aſcended a pulpit erected for that purpoſe in the midſt of them, he began his ſpeech by praiſing God, and recounted all the favours he had received from the Almighty: he then mentioned the perfidious behaviour of their ſultan towards himſelf, telling them that God had ſent him, to rid the world of ſuch wicked men. As to them, he teſtified his ſatisfaction for their having freely furniſhed his army with neceſſaries; and promiſed that his ſoldiers ſhould not meddle with any goods which they made uſe of in their houſes; but commanded them to deliver up what they had hidden, under pain of being tortured. This ſpeech had ſuch an effect, that the poor inhabitants delivered up every thing, as well what they had concealed as what they had preſent uſe for; notwithſtanding which, the tyrant ſoon after cauſed the city to be burnt, on pretence that ſome of the ſultan's ſoldiers were concealed in it. As all the houſes were made of wood, except the ſultan's palace which was built of ſtone, and ſome few private houſes of brick, the whole was utterly conſumed; and Jenghiz Khan having found ſome few ſoldiers that had actually concealed themſelves, put them all to death without mercy. The caſtle ſurrendered at diſcretion ſoon after; and though it was demoliſhed, the governor and garriſon, out of a very extraordinary piece of clemency from ſo bloody a tyrant, had their lives ſpared. Bokhara continued in ruins for ſome years, but at length Jenghiz Khan ordered it to be rebuilt. It is now large and populous; and is the reſidence of a khan who is altogether deſpotic, though his power reaches but a

Bokhara.

little

Boi || Boles.

little way without the city. The town is ſeated on a riſing ground, with a ſlender wall of earth and a dry ditch. The houſes are low, built moſtly of mud; but the caravanſeras and moſques, which are numerous, are all of brick. The bazars or market-places, which have been ſtately buildings, are now moſtly in ruins. The inhabitants are more civilized and polite than ſome of their neighbours; and yet are cowardly, cruel, effeminate, and very perfidious. Great numbers of Jews and Arabians frequent this place, though they are much oppreſſed, and frequently deprived of all their properties by the khan or his attendants at pleaſure. At beſt they pay heavy taxes, and it is almoſt criminal to be rich.

BOL, Hans or John, a painter, born at Mechlin in 1534. He received his firſt inſtructions from a maſter of no great repute, whom he ſoon left; and going to Heidelberg, employed himſelf in copying ſeveral pictures of the eminent artiſts. His ſubjects are chiefly landſcapes with animals; but he alſo ſometimes painted hiſtory, with no ſmall ſucceſs. We have by him a ſet of landſcapes, views in Holland, ſlightly etched, but in a ſtyle that indicates the hand of the maſter. He died in 1593.

Bol, *Ferdinand*, a celebrated painter both of hiſtory and portraits, was born at Dort in 1611, and educated at Amſterdam. In the ſchool of the celebrated Rembrandt Gerretz, he received his inſtructions as a painter; and imitated the ſtyle of his maſter with no little ſucceſs, not only in his pictures but in his engravings. Bol's etchings are bold and free. The lights and ſhadows in them are broad and powerful, which renders the effect very ſtriking; but they want that lightneſs of touch and admirable taſte which thoſe of Rembrandt poſſeſs in ſo great a degree. Bol died at Dort, the place of his birth, in 1681, aged 70.

BOKHARIA. See Bukharia.

BOLANDUS, John, a famous Jeſuit, born at Tillemont in the Netherlands, in 1796. He diſtinguiſhed himſelf by writing the lives of the ſaints, under the title of *Acta Sanctorum*, of which he publiſhed five volumes in folio; but died while he was labouring at the ſixth, in the 70th year of his age. The continuators of that work are called *Bolandiſts*.

BOLBITINUM, in *Ancient Geography*, the ſecond mouth of the Nile reckoning from weſt to eaſt; now very ſmall, choaked up with ſand, and called *le Bras de Beltin*.

BOLENTIUM, in *Ancient Geography*, a town of Pannonia Superior; now *Rackerſburg* in Stiria. See Rackersburg.

BOLES, are viſcid earths, leſs coherent and more friable than clay; more readily uniting with water, and more freely ſubſiding from it. They are ſoft and unctuous to the touch; adhere to the tongue; and by degrees melt in the mouth, impreſſing a light ſenſe of aſtringency. There is a great variety of theſe earths; the principal of which are the following.

1. Armenian bole, when pure, is of a bright red colour with a tinge of yellow: It is one of the hardeſt and moſt compact bodies of this claſs, and not ſmooth and gloſſy like the others, but generally of a rough and duſty ſurface. It does not effervеſce with acids, though ſome part of it is diſſolved by all of them. Neuman obſerves, that four ounces of Armenian bole diſtilled in a glaſs retort in an open fire, yielded three drachms of a ſaline phlegm, which ſmelt a little urinous, and changed ſyrup of violets green. In the neck of the retort was found a little powdery ſaline matter which had an ammoniacal taſte, but it was in too ſmall quantity to be collected or further examined. Like moſt other coloured earths, this kind of bole contains a portion of ferruginous matter, to which the colour is owing; and which may be ſeparated by the magnet, after the bole has been calcined with oil or other inflammable matters. It is likewiſe impregnated with vitriolic acid; and hence, when mixed with nitre or ſea ſalt, it extricates the acids of theſe ſalts in the fire.

Boleſlaus || Boleyn.

2. French bole is of a pale red colour, variegated with irregular ſpecks of white and yellow. It is much ſofter than the Armenian, and ſlightly effervеſces with acids.

3. Bole of Blois is yellow, remarkably lighter than moſt of the other yellow earths, and effervеſces ſtrongly with acids.

4. Bohemian bole is of a yellow colour, with a caſt of red, and generally of a flaky texture. It is not acted on by acids.

5. Lemnian earth is of a pale red colour, and ſlightly effervеſces with acids.

6. Sileſian bole is of a pale yellow colour, and acids have no ſenſible effect upon it.

Theſe and other earths, made into little maſſes, and ſtamped with certain impreſſions, are called *terræ ſigillatæ*. They have been recommended as aſtringent, ſudorific, and alexipharmic; but theſe and many other virtues that have been aſcribed to them appear to have no foundation. They are ſtill, however, preſcribed in fluxes and complaints of the primæ viæ.

BOLESLAFF, or Buntzlau, a town of Sileſia, ſeated on the river Bobar, in E. Long. 16. 0. N. Lat. 51. 12.

BOLESLAUS I. and II. kings of Poland. See Poland.

BOLETUS, ſpunk. See Botany *Index*.

BOLEYN, Ann, queen of Henry VIII. of England; memorable in the Engliſh hiſtory, as the firſt cauſe of the reformation, as the mother of Queen Elizabeth under whom it was completely eſtabliſhed, and alſo on account of her own ſufferings. She was the daughter of Sir Thomas Boleyn, and born in 1507. She was carried into France at ſeven years of age by Henry VIII's ſiſter, who was wife of Louis XII: nor did ſhe return into England when that queen retired thither after the death of her huſband; but ſtaid in the ſervice of Queen Claudia the wife of Francis I. and after the death of that princeſs went to the ducheſs of Alençon. The year of her return is not well known: ſome will have it to have been in 1527, others in 1525. This much is certain, that ſhe was maid of honour to Queen Catharine of Spain, Henry VIII's firſt wife; and that the king fell extremely in love with her. She behaved herſelf with ſo much art and addreſs, that by refuſing to ſatisfy his paſſion, ſhe brought him to think of marrying her: and the king, deceived by her into a perſuaſion that he ſhould never enjoy her unleſs he made her his wife, was induced to ſet on foot the affair of his divorce with Catharine, which at laſt was executed

Boleyn. with great ſolemnity and form. A celebrated author obſerves, that "That which would have been very praiſe-worthy on another occaſion, was Anne Boleyn's chief crime: ſince her refuſing to comply with an amorous king, unleſs he would divorce his wife, was a much more enormous crime than to have been his concubine. A concubine (ſays he) would not have dethroned a queen, nor taken her crown or her huſband from her; whereas the crafty Anne Boleyn, by pretending to be chaſte and ſcrupulous, aimed only at the uſurpation of the throne, and the excluſion of Catharine of Arragon and her daughters from all the honours due to them." In the mean time, Henry could not procure a divorce from the Pope; which, we know, made him reſolve at length to diſown his authority, and to fling off his yoke. Nevertheleſs he married Anne Boleyn privately upon the 14th of November 1532, without waiting any longer for a releaſe from Rome; and as ſoon as he perceived that his new wife was with child he made his marriage public. He cauſed Anne Boleyn to be declared queen of England on Eaſter-eve 1533, and to be crowned the firſt of June following. She was brought to bed upon the 7th of September of a daughter, who was afterwards Queen Elizabeth; and continued to be much beloved by the king, till the charms of Jane Seymore had fired that prince's heart in 1536. Then his love for his wife was changed into violent hatred: he believed her to be unchaſte, and cauſed her to be impriſoned and tried. "She was indicted of high treaſon, for that ſhe had procured her brother and other four to lie with her, which they had done often: that ſhe had ſaid to them, that the king never had her heart; and had ſaid to every one of them by themſelves, that ſhe loved him better than any perſon whatever; which was to the ſlander of the iſſue that was begotten between the king and her." And this was treaſon according to the ſtatute made in the 26th year of this reign; ſo that the law which was made for her and the iſſue of her marriage, is now made uſe of to deſtroy her." She was condemned to be either burnt or beheaded; and ſhe underwent the latter on the 19th of May 1536. The right reverend author of the *Hiſtory of the Reformation*, relates ſome very remarkable things of her behaviour during the time of her impriſonment, and a little before her execution. When ſhe was impriſoned, ſhe is ſaid to have acted very different parts; ſometimes ſeeming devout and ſhedding abundance of tears, then all of a ſudden breaking out into a loud laughter. A few hours before her death, ſhe ſaid, that the executioner was very handy: and beſides, that ſhe had a very ſmall neck; at the ſame time feeling it with her hands, and laughing heartily. However, it is agreed that ſhe died with great reſolution; taking care to ſpread her gown about her feet, that ſhe might fall with decency; as the poets have related of Polyxena, and the hiſtorians of Julius Cæſar. Roman-catholic writers have taken all occaſions to rail at this unhappy woman, as well through vexation at the ſchiſm which ſhe occaſioned, as for the ſake of defaming and diſhonouring Queen Elizabeth by this means; and they have triumphed vehemently, that in the long reign of that queen, no endeavours were uſed to juſtify her mother. But either Queen Elizabeth or her miniſters are greatly to be admired for prudence in this reſpect; ſince it is certain, that Anne Boleyn's juſtification could never have been carried on without diſcovering many things which muſt have been extremely prejudicial to the queen, and have weakened her right inſtead of eſtabliſhing it. For though the repreſentations of the papiſts are in nowiſe to be regarded, yet many things might have been ſaid to the diſadvantage of her mother, without tranſgreſſing the laws of true hiſtory; as that ſhe was a woman gay even to immodeſty, indiſcreet in the liberties ſhe took, and of an irregular and licentious behaviour. Boling-broke.

BOLINGBROKE, or BULLINGBROKE, a town of Lincolnſhire in England, and of great antiquity, but now in a mean condition. It gives title of viſcount to the St Johns of Batterſea. E. Long. 0. 40. N. Lat. 53. 15.

BOLINGBROKE, *Henry St John*, lord viſcount, a great ſtateſman and philoſopher, deſcended from an ancient and noble family, was born about the year 1672. He had a regular and liberal education; and by the time he left the univerſity, was conſidered as a perſon of uncommon qualifications: but with great parts, he had, as it uſually happens, great paſſions, and theſe hurried him into many indiſcretions and follies. Contrary to the inclinations of his family, he cultivated Tory connections; and gained ſuch an influence in the houſe of commons, that in 1704 he was appointed ſecretary of war and of the marines. He was cloſely united in all political meaſures with Mr Harley: when, therefore, that gentleman was removed from the ſeals in 1707, Mr St John reſigned his employment; and in 1710, when Mr Harley was made chancellor of the exchequer, the poſt of ſecretary of ſtate was given to Mr St John. In 1712 he was created Baron St John of Lediard-Tregoze in Wiltſhire, and Viſcount Bolingbroke. But being overlooked in the beſtowal of vacant ribbons of the order of the garter, he reſented the affront, renounced the friendſhip of Harley then earl of Oxford, and made his court to the Whigs. Nevertheleſs, on the acceſſion of George I. the ſeals were taken from him; and being informed that a reſolution was taken to purſue him to the ſcaffold, for his conduct regarding the treaty of Utrecht, he withdrew to France. Here he accepted an invitation to enter into the Pretender's ſervice, and accepted the ſeals as his ſecretary: but he was as unfortunate in his new connections as in thoſe he had renounced; for the year 1715 was ſcarcely expired, when at the ſame time that he was attainted of high treaſon at home, the ſeals and papers of his foreign ſecretary's office were taken from him; followed by an accuſation from the Pretender and his party, of neglect, incapacity, and treachery. Such a complication of diſtreſsful events threw him into a ſtate of reflection, that produced by way of relief a *conſolatio philoſophica*, which he wrote the ſame year under the title of *Reflections upon exile*; and the following year drew up a vindication of his conduct with reſpect to the Tories, in the form of *A Letter to Sir William Wyndham*. His firſt lady being dead, he about this time eſpouſed a niece of the famous Madame Maintenon, and widow of the Marquis de Vilette, with whom he had a very large fortune. In 1723 the king was prevailed on to grant him a free pardon, and he returned in conſequence to England; but was by no means ſatisfied within, while he was yet no more than a mere titular lord, and remained excluded from the houſe

Boliſaw || Bologne.

houſe of peers. This ſtigma operated to fix him in enmity to Sir Robert Walpole, to whoſe ſecret enmity he attributed his not receiving the full extent of the king's clemency: hence he diſtinguiſhed himſelf by a multitude of political writings, till the year 1735; when being thoroughly convinced that the door was finally ſhut againſt him, he returned once more to France. In this foreign retreat he began his courſe of Letters on the ſtudy and uſe of Hiſtory, for the uſe of Lord Combury, to whom they are addreſſed. Upon the death of his father, who lived to be extremely old, he ſettled at Batterſea, the ancient ſeat of his family, where he paſſed the remainder of his life in philoſophical dignity. Pope and Swift, one the greateſt poet, the other the greateſt wit, of the time, perfectly adored him; and it is well known that the former received from him the materials for his incomparable poem the "Eſſay on Man."—He died in 1751, and left the care and benefit of his MSS. to Mr Mallet, who publiſhed them together with his former printed work, in 5 vols 4to; they are alſo printed in 8vo.

BOLISAW, a town of the kingdom of Bohemia in Germany, ſituated in E. Long. 14. 35. N. Lat. 50. 25.

BOLKOWITZ, a town of Sileſia in the duchy of Glogaw. E. Long. 15. 20. N. Lat. 51. 27.

BOLLARDS, large poſts ſet into the ground on each ſide of a dock. On docking or undocking ſhips, large blocks are laſhed to them; and through theſe blocks are reeved the tranſporting hawſers to be brought to the capſtans.

BOLLITO, a name by which the Italians call a *ſea-green colour* in artificial cryſtal. To prepare this colour, you muſt have in the furnace a pot filled with 40lb. of good cryſtal, firſt carefully ſkimmed, boiled, and purified, without any mangaueſe: then you muſt have twelve ounces of the powder of ſmall leaves of copper thrice calcined, and half an ounce of zaffre in powder: mix them together; and put them at four times into the pot, that they may the better mix with the glaſs; ſtirring them well each time of putting in the powder, leſt the mixture ſhould ſwell and run over.

BOLOGNA, an ancient, large, and very handſome town of Italy, in the territory of the church, and capital of the Bologneſe; an archbiſhop's ſee, and an univerſity. The public buildings are magnificent, as well with regard to the architecture as the ornaments, eſpecially the paintings, which are done by the greateſt maſters. There is a vaſt number of palaces, in one of which the pope's nuncio reſides; the private houſes are alſo well built. Here are 169 churches, and the town is ſaid to contain about 80,000 inhabitants. All the gates and windows are open during the ſummer; inſomuch that one may ſee into their apartments and gardens, where there are vaſt numbers of orange trees that perfume the air. It is a place of great trade, which is in ſome meaſure owing to a canal that runs from this city to the river Po. The Reno, which runs near Bologna, turns 400 mills that are employed in the ſilk-works; beſides, they deal in wax, ſoap, hams, ſauſages, and even lap-dogs, which are greatly eſteemed. It is ſeated at the foot of the Apennine mountains, in E. Long. 11. 30. N. Lat. 44. 27.

BOLOGNE, by the Engliſh commonly called *Bullen*, a city of France, in the department of the Straits of Calais, and capital of the Bolonnois, ſeated near the ſea. It is divided into two towns, the Upper and Lower; the firſt is ſtrongly fortified, the other is encloſed by walls only. The port is at the mouth of the river Lianne, but the water is ſo ſhallow that no ſhips of burden can enter it. It is defended on the ſide of the river by a mole, which ſhelters it from the winds, and at the ſame time prevents the river from filling it with filth. E. Long. 1. 40. N. Lat. 50. 42.

Bologneſe || Bomſwaert.

BOLOGNESE, a ſmall province of Italy, in the territory of the church, bounded on the north by the Ferrareſe, on the weſt by the duchy of Modena, on the ſouth by Tuſcany, and on the eaſt by Romagna. It is watered by a great number of ſmall rivers, which render its ſoil the moſt fertile of any in Italy. Bologna is the capital, and from the great produce of the land about it is called *Bologna the fat*. It produces abundance of all ſorts of grain and fruits; particularly muſcadine grapes, which are in high eſteem. Here are mines of alum and iron; and the inhabitants fabricate large quantities of linen, ſilk ſtockings, and cloth. This territory was overrun by the French in 1796, and is now included in the Ciſalpine republic.

BOLOGNESE. See GRIMALDI.

BOLOGNIAN or BONONIAN STONE, a phoſphoric ſubſtance firſt diſcovered near Bologna in Italy, whence it received its name. It has been ſuppoſed to contain ſome metallic matter, on account of its great ſpecific gravity; but it is now found to be only a compound of ponderous earth and ſulphuric acid. See BARYTES, MINERALOGY *Index*.

BOLSANE, a town of Germany, in the territory of Tyrol, and circle of Auſtria. It is very agreeably ſituated in the midſt of a fine large valley, full of villages, and abounding in vineyards. The wines in this valley are the beſt in all Tyrol; but they muſt be drank the year after that of their growth, otherwiſe, they become unfit for uſe. E. Long. 11. 11. N. Lat. 46. 42.

BOLSENNA, a town of Italy, in the territories of the pope, ſeated on a lake of the ſame name. E. Long. 11. 3. N. Lat. 42. 37.

BOLSTER, among ſurgeons, a ſoft yielding ſubſtance, either laid under the head or a broken limb. In this ſenſe, bolſters are contrived for crooked, bunched, and otherwiſe diſtorted backs, ſhoulders, &c.

By a conſtitution made under Archbiſhop Burchier, the clergy are forbidden to wear bolſters about their ſhoulders, in their gowns, coats, or doublets. The occaſion of the prohibition is variouſly conſtrued. Some ſay that bolſters came in faſhion in the reign of King Richard III. who being neceſſitated, by his natural deformity, to pad, the courtiers, and even the clergy, did the ſame, out of complaiſance to their prince; ſo that every body who had the misfortune to be born ſtraight, was obliged to wear a bolſter on his ſhoulders to be in the faſhion. Others, however, controvert this; alleging that the conſtitution above-mentioned was made 20 years before the uſurpation of Richard.

BOLSTERS of a ſaddle, thoſe parts of a great ſaddle which are raiſed upon the bows, both before and behind to hold the rider's thigh, and keep him in a right poſture.

BOLSWAERT, a town of the United Provinces, in Weſt Frieſland, and in the county of Weſtergoe. E. Long. 5. 35. N. Lat. 53. 6.

Bolſwert. BOLSWERT, or BOLSUERD, *Boetius Adam à*, an engraver and printſeller eſtabliſhed at Antwerp, was the deſcendant of a family who reſided at the city of Bolſwert in Frieſland, from whence he derived his name. He flouriſhed about 1620; but by what maſter he was inſtructed in the art of engraving, does not appear. He worked with the graver only; the free open ſtyle of the Bloemarts he imitated with great ſucceſs; and perhaps perfected himſelf in their ſchool. When he worked from Rubens, he altered that ſtyle; and his plates are neater, fuller of colour, and more highly finiſhed. The two following from this maſter may be here mentioned. 1. The Reſurrection of Lazarus, a large upright plate. 2. The Laſt Supper, its companion. Baſan, ſpeaking of this print, ſays, that it proves by its beauty, and the knowledge with which it is engraved, that Boetius could ſometimes equal his brother Scheltius.

BOLSWERT or *Bolſuerd, Scheltius à*, an admirable engraver, was the brother of Boetius Adam à Bolſwert mentioned in the preceding article. We have no other account of his family than what is there given; nor unfortunately any of himſelf of the leaſt conſequence. The time of his birth and of his death, and the name of the maſter he ſtudied under, are equally unknown. Bolſwert worked entirely with the graver, and never called in the aſſiſtance of the point. His general character as an artiſt is well drawn by Baſan, in the following words: "We have a large number of prints, which are held in great eſteem, by this artiſt, from various maſters; but eſpecially from Rubens, whoſe pictures he has copied with all poſſible knowledge, taſte, and great effect. The freedom with which this excellent artiſt handled the graver, the pictureſque roughneſs of etching, which he could imitate without any other aſſiſting inſtrument, and the ability he poſſeſſed of diſtinguiſhing the different maſſes of colours, have always been admired by the connoiſſeurs, and give him a place in the number of thoſe celebrated engravers, whoſe prints ought to be conſidered as models by all hiſtorical engravers, who are deſirous of rendering their works as uſeful as they are agreeable, and of acquiring a reputation as laſting as it is juſtly merited." He drew excellently, and without any manner of his own; for his prints are the exact tranſcripts of the pictures he engraved from. His beſt works, though not always equally neat or finiſhed, are always beautiful, and manifeſt the hand of the maſter. Sometimes we find his engravings are in a bold, free, open ſtyle; as the Brazen Serpent, the Marriage of the Virgin, &c. from Rubens. At other times they are very neat, and ſweetly finiſhed: as, the crowning with Thorns, and the Crucifixion, &c. from Vandyck. Mr Strutt obſerves, that his boldeſt engravings are from Rubens, and his neateſt from Vandyck and Jordaens.—How greatly Bolſwert varied his manner of engraving appears from ſome prints, which, like the greater part of thoſe of his brother Boetius, bear great reſemblance to the free engravings of the Bloemarts, and to thoſe of Frederic Bloemart eſpecially; and form a part of the plates for a large folio volume, entitled *Academie de l'Eſpee*, by Girard Thibault of Antwerp, where it was publiſhed, A. D. 1628; and to theſe he ſigns his name, "Scheltius," and ſometimes "Shelderic Bolſwert," adding the word Bruxelle. His name is uſually affixed to his plates in this manner, "S. A. Bolſwert." It is very neceſſary to caution the collectors of this maſter's works (thoſe eſpecially who are not very converſant with them), that many of them have been copied in a very careful manner, ſo as eaſily to deceive the unſkilful. Some of theſe copies, as the Marriage of the Virgin, from Rubens, &c. are by Lauwers. But thoſe which are moſt likely to miſlead, are by Ragot, a French engraver, employed by Mariette the printſeller, who frequently meeting with the reverſes or counterproofs from the prints of Bolſwert, gave them to the engraver; and he imitated them with the utmoſt preciſion. By this means the impreſſions from the plate copied come upon the paper the ſame way with the original. It is true his name is uſually affixed at the bottom; but it is often cut off, and then the copy is not eaſily diſtinguiſhed from the original. Among other prints thus imitated by Ragot from Bolſwert, is Chriſt crucified between the two Thieves, where the ſoldier is repreſented piercing his ſide, from Rubens. Bolſwert.

Among the variety of eſtimable engravings by this great artiſt, the few following may be here mentioned. 1. The Brazen Serpent, a large plate, lengthwiſe, from Rubens. Thoſe impreſſions are the moſt eſtimable which have only the word *Antuerpiæ* at the right-hand corner, without the name of Giles Hendrix, which was afterwards inſerted above it, and part of the ſmall circle over the arms is left white. 2. Abraham offering his ſon Iſaac, a large plate nearly ſquare, from Theodore Rombout. 3. The education of the Virgin by Saint Anne, a middling-ſized upright plate, from Rubens. Thoſe impreſſions without the name of Hendrix are the moſt eſteemed. 4. The marriage of the Virgin, a middling-ſized upright plate, from the ſame painter. Thoſe impreſſions are beſt in which the word *Antuerpiæ* is not added to the name of Hendrix. 5. The adoration of the wiſe men, a middling-ſized upright plate, from the ſame. The good impreſſions of this plate have the name of Vanden Enden. 6. The feaſt of Herod, in which is repreſented the daughter of Herodias, preſenting the head of John the Baptiſt to her mother, a large plate, lengthwiſe, from the ſame. 7. The miraculous draught of fiſhes; a large print lengthwiſe, on three plates, from the ſame. 8. Chriſt crowned with thorns; a large upright plate from Vandyck: An admirable print; with the name of Vanden Enden. 9. A crucifixion, where a figure appears preſenting the ſponge to Chriſt, St John and the Virgin are ſtanding at the foot of the croſs, and Mary Magdalene is reclining towards it; a large upright plate, from Vandyck. Of this admirable engraving there appear to have been four different impreſſions; though Baſſan mentions only three, and ſays that in the firſt the left hand of St John is hid. The chief marks of thoſe impreſſions are: In the 1ſt, St John's left hand appears on the ſhoulder of the Virgin (A). In

(A) Prints of this impreſſion are very rare, and at ſales have been known to fetch from 25l. to 30l.

Bolt || Bolting.

In the 2d impreſſion, the hand is eraſed: This Baſan calls the firſt impreſſion; and it ſells at a very high price. In the 3d impreſſion, the hand is reſtored: In the 4th, it is again eraſed: And in both, the ſhort ſtrokes upon the ground near the great toe of the figure who holds the ſponge are croſſed with ſecond ſtrokes; which croſs-hatchings are not in the two firſt impreſſions. There are ſeveral other crucifixions by the ſame maſter after different deſigns. 10. The god Pan playing upon his flute, from Jordaens. 11. Mercury and Argus, a large plate lengthwiſe, from the ſame. 12. A drunken Silenus, ſupported by a ſatyr, and another figure; a middling ſized upright plate from Rubens. Of theſe three laſt, the impreſſions without the addreſs of Bloteling are the beſt. 13. A chaſe of lions: a large plate lengthwiſe, from the ſame. 14. A variety of landſcapes.

BOLT, among builders, an iron faſtening fixed to doors and windows. They are generally diſtinguiſhed into three kinds, viz. plate, round, and ſpring bolts.

Bolts, in *Gunnery*, are of ſeveral ſorts; as, 1. Tranſum-bolts, that go between the cheeks of a gun carriage, to ſtrengthen the tranſums. 2. Priſe bolts; the large knobs of iron on the cheeks of a carriage, which keep the hand-ſpike from ſliding, when it is poizing up the breech of a piece. 3. Traverſe bolts; the two ſhort bolts, that, being put one in each end of a mortar carriage, ſerve to traverſe her. 4. Bracket-bolts; the bolts that go through the cheeks of a mortar, and by the help of quoins keep her fixed at the given elevation. And, 5. Bed-bolts; the four bolts that faſten the brackets of a mortar to the bed.

Bolts, in a ſhip, are iron pins, of which there are ſeveral ſorts, according to their different makes and uſes. Such are drive-bolts, uſed to drive out others. Ray-bolts, with jags or barbs on each ſide, to keep them from flying out of their holes. Clench-bolts, which are clenched with rivetting hammers. Forelock-bolts, which have at the end a forelock of iron driven in to keep them from ſtarting back. Set-bolts, uſed for forcing the planks, and bringing them cloſe together. Fend or fender bolts, made with long and thick heads, and ſtruck into the uttermoſt bends of the ſhip, to ſave her ſides from bruiſes. And ring-bolts, uſed for bringing to of the planks, and thoſe parts whereto are faſtened the breeches and tackle of the guns.

Bolt of Canvas, in commerce, the quantity of 28 ells.

Bolt-Rope, in naval affairs, a rope paſſing round the ſail, to which the edges of it are ſewed, to prevent the ſail from tearing: the bottom part of it is called the *foot-rope*; the ſides, *leeches*; and if the ſail be oblong or ſquare, the upper part is called the *head rope*.

BOLTED flour, that which has paſſed through the bolters. See the following article.

BOLTER, or Boulter, a kind of ſieves for meal, having the bottoms made of woollen, hair, or even wire. The bakers uſe bolters which are worked by the hand; millers have a larger ſort, wrought by the motion of the mill.

BOLTING, a term of art uſed in our inns of court, whereby is intended a private arguing of caſes. The manner of it at Gray's inn is thus: An ancient and two barriſters ſit as judges; three ſtudents bring each a caſe, out of which the judges chooſe one to be argued; which done, the ſtudents firſt argue it, and after them the barriſters. It is inferior to *mooting*; and may be derived from the Saxon word *bolt*, "a houſe," becauſe done privately in the houſe for inſtruction. In Lincoln's inn, Mondays and Wedneſdays are the bolting days in vacation time; and Tueſdays and Thurſdays the moot days.

Bolting || Bomb.

Bolting, or *Boulting*, the act of ſeparating the flour from the bran by means of a ſieve or bolter. See Bolter.

Bolting-Cloth, or *Bolſter-cloth*, ſometimes alſo called *Boulting-cloth*, denotes a linen or hair-cloth for ſifting meal or flour.

Bolting-Mill, a verſatile engine for ſifting with more eaſe and expedition. The cloth round this is called the *bolter*.

Bolting, or *Boulting*, among ſportſmen, ſignifies rouſing or diſlodging a coney from its reſting place. They ſay, to *bolt* a coney, *ſtart* a hare, *rouſe* a buck, &c.

BOLTON, or Boulton, *Edmund*, an ingenious Engliſh antiquarian, who lived in the beginning of the 17th century. His moſt conſiderable work is that entitled *Nero Cæſar*, or *Monarchie depraved*, dedicated to the duke of Buckingham, lord-admiral, printed at London 1624, folio, and adorned with ſeveral curious and valuable medals. It is divided into 55 chapters, in ſome of which are introduced curious remarks and obſervations. In the 24th and 25th chapters he gives an account of the revolt in Britain, againſt the Romans, under the conduct of Boadicea, which he introduces with a recapitulation of the affairs in Britain from the firſt entrance of the Romans into this iſland under Julius Cæſar, till the revolt in the reign of Nero. In chapter 36th he treats of the Eaſt-India trade in Nero's time, which was then carried on by the river Nile, and from thence by caravans over land to the Red-ſea, and thence to the Indian ocean; the ready coin carried yearly from Rome upon this account amounting, according to Pliny's computation, to above 300,000l. ſterling; and the uſual returns in December and January yielding in clear gain an hundred for one. Beſides this he wrote, 1. An Engliſh tranſlation of Lucius Florus's Roman Hiſtory. 2. Hypercritica, or a rule of judgment for reading or writing our hiſtories. 3. The elements of armories, &c.; and ſome other works.

Bolton, a town of Lancaſhire in England, ſeated on the river Croell, and pretty well built. It has a manufacture for fuſtians, and the market is conſiderable for cloth and proviſions. W. Long. 2. 15. N. Lat. 53. 55.

BOLUS, in *Pharmacy*, an extemporaneous form of a medicine, ſoft, coherent, a little thicker than honey, and the quantity of which is a little morſel or mouthful; for which reaſon it is by ſome called *buccella*.

BOMAL, a town of Luxemburg in the Auſtrian Netherlands, ſituated on the river Ourt, in E. Long. 5. 30. N. Lat. 50. 20.

BOMB, in military affairs, a large ſhell of caſt iron, having a great vent to receive the fuſee, which is made of wood. The ſhell being filled with gunpowder, the fuſee

Bomb-Cheſt || Bombardo.

fuſee is driven into the vent or aperture, within an inch of the head, and faſtened with a cement made of quick-lime, aſhes, brick-duſt, and ſteel filings, worked together in a glutinous water; or of four parts of pitch, two of colophony, one of turpentine, and one of wax. This tube is filled with a combuſtible matter, made of two ounces of nitre, one of ſulphur, and three of gunpowder-duſt, well rammed. To preſerve the fuſee, they pitch it over, but uncaſe it when they put the bomb into the mortar, and cover it with gunpowder-duſt; which having taken fire by the flaſh of the powder in the chamber of the mortar, burns all the time the bomb is in the air; and the compoſition in the fuſee being ſpent, it fires the powder in the bomb, which burſts with great force, blowing up whatever is about it. The great height a bomb goes in the air, and the force with which it falls, makes it go deep into the earth.

Bombs may be uſed without mortar-pieces, as was done by the Venetians at Candia, when the Turks had poſſeſſed themſelves of the ditch, rolling down bombs upon them along a plank ſet ſloping towards their works, with ledges on the ſides, to keep the bomb right forward. They are ſometimes alſo buried under ground to blow up. See CAISSON.—Bombs came not into common uſe before the year 1634, and then only in the Dutch and Spaniſh armies. One Malthus an Engliſh engineer is ſaid to have firſt carried them into France, where they were put in uſe at the ſiege of Collioufe. The French have lately invented a new ſort of bombs of vaſt weight called *Comminges*.—The art of throwing bombs makes a branch of gunnery, founded on the theory of projectiles, and the laws and qualities of gunpowder. See GUNNERY, PROJECTILES, GUNPOWDER, &c.

BOMB-Cheſt, is a kind of cheſt filled uſually with bombs, ſometimes only with gunpowder, placed under ground, to tear and blow it up in the air with thoſe who ſtand on it. Bomb-cheſts were formerly much uſed to drive enemies from a poſt they had ſeized or were about to take poſſeſſion of: they were ſet on fire by means of a ſauciſſee faſtened at one end, but they are now much diſuſed.

BOMB-Veſſels, which are ſmall ſhips formed for throwing bombs into a fortreſs, are ſaid to be the invention of M. Reyneau, and to have been firſt uſed at the bombardment of Algiers. Till then it had been judged impracticable to bombard a place from the ſea. See KETCH.

BOMBARD, a piece of ordnance anciently in uſe, exceedingly ſhort and thick, and with a very large mouth. There have been bombards which have thrown a ball of 300 pound weight. They made uſe of cranes to load them. The bombard is by ſome called *baſiliſk*, and by the Dutch *donderbaſs*.

BOMBARDIER, a perſon employed about a mortar. His buſineſs is to drive the fuſee, fix the ſhell, and load and fire the mortar.

BOMBARDIER. See CARABUS, ENTOMOLOGY *Index*.

BOMBARDMENT, the havock committed in throwing bombs into a town or fortreſs.

BOMBARDO, a muſical inſtrument of the wind kind, much the ſame as the baſſoon, and uſed as a baſs to the hautboy.

BOMBASINE, a name given to two ſorts of ſtuffs, the one of ſilk, and the other croſſed of cotton. Bombaſine || Bombay.

BOMBAST, in compoſition, is a ſerious endeavour, by ſtrained deſcription, to raiſe a low or familiar ſubject beyond its rank; which, inſtead of being ſublime, never fails to be ridiculous. The mind in ſome animating paſſions is indeed apt to magnify its objects beyond natural bounds; but ſuch hyperbolical deſcription has its limits; and when carried beyond theſe, it degenerates into burleſque, as in the following example.

Sejanus.——————Great and high,
The world knows only two, that's Rome and I.
My roof receives me not; 'tis air I tread,
And at each ſtep I feel my advanc'd head
Knock out a ſtar in heaven.

SEJAN. of *Ben. Johnſon*, Act v.

A writer who has no natural elevation of genius is extremely apt to deviate into bombaſt. He ſtrains above his genius, and the violent effort he makes carries him generally beyond the bounds of propriety.

BOMBAX, or SILK COTTON TREE. See *BOTANY Index*.

BOMBAX, in *Zoology*, a ſynonyme of a ſpecies of CONUS. *Bombax* is alſo uſed ſometimes for ſilk or cotton; but the true botanic name of cotton is GOSSYPIUM. It is likewiſe applied by Linnæus to ſignify ſuch inſects as have incumbent wings, and feelers reſembling a comb.

BOMBAY, an iſland in the Eaſt Indies near the coaſt of Decan, ſituated in N. Lat. 19. 0. and E. Long. 73. 0. It has its preſent name from the Portugueſe *Buon-bahia*, on account of the excellent bay formed by it together with the winding of other iſlands adjacent. The harbour is ſpacious enough to contain any number of ſhips, and has likewiſe excellent anchoring ground, affording alſo, by its land-locked ſituation, a ſhelter from any winds to which the mouth may be expoſed.

This iſland was formerly reckoned exceedingly unhealthy, inſomuch that it had the name of the burying ground of the Engliſh, though it is now ſo far improved in this reſpect as to be no worſe than any other place in the Eaſt Indies under the ſame parallel of latitude. The reaſons of this unhealthineſs and the ſubſequent improvements are enumerated by Mr Groſe. 1. The nature of the climate, and the precautions required by it, being leſs underſtood than they are at preſent. 2. Formerly there obtained a very pernicious practice of employing a ſmall fry of fiſh as manure for the cocoa-trees which grow in plenty on the iſland; though this has been denied by others, and perhaps with juſtice, as the putrid effluvia of animal bodies ſeems to be very effectually abſorbed by the earth, when buried in it. All agree, however, that the habitations in the woods or cocoa-nut groves are unwholeſome by reaſon of the moiſture, and want of a free circulation of air. 3. Another cauſe has been aſſigned for the ſuperior healthineſs of this iſland, viz. the leſſening of the waters by the banking of a breach of the ſea, though this does not appear ſatisfactory to our author. There is ſtill, ſays he, a great body of ſalt water on the inſide of the breach, the communication of which with the ocean being leſs free than before the breach was built,

This iſland more healthy now than formerly, and why.

Bombay. built, muſt be proportionably more apt to ſtagnate, and to produce noxious vapours.

Whatever may be the cauſe, however, it is certain, that the iſland of Bombay no longer deſerves its former character, provided a due degree of temperance be obſerved; without which health cannot be expected in any warm climate.

2 Climate, &c. The climate of Bombay ſeems to be drier than many other parts under the ſame parallel. The rains laſt only four months of the year, but with ſhort intermiſſions. The ſetting in of the rains is commonly uſhered in by a violent thunder-ſtorm called there the *Elephanta* from its extraordinary violence. The air, however, is then agreeably cooled, and the exceſſive heat, then nearly at its height, much moderated. The rains begin about the end of May, and go off in the beginning of September; after which there never falls any except a ſhort tranſient ſhower, and that but very rarely.

3 Fiſh in all the ſtagnant pools formed by the rains. A very extraordinary circumſtance is related by Mr Ives concerning the iſland of Bombay during the rainy ſeaſon, viz. that, ten days after the rains ſet in, every pool and puddle ſwarms with a ſpecies of fiſh about ſix inches long and ſomewhat reſembling a mullet. Such a phenomenon has occaſioned various ſpeculations. Some have imagined that the exhaling power of the ſun is ſo ſtrong in the dry ſeaſons as to be able to raiſe the ſpawn of theſe fiſhes into the atmoſphere, and there ſuſpend and nouriſh it till the rains come on, when it drops down again in the ſtate of living and perfectly formed fiſh. A leſs extravagant ſuppoſition is, that after the ponds become dry, the ſpawn may poſſibly fall into deep fiſſures below the apparent bottom, remaining there during the dry ſeaſon, and being ſupplied with a ſufficient quantity of moiſture to prevent it from corruption.

4 Account of the quantity of rain that falls during the rainy ſeaſon. The quantity of rain that falls at Bombay in one ſeaſon has been accurately meaſured by Mr Thomas, Mr Ives's predeceſſor as hoſpital ſurgeon. His apparatus conſiſted of a lead cylinder about nine inches diameter, and as many deep, marked on the inſide with inches and tenths. To prevent the water from ſplaſhing over, he cut a hole two inches from the bottom, and placed the cylinder in a glazed earthen veſſel; after which a wax-cloth was ſecurely tied round it, ſo as to cover the veſſel, and prevent any water from getting in, excepting what paſſed through the cylinder. When more than two inches fell, the hole in the ſide was ſtopped with wax, and the water poured from the veſſel into the cylinder to aſcertain its quantity. It was kept in an open place free from houſes, and meaſured at ſix in the morning, noon, and ſix in the evening. The following table ſhows the quantity of rain that fell from the 25th of May, when it firſt began, though the ſky looked cloudy over land from the beginning of the month.

May 1756. Days of the month.	Quantity of rain in In. Tenths.
25	0 3
31	0 7
June.	
3	0 1

June. Days of the month.	Quantity of rain in In. Tenths.
4	0 1
5	0 6
6	0 8
7	0 9
8	1 0
9	0 3
11	3 0
12	0 3
13	0 5
14	4 5
15	1 3
16	2 5
17	5 6
18	0 8
19	0 2
20	0 4
21	0 3
22	1 2
23	0 3
24	0 7
25	0 7
26	0 8
27	4 0
28	6 7
29	5 3
30	1 8
July.	
1	1 3
2	2 0
3	0 9
4	1 9
5	0 5
6	0 2
7	0 4
8	0 9
9	1 3
10	3 1
11	3 7
12	0 7
13	5 5
14	4 9
15	2 2
16	0 1
18	0 5
19	1 1
20	0 5
21	0 7
22	0 2
23	0 2
25	0 1
26	0 3
27	0 3
28	0 8
29	0 6
August.	
3	0 4
5	1 4
6	7 0
7	0 8
8	0 6
9	1 3
10	0 4

Bombay.

August. Days of the month.	Quantity of rain in In. Tenths.
11	0 1
12	0 2
13	1 1
14	0 8
15	0 3
16	0 2
17	0 2
18	0 2
19	0 2
20	0 2
21	0 1
22	0 4
25	0 4
26	0 7
27	0 5
28	0 2
30	0 1
31	0 2
September.	
1	0 2
3	0 3
8	0 1
9	0 4
10	0 5
11	0 9
12	0 2
13	0 5
16	0 4
17	0 4
18	0 5
19	0 6
20	3 2
21	0 4
22	0 6
23	0 3
24	0 3
25	0 2
26	0 2
27—30	1 0
October.	
2—7	2 1
9	2 0
15	0 3
16, 17	0 1

22 The air fine and clear, without a cloud, the land and ſea-breezes regular.

Whole quantity of rain in

	In. Tenths.
May —	1 0
June —	44 7
July —	29 9
Auguſt —	19 0
September	11 2
October —	4 5
Total	110 3

In this journal our author makes no mention of the elephanta above mentioned from Mr Groſe as the forerunner of the rainy ſeaſon, though he mentions a ſtorm under

Bombay. under that name on the 9th of October. It was an excessive hard gale, with violent thunder, lightning, and rain; of which last there fell two inches in no more than four hours. Neither is the quantity of thunder and lightning at all comparable to what people unacquainted with hot climates might be apt to expect. The only thunder-storms mentioned in the journal were on May 31st, June 3d, 5th, 12th, 14th; September 7th, October 9th, an elephanta; and some thunder on the 15th of the same month.

5 Vegetable productions of Bombay.

The vegetable productions of Bombay are very insignificant. Mr Ives says, that its "soil is so barren as not to produce any one thing worth mentioning;" but afterwards informs us, that its "natural produce is the cocoa-nut tree, from which they extract a liquor called *toddy*. This is soft and mild when drunk immediately: but if it stands long, it gathers strength, and becomes very intoxicating; whence probably arose the term *toddy-headed*. For each tree a tax of 20s. a-year is paid to the company, which is appropriated towards maintaining the garrison and ships of war."

Mr Grose gives an account somewhat different.—"The *oarts*, or cocoa-nut groves, make the most considerable part of the landed property, being planted wherever the situation and soil is favourable to them. When a number of these groves lie contiguous to each other, they form what is called the *woods*; through which there is a due space left for roads and path-ways, where one is pleasantly defended from the sun at all hours in the day. They are also thick set with houses belonging to the respective proprietors as well as with the huts of the poorer sort of people; but are very unwholesome for the reasons already given. As to the cocoa-nut tree itself, not all the minute descriptions I have met with in many authors seem to me to come up to the reality of its wonderful properties and use. The cultivation of it is extremely easy, by means of channels conveying water to the roots, and by the manure already mentioned laid round them. An owner of 200 cocoa-nut trees is supposed to have a competency to live on.

"As to the rice fields, they differ in value, according to the fineness and quantity of rice they produce. The growth of this grain has a particularity not unworthy of notice, viz. that as it loves a watery soil, so to whatever height the water rises, wherever it is planted, the growth of the rice keeps measure with it, even to that of 12 and 14 feet; the summit always appearing above the surface of the water. It is also remarked, that the eating of new rice affects the eyes. The fact is certain, though the physical reason of it is unknown.

"Here and there are interspersed some few *brab trees*, or rather wild palm trees (the word *brab* being derived from *brabo*, which in the Portuguese signifies *wild*.) They bear an insipid kind of fruit, about the bigness of a common pear; but the chief profit from them is the toddy, or liquor drawn from them by incisions at the top, of which the arrack is reckoned better than that produced by the cocoa-nut trees. They are generally near the sea-side, as they delight most in a sandy soil. It is on this tree that the *toddy birds*, so called from their attachment to it, make their exquisitely curious nests, wrought out of the thinnest reeds and filaments of branches, with an inimitable mechanism. The birds themselves are about the size of a partridge, but are of no value either for plumage, song, or the table. Bombay.

"This island is a strong instance of the benefits of a good government, and a numerous population; for not a spot of it remains uncultivated: so that though it is far from producing sufficient for the consumption of its inhabitants, and notwithstanding its many disadvantages of situation and soil, it yields incomparably more than the adjacent island of Salsette."

6 Curiosities in this island.

Among the curiosities of Bombay Mr Ives mentions a large *terapin* or land tortoise kept at the governor's house, the age of which was upwards of 200 years. Frogs, which abound everywhere through the East Indies, are very large at Bombay. Our author saw one that measured 22 inches from the extremities of the fore and hind feet when extended; and he supposes that its weight would not have been less than four or five pounds. On the sea-shore round the island are a great variety of beautiful shells, particularly the sort called *ventle-traps* or *wendle-traps*, held in great esteem among the ladies some time ago. Several pounds sterling are said to have been given by a *virtuoso* for one of these shells when Commodore Leslie's collection of shells was sold by auction.

7 Different kind of serpents found here.

Mr Ives enumerates the following kinds of snakes found on this island and other parts of the British empire in the East Indies. 1. The *cobra de capella*, growing from four to eight or nine feet long. They kill by their bite in 15 minutes. 2. The *cobra manila* is a small bluish snake, of the size of a man's little finger, and about a foot long, frequently seen about old walls. A species of these found at Bombay kill much sooner than even the former. 3. The *palmira*, a very thin beautiful snake, of different colours: its head is like that of the common viper, but much thicker than the body. Our author saw one that was four feet long, and the body not much thicker than a swan's quill. 4. The green snake is of a very bright green colour, with a sharp head: towards the tail it is smaller than in the middle. The largest part of it is no bigger than a tobacco-pipe. 5. The sand snake is small and short, but not less deadly than the others. 6. The *cobra de aurelia* resembles an earth-worm, is about six inches long, and no bigger than a small crow-quill. It kills by getting into the ear, causing madness, &c. 7. The *manila bomba* is a very beautiful snake, of almost the same size throughout the whole length, except at the two ends, where it comes to a point. It is white on the belly, but finely variegated on the back. It lives in the sand, and is said to sting with its tail, which occasions contractions in the joints.

Bombay is the most considerable English settlement on the Malabar coast; and by reason of its situation, may be styled the grand storehouse of all the Arabian and Persian commerce. It is also the most convenient place in all the East Indies for careening or heaving down large ships; and for small ones they have a very good dock. They have also a very good rope-yard; and indeed, says Mr Ives, "this is the only place, in this distant part of the world, for shattered ships to refit at, having always a good quantity of naval stores, and its very name conveying an idea of a safe retreat in foul weather."

8 Different forts, &c.

On this island are many little forts and batteries, which

Bombay. which carry ſome guns; but the principal fort, which defends the place, has above an hundred. Mr Groſe finds fault with the ſituation of this laſt fort, which he ſays, not only does not command the harbour ſufficiently, but is itſelf overlooked by an eminence called Dungharee point. The caſtle itſelf is a regular quadrangle, well built of ſtrong hard ſtone. In one of the baſtions facing Dungharee point is a large tank or ciſtern which contains a great quantity of water conſtantly repleniſhed by the ſtationary rains. There is alſo a well within the fort, but the water is not very good, and liable to be dried up by the heats. The water of Bombay in general indeed is not good, which has been given as a reaſon why the Gentoo merchants were not fond of ſettling upon it; for as they drink no wine nor ſpirituous liquors, they are very nice judges of the taſte and qualities of waters.

When the town of Bombay began to increaſe conſiderably, it was judged proper to add the ſecurity of a wall round it to the ſtrength of the fort it had before. Even then, however, it was neglected to take in the dangerous poſt of Dungharee, which now evidently commands both the town and fort. There has ſince that time been added, at a great expence, a ditch that encompaſſes the wall, and can be flooded at pleaſure, by letting in the ſea, which terminates the ditch on two ſides, ſo that the town is now entirely ſurrounded with water, and is one of the ſtrongeſt places in India.

Next to Bombay, the moſt conſiderable fort on the iſland is that of *Mahim*. It is ſituated at the oppoſite extremity of the iſland, and commands the paſs of Bandurah, a fort directly oppoſite to it on the coaſt of Salſette. From this iſland Bombay is ſeparated by an arm of the ſea, capable of receiving only ſmall craft. The other forts are capable of making but a ſlight defence.

About two miles out of town, towards the middle of the iſland, the ſea had gained ſo far as almoſt to divide it in two, and rendered the roads impaſſable. A great quantity of this water, however, was drained off at a very conſiderable expence, and a cauſeway raiſed which kept it from overflowing again. This cauſeway is above a quarter of a mile in length, and conſiderably broad; "but (ſays Mr Groſe), there is one groſs fault remarked in it; that, being bending near the middle, the architect has oppoſed to the ſea a re-entering angle inſtead of a ſaliant one." Within the beach, however, there is ſtill a conſiderable body of water, that has a free communication with the ſea, as appears by its ebbing and flowing; ſo that it is probable the cauſeway itſelf, erected at the expence of at leaſt 100,000l. may in no long time be totally undermined and thrown down.

9 Diviſion, &c. When the iſland of Bombay was ceded to the Engliſh by the Portugueſe, it was divided, and ſtill continues to be ſo, into three Roman Catholic pariſhes, Bombay, Mahim, and Salvacam. The churches of theſe are governed by prieſts of that religion, and of any nation excepting Portugal, who were expreſsly objected to at the time of ceſſion. The bulk of the land-proprietors at that time were Meſtizos and Canarins. The former are a mixed breed of the natives and Portugueſe; the latter purely aborigines of the country converted to the Popiſh religion. The other land-owners were Moors, Gentoos, and Parſees; but theſe laſt are of more modern date, having purchaſed eſtates on the iſland. The company has alſo a very conſiderable landed eſtate either by purchaſes, confiſcations for crimes, or ſeizures for debt. The land is laid out in cocoa-nut groves, rice fields, and onion grounds, which laſt are reckoned of an excellent quality. Bombay.

There is only one Engliſh church at Bombay, a very neat commodious building ſeated on a ſpacious area called the Green; which continues from the church to the fort, and is pleaſantly laid out in walks planted with trees, round which the houſes of the Engliſh inhabitants are moſtly ſituated. Theſe are generally only ground-floored, with a court-yard before and behind, in which are the offices and out-houſes. They are ſubſtantially built of ſtone and lime, and ſmooth plaſtered on the outſide. They are often kept white-waſhed, which, however neat, is in ſome reſpects very diſagreeable, by reaſon of the exceſſive glare it occaſions in reflecting the light of the ſun. Few of them have glaſs windows to any apartment; the ſaſhes being generally paned with a kind of tranſparent oyſter-ſhells, ſquare cut; which have the ſingular property of tranſmitting ſufficient light, at the ſame time that they exclude the violent glare of the ſun, and have beſides a cool look. The flooring is generally compoſed of a kind of loam or ſtucco called *chunam*, being a lime made of burnt ſhells, which if well tempered in a peculiar manner known to the natives, is extremely hard and laſting, and takes ſuch a ſmooth poliſh, that one may ſee his own face in it. But where terraces are made of this ſubſtance, unleſs it be duly prepared, and which is very expenſive, it is apt to crack by the ſun's heat. Some attempts have made to paint the ſtucco walls in apartments; but theſe have proved abortive through the ignorance of the artiſts, who have not choſen colours capable of reſiſting the alkaline power of the lime *. Our author remarks, that in the gardens of Surat he ſaw this kind of ſtucco made uſe of inſtead of gravel for the walks. They were a little raiſed above the garden beds, ſo that they muſt be inſtantly dry after the moſt violent rain; though their whiteneſs and poliſh muſt not only produce a diſagreeable reflection in ſunſhine, but be extremely ſlippery to walk on. The houſes of the black merchants are for the moſt part extremely ill built and inconvenient; the window lights ſmall, and the apartments ill diſtributed. Some, however, make a better appearance if only one ſtory high; but even the beſt of them have a certain meanneſs in the manner, and clumſineſs in their execution, which renders the architecture contemptible in compariſon of the European. There is one convenience, however, in all the houſes of Bombay, viz. ſmall ranges of pillars that ſupport a penthouſe or ſhed, forming what are called in the Portugueſe language *verandas*, either all round the houſe, or on particular ſides of it, which afford a pleaſing ſhelter from the ſun, and keep the inner apartments cool and refreſhed by the draught of air under them. The pagodas, or temples of the Gentoos, are low mean buildings, having uſually no light but what is admitted by the door; facing which is the principal idol. They imagine that a dark gloomy place inſpires a kind of religious horror and reverence; and are very fond

* See *Colour-making*.

Bombay. of having theſe pagodas among trees, and near the ſide of a tank or pond, for the ſake of their frequent ablutions. Theſe tanks are often very expenſive; being generally ſquare and ſurrounded with ſtone ſteps that are very convenient for the bathers.

10 Inhabitants, manners, &c. The natives of Bombay, though compoſed of almoſt every Aſiatic nation, are ſhorter of ſtature and ſtronger than the inhabitants of the Coromandel coaſt. Here a palanquin which requires ſix men to carry it at Madras, or Fort St David, is carried by four. Here are ſome Parſees, who like their forefathers the ancient Perſians, are followers of Zoroaſter, who is ſaid to have reduced into order the religion of the Perſian magi; the fundamental maxim of which was the worſhipping of one God under the ſymbol of light. They adore the ſun, particularly when riſing, with the moſt profound reverence and veneration; and likewiſe pay a kind of adoration to common fire. Mr Ives had once the opportunity of obſerving the manner in which they perform this devotion. A large braſs pan was placed in the middle of the houſe with fire in it: before this fire, or rather on each ſide of it, two men were kneeling at their devotions, pronouncing their prayers with great rapidity. He was afterwards informed, that one of them was a prieſt, at that time on a viſit to another prieſt in a fit of ſickneſs. He was likewiſe informed, that the Parſees have ſuch a veneration for the fire, that they never put it out, or even breathe upon it; and he obſerved, that while the two prieſts were at their prayers over the pan of coals, they had a little white bib over their mouths, as he ſuppoſed to prevent their breath from approaching their favourite element. The prayers, however, from the ſimilarity of the ſounds, appeared to him only to be a repetition of the ſame ſet of words. The viſiting prieſt uſed many geſtures with his hands over the fire, and afterwards ſtroaked down the face of the ſick prieſt, which our author looked upon to be the final benediction, as the ceremony ended immediately.

As the Gentoos burn their dead, one would imagine that the Parſees, who have ſuch a veneration for fire, would be deſirous of having their bodies conſumed by that element; but inſtead of this, they expoſe their dead bodies to be devoured by birds of prey; becauſe, ſay they, a living man is compoſed of all the elements; ſo that it is but reaſonable, after he is dead, that every particular element ſhould receive its own again. On the top of Malabar hill, about two miles from the town of Bombay, there are two round buildings for receiving the dead bodies of the Parſees, which remain there till the bones are clean picked by the birds. This is certainly an abominable cuſtom, and affords very ſhocking ſpectacles; however, a guard is always placed at a little diſtance to prevent people from prying too narrowly into theſe matters, or, as Mr Ives ſays, to enſure the vultures of their repaſt without any diſturbance. Mr Groſe tells us, that on his going to look into one of theſe repoſitories, a Parſee adviſed him in a friendly manner to let it alone, as no perſon, who was not a party concerned, would long ſurvive ſuch curioſity. He tells us alſo, that the perſon appointed to look after the dead, carefully obſerves which eye is firſt picked out by the birds, and from thence judges of the ſituation of the ſoul of the deceaſed; a ſtate of happineſs being indicated by the right eye being firſt picked out. Mr Ives obſerves, that by reaſon of the heat of the ſun, much leſs noxious vapour is emitted by theſe bodies than might be expected; the fleſh being ſoon ſhrivelled up, and the bones turning quite black. Bombay || Bona.

At the extreme point of Malabar-hill there is a rock, on the deſcent to the ſea, flat on the top, in which there is a natural crevice, which communicates with a hollow terminating at an exterior opening to the ſea. This place is uſed by the Gentoos as a purifier from their ſins. This purification is effected by their going in at the opening, and coming through the crevice, though it ſeems too ſmall for people of any corpulence to paſs.

11 Oxen uſed here inſtead of horſes. In Bombay, and indeed in many other places of the Eaſt Indies, oxen are generally uſed inſtead of horſes, not only for drawing carriages but for riding; and, however ridiculous ſuch a practice may ſeem to us, it appears that they are not in this reſpect inferior to ordinary horſes, being capable of going at the rate of ſeven or eight miles an hour. They are commonly of a white colour, with large perpendicular horns, and black noſes. The only inconvenience that attends them, is, that, by being naturally ſubject to a lax habit of body, they ſometimes incommode the rider with filth thrown upon him by the continual motion of their tails. In other reſpects they are far preferable to Indian horſes, and will trot and gallop as naturally as the horſes of this country. Admiral Watſon, while at Bombay, was allowed a chaiſe drawn by two of theſe oxen by the Eaſt India Company. At the end of every ſtage the driver always put the near bullock in the place of the other; he then puts his hand into both their mouths, to take out the froth; without which precaution they would be in danger of ſuffocation.

For the Hiſtory, Government, &c. of Bombay, ſee the articles INDOSTAN, and *Eaſt India* COMPANY.

BOMB KETCH, a ſmall veſſel built and ſtrengthened with large beams for the uſe of mortars at ſea.

BOMBUS, in *Muſic*, an artificial motion with the hands, imitating in cadence and harmony the buzzing of bees. The word is originally Greek, and ſignifies the buzz or noiſe of bees, gnats, and the like. In this ſenſe, bombus made one of the ſpecies of applauſe uſed by the ancient auditories.

BOMBUS, in *Medicine*, denotes a murmuring noiſe, as of wind breaking out of a narrow into a larger cavity, frequently heard in the thick inteſtines. The bombus heard in the ears, in acute diſeaſes, is laid down by Hippocrates as a ſign of death.

BOMBYLIUS. See ENTOMOLOGY *Index*.

BOMENE, a ſea-port town of the United Provinces in Zealand, ſeated on the northern ſhore of the iſland of Schonen, oppoſite to the iſland of Goree, in E. Long. 4. 0. N. Lat. 51. 50.

BOMMEL, a town of Dutch Guelderland, ſituated on the northern ſhore of the river Waal, in E. Long. 5. 50. N. Lat. 52. 0.

BOMONICI, in Grecian antiquity, young men of Lacedæmon, who contended at the ſacrifices of Diana which of them was able to endure moſt laſhes; being ſcourged before the altar of this goddeſs.

BONA, by the Moors called *Balederna*, a ſea-port town of the kingdom of Algiers in Africa, ſituated in E. Long. 7. 57. N. Lat. 36. 5. It was formerly rich, populous,

Bona. populous, capital of the province of the ſame name under the kingdom of Conſtantina, and is ſuppoſed by ſome to be the ancient Hippo, once the ſeat of the great St Auſtin, and a ſea-port built by the Romans. The inhabitants, however, deny it to be the ancient Hippo, which had been ſo often taken, retaken, and deſtroyed by the wars; and pretend it to be ſince rebuilt at the diſtance of two or three miles from the ancient Hippo, out of its ruins, and called *Baleed-el-Ugned*, from a ſort of trees of that name that grow in the neighbourhood. It is now a very mean place, poorly built, and thinly inhabited, with ſcarce any traces of its former grandeur, except the ruins of a cathedral, or as others gueſs, of a monaſtery, built by St Auſtin, about three miles diſtance from the city. Near theſe ruins is a famed ſpring called by his name, much reſorted to by the French and Italian ſailors, who come to drink of its waters, and pay their devotions to a maimed ſtatue ſaid alſo to belong to the ſaint, but ſo mutilated that no traces either of face or dreſs are remaining; and as each of them ſtrives to break off ſome ſplinter, or to ſcrape off ſome part of it on account of its ſuppoſed ſanctity, it will probably be ſoon reduced to a ſtate of non-exiſtence. Bona was taken by the pirate Barbaroſſa, and joined to his new kingdom of Algiers; but as quickly loſt, and recovered by its old maſters the Tuniſeens, who ſoon after loſt it again. It is commanded by a little fort, in which is a garriſon of about 300 Turks, under the command of an aga, who is alſo governor of the town. The road for the ſhips is good for nothing before the town, but a little farther weſt is very deep and ſafe. Dr Shaw tells us, that the continual diſcharging of ballaſt into the road, and the neglect of cleanſing the port which came to the very walls, is the cauſe of both becoming ſo unſafe and incommodious; though this might be eaſily remedied ſo as to make the town one of the moſt flouriſhing in all Barbary.

Bona Dea, the good goddeſs, in Pagan mythology, one of the names of Cybele. Others ſay, ſhe was a Roman lady, the wife of one Faunus, and was famous for her chaſtity, and that after her death ſhe was deified. Her ſacrifices were performed only by matrons; and in ſo ſecret a manner, that it was no leſs than death for any man to be preſent at the aſſembly (ſee Cybele). Cicero reproaches Clodius with having entered into this temple diſguiſed as a ſinging woman, and having by his preſence polluted the myſteries of the good goddeſs. What kind of myſteries theſe were, we may learn from Juvenal, Sat. vi. 313. The poet then mentions the adventure of Clodius.

Atque utinam ritus veteres, et publica ſaltem
His intacta malis agerentur ſacra: ſed omnes
Noverunt Mauri, atque Indi, quæ pſaltria penem
Majorem, quam ſint duo Cæſaris Anticatones,
Illuc teſticuli ſibi conſcius, unde fugit mus,
Intulerit.

I wiſh at leaſt our ſacred rites were free
From theſe pollutions of obſcenity:
But 'tis well known what ſinger, how diſguis'd,
A lewd audacious action enterpriz'd:
Into the fane, with women mix'd, he went,
Arm'd with a huge two-handed inſtrument;
A grateful preſent to theſe holy choirs,
Where the mouſe, conſcious of his ſex, retires.
Dryden.

Bona || Bonaventure.

Bona Fides, in *Law*. When a perſon performs any action which he believes at the time to be juſt and lawful, he is ſaid to have acted *bona fide*.

Bona Mobilia, the ſame with moveable effects or goods.

Bona Notabilia, are ſuch goods as a perſon dying has in another dioceſe than that wherein he dies, amounting to the value of 5l. at leaſt; in which caſe the will of the deceaſed muſt be proved, or adminiſtration granted in the court of the archbiſhop of the province, unleſs by compoſition or cuſtom, any dioceſes are authorized to do it, when rated at a greater ſum.

Bona Patria, an aſſize of countrymen or good neighbours, where 12 or more are choſen out of the country to paſs upon an aſſize, being ſworn judicially in the preſence of the party.

Bona Peritura, periſhable goods. By ſtat. 13 Ed. I. cap. 4. the cargo of a ſhip that has been caſt away ſhall be kept for a year and a day, and reſtored to the rightful owner; but if the goods be ſuch as will not endure ſo long, they are *bona peritura*, which the ſheriff is allowed to ſell, and to account in money for the value.

Bona Vacantia, goods, ſuch as royal-fiſh, ſhipwrecks, treaſure-trove, waifs, and eſtrays, in which no one can claim a property. Theſe goods by the law of nature, and by the imperial law, belonged to the firſt occupant or finder; but in the modern conſtitutions of European governments, they are annexed to the ſupreme power by the poſitive laws of the ſtate.

BONAIRE, an iſland of South America, near the north coaſt of Terra Firma. It belongs to the Dutch; and abounds in kabritoes and ſalt. W. Long. 66. 18. N. Lat. 20. 16.

BONAIS, very high mountains of Italy, in the duchy of Savoy, not far from Laſſoreburg: in ſome ſeaſons they cannot be aſcended without great danger.

BONARELLI, Count Guid Ubaldo, an Italian poet, was the ſon of Count Pietro Bonarelli, miniſter of the duke of Urbino. He was intruſted with ſeveral important negociations, and was eſteemed an able politician and learned philoſopher. He was the author of a fine Italian paſtoral entitled, *Filli di Sciro*. He died at Fano, in 1608, aged 45.

BONAVENTURA, the Bay of, in America, on the coaſt next the South ſea, in the Popayan. It has a port and harbour for ſhips; but the air is very unwholeſome. W. Long. 75. 18. N. Lat. 3. 20.

BONAVENTURE, a celebrated cardinal, called, from his works, the *ſeraphic doctor*. He was born at Bagnarea, a ſmall town of Tuſcany, in 1221; and his original name was *John Fidanza*. He took the habit of a monk of the order of St Francis in 1243, became doctor of Paris in 1255, and the next year general of his order. After the death of Clement IV. the cardinals diſagreeing about the election of a new pope, engaged themſelves by a ſolemn promiſe to elect him who ſhould be named by Bonaventure, even though it ſhould be himſelf; but he choſe Theobald archdeacon

Bonavista, Bond.

of Liege, who was then in the Holy Land, and took the name of *Gregory* X. This pope, in return, in 1272, made him cardinal and biſhop of Alba, and ordered him to aſſiſt at the ſecond general council of Lyons, where he died in 1274. His works were printed at Rome in 8 vols folio.

BONAVISTA, an iſland in the Atlantic ocean, the moſt eaſterly and firſt diſcovered of the Cape de Verd iſlands. It is 20 miles long, and 13 broad; has plenty of goats and cotton, and ſome indigo. The inhabitants are remarkable for ſlothfulneſs: they have a town and two roads where ſhips come to an anchor. W. Long. 23. 6. N. Lat. 16. 5.

BOND, John, a commentator on Horace and Perſius, was born in Somerſetſhire in the year 1550, and educated at Wincheſter ſchool. In 1569 he was entered a ſtudent of the univerſity of Oxford, probably in the New college, of which he became either one of the clerks or one of the chaplains. He took his bachelor of arts degree in 1573, and that of maſter in 1579; ſoon after which he was appointed by his college, maſter of the free ſchool in Taunton in Somerſetſhire. In this employment he continued many years with great reputation: but being at length weary of his laborious employment, he commenced phyſician, and we are told became eminent in that capacity. He died in the year 1612, poſſeſſed of ſeveral lands and tenements in his neighbourhood; but whether acquired by the practice of phyſic, does not appear. He wrote, 1. *Commentarii in poemata Q. Horatii*, 8vo. 2. *Commentarii in ſex ſatyras Perſii*, Lond. 1614, 8vo.

Bond, in *Law*, is a deed whereby the obligor obliges himſelf, his heirs, executors, and adminiſtrators, to pay a certain ſum of money to another at a day appointed. If this be all, the bond is called a ſimple one, *ſimplex obligatio*. But there is generally a condition added, that if the obligor does ſome particular act, the obligation ſhall be void, or elſe ſhall remain in full force: as payment of rent; performance of covenants in a deed; or repayment of a principal ſum of money borrowed of the obligee, with intereſt; which principal ſum is uſually one half of the penal ſum ſpecified in the bond. In caſe this condition is not performed, the bond becomes forfeited, or abſolute at law, and charges the obligor while living; and after his death the obligation deſcends upon his heir, who (on defect of perſonal aſſets) is bound to diſcharge it, provided he has real aſſets by deſcent as a recompenſe.

If the condition of a bond be impoſſible at the time of making it, or be to do a thing contrary to ſome rule of law that is merely poſitive, or be uncertain, or inſenſible, the condition alone is void, and the bond ſhall ſtand ſingle and unconditional: for it is the folly of the obligor to enter into ſuch an obligation from which he can never be releaſed. If it be to do a thing that is *malum in ſe*, the obligation itſelf is void: for the whole is an unlawful contract, and the obligee ſhall take no advantage from ſuch a tranſaction. And if the condition be poſſible at the time of making it, and afterwards becomes impoſſible by the act of God, the act of law, or the act of the obligee himſelf, there the penalty of the obligation is ſaved: for no prudence or foreſight of the obligor could guard againſt ſuch a contingency. On the forfeiture of a bond, or its becoming ſingle, the whole penalty was recoverable at law; but here the courts of equity interpoſed, and would not permit a man to take more than in conſcience he ought, viz. his principal, intereſt, and expences, in caſe the forfeiture accrued by non-payment of money borrowed; the damages ſuſtained upon non-performance of covenants; and the like. And the ſtatute 4 and 5 Ann. c. 16. hath alſo enacted, in the ſame ſpirit of equity, that in caſe of a bond, conditioned for the payment of money, the payment or tender of the principal ſum due, with intereſt and coſts, even though the bond be forfeited and a ſuit commenced thereon, ſhall be a full ſatisfaction and diſcharge.

Bond || Bones.

Bond, in maſonry and brick-laying, is when bricks or ſtones are as it were knit and interwoven; and when they ſay, make *good bond*, they mean that the joints are not made over, or upon other joints; but reach at leaſt ſix inches, both within the wall and on the ſurface, as the art of building requires.

BONDAGE, properly ſignifies the ſame with ſlavery, but in old law books is uſed for villenage (ſee Villenage). Tenants in bondage paid kenots, and did fealty; they were not to fell trees in their own garden, without licenſe of the lord. The widow of a tenant in bondage held her huſband's eſtate *quam diu vixerit ſine marito*, "as long as ſhe lived ſingle."

Bondage by the Forelock, or *Bondagium per anteriores crines capitis*, was when a freemen renounced his liberty, and became ſlave to ſome great man; which was done by the ceremony of cutting off a lock of hair from the forehead, and delivering it to his lord; denoting that he was to be maintained by him for the future. Such a bondman, if he reclaimed his liberty, or were fugitive from his maſter, might be drawn again to his ſervitude by the noſe; whence the origin of the popular menace to pull a man by the noſe.

BONDMAN, in the Engliſh law, is uſed for a villain, or tenant in villenage *.—The Romans had two kinds of bondmen; one called *ſervi*, who were thoſe either bought for money, taken in war, left by ſucceſſion, or purchaſed by ſome other lawful acquiſition; or elſe born of their *bondwomen*, and called *vernæ*. We may add a third kind of bondmen mentioned by Juſtinian, called *adſcriptitii glebæ*, or *agricenſiti*; who were not bound to the perſon, but to the ground or place, and followed him who had the land. Theſe in our law are called *villains regardants*, as belonging to the manor or place.

* See *Villain* and *Villenage*.

BONE-ace, a game at cards played thus: The dealer deals out two cards to the firſt hand, and turns up the third, and ſo on through all the players, who may be ſeven, eight, or as many as the cards will permit: he that has the higheſt card turned up to him carries the bone; that is, one half of the ſtake; the other half remaining to be played for. Again, if there be three kings, three queens, three tens, &c. turned up, the eldeſt hand wins the bone. But it is to be obſerved, that the ace of diamonds is bone-ace, and wins all other cards whatever. Thus much for the bone: and as for the other half of the ſtake, the neareſt to 31 wins it; and he that turns up or draws 31 wins it immediately.

BONES, their origin, formation, compoſition, texture, variety, offices, &c. See Anatomy.

Bones Whitened for Skeletons. Two proceſſes are deſcribed in the *Acta Hoffnienſia* for whitening bones.

Profeſſor

Bones. Profeſſor Rau had a method of giving them a great degree of whiteneſs. By bare expoſure to the air, ſun, and rain, for a length of time, they become notably white; but the whiteſt bones, kept in rooms tainted with ſmoke or fuliginous vapours, grow in a little time yellowiſh, browniſh, and unſightly. It is cuſtomary for the purification of bones, to boil them in alkaline liquors; which, by diſſolving and extracting the ſuperfluous fat, improve their whiteneſs.

Bones Hardened and Softened. Boerhaave obſerves, that alkaline ſalts render bones harder and firmer, and that acids make them ſofter and more flexible. Theſe effects ſucceed in certain circumſtances, but not univerſally; for bones may be hardened and ſoftened both by acids and by alkalies, according to the quantity of ſaline matter employed, and the manner in which it is applied. Newmann made bones harder and more compact by treating them with the ſtrongeſt of the mineral acids; though, when the acid is in ſufficient proportion, it deſtroys or diſſolves them. In Papin's digeſter (a ſtrong cloſe veſſel, in which the ſteam of boiling liquors is confined, and the fluid by this means made to undergo a greater degree of heat than it could otherwiſe ſuſtain), the hardeſt bones are reduced in a ſhort time, by the action of ſimple water, into a ſoft pap or jelly; and alkaline liquors produce this effect ſtill ſooner.

In the hiſtory of the French Academy for the years 1742 and 1743, there is an account that Mr Geoffroy produced before the academy a ſmall ivory ſpoon, which by long lying in muſtard, was become flexible and tranſparent like horn; that Mr Fouchy ſaw an ivory ſpoon, which, by lying for a conſiderable time in milk, was become ſupple like leather; and that Mr Hunauld produced bones, which had been ſoftened by ſteeping in vinegar, afterwards hardened to their natural ſtate by ſteeping in water, and ſoftened a ſecond time by ſteeping in vinegar. Dr Lewis obſerved that the nitrous and marine acids diluted, and the acetous acid, make bones flexible and tough like leather; but that the diluted vitriolic acid, though it renders them notably ſoft, makes them at the ſame time brittle. It ſeems as if a great part of the earthy matter, which is the baſis of the bone, and on which its hardneſs depends, was diſſolved and extracted by the three firſt; whilſt the latter, incapable of diſſolving this kind of earth into a liquid form, only corrodes it into a kind of ſelenitic concrete, which remains intermixed in minute particles among the gelatinous matter. Dr Lewis did not find that the ſoftened bones, whatever acid they were ſoftened by, recovered their hardneſs by ſteeping in water. Slips of ſoftened ivory, after lying above a month in water, continued nearly as ſoft as when they were taken out of the acid liquor.

There is a ſingular induration of bones produced by fire; the effects of which agent are here remarkably different according to its degree and the circumſtances of its application. Bones expoſed to a moderate fire, either in open veſſels, or in contact with the burning fuel, become opaque, white, and friable throughout; and an increaſe of fire, after they have once ſuffered this change, renders them only more and more friable. But if they are urged at firſt with a ſtrong fire, ſuch as that in which copper or iron melts, they become hard, ſemitranſparent, and ſonorous, like the hard mineral ſtones. This curious experiment deſerves to be further proſecuted. Bones

Colouring of Bones. Bones may be ſtained of a variety of colours by the common dyeing infuſions and decoctions of animal and vegetable ſubſtances. They are ſtained alſo, without heat, by metallic ſolutions; and by means of theſe may be ſpotted or variegated at pleaſure. Thus, ſolution of ſilver in aquafortis gives a brown or black according to its quantity; ſolution of gold in aqua regia, or in ſpirit of ſalt, a fine purple; ſolution of copper in the acetous acid, a fine green; and ſolutions of the ſame metal in volatile alkalies, a blue, which at firſt is deep and beautiful, but changes, upon expoſure to the air, into a green or bluiſh-green. If the bone is but touched with the two firſt ſolutions, and expoſed to the air, it does not fail to acquire the colour in a few hours: In the two latter, it requires to be ſteeped for a day or longer in order to its imbibing the colour. In theſe and other caſes where immerſion for ſome time is neceſſary, the bone may be variegated, by covering ſuch parts as are to remain white, with wax or any other matter that the liquor will not diſſolve or penetrate.

Oeconomical Uſes of Bones. Bones are a very uſeful article, not only for making different kinds of toys, but likewiſe in ſeveral of the chemical arts; as, For making caſt iron malleable, for abſorbing the ſulphur of ſulphureous ores; for forming teſts and cupels, or veſſels for refining gold and ſilver with lead (burnt bones compoſing a maſs of a porous texture, which abſorbs the vitrified lead and other matters, while the unvitreſcible gold and ſilver remain entire behind); for the preparation of milky glaſſes and porcelains; for the rectification of volatile ſalts and empyreumatic oils; and for making glue. The bones of different animals are not equally fit for theſe uſes: even the glue, or gelatinous part of the bones of one animal is notably different both in quantity and coheſiveneſs from that of another.

The human ſkull-bone, or cranium, the natural defence of the ſeat of ſenſation and perception in the nobleſt animal, has been recommended medicinally as a cure for epilepſies, deliria, and all diſorders of the ſenſes, from the ſame philoſophy which aſcribed antiaſthmatic virtues to the lungs of the long-winded fox; and expected, becauſe fowls are ſaid to digeſt even ſmall ſtones, that the ſkin of the gizzard, dried and powdered, would produce a ſimilar effect in the human ſtomach. To ſuch lengths of extravagance have the ſons of phyſic been carried by the blind ſuperſtition of former ages!

Bones in the Funeral Solemnities of the Ancients.—Divers uſages and ceremonies relating to the bones of the dead have obtained in different ages; as gathering them from the funeral pile, waſhing, anointing, and depoſiting them in urns, and thence into tombs; tranſlating them, which was not to be done without the authority of the pontiffs; not to ſay worſhipping of them, ſtill practiſed to the bones of the ſaints in the Romiſh church. Among the ancients, the bones of travellers and ſoldiers dying in foreign countries were brought home to be buried; till, by an expreſs S. C. made during the Italic war, it was forbid, and the ſoldiers bodies ordered to be buried where they died.

The Romans had a peculiar deity under the denomination

Bones. mination of *Offilago*, to whom the care of the induration and knitting of the human bones was committed; and who, on that account, was the object of the adoration of all breeding women.

Foſſil or *Petrified* BONES, are thoſe found in the earth, frequently at great depths, in all the ſtrata, even in the bodies of ſtones and rocks; ſome of them of a huge ſize, uſually ſuppoſed to be the bones of giants, but more truly of elephants or hippopotami. It is ſuppoſed they were repoſited in thoſe ſtrata when all things were in a ſtate of ſolution; and that they incorporated and petrified with the bodies where they happened to be lodged.

In the muſeum of the Ruſſian Academy of Sciences, there is a vaſt collection of foſſil bones, teeth, and horns, of the elephant, rhinoceros, and buffalo, which have been found in different parts of this empire, but more particularly in the ſouthern regions of Siberia. Naturaliſts have been puzzled to account for ſo great a variety being found in a country where the animals of which they formerly made a part were never known to exiſt. It was the opinion of Peter, who, though he deſerves to be eſteemed a great monarch, was certainly no great naturaliſt, that the teeth found near Voronetz were the remains of elephants belonging to the army of Alexander the Great, who according to ſome hiſtorians, croſſed the Don, and advanced as far as Koſtinka. The celebrated Bayer, whoſe authority carries greater weight in the literary world, conjectures, that the bones and teeth found in Siberia belonged to elephants common in that country during the wars which the Mogul monarchs carried on with the Perſians and Indians; and this plauſible ſuppoſition ſeems in ſome meaſure to be corroborated by the diſcovery of the entire ſkeleton of an elephant in one of the Siberian tombs. But this opinion, as Mr Pallas † very juſtly obſerves, is ſufficiently refuted by the conſideration, that the elephants employed in the armies of all India could never have afforded the vaſt quantities of teeth which have been diſcovered, not to mention thoſe which it is juſtly to be preſumed may ſtill be buried. They have been already dug up in ſuch plenty as to make a conſiderable article of trade. The ſame ingenious naturaliſt has given an ample deſcription of theſe foſſil bones, and has endeavoured to account for their origin. Upon examining thoſe in the muſeum, he was led to conclude, that as theſe bones are equally diſperſed in all the northern regions of Europe, the climate probably was in the earlier ages leſs ſevere than at preſent, and then poſſibly ſufficiently warm to be the native countries of the elephant, rhinoceros, and other quadrupeds, now found only in the ſouthern climates. But when he viſited, during his travels, the ſpots where the foſſil bodies were dug up, and could form a judgment from his own obſervations, and not from the accounts of others, he renounced his former hypotheſis; and, in conformity with the opinions of many modern philoſophers, aſſerted, that they muſt have been brought by the waters; and that nothing but a ſudden and general inundation, ſuch as the deluge, could have tranſported them from their native countries in the ſouth, to the regions of the north. In proof of this aſſertion, he adds, that the bones are generally found ſeparate, as if they had been ſcattered by the waves, covered with a ſtratum of mud evidently formed by the waters, and commonly intermixed with the remains of marine plants, and ſimilar ſubſtances; inſtances of which he himſelf obſerved during his progreſs through Siberia, and which ſufficiently prove that theſe regions of Aſia were once overwhelmed with the ſea. Bone-ſpavin ‖ Bonet.

† *Nov. Com. de Oſſibus. Siberiae foſſilibus*, p. 440.

We often find in the earth petrified bones, the greateſt part of their gelatinous matter being extracted by the moiſture, and a ſtony one introduced in its room. In ſome parts of France petrified bones are met with which have an impregnation of copper. Hence, on being calcined in an open fire, a volatile ſalt is produced from the remains of their gelatinous principle, and the bone is tinged throughout of a fine greeniſh-blue colour, copper always ſtriking a blue with volatile alkalies. The French turcoiſe ſtones are no other than theſe bones prepared by calcination: they are very durable, and bear to be worked and poliſhed nearly in the ſame manner as glaſs; without the imperfection, inſeparable from glaſſy bodies, of being brittle. See the article TURCOISE.

There have been lately diſcovered ſeveral enormous ſkeletons, five or ſix feet beneath the ſurface, on the banks of the Ohio, not far from the river Miami in America, 700 miles from the ſea-coaſt. Some of the tuſks are ſeven, others ten feet long; one foot ſix inches in circumference at the baſe, and one foot near the point; the cavity at the root or baſe, 19 inches deep. Beſides their ſize, there are ſeveral other differences which will not allow the ſuppoſition of their having been elephants: the tuſks of the true elephant have ſometimes a very ſlight lateral bend; theſe have a larger twiſt, or ſpiral curve, towards the ſmaller end: but the great and ſpecific difference conſiſts in the ſhape of the grinding teeth; which, in theſe newly found, are faſhioned like the teeth of a carnivorous animal; not flat and ribbed tranſverſely on their ſurface like thoſe of the modern elephant, but furniſhed with a double row of high and conic proceſſes, as if intended to maſticate, not to grind, their food. A third difference is in the thigh-bone, which is of great diſproportionable thickneſs to that of the elephant; and has alſo ſome other anatomical variations. Theſe foſſil bones have been alſo found in Peru and the Brazils; and when cut and poliſhed by the workers in ivory, appear in every reſpect ſimilar. It is the opinion of Dr Hunter, that they muſt have belonged to a larger animal than the elephant; and differing from it, in being carnivorous. But as yet this formidable creature has evaded our ſearch; and if, indeed, ſuch an animal exiſts, it is happy for man that it keeps at a diſtance; ſince what ravage might not be expected from a creature, endowed with more than the ſtrength of the elephant, and all the rapacity of the tiger? See MAMMOUTH.

BONE-Spavin. See FARRIERY *Index*.

BON-ESPERANCE, the ſame with the Cape of Good Hope. See GOOD HOPE.

BONET, THEOPHILUS, an eminent phyſician born at Geneva, March 15th 1620. He took his degree in phyſic in 1643, after he had gone through moſt of the famous univerſities, and was for ſome time phyſician to the duke of Longueville. Mean while his ſkill in his profeſſion got him conſiderable practice; but being ſeized with deafneſs, it obliged him to retire from buſineſs, which gave him leiſure to collect all the obſerva-

tions

Bonfadio || Boniface.

tions he had made during a practice of 40 years. He wrote, 1. *Polyalthes, ſive Theſaurus Medico-practico*, 3 vols. folio. 2. *Labyrinthi Medici extricati.* 3. *Medicini Septentrionalis Collatitia;* and other works.

BONFADIO, JAMES, one of the moſt polite writers of the 16th century, was born in Italy, near the lake Garda. He was ſecretary to the cardinal de Bari, and after his death to the cardinal Ghinucci. He afterwards read public lectures on Ariſtotle's politics, and on rhetoric; and was made hiſtoriographer to the republic of Genoa. He applied himſelf to compoſe the annals of that ſtate, in which he wrote too ſatirically on ſome families. This creating him enemies who were reſolved to ruin him, they accuſed him of the unnatural ſin; and, as witneſſes were found to convict him of it, he was condemned to be burnt. Some ſay that this ſentence was executed; and others, that his puniſhment was changed, and that he was beheaded. This was in the year 1560. Upon the day of his execution he wrote a note to John Baptiſt Grimaldi, to teſtify his gratitude to the perſons who had endeavoured to ſerve him; and promiſed to inform them how he found himſelf in the other world, if it could be done without frightening them. But it does not appear that he performed his promiſe, any more than the many who had promiſed the like before him.—His hiſtory of Genoa is eſteemed. We have alſo ſome letters, ſome orations, and Latin and Italian poems, of his, which were printed at Bologna in the year 1744, octavo.

BONFINIUS, ANTHONY, flouriſhed in the 15th century. He was a native of Aſcoli in Italy, and attached himſelf to the ſtudy of the belles lettres. Matthias Cowin king of Hungary, having heard of his learning, ſent for him, retained him, and ſettled upon him a penſion. He wrote, 1. A hiſtory of Aſcoli; 2. A treatiſe of virginity and conjugal chaſtity; 3. An hiſtory of Hungary; and other works.

BONFRERIUS, JAMES, a learned Jeſuit, born at Dinant, in 1573. He wrote a commentary on the Pentateuch, and learned notes on the Onamaſticon of the places and towns mentioned in the Scripture. He died at Tournay in 1643, aged 70.

BONGARS, JAMES, in Latin *Bongarſius*, a native of Orleans, was one of the moſt learned men of the 16th century. He applied himſelf to the ſtudy of critical learning, and was for near 30 years employed in the moſt important negociations of Henry IV. whoſe reſident he was ſeveral times at the courts of the princes of Germany, and at length his ambaſſador. He was of the Proteſtant religion; and, when very young, had the courage to write and poſt up in Rome a very ſpirited anſwer to a bull of Pope Sixtus V. The public is obliged to him for the edition of ſeveral authors who have written the Hiſtory of the expeditions to the Holy Land; he alſo publiſhed, among other works, an edition of Juſtin, in which he reſtored ſeveral paſſages that had been corrupted, by conſulting valuable manuſcripts, and added notes which explained many difficulties. He died in 1612, aged 58.

BONIFACE, the name of ſeveral eminent men, particularly of nine popes. To the firſt of theſe, who was choſen pope in 418, St Auguſtine dedicated his four books againſt the two epiſtles of the Pelagians. The third of that name prevailed upon the emperor Phocas to conſent that the title of *Univerſal Biſhop* ſhould be conferred on no other than the biſhop of Rome. Boniface IV. obtained from the ſame emperor, the pantheon, a famous heathen temple built by Agrippa, and converted it into a church which is now called "Our Lady della Rotunda." Several works are alſo attributed to him, but they appear to be ſpurious. Boniface VII. hath the title of *antipope;* becauſe in 974 he cauſed Benedict VI. to be ſtrangled in priſon, and after the election of Benedict VII. removed the treaſures of the church to Conſtantinople. He, however, at length returned after the death of Benedict, and cauſed his ſucceſſor John XIV. to be murdered; but died himſelf ſoon after, and was dragged naked by the feet about the ſtreets. Boniface VIII. canonized St Lewis in 1297, and in 1300 appointed the jubilee to be ſolemnized every 100 years after.

Boniface || Bonner.

BONIFACE is alſo the name of a ſaint, who before he took that name was called *Winifred*, and was born at Kirton in Devonſhire. He choſe to go and preach the goſpel among the barbarous nations; and though created archbiſhop of Mentz, ſoon after reſigned his office, to go and preach in Eaſt Friezland, where he was killed by the Pagans on the 5th of June 754. His letters were publiſhed by Senarius.

BONIFACIO, a town in the iſland of Corſica, beyond the mountains, near the ſtrait called *Bocca di Bonifacio*. It is well fortified, and pretty populous. E. Long. 9. 20. N. Lat. 41. 25.

BONIS NON AMOVENDIS, in *Law*, is a writ directed to the ſheriffs of London, &c. charging them that a perſon againſt whom judgment is obtained, and proſecuting a writ of error, be not ſuffered to remove his goods until the error is determined.

BONITO. See SCOMBER, ICHTHYOLOGY *Index*.

BONN, an ancient and ſtrong city of Germany, in the electorate of Cologn, and the uſual reſidence of the elector. It is of great conſequence in the time of war; becauſe it is ſituated on the Rhine, in a place where it can ſtop every thing that comes down that river. It is well fortified by the elector, who has a fine palace and beautiful gardens in the city. E. Long. 7. 5. N. Lat. 50. 44.

BONNA, in *Ancient Geography*, one of the 50 citadels built by Druſus on the Rhine; ſuppoſed by ſome to be the ſame with the *Ara Ubionum:* now *BONN*.

BONEFONS, JOHN, or BONNEFONIUS, a Latin poet, was born at Clermont in Auvergne, in 1554. He became an advocate in the parliament of Paris, and was appointed lieutenant general of Bar ſur Seine, and acquired great reputation by his *Pancharis*, and other poems. He died under the reign of Louis XIII. He ought not to be confounded with John Bonnefons his ſon, another Latin poet.

BONNER, EDMUND, biſhop of London, of infamous memory, was born at Hanley in Worceſterſhire, and generally ſuppoſed to be the natural ſon of one Savage a prieſt; and that prieſt was the natural ſon of Sir John Savage of Clifton in the ſame county. Strype however, ſays, he was poſitively aſſured that Bonner was the legitimate offspring of a poor man, who lived in a cottage known to this day by the name of *Bonner's place*. About the year 1512, he entered ſtudent of Broadgate Hall in Oxford. In 1519, he was admitted bachelor of the canon and civil law. About the

Bonner, Bonneſtable.

ſame time he took orders, and obtained ſome preferment in the dioceſe of Worceſter. In 1525, he was created doctor of canon law. Having now acquired the reputation of a ſhrewd politician and civilian, he was ſoon diſtinguiſhed by Cardinal Wolſey, who made him his commiſſary for the faculties, and heaped upon him a variety of church preferments. He poſſeſſed at the ſame time the livings of Blaydon and Cherry-Burton in Yorkſhire, Ripple in Worceſterſhire, Eaſt Dercham in Norfolk, the prebend of St Paul's, and archdeaconry of Leiceſter. Bonner was with the cardinal at Caw-wood, when he was arreſted for high treaſon. After the death of that miniſter, he ſoon found means to inſinuate himſelf into the favour of Henry VIII. who made him one of his chaplains, and employed him in ſeveral embaſſies abroad, particularly to the pope. In 1532, he was ſent to Rome, with Sir Edward Kame, to anſwer for the king, whom his holineſs had cited to appear in perſon or by proxy. In 1533, he was again deſpatched to Pope Clement VII. at Marſeilles, upon the excommunication of King Henry on account of his divorce. On this occaſion he threatened the pope with ſo much reſolution, that his holineſs talked of burning him alive, or throwing him into a caldron of melted lead; upon which Bonner thought fit to decamp. His infallibility did not foreſee that the man whom he thus threatened was predeſtined to burn heretics in England. In 1538, being then ambaſſador at the court of France, he was nominated biſhop of Hereford; but, before conſecration, was tranſlated to the ſee of London, and enthroned in April 1540. Henry VIII. died in 1547, at which time Bonner was ambaſſador with the emperor Charles V. During this reign he was conſtantly zealous in his oppoſition to the pope; and, in compliance with the king, favoured the reformation. Henry VIII. was not to be trifled with; but on the acceſſion of young Edward, Bonner refuſed the oath of ſupremacy, and was committed to the Fleet; however, he ſoon thought fit to promiſe obedience to the laws, and was accordingly releaſed. He continued to comply with reformation; but with ſuch manifeſt neglect and reluctance, that he was twice reprimanded by the privy council, and in 1549, after a long trial, was committed to the Marſhalſea, and deprived of his biſhopric. The ſucceeding reign gave him ample opportunity of revenge. Mary was ſcarce ſeated on the throne before Bonner was reſtored to his biſhopric; and ſoon after appointed vicegerent and preſident of the convocation. From this time he became the chief inſtrument of papal cruelty: he is ſaid to have condemned no leſs than 200 Proteſtants to the flames in the ſpace of three years. Nor was this monſter of a prieſt more remarkable for his cruelty than his impudence. When Queen Elizabeth came to the crown, he had the inſolence to meet her, with the reſt of the biſhops, at Highgate. In the ſecond year of her reign, refuſing to take the oath of allegiance and ſupremacy, he was again deprived, and committed to the Marſhalſea; where he died in 1569, after ten years confinement. There cannot be a ſtronger inſtance of the comparative lenity of the Proteſtant church, than its ſuffering this miſcreant to die a natural death. Several pieces were publiſhed under his name.

BONNESTABLE, a town of France, in the department of Sarte, which carries on a great trade in corn. E. Long. 0. 30. N. Lat. 48. 11.

Bonnet.

BONNET, Charles, an eminent naturaliſt, was born in 1720 at Geneva, of a French family who had been forced on account of religious principles to leave their native country. As he was an only ſon, his father paid great attention to his education, and finding that he made little progreſs at the public ſchools, both from a diſlike to the dry ſtudy of grammar, and deafneſs, with which he was very early afflicted, he put him under the care of a domeſtic tutor, and under him his progreſs was rapid and ſucceſsful in general literature. At the early age of 16, his attention was ſo deeply engaged in the peruſal and ſtudy of *Le Spectacle de la Nature*, that it ſeems to have directed the bias and taſte of his future ſtudies. The hiſtory and the habits of the ant-lion (*formica leo*), particularly attracted his attention, and led him to make his firſt obſervations in natural hiſtory. He diſcovered the haunts of this curious inſect, watched and ſtudied its manners and habits, and added many obſervations to thoſe of Poupart and Reaumur. Reaumur's Memoirs on Inſects happened to fall accidentally in his way, he peruſed it with great eagerneſs, and this peruſal probably decided his taſte for natural hiſtory. To the obſervations and experiments of that naturaliſt, Bonnet added many new facts which he had diſcovered, the detail of which he communicated to Reaumur, who was not leſs ſurpriſed than pleaſed to find ſo much ſagacity and acuteneſs of reſearch, exhibited in the inveſtigations of a young man of eighteen.

Young Bonnet had been deſtined by his father to the profeſſion of the law; but it was with no ſmall reluctance that he entered on the ſtudies neceſſary to qualify himſelf for that profeſſion. The bias of his mind leaned too ſtrongly to natural hiſtory, to permit him to occupy his attention with other purſuits. The ſtudy of ſome of the elementary books on law was therefore ſubmitted to merely as a taſk. In the years 1738, and 1739, he ſent to Reaumur many intereſting obſervations on different ſpecies of caterpillars; and in 1740, he communicated a paper to the Academy of of Sciences reſpecting the propagation or multiplication of *Aphides*, or tree-lice, without actual conjunction. This queſtion had been left unſettled by Reaumur. It was now determined by deciſive experiments; and his paper on the ſubject obtained for him the honour of being admitted a correſpondent member of the Academy. His experiments on the generation of theſe inſects were conducted with ſuch cloſeneſs of attention, and ſuch minuteneſs of reſearch, as to injure his eyeſight to ſuch a degree as he never afterwards recovered. In the year 1741, he inſtituted a ſet of experiments, on the effects that follow the diviſion of worms, and he found that many ſpecies poſſeſſed in ſome degree the ſame reproductive power as the polype. In the following year his inveſtigations and experiments were directed to the peculiarities in the mode of reſpiration of caterpillars and butterflies; and he proved that this function was performed by means of pores to which the name of ſtigmata has been given. It was about the ſame time that he made ſome curious diſcoveries reſpecting the *tænia*, or tapeworm. In the year 1743, when he was raiſed to the rank of doctor of laws, he procured a welcome

diſpenſation

Bonnet. diſpenſation from the farther proſecution of ſtudies which had never been agreeable to him, and which being no longer abſolutely neceſſary, he relinquiſhed for ever. In conſequence of a memoir on inſects which he communicated to the Royal Society of London, the ſame year, he was admitted a member of that body. Next year he publiſhed in one work, his obſervations on aphides and worms, under the title of *Inſectology*. To this work he prefixed a preface, in which he exhibits a philoſophical ſketch of his ideas concerning the ſyſtem of the developement of germs, and the ſcale of organized beings. This work was in general well received by the public. The want of delicacy was objected to in ſome journals, which it was alleged, appeared in his deſcriptions of the mode of propagation of tree-lice.

But the conſtant labours to which Bonnet had ſubjected himſelf in all his inquiries began to produce very ſerious conſequences on his health. His eyes particularly began to be affected with ſevere pains, and his general health viſibly declined. This not only obliged him to lay aſide the uſe of the microſcope, but alſo to forego for a time all reading and writing. Like a true philoſopher he bore his afflictions with patience. But he was not idle; for though he was interdicted from all obſervation, his mind was fully occupied in reflection. After ſome time's relaxation from his uſual purſuits he was at laſt reſtored to tolerable health and eaſe, but he never could employ his eyes with the ſame freedom as formerly. About the year 1746, he undertook a courſe of experiments on the vegetation of plants in moſs and other ſubſtances; and in the following year his reſearches were directed to the functions of the leaves of plants, with the view of aſcertaining the different action of the different ſides of the leaves. Another queſtion in vegetation offered itſelf to his conſideration. This was the aſcent of the ſap. And to determine whether it roſe by the bark or wood, he employed coloured injections. This inveſtigation, with ſome obſervations which he made on vegetable monſters, was the foundation of one of his moſt intereſting and original works, his "Inquiries into the Uſe of the Leaves of Plants." This work was firſt publiſhed in 4to at Leyden in 1754. A ſupplement was added to it in 1779.

Obſervation and experiment had been the firſt paſſion of Bonnet, yet theſe now began to give way to ſpeculation; and his inquiries in natural hiſtory, in which he had ſo much ſtudied the nature and generation of the loweſt part of the ſcale of beings, led him to conſider the faculties and deſtination of the higheſt. Mallebranche and Leibnitz laid the foundation of his metaphyſical ideas. He engaged deeply in all the diſcuſſions connected with the hiſtory of the human mind, and the firſt fruit of his meditations was a kind of abridgment of the materials he had collected, under the title of an "Eſſay on Phyſiology," publiſhed in London in 1755, but without his name, nor did he acknowledge it till near thirty years afterwards. This work contains in a conciſe form the fundamental principles of his philoſophy. It traces the origin and progreſs of the human mind, from the firſt germ of life to the developement of all its faculties, the mutual dependence of which it points out, as deduced from actual obſervation. It enters into the difficult ſubject of human liberty, and endeavours to reconcile it with the divine preſcience, and the philoſophical principle, that every effect muſt have an adequate cauſe. From the eſſential properties of the activity of the ſoul, and the effects of habit upon it, the whole art of education and government is deduced; and a ſyſtem of the former is laid down, materially different from the uſually eſtabliſhed methods. It was the freedom with which he had diſcuſſed ſome of theſe delicate points, and the fear of being involved in perſonal controverſy, which induced the author to remain ſo long concealed. It met with a number of critics, yet its ſucceſs was brilliant. Bonnet.

The next work of Bonnet was a developement of part of the ſubſtance of the preceding, viz. the origin and progreſs of the mental faculties. After a labour of five years on the ſubject, he produced his "Analytical Eſſay on the faculties of the ſoul." This was firſt printed at Copenhagen in 1760, in 4to, at the expence of the king of Denmark. In this work, like that of the Abbé Condillac, he takes the ſuppoſition of a ſtatue organized like the human body, which he by degrees, animates and ſhows how its ideas would ariſe from impreſſions on the organs of ſenſe. This work was well received by philoſophers, though with ſome it ſubjected him to the charge of materialiſm. To theſe he made no reply, but contented himſelf with proceeding in thoſe efforts for the ſervice of religion and morals, to which the beſt part of his life was devoted. His retired and ſtudious habits, together with his deafneſs and other bodily infirmities, had ever prevented him from joining in the aſſemblies of the young and gay; at the ſame time they rendered domeſtic comforts more eſſential to him. In 1756, he married a lady of the reſpectable family of de la Rive, and with her he paſſed thirty-ſeven years of that perfect union which reſults from mutual tenderneſs, directed by good ſenſe and virtue. The celebrated Sauſſure was the nephew of Mad. Bonnet, and it was no ſmall pleaſure to her huſband to witneſs the early diſplay of genius and knowledge in this extraordinary young man.

The next work of our author was properly the phyſical part of his great ſyſtem. It appeared at Amſterdam in 1762, under the title of "Conſiderations on organized bodies," 2 vols. 8vo. Its principal objects were, to give in an abridged form all the moſt intereſting and well aſcertained facts reſpecting the origin, developement and reproduction of organized bodies; to refute the different ſyſtems founded upon *epigeneſis*; and to explain and defend the ſyſtem of germs. This publication, though well received by philoſophers in general, was, from ſome ſuſpicion of its principles, prohibited in France; but a remonſtrance from the author to M. des Maleſherbes, then licenſer of the preſs, cauſed the interdict to be removed, after a new examination. His "Contemplation of Nature," which appeared in 1764, Amſt. 2 vols. 8vo. was a work rather meant for popular uſe, in which the principal facts relative to the different orders of created beings are diſplayed in a manner both inſtructive and entertaining, and ſet off by the charms of an eloquent ſtyle, with a continual reference to final cauſes, and the proofs of wiſdom and benevolence in the Creator. It has been tranſlated into moſt of the European languages, and enriched with notes by ſeveral hands, as well as by the author himſelf in a new edition.

Bonnet. The concluding work of Bonnet was his "Palingenesie Philoſophique," printed at Geneva in 1769, 2 vols. 8vo. In this he treats on the paſt and future ſtate of living beings, and ſupports the idea of the ſurvival of all animals, and the perfecting of their faculties in a future ſtate. Attached to this work is "An Inquiry into the Evidences of the Chriſtian Revelation, and the Doctrines of Chriſtianity," which, with a treatiſe "On the Exiſtence of God," was publiſhed ſeparately at Geneva in 1770. It was likewiſe tranſlated into German, and dedicated by the tranſlator to a celebrated Jew, with a ſummons to him to refute it, or acknowledge his conviction. Bonnet, who had an invincible repugnance for controverſy, no ſooner heard of this ſtep, than he wrote to the Jew, aſſuring him, that he had no ſhare in it; and the two philoſophers mutually agreed to forbear any diſcuſſion of a topic in which their opinions were totally different. The temper of Bonnet was, indeed, the direct reverſe of that which diſpoſes to contention; and tranquillity was the great object of his life. He readily corrected his own errors; and never but once entered into a defence of himſelf. This was on occaſion of a charge of plagiariſm brought againſt him as having borrowed from Leibnitz his hypotheſis on the reſurrection. He had, in the earlier part of life, made an anonymous attack in the French Mercury upon Rouſſeau's diſcourſe on the origin of inequality among men, to which that writer made a reply; but the controverſy went no further.

After having in ſome meaſure relinquiſhed ſpeculative philoſophy, he reſumed his attention to natural hiſtory, and in 1773, publiſhed in Rozier's Journal a memoir on the method of preſerving inſects and fiſh in cabinets. In 1774 he communicated to the ſame journal a memoir on the loves of plants, originating in the diſcovery of a kind of cleft or mouth in the piſtil of a lily. Some experiments on the reproduction of the heads of ſnails, and of the limbs and organs of the water ſalamander, furniſhed matter for other memoirs. He alſo made obſervations on the pipa or Surinam toad, on bees, on the blue colour acquired by muſhrooms from expoſure to the air, and on various other ſubjects in natural hiſtory, which agreeably and uſefully occupied his leiſure. His reputation was now fully eſtabliſhed. There was ſcarcely an eminent learned ſociety in Europe which did not aſſociate him as a member; and theſe honours were crowned in 1783 by his election into the ſmall and very ſelect number of foreign aſſociates of the academy of ſciences in Paris. His literary correſpondents were numerous. Among theſe were the diſtinguiſhed names of Reaumur, du Hamel, de Geer, Haller, Van Swieten, Spallanzani, and Merian. Though attached by inclination to the purſuit of ſcientific ſtudies in retirement, he did not entirely withdraw from public duties. He entered into the great council of the republic in 1752, and kept his ſeat in it till 1768, having frequently diſtinguiſhed himſelf by the manly eloquence with which he ſupported wiſe and moderate meaſures, and his conſtant zeal in the cauſe of morals and religion, on which he thought the proſperity of the ſtate eſſentially founded. The laſt twenty five years of his life he paſſed entirely in the country, in a ſimple and uniform mode of living, happy in an eaſy competence, and in a ſmall circle of friends. It appears that he was, for ſome time, engaged in the education of youth, an employment for which he was peculiarly fitted, and in which he obtained the warmeſt attachment of his pupils. The publication of all his works, corrected and reviſed, in a general collection, occupied near eight years of his life, which greatly injured his health, from the intenſe application which he beſtowed upon it. This appeared at Neufchatel, in 9 vols. 4to, and 18 vols. 8vo.; and beſides the works already mentioned, contains a number of ſmaller pieces, both in natural hiſtory and metaphyſics. They are all written in French. It was not till about 1788 that his conſtitution, feeble as it was, viſibly gave way. The ſymptoms of a dropſy in the cheſt then began to manifeſt appearance; and theſe with ſome intervals, gradually increaſed upon him, occaſioning a variety of ſufferings, which he bore with great patience and ſerenity. He died on May 20. 1793, at the age of 73. Public honours were rendered to his remains by his fellow-citizens, and his funeral eulogy was pronounced by his learned friend and kinſman, M. de Sauſſure. Bonnet, Bonneval.

Bonnet, in a general ſenſe, denotes a cover for the head, in common uſe before the introduction of hats. Bonnets are ſtill uſed in many parts of Scotland.

Bonnet, in *Fortification*, a ſmall work conſiſting of two faces, having only a parapet with two rows of paliſadoes, of about 10 or 12 feet diſtance; it is generally raiſed before the ſaliant angle of the counterſcarp, and has a communication with the covered way, by a trench cut through the glacis, and paliſadoes on each ſide.

Bonnet à Pretre, or *Prieſt's Bonnet*, in *Fortification*, is an out-work, having at the head three ſaliant angles, and two inwards. It differs from the double tenaille only in this, that its ſides, inſtead of being parallel, are like the *queue d'aronde*, or ſwallow's tail, that is, narrowing, or drawing cloſe at the gorge, and opening at the head.

Bonnet, in the ſea-language, denotes an addition to a ſail; thus we ſay, lace on the bonnet, or ſhake off the bonnet.

BONNEVAL, Claudius Alexander, Count de, known in the latter part of his life by the name of *Oſman Baſhaw*, deſcended from a family related to the blood-royal of France, entered himſelf at the age of 16 in the ſervice of that crown, and married the daughter of Marſhal de Biron. He made the campaign in Flanders in 1690; but ſoon after left the French army, and entered into the Imperial ſervice under Prince Eugene, who honoured him with an intimate friendſhip. The intrigues of the marquis de Prié, his inveterate enemy, ruined his credit, however, at the court of Vienna, and cauſed him to be baniſhed the empire. He then offered his ſervice to the republic of Venice and to Ruſſia; which being declined, his next tender was to the Grand Signior, who gladly received him. It was ſtipulated, that he ſhould have a body of 30,000 men at his diſpoſal; that a government ſhould be conferred on him, with the rank of baſhaw of three tails, and a ſalary of 10,000 aſpers a-day; and that, in caſe of a war, he ſhould be commander in chief. The firſt expedition he engaged in after his arrival at Conſtantinople, was to quell an inſurrection in Arabia

Bonneval ‖ Bononia.

Arabia Petræa, which he happily effected; and at his return had large offers made him by Kouli Khan, but he did not chooſe to accept them. Some time after, he commanded the Turkiſh army againſt the emperor, over whoſe forces he gained a victory on the banks of the Danube. But ſucceſs does not always protect a perſon againſt diſgrace, for Bonneval, notwithſtanding his ſervice, was firſt impriſoned, and then baniſhed to the iſland of Chio. The ſultan, however, continued his friend; and the evening before his departure made him baſhaw-general of the Archipelago, which, with his former appointment of beglerbeg of Arabia, rendered him one of the moſt powerful perſons in the Ottoman empire. In this iſland he found a retirement quite agreeable to his wiſhes; but did not long enjoy it, being ſent for back, and made *topigi* or maſter of the ordnance, a poſt of great honour and profit. He died in this employment, aged 75, in 1747; and wrote the memoirs of his own life.

Bonneval, a town of France, in the department of Eure and Loire, which had before the revolution a fine Benedictine abbey. It is ſeated on the river Loire, in E. Long. 1. 30. N. Lat. 48. 10.

Bonneville, a town of Savoy, capital of Faucigny, ſituated on the north ſide of the river Arve, and ſubject to the king of Sardinia. It is ſituated at the foot of a mountain called the *Mole*, and is 20 miles ſouth of Geneva. E. Long. 6. 10. N. Lat. 46. 18.

Bonny, among miners, a bed of ore, differing only from a ſquat as being round, whereas the ſquat is flat. See Squat.

Bonny, a town of France, in the Gatinois, ſeated at the confluence of a river of the ſame name with the Loire. E. Long. 2. 54. N. Lat. 47. 36.

Bononcini, Giovanni, an eminent compoſer of muſic, for ſome time divided the opinions of the *conoſcenti* of this kingdom with reſpect to the comparative merits of himſelf and the great Handel, which gave occaſion for the following epigram, ſaid to have been written by Dr Swift:

> Some ſay that Signior Bononcini
> Compar'd to Handel's a meer ninny;
> Others aver, that to him Handel
> Is ſcarcely fit to hold the candle.
> Strange! that ſuch high diſputes ſhould be
> 'Twixt *Tweedle Dum* and *Tweedle Dee*.

There is one opera (Italian) publiſhed with his name prefixed to it, entitled *Pharnaces*; but whether the words, or only the muſic, are his compoſition, is uncertain; and indeed, in the general, the language of thoſe pieces written merely for muſical repreſentation, is ſo extremely paltry, and ſo oppoſite to every thing that can be deemed poetry, that the greateſt compliment that can be paid to the authors of them is, to ſuffer their names to lie buried in the ſhades of obſcurity.

Bononia, in *Ancient Geography*, a town of Gallia Belgica, ſuppoſed to be the *Portus Iccius* of Cæſar, and the *Geſſoriacum* of Mela, and to have had three different names (Cluverius). Peutinger's map expreſsly calls Geſſoriacum *Bononia*. Now *Boulogne*. E. Long. 1. 30. N. Lat. 50. 40.

Bononia, a town of Italy, in the Gallia Ciſpadana; a name probably given by the Gauls, there being a *Bononia* in Gallia Belgica. Its ancient name, when in the hands of the Tuſcans, who were expelled by the Gauls, was *Falſina*. In the 563d year of the city the Romans led a colony thither; which, about the beginning of the Actiac war, was increaſed by Auguſtus, and is the *Colonia Bononienſis* of Tacitus. Now *Bologna*; which ſee.

Bononia ‖ Bonzes.

Bononia, a town of Pannonia Inferior, between Murſa to the north-weſt, and Taurinum to the eaſt.—Another Bononia, a town of Mœſia Superior, on the Danube; now *Bodon* in Bulgaria. See Bodon.

Bononian. See Bolonian.

Bonosiani, or Bonosiaci, an ancient branch of *Adoptiani*, in the fourth century, denominated from their leader Bonoſus, a biſhop of Macedonia. The Bonoſiani were prior to the Feliciani, and even to Neſtorius; whence ſome rather conſider them as a branch of Arians. They allowed Chriſt to be no otherwiſe the Son of God than by adoption.

Bonpournickel, a coarſe kind of bread uſed in Weſtphalia. See Bread.

Bons-hommes, or *Bon-hommes*, a ſort of hermits of St Auguſtin, founded by F. de Paula. They were brought over into England in 1283, by Edmund earl of Cornwall, and ſettled at Aſhorug in Bucks, beſides which they had only one houſe more at Edingdon in Wiltſhire. They followed the rule of St Auſtin, and wore a blue habit. The name is ſaid to have ariſen from Louis XI. of France who uſed to call F. de Paula, prior of the order, *Le bon homme*. Till then they had been called the *Minimi*, or the order of Grammont. See Albigenses.

Bontia, wild olive of Barbadoes. See Botany *Index*.

Bonvincino, Aleſſandro, called Le Moretto, hiſtory and portrait painter, was born at Rovate in 1514. He was firſt the diſciple of Titian, under whoſe direction he ſtudied diligently for ſome years. But, having accidentally ſeen the deſigns of Raphael, he felt an elevation of mind that he never had before experienced. He therefore gave himſelf up entirely to ſtudy thoſe maſterpieces of art and genius; and his obſervations were guided with ſuch judgment, as well as attention, that his improvement was truly ſurpriſing, and he became an exceeding good painter. His works were eagerly bought up, as being extremely admired for the tenderneſs of the penciling; for the correctneſs and ſpirited expreſſion of the figures; for the neatneſs of the finiſhing; and for the rich variety of his draperies, which uſually conſiſted of velvets, damaſks, or ſatins, all copied after nature, and being wonderfully imitated. He was alſo equally excellent in portrait, and by many was placed in competition even with Titian. He died in 1564.

Bonus henricus. See Chenopodium, Botany *Index*.

Bonzes, Indian prieſts. The Tonquineſe have a pagod or temple in each town; and each pagod has at leaſt two bonzes belonging to it: ſome have 30 or 40. Theſe bonzes, in order to diſtinguiſh themſelves from the laity, wear a chaplet about their necks conſiſting of 100 beads; and carry a ſtaff, at the end of which is a wooden bird. They live upon the alms of the people; yet are very charitably diſpoſed, and maintain ſeveral orphans and widows out of their own collections.

Bonzes || Book.

The bonzes of China are the prieſts of the Fohiſts or ſect of Fohi. It is one of their eſtabliſhed tenets that there are rewards allotted for the righteous, and puniſhments for the wicked, in the next world; and that there are various manſions in which the ſouls of men will reſide, according to their different degrees of merit. But, in order to deſerve the favour of heaven, the bonzes inſtruct the people to treat the prieſts with reſpect and reverence, to ſupport and maintain them, and to erect temples and monaſteries for them. They tell them, that, unleſs they comply with theſe injunctions, they will be cruelly tormented after death, and paſs through a diſagreeable variety of tranſmigrations: in ſhort, that they will be changed into mules, aſſes, rats, and mice.

The Chineſe bonzes, according to F. le Compte, are no better than a gang of diſſolute idle fellows. All their aim is to incite people to commiſerate their abject condition: to which end they have recourſe to ſeveral tricks and impoſtures. When the common arts of addreſs fail them, they try what public acts of penance will do. Some of them drag heavy chains 30 feet long after them; ſome ſit in the highway knocking their heads againſt flint ſtones; others ſet particular drugs on fire upon their heads: all theſe are ſeveral ways of drawing the attention and exciting the compaſſion of the people, and they ſeldom fail of ſucceſs.

The bonzes of Japan are generally gentlemen of the higheſt extraction; for when a gentlemen of quality finds his family grow too numerous, nay, when he has only two ſons, he very often makes the youngeſt a bonze, to prevent all domeſtic broils and confuſions. Theſe prieſts are dreſſed in various colours; their apartments are very commodious, and ſituated in the healthieſt parts of the country.

F. Navarette tells us, that the bonzes are obliged to chaſtity; and that, on the 2d of April 1667, a petty king of Canton had condemned 11 of them to be burnt alive for incontinence. He adds, that it was reported of an empreſs of the laſt reigning family, who had a particular kindneſs for the bonzes, that ſhe granted them a diſpenſation for the uſe of women during three days. The bonzes of China, according to the ſame author, are computed at 50,000.

BOOBY. See PELICANUS, ORNITHOLOGY *Index*.

BOOK, the general name of almoſt every literary compoſition; but, in a more limited ſenſe, is applied only to ſuch compoſitions as are large enough to make a volume. As to the origin of books or writing, thoſe of Moſes are undoubtedly the moſt ancient that are extant: But Moſes himſelf cites many books which it behoved to be written before his time.

Of profane books, the oldeſt extant are Homer's poems, which were ſo even in the time of Sextus Empiricus; though we find mention in Greek writers of ſeveral others prior to Homer; as Hermes, Orpheus, Daphne, Horus, Linus, Muſæus, Palamedes, Zoroaſter, &c.: but of the greater part of theſe there is not the leaſt fragment remaining; and of others, the pieces which go under their names are generally held, by the learned, to be ſuppoſititious.

Several ſorts of materials were uſed formerly in making books: Plates of lead and copper, the bark of trees, bricks, ſtone, and wood, were the firſt materials employed to engrave ſuch things upon as men were willing to have tranſmitted to poſterity. Joſephus ſpeaks of two columns, the one of ſtone, the other of brick, on which the children of Seth wrote their inventions and aſtronomical diſcoveries: Porphyry makes mention of ſome pillars, preſerved in Crete, on which the ceremonies obſerved by the Corybantes in their ſacrifices were recorded. Heſiod's works were originally written upon tables of lead, and depoſited in the temple of the Muſes, in Bœotia: The ten commandments, delivered to Moſes, were written upon ſtone; and Solon's laws upon wooden planks. Tables of wood, box, and ivory, were common among the ancients: When of wood, they were frequently covered with wax, that people might write upon them with more eaſe, or blot out what they had written. The leaves of the palm-tree were afterwards uſed inſtead of wooden planks, and the fineſt and thinneſt part of the bark of ſuch trees, as the lime, the aſh, the mapple, and the elm; from hence comes the word *liber*, which ſignifies the inner bark of the trees: and as theſe barks are rolled up, in order to be removed with greater eaſe, theſe rolls were called *volumen*, a volume; a name afterwards given to the like rolls of paper or parchment. Book.

Thus we find books were firſt written on ſtones, witneſs the Decalogue given to Moſes: Then on the parts of plants; as leaves, chiefly of the palm-tree, the rind and barks, eſpecially of the tilia, or phillyrea, and the Egyptian papyrus. By degrees wax, then leather, were introduced, eſpecially the ſkins of goats and ſheep, of which at length parchment was prepared: then lead came into uſe; alſo linen, ſilk, horn, and laſtly paper itſelf.

The firſt books were in the form of blocks and tables; but as flexible matter came to be wrote on, they found it more convenient to make their books in the form of rolls: Theſe were compoſed of ſeveral ſheets faſtened to each other, and rolled upon a ſtick, or *umbilicus;* the whole making a kind of column, or cylinder, which was to be managed by the umbilicus as a handle, it being reputed a crime to take hold of the roll itſelf: The outſide of the volume was called *frons;* the ends of the umbilicus, *cornua*, which were uſually carved, and adorned with ſilver, ivory, or even gold and precious ſtones: The title, συλλαβος, was ſtruck on the outſide; the whole volume, when extended, might make a yard and a half wide, and fifty long. The form which obtains among us is the ſquare, compoſed of ſeparate leaves; which was alſo known, though little uſed, by the ancients.

To the form of books belongs alſo the internal economy, as the order and arrangement of points and letters into lines and pages, with margins and other appurtenances. This has undergone many varieties. At firſt the letters were only divided into lines; then into ſeparate words; which, by degrees, were noted with accents, and diſtributed, by points and ſtops, into periods, paragraphs, chapters, and other diviſions. In ſome countries, as among the orientals, the lines began from the right and ran leftward; in others, as the northern and weſtern nations, from left to right; others, as the Greeks, followed both directions, alternately going in the one, and returning in the other, called *bouſtrophedon:* In moſt countries, the lines run

Books. from one ſide to the other; in ſome, particularly the Chineſe, from top to bottom.

Multitude of Books has been long complained of: the complaint is as old as Solomon, who lived three thouſand years ago: they are grown too numerous not only to procure and read, but to ſee, to learn the names of, or even to number. England has more to fear on this ſcore than other countries; ſince, beſides our own produce, we have for ſome years paſt drained our neighbours. However, as Biſhop Caramuel's ſcheme miſcarried, which was to write about an hundred volumes in folio, and then prevail on the civil and military powers to oblige all their ſubjects to read them, we need not much regret the multitude of books.

As knowledge, however, is naturally advantageous, and as every man ought to be in the way of information, even a ſuperfluity of books is not without its uſe, ſince hereby they are brought to obtrude themſelves on us, and engage us when we had leaſt deſign. This advantage, an ancient father obſerves, we owe to the multiplicity of books on the ſame ſubject, that one falls in the way of one man, and another beſt ſuits the level or the apprehenſion of another. "Every thing that is written (ſays he) does not come into the hands of all perſons: perhaps ſome may meet with my books, who may hear nothing of others which have treated better of the ſame ſubject. It is of ſervice, therefore, that the ſame queſtions be handled by ſeveral perſons, and after different methods, though all on the ſame principles, that the explications of difficulties and arguments for the truth may come to the knowledge of every one by one way or other." Add, that the multitude is the only ſecurity againſt the total loſs or deſtruction of books: it is this that has preſerved them againſt the injuries of time, the rage of tyrants, the zeal of perſecutors, and the ravages of barbarians; and handed them down, through long intervals of darkneſs and ignorance, ſafe to our days. *Solaque non norunt hæc monumenta mori.*

Scarcity of Books. Of the ſcarcity and value of books during the ſeventh and many ſubſequent centuries, the following curious account is given by Mr Warton in his hiſtory of Engliſh Poetry, vol. i.

"Towards the cloſe of the ſeventh century (ſays he), even in the papal library at Rome, the number of books was ſo inconſiderable, that Pope Saint Martin requeſted Sanctamund biſhop of Maeſtricht, if poſſible, to ſupply this defect from the remoteſt parts of Germany. In the year 855, Lupus, abbot of Ferrieres in France, ſent two of his monks to Pope Benedict III. to beg a copy of *Cicero de Oratore*, and Quintilian's Inſtitutes, and ſome other books: 'for (ſays the abbot) although we have part of theſe books, yet there is no whole or complete copy of them in all France.' Albert, abbot of Gemblours, who with incredible labour and immenſe expence had collected a hundred volumes on theological, and fifty on profane ſubjects, imagined he had formed a ſplendid library. About the year 790, Charlemagne granted an unlimited right of hunting to the abbot and monks of Sithin, for making their gloves and girdles of the ſkins of the deer they killed, and covers for their books. We may imagine that theſe religious were more fond of hunting than reading. It is certain that they were obliged to hunt before they could read: and at leaſt it is probable, that under theſe circumſtances, and of ſuch materials, Books. they did not manufacture many volumes. At the beginning of the tenth century books were ſo ſcarce in Spain, that one and the ſame copy of the Bible, Saint Jerome's epiſtles, and ſome volumes of eccleſiaſtical offices and martyrologies, often ſerved ſeveral different monaſteries. Among the conſtitutions given to the monks of England by Archbiſhop Lanfranc, in the year 1072, the following injunction occurs. At the beginning of Lent, the librarian is ordered to deliver a book to each of the religious: a whole year was allowed for the peruſal of this book; and at the returning Lent, thoſe monks who had neglected to read the books they had reſpectively received, are commanded to proſtrate themſelves before the abbot, and to ſupplicate his indulgence. This regulation was partly occaſioned by the low ſtate of literature which Lanfranc found in the Engliſh monaſteries. But at the ſame time it was a matter of neceſſity, and is in great meaſure to be referred to the ſcarcity of copies of uſeful and ſuitable authors. In an inventory of the goods of John de Pontiſſara, biſhop of Wincheſter, contained in his capital palace of Wulveſey, all the books which appear are nothing more than *Septendecem ſpecies librorum de diverſis ſcientiis.* This was in the year 1294. The ſame prelate, in the year 1299, borrows of his cathedral convent of St Swithin at Wincheſter, *Bibliam bene gloſſatam;* that is, the Bible with marginal annotations, in two large folio volumes; but gives a bond for due return of the loan, drawn up with great ſolemnity. This Bible had been bequeathed to the convent the ſame year by Pontiſſara's predeceſſor, Biſhop Nicholas de Ely: and in conſideration of ſo important a bequeſt, that is *pro bona Biblia dicti epiſcopi bene gloſſata*, and one hundred marks in money, the monks founded a daily maſs for the ſoul of the donor. When a ſingle book was bequeathed to a friend or relation, it was ſeldom without many reſtrictions and ſtipulations. If any perſon gave a book to a religious houſe, he believed that ſo valuable a donation merited eternal ſalvation; and he offered it on the altar with great ceremony. The moſt formidable anathemas were peremptorily denounced againſt thoſe who ſhould dare to alienate a book preſented to the cloiſter or library of a religious houſe. The prior and convent of Rocheſter declare, that they will every year pronounce the irrevocable ſentence of damnation on him who ſhall purloin or conceal a Latin tranſlation of Ariſtotle's Phyſics, or even obliterate the title. Sometimes a book was given to a monaſtery on condition that the donor ſhould have the uſe of it during his life; and ſometimes to a private perſon, with the reſervation that he who receives it ſhould pray for the ſoul of his benefactor. The gift of a book to Lincoln cathedral, by Biſhop Repingdon, in the year 1422, occurs in this form, and under theſe curious circumſtances. The memorial is written in Latin, with the biſhop's own hand, which I will give in Engliſh, at the beginning of Peter's Breviary of the Bibile. 'I Philip of Repyndon, late biſhop of Lincoln, give this book, called *Peter de Aurcolis*, to the new library to be built within the church of Lincoln: reſerving the uſe and poſſeſſion of it to Richard Tryſely, clerk, canon, and prebendary, of Miltoun, in fee, and to the term of his life; and afterwards to be given up and reſtored to the ſaid library, or the

keepers

Books. keepers of the ſame, for the time being, faithfully, and without delay. Written with my own hand, A. D. 1422.' When a book was bought, the affair was of ſo much importance, that it was cuſtomary to aſſemble perſons of conſequence and character, and to make a formal record that they were preſent on this occaſion. Among the royal manuſcripts, in the book of the Sentences of Peter Lombard, an archdeacon of Lincoln has left this entry. 'This book of the Sentences belongs to maſter Robert archdeacon of Lincoln, which he bought of Geoffrey the chaplain, brother of Henry vicar of Northelkington, in the preſence of maſter Robert de Lee, maſter John of Lirling, Richard of Luda clerk, Richard the almoner, the ſaid Henry the vicar, and his clerk, and others: and the ſaid archdeacon, gave the ſaid book to God and Saint Oſwald, and to Peter abbot of Barton, and the convent of Barden.' The diſputed property of a book often occaſioned the moſt violent altercations. Many claims appear to have been made to a manuſcript of Matthew Paris, belonging to the laſt-mentioned library; in which John Ruſſel, biſhop of Lincoln, thus conditionally defends or explains his right of poſſeſſion. 'If this book can be proved to be or to have been the property of the exempt monaſtery of St Alban in the dioceſe of Lincoln, I declare this to be my mind, that in that caſe I uſe it at preſent as a loan under favour of thoſe monks who belong to the ſaid monaſtery. Otherwiſe, according to the condition under which this book came into my poſſeſſion, I will that it ſhall belong to the college of the bleſſed Wincheſter Mary at Oxford, of the foundation of William Wykham. Written with my own hand at Buckdane, 1ſt Jan. A. D. 1488. Jo. Lincoln. Whoever ſhall obliterate or deſtroy this writing, let him be anathema.' About the year 1225, Roger de Inſula, dean of York, gave ſeveral Latin Bibles to the univerſity of Oxford, with a condition that the ſtudents who peruſed them ſhould depoſite a cautionary pledge. The library of that univerſity, before the year 1300, conſiſted only of a few tracts, chained or kept in cheſts in the choir of St Mary's church. In the year 1327, the ſcholars and citizens of Oxford aſſaulted and entirely pillaged the opulent Benedictine abbey of the neighbouring town of Abingdon. Among the books they found there, were one hundred pſalters, as many grayles, and 40 miſſals, which undoubtedly belonged to the choir of the church: but beſides theſe, there were only twenty-two codices, which I interpret books on common ſubjects. And although the invention of paper, at the cloſe of the eleventh century, contributed to multiply manuſcripts, and conſequently to facilitate knowledge, yet, even ſo late as the reign of our Henry VI. I have diſcovered the following remarkable inſtance of the inconveniences and impediments to ſtudy, which muſt have been produced by a ſcarcity of books. It is in the ſtatutes of St Mary's college at Oxford, founded as a ſeminary to Oſeney abbey in the year 1446: 'Let no ſcholar occupy a book in the library above one hour, or two hours at moſt, ſo that others be hindered from the uſe of the ſame.' The famous library eſtabliſhed in the univerſity of Oxford by that munificent patron of literature Humphrey duke of Glouceſter contained only 600 volumes. About the commencement of the 14th century there were only four claſſics in the royal library of Paris. Theſe were one copy of Cicero, Ovid, Lucan, and Boethius. The reſt were chiefly books of devotion, which included but few of the fathers: many treatiſes of aſtrology, geomancy, chiromancy, and medicine, originally written in Arabic, and tranſlated into Latin or French: pandects, chronicles, and romances. This collection was principally made by Charles V. who began his reign in 1365. This monarch was paſſionately fond of reading; and it was the faſhion to ſend him preſents of books from every part of the kingdom of France. Theſe he ordered to be elegantly tranſcribed and richly illuminated; and he placed them in a tower of the Louvre, from thence called *La Tour de la Libraire*. The whole conſiſted of 900 volumes. They were depoſited in three chambers; which, on this occaſion were wainſcotted with Iriſh oak, and cieled with cypreſs curiouſly carved. The windows were of painted glaſs, fenced with iron bars and copper wire. The Engliſh became maſters of Paris in the year 1425; on which event the duke of Bedford, regent of France, ſent the whole library, then conſiſting of only 853 volumes, and valued at 2223 livres, into England; where perhaps they became the ground-work of Duke Humphrey's library, juſt mentioned. Even ſo late as the year 1471, when Louis XI. of France borrowed the works of the Arabian phyſician Rhaſis from the faculty of medicine at Paris, he not only depoſited, by way of pledge, a quantity of valuable plate, but was obliged to procure a nobleman to join with him as ſurety in a deed, by which he bound himſelf to return it under a conſiderable forfeiture. The exceſſive prices of books in the middle ages afford numerous and curious proofs. I will mention a few only. In the year 1174, Walter, prior of St Swithin's at Winchſter, afterwards elected abbot of Weſtminſter, a writer in Latin of the lives of the biſhops who were his patrons, purchaſed of the monks of Dorcheſter in Oxfordſhire, Bede's Homilies and St Auſtin's Pſalter, for twelve meaſures of barley, and a pall on which was embroidered in ſilver the hiſtory of St Birinus converting a Saxon king. Among the royal manuſcripts in the Britiſh muſeum there is Comeſtor's Scholaſtic Hiſtory in French; which as it is recorded in a blank page at the beginning, was taken from the king of France at the battle of Poitiers; and being purchaſed by William Montague earl of Saliſbury for 100 marcs, was ordered to be ſold by the laſt will of his counteſs Elizabeth for 40 livres. About the year 1400, a copy of John of Meun's *Roman de la Roze* was ſold before the palace gate at Paris for 40 crowns, or 33l. 6s. 6d. Books.

Books, burning of, was a kind of puniſhment much in uſe among the Romans, by legal ſentence: ſometimes the care of the execution was committed to *triumviri* appointed on purpoſe; ſometimes to the prætors, and ſometimes to the ædiles. Labienus, whom from his ſatirical ſpirit ſome have called *Rabienus*, is ſaid to have been the firſt who underwent the ſeverity of it. His enemies procured a *ſenatuſconſultum*, whereby all his books publiſhed during ſeven years were ordered to be collected and burnt. "The thing (ſays Seneca) then appeared new and ſtrange, to take revenge on learning!" *Res nova et inſueta! ſupplicium de ſtudiis ſumi.* Caſſius Servius, a friend of Labienus, hearing the ſentence pronounced, cried aloud, "That they muſt burn him too, ſince he had got all the books by heart:"

Nunc

Book ‖ Everlaſting Book.

Nunc me vivum uri oportet, quia illos didici. Labienus could not ſurvive his books, but ſhutting himſelf up in the tomb of his anceſtors, pined away, and was buried alive. Divers other ancient teſtimonies concerning the burning of books are given in Reimm. *Idea Syſt. Antiq. Liter.* p. 389.

Book is alſo uſed for a part or diviſion of a volume or large work. In this ſenſe we ſay, the *book of Geneſis*, the *firſt book of Kings*, the *five books of Moſes*, &c. The Digeſt is contained in fifty books, the Code in twelve books.

Books are uſually ſubdivided into chapters, ſometimes into ſections or paragraphs: accurate writers quote chapter and book.

Everlaſting Book.—We find in Signior Caſtaquo's account of the aſbeſtus, a ſcheme for the making of a book, which, from its imperiſhable nature, he is for calling the *book of eternity*. The leaves of this book were to be of the aſbeſtus paper, the covers of a thicker ſort of work of the ſame matter, and the whole ſewed with thread ſpun from the ſame ſubſtance. The things to be commemorated in this book were to be written in letters of gold; ſo that the whole matter of the book being incombuſtible, and everlaſtingly permanent againſt the force of all the elements, and ſubject to no changes from fire, water, or air, muſt remain for ever, and always preſerve the writing committed to it. He carried this project ſo far towards execution, as to find a way of making a ſort of paper from the aſbeſtus, which was ſo tractable and ſoft, that it very well reſembled a thin parchment; this, by the ſame proceſs, was capable of being thickened or thinned at pleaſure, and in either ſtate equally reſiſted the fire. The covering of the thinneſt kind of this paper with fire, only makes it red hot and very clear, the fire ſeeming to paſs through it without waſting or altering any part of it. Copper, iron, or any other metal except gold or ſilver, expoſed to the ſame degree of fire in the ſame thin plates, would be found not to bear it in this manner, but to ſcale, and burn into ſcoriæ at the ſurface, which this ſtone does not.

Everlaſting Book.

END OF THE THIRD VOLUME.

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